USDA
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Natural Resources Conservation Service

FINAL SUPPLEMENTAL WATERSHED PLAN AND ENVIRONMENTAL ASSESSMENT FOR THE LOWER GUNNISON PROJECT

United States Department of Agriculture
Natural Resources Conservation Service

In Cooperation With
Colorado River Water Conservation District
Bureau of Reclamation
Bureau of Land Management

October 2024

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Final Supplemental Watershed Plan and Environmental Assessment for the Lower Gunnison Project

Colorado

Lead Agency: U.S. Department of Agriculture, Natural Resources Conservation Service, Colorado (USDA-NRCS)

Cooperating Agencies: U.S. Department of the Interior**,** Bureau of Reclamation (Reclamation) and U.S. Department of the Interior**,** Bureau of Land Management (BLM) Note: Cooperating agencies are signatories on the Memorandum of Agreement (MOA) regarding compliance with Section 106 of the National Historic Preservation Act (NHPA)

Sponsoring Local Organization (SLO): Colorado River Water Conservation District (River District)

Authority: This Supplemental Watershed Plan and Environmental Assessment (Supplemental Plan-EA) has been prepared under the authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law [P.L.] 83-566), authorized by Subtitle I of Title XII of the Food Security Act of 1985 (1985 Act), as amended by Section 2401 of the Agricultural Act of 2014 (2014 Act). This Supplemental Plan-EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, P.L. 91-190, as amended (42 U.S. Code [U.S.C.] 43221 et seq.).

Abstract:

This Supplemental Plan-EA for the Lower Gunnison Project will improve Agricultural Water Management in two of four subwatersheds included in a Watershed Management Plan and Environmental Assessment for the Lower Gunnison Project, completed in 2018 (2018 Plan-EA; NRCS 2018). The subwatersheds are irrigated with water from the Lower Gunnison River, defined as the reach from Morrow Point Dam to the confluence with the Colorado River, and its tributaries. This Supplemental Plan-EA includes specific additional measures that will be implemented in the North Fork and Crawford subwatersheds to increase water efficiency and reduce the contribution of salts and selenium to the Lower Gunnison River, and subsequently to the Colorado River.

The project will include modernization of infrastructure and construction of automated regulation structures. The project installation cost is estimated to be $13,226,650, of which $3,068,500 will be paid by the SLO and other funding sources. The estimated amount to be paid through USDA-NRCS P.L. 83-566 funds is $10,158,200. This Supplemental Plan-EA is intended to fulfill NEPA requirements and to be considered for authorization of P.L. 83-566 funding.

Comments: USDA-NRCS has completed this Final Supplemental Plan-EA in accordance with NEPA and USDA-NRCS guidelines and standards. Reviewers have provided comments to USDA-NRCS during the allotted Draft Supplemental Plan-EA review period: May 24 through June 24, 2024.

To submit questions about this Supplemental Plan-EA, please contact:

NRCS Colorado State Office
Denver Federal Center Building 56, Room 2604
Attention: Blongshia Cha
P.O. Box 25486 DFC
Denver, Colorado 80225

Or e-mail to blongshia.cha@usda.gov

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LOWER GUNNISON RIVER BASIN WATERSHED

Supplemental Watershed Plan Agreement No. 1
between the
Colorado River Water Conservation District
(Referred to herein as the sponsor)
and the
Natural Resources Conservation Service,
U.S. Department of Agriculture
(Referred to herein as NRCS)

Whereas, the Watershed Plan Agreement for Lower Gunnison River Basin Watershed, State of Colorado, executed by the sponsor named therein and NRCS, became effective on the 12th day of December, 2017; and

Whereas, in order to carry out the watershed plan for said watershed, it has become necessary to modify said watershed agreement; and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, has been assigned by the Secretary of Agriculture to NRCS; and

Whereas, a Supplemental Watershed Plan which modifies the watershed plan dated April 17, 2018, for said watershed has been developed through the cooperative efforts of the sponsor and the NRCS;

Now, therefore, the Secretary of Agriculture through the NRCS and the sponsor hereby agree upon the following modifications and additions to the terms, conditions, and stipulations of said watershed agreement;

1. **Additional planned works of improvement within the North Fork subwatershed.** A regulating reservoir pond, four SCADA sites and a SCADA tower, and 13,800 feet of piping along the Fire Mountain Canal (FMC) is hereby added to planned works of improvement within the North Fork subwatershed.
2. **Additional planned works of improvement within the Crawford subwatershed.** Sixteen SCADA sites and a SCADA tower is hereby added to planned works of improvement within the Crawford subwatershed.
3. Paragraph number 1 is modified to read as follows:
   Term. The term of this agreement is for the installation period and evaluated life of the project is (**52** years) and does not commit NRCS to assistance of any kind beyond the end of the evaluated life.
4. Paragraph number 3 is modified to read as follows:
   Real property. The sponsor will provide assurance that subrecipients or any landowner with who it contracts has acquired or has legal access to such real property as will be needed in connection with the works of improvement. These assurances will include the subrecipients or landowners agreement to obtain needed land as well as required Federal, State, and local permits, easements, or rights of way. The amounts and percentages of the real property acquisition costs to be borne by the sponsor are as shown in the Cost-share table in item 5 hereof. The sponsor agrees that all land acquired for measures, other than land treatment practices, with financial or credit assistance under this agreement will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the development in accordance with the Operation and Maintenance Agreement.

5. The following paragraph is added as follows:
Uniform Relocation Assistance and Real Property Acquisition Policies Act. The sponsor hereby agrees to provide assurance that any subrecipient with who it contracts agrees to comply with all the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. Section 4601 et seq. as further implemented through regulations in 49 CFR Part 24 and 7 CFR Part 21) when acquiring real property interests for this federally assisted project. If the subrecipients are legally unable to comply with the real property acquisition requirements the, sponsor agrees that, before any Federal financial assistance is furnished, the subrecipient will be required to provide a statement regarding its inability to legally comply, supported by an opinion of the chief legal officer of the state containing a full discussion of the facts and law involved. This statement may be accepted as constituting compliance.

6. Paragraph number 4 is supplemented to read as follows:
Cost-share for the Supplemental Watershed Work Plan. The following table shows cost-share percentages and amounts for Watershed Work Plan implementation. The costs shown in this plan are preliminary estimates for the Preferred Alternative (Alternative 3). Final costs to be borne by the parties hereto will be the actual costs incurred in the installation of works of improvement.

Cost-share Table for Watershed Operation or Rehabilitation Projects

Works of Improvement Cost-Shareable Items	NRCS		Sponsor		Total
	Percent	Cost	Percent	Cost	Cost
Construction					
3300 Road Regulating Reservoir	75%	$1,060,275	25%	$353,425	$1,413,700
Fire Mountain Canal (FMC) Piping (13,000 ft)	75%	$5,630,175	25%	$1,876,725	$7,506,900
FMC SCADA System	75%	$127,500	25%	$42,500	$170,000
Crawford SCADA System	75%	$1,239,675	25%	$413,225	$1,652,900
Subtotal: Cost-Sharable	**75%**	**$8,057,625**	**25%**	**$2,685,875**	**$10,743,500**
Non-Cost-Sharable Items[2]					
NRCS Technical Assistance/Engineering	100%	$1,279,800	0%	$0	$1,279,800
Project Administration (10% of construction costs)	N/A	$805,758	N/A	$268,588	$1,074,350
Environmental Permitting	0%	0	100%	$15,000	$15,000
Real Property Rights	0%	$0	100%	$114,000	$114,000
Relocation[1]	0%	$0	100%	$0	$0
Subtotal: Non-Cost-Share Costs		**$2,100,558**		**$382,588**	**$2,483,150**
Total:		**$10,158,188**		**$3,068,463**	**$13,226,650**

[1]Investigation of the watershed project area indicates that no displacements will be involved under present conditions However, in the event that displacement becomes necessary at a later date, the cost of relocation assistance and payments will be cost-shared in accordance with the percentages shown

[2]If actual non-cost-sharable item expenditures vary from these figures, the responsible party will bear the change

7. The following paragraph is added as follows:
Land treatment agreements. The sponsor- will obtain agreements from owners of not less than 50 percent of the land within the contributing drainage area above each multiple-purpose structure. These agreements must provide that the owners will carry out farm or ranch conservation plans on their land. The sponsor will ensure that 50 percent of the land within the contributing drainage area upstream of any retention reservoir site is adequately protected before construction of the dam. The sponsor will provide assistance to landowners and operators to ensure the installation of the land treatment measures shown in the watershed project plan. The sponsor will encourage landowners and

operators to continue to operate and maintain the land treatment measures after the long-term contracts expire, for the protection and improvement of the watershed.

8. The following paragraph is added as follows:
Floodplain Management. Before construction of any project for flood prevention, the sponsor must agree to participate in and comply with applicable Federal floodplain management and flood insurance programs. The sponsor is required to have development controls in place below low and significant hazard dams prior to NRCS or the sponsor entering into a construction contract.

9. Paragraph 13 is modified to read as follows:
Nondiscrimination Provisions.
In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident. Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

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   By signing this agreement, the recipient assures the Department of Agriculture that the program or activities provided for under this agreement will be conducted in compliance with all applicable Federal civil rights laws, rules, regulations, and policies.

10. Paragraphs 2, 5-12, and 14-19 of the Lower Gunnison River Basin Watershed Agreement dated 12/17/2017 remain and are not changed by this agreement. The project sponsor and NRCS further agree to all other terms, conditions, and stipulations of said watershed agreement not modified herein.

The Sponsors and NRCS further agree to all other terms, conditions, and stipulations of said watershed agreement not modified herein.

11. **Signatures.**

Colorado River District

The signing of this plan was authorized by a motion by the Colorado River Water Conservation District governing body and adopted at an official meeting held on

October 15, 2024 at Glenwood Springs, Colorado.

By: _____ Date: 10/23/24

Andrew A. Mueller , General Manager, Colorado River Water Conservation District

USDA-NATURAL RESOURCES CONSERVATION SERVICE

Approved by: Date: 11/4/24

Clinton Evans

Clinton Evans, State Conservationist
Natural Resources Conservation Service
Denver Federal Center
Building 56, Room 2400, PO Box 25426
Denver, CO 80225-0426

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Summary (OMB Factsheet)

Supplemental Watershed Plan and Environmental Assessment
for
The Lower Gunnison Project
Delta County, Colorado
Third Congressional District

Project Sponsor: Colorado River Water Conservation District

Authorization: Watershed Protection and Flood Prevention Act of 1954, as authorized by P.L. 83- 566 Stat. 666, as amended (16 U.S.C. 1001 et seq.)

Purpose and Need for Action:
The purpose of the proposed project measures in the Supplemental Lower Gunnison Project is to improve Agricultural Water Management by increasing overall irrigation efficiency in order to respond to the increased need for quality water supply in the Colorado River Basin. The proposed project measures will improve agricultural water use efficiency, improve water quality to improve soil health and fish and wildlife habitat and reduce system operational and maintenance burden.

Preferred Alternative (Alternative 3) Project Measures:

- Convert approximately 13,000 feet of the Fire Mountain Canal in the North Fork subwatershed from open earthen ditches to enclosed pipe to minimize off-farm delivery system losses;
- Install the 3300 Road Regulating Reservoir in the North Fork subwatershed to enable piping system maintenance, pressure regulation, and control; and
- Incorporate "smart" headgate diversion control structures and Supervisory Control and Data Acquisition (SCADA) systems in the two subwatersheds to better manage irrigation water supplies, including a SCADA tower site and four additional SCADA sites in the North Fork subwatershed to support the regulating reservoir and pipeline, and 16 SCADA systems and a repeater antenna on an existing tower in the Crawford subwatershed.

Resource Information

Subwatershed	12-Digit Hydrologic Unit Code	Latitude and Longitude	Subwatershed Size (acres)	Planning Area within the Subwatershed (acres)
North Fork	14020002	38.828968, -107.7011	**30,753**	**51.42**
Crawford	14020004	38.727522, -107.641647	**29,669**	**12.93**

Climate and Topography: The two subwatersheds of the project area lie mostly in the sedimentary basins, benchlands, and shale salt-shrub deserts of the Colorado Plateaus Ecoregion (Chapman et al. 2006) and drain from the sedimentary mid-elevation woodlands and shrublands of the foothills of the Southern Rocky Mountains (Appendix B – Figures 1 through 3). The area is characterized by relatively warm and dry summers, cold winters without persistent snowpack, and less than approximately 15 inches of precipitation annually. The elevation of the project area ranges from about 5,800 to 6,600 feet above sea level.

In the Crawford subwatershed, the project area is characterized by gently sloping agricultural fields on the east side of Crawford Mesa and along the Smith Fork (**Appendix B**, **Figure 3**). In the North Fork subwatershed, proposed projects along the Fire Mountain Canal are located on dissected mesas between Barrow Mesa and Horse Park, overlooking Leroux Creek.

Watershed Size (acres): The total watershed size is 60,422 acres in two distinct subwatersheds (North Fork and Crawford); of this total, 21,494 acres are irrigated.

Land Uses (acres): The primary land uses across the two subwatersheds are comprised of: 35,630 acres classified as Agriculture; 1,299 acres classified as Residential/Other Development; 3,823 acres classified as Grasslands; and 19,671 acres classified as Forested.

Land Ownership—Private (%), State-Local (%) Federal (%) Land ownership across the two subwatersheds are:

Private 86% (52,145 acres)
State-Local 1% (758 acres)
Federal 13% (7,519 acres)

Population and Demographics: Project measures are proposed to occur in Delta County, Colorado. Delta County has experienced population declines (4 percent) from 2010 to 2015. The population of the state of Colorado has grown by 8 percent from 2010 to 2015 (U.S. Census Bureau [USCB] 2015). The project area contains a greater percentage of persons identifying as non-Hispanic or Latino than the state average. Unemployment is higher in Delta County than the state average and income is below the average for the state of Colorado. Delta County has higher levels of poverty than the state. (None of these criteria reach the 10 percent% threshold for Environmental Justice.)

Resource Concerns Identified Through Scoping: Resource concerns discussed in scoping comments include salinity, selenium, and climate change. Agency concerns were also provided, including water, vegetation such as wetlands, special status species and invasive species, wildlife, cultural resources, visual resources, and socioeconomics.

Alternatives

Alternative Plans Considered: Three alternatives are analyzed in full in this Supplemental Plan-EA: the No Action Alternative (Alternative 1), and two reasonable action alternatives: Alternative 2, and Alternative 3 (Preferred Alternative).

Components of Each Alternative: Alternative 2 and Alternative 3 would include implementing water efficiency upgrades, specifically conversion of open segments of the Fire Mountain Canal to enclosed pipe; installing a regulating reservoir in the North Fork subwatershed; and incorporating "smart" headgate diversion control structures and SCADA systems in the two subwatersheds. In these alternatives, the regulating reservoir varies as well as the length of piping and location of SCADA sites. The No Action Alternative assumes that no project measures described in this Supplemental Plan-EA would occur.

Mitigation Measures: For the known project measures, NRCS would not require habitat replacement for the loss of artificial wetland and riparian habitat wetlands created by irrigation infrastructure. Thus, the statutory funding for projects performed under this Supplemental Plan-EA would not require habitat replacement. The long-term loss of artificial local wetland and riparian habitat resulting from canal and ditch conversions would be offset by gains in water quality and habitat function in the project area's natural riverine systems. Adverse impacts on one historic canal would result from either of the action alternatives, and acceptable treatment for the adverse effects has been determined and agreed upon by all consulting parties in the MOA (Appendix E). Other minimization measures are included in Chapter 7.

Project Costs	**P.L. 83-566 Funds**		**Other Funds**		**Total**	
Construction	$8,057,625	75%	$2,685,875	25%	$10,743,500	100%
Engineering	$1,279,800	100%			$1,279,800	100%
Relocation	$0		$0		$0	
Real Property Rights		0%	$114,000	100%	$114,000	
Environmental Permits	$0	100%	$15,000	0%	$15,000	
Project Administration	$805,758	100%	$268,588	100%	$1,074,350	N/A
TOTAL COSTS	$10,143,188		$3,083,463		$13,226,650	

Real Property Rights: U.S. Army Corps of Engineers (USACE), Reclamation, and BLM permitting will be required and is included in real property rights costs. In addition, for Alternative 3, private land or easement acquisition would be required for the regulating reservoir location included in this alternative.

TOTAL COSTS: $13,226,650

Project Benefits: For the Lower Gunnison Project, the action alternatives include optimization techniques for irrigation water conveyance, canal piping, and SCADA systems installation. Benefits include: improved water quality downstream of the watershed and reduction of annual salinity damages, reduced operations and maintenance (O&M) expenditures in the North Fork and Crawford subwatersheds, and saving substantial amounts of water that are currently lost to leakage, seepage, and structural losses, thereby reducing agricultural damages in the watershed. The water conservation resulting from the North Fork subwatershed project measures can be used to irrigate the primary crops grown with water delivered by the Fire Mountain Canal: orchards, grapes, and grass hay.

Number of Direct Beneficiaries (On-site – Off-site): In the two subwatersheds project area, it is estimated by the project sponsor that there may be up to approximately 300 producers for the Crawford subwatershed and 488 for the North Fork subwatershed who directly benefit from the project.

Other Beneficial Effects in Physical Terms: Long-term minor to major beneficial impacts on agricultural water availability, water quality, soil quality, and fish and wildlife habitat would result from implementation of either action alternative.

Benefit to Cost Ratio: 1.8.

Net Beneficial Effects (NED):
The benefit categories calculated for the Preferred Alternative
(Alternative 3) are:
Reduced Agricultural Damages: $636,006
Reduced salinity and selenium mitigation costs: $186,698
O&M Savings: $52,972
Total Benefit, Average Annual: $875,676

Funding Schedule (Budget Year + 5): 2024 to 2029 for federal funds and non-federal funds.

Year	**1**	**2**	**3**	**4**	**5**
Federal Funds	$914,237	$9,243,950	-	-	-
Other Funds	$92,054	$2,976,409	-	-	-

Period of Analysis: 52 years.

Project Life: 50 years.

Environmental Effects: The Preferred Alternative would be planned, designed, and installed to have a long-term net beneficial effect on resources in the project area—specifically water quality and quantity for agricultural production. Construction activities would result in short-term minor adverse effects on soil, vegetation, and wildlife resources. Approximately 27.5 total acres of soil and associated vegetation communities would be disturbed during construction. These impacts would be short-term, minor, and adverse during construction activities. Long-term moderate beneficial impacts on soil resources would occur from reduction of erosion and sedimentation issues associated with the current irrigation systems. Water impacts would be long-term, major, and beneficial. Implementation of the project measures would result in an estimated 1,007 tons/year of salinity reduction, 15 pounds/year of selenium reduction, and 826 acre-feet/year of water seepage prevention. Long-term moderate beneficial impacts on wetlands, riparian habitat, and fish habitat would occur from improvements in water quality. The project would result in adverse impacts on historic properties; specifically, one historic canal (Fire Mountain Canal); these impacts would be mitigated. Acceptable treatment for the adverse effects has been determined and agreed upon by all consulting parties, including tribes, Reclamation, and BLM. A MOA has been signed and is available in Appendix E. With implementation of compliance and Best Management Practices, impacts on other environmental or social resources would be minor to negligible.
Major Conclusions: Major beneficial impacts on water quality by reduced selenium and salinity loading would be realized by the project as described immediately above.
Areas of Controversy/Controversial Issues: There are no areas of controversy or controversial issues.
Issues to be Resolved: Not applicable.
Evidence of Unusual Congressional or Local Interest: There appears to be wide support for this initiative.
Is this Report in Compliance with Executive Orders, Public Laws, and Other Statutes Governing the Formulation of Water Resource Projects? Yes ✓ No____

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Changes Requiring Preparation of a Supplement

In 2017 and 2018, the NRCS completed the initial Lower Gunnison Watershed Plan-EA (NRCS 2018) for the Lower Gunnison Watershed to assess and disclose the potential impacts of the Lower Gunnison Project, which is intended to comprehensively improve water use efficiency by coordinating, expanding, and integrating off-farm irrigation conveyance systems and on-farm application efficiency improvements in a scalable way in the Lower Gunnison River Basin. The 2018 Plan-EA evaluated four subwatershed areas or focus areas, and a specific set of projects, referred to as "Batch 1."

The purpose and need for this Supplemental Plan-EA is to supplement the analysis contained in the 2018 Plan-EA by assessing and disclosing the environmental impacts resulting from specific additional project measures (referred to as "Batch 2") that are planned in the North Fork and Crawford subwatersheds and were not included in the original analysis.

Introduction

Background

The USDA-NRCS and River District are engaged in complementary and compatible activities related to providing financial and technical assistance to agricultural and forest producers through provisions of the Watershed Protection and Flood Prevention Act. Partnership activities include efforts to encourage conservation of natural resources through technical and financial assistance that may be provided by both parties to this Supplemental Plan-EA.

The initial 2018 Plan-EA was funded under the Watershed Protection and Flood Prevention Act (P.L. 83-566) (NRCS 2018). The Supplemental Watershed Plan EA is requesting funding under the authority of the Watershed Protection and Flood Prevention Act; these project measures are eligible as they are located in the Colorado River Basin Critical Conservation Area (CCA). CCAs are designated by the Secretary of Agriculture and represent an opportunity for many stakeholders to come together at a regional level to address common natural resource goals while maintaining or improving agricultural productivity. NRCS's overall goal for the Colorado River Basin CCA is to improve water quality and quantity in the Colorado River Basin by addressing water quality degradation, insufficient water, soil quality degradation, and inadequate habitat for fish and wildlife (NRCS 2017d).

This Supplemental Plan-EA has been prepared by the NRCS which as the lead federal agency is responsible for review and issuance of a decision in accordance with the National Environmental Policy Act (NEPA) This Supplemental Plan-EA has been prepared in accordance with applicable Council on Environmental Quality regulations implementing NEPA at 40 Code of Federal Regulations (CFR) 1500–1508, USDA's NEPA regulations (7 CFR Part 650), NRCS Title 190 General Manual Part 410, and the NRCS National Environmental Compliance Handbook Title 190 Part 610 (May 2016). This Supplemental Plan-EA also meets the guidelines of the NRCS National Watershed Program Manual (NWPM), Part 500 (NRCS 2015) and the NRCS National Watershed Program Handbook, Part 600 (NRCS 2014b).

This Supplemental Plan-EA serves to fulfill the NEPA and NRCS environmental review requirements of the Proposed Action, as described in **Section 4.3.1**. Should any project component of the Proposed Action deviate from its description in **Section 4.3.1**, a project component-specific Environmental

Evaluation (EE) will need to be completed and documented on a NRCS CPA-52 worksheet. Any future NRCS funding obligated to the project sponsor for the Lower Gunnison Project will undergo its own independent NEPA review. However, that NEPA review may be tiered from this Supplemental Plan-EA or the 2018 Plan-EA.

Reclamation, the BLM, and the River District (as the SLO) are cooperating agencies on this Supplemental Plan-EA. Reclamation owns lands and facilities in the project area and is responsible for permitting, contracting, and administrative duties related to federal irrigation projects. The River District is an eligible partner entity and meets NRCS statutory requirements to carry out activities specified in this agreement and work with eligible program participants to help implement conservation activities on eligible lands as defined in this Supplemental Plan-EA. This Supplemental Plan-EA also conforms with BLM and Reclamation planning considerations, including the Salinity Control Program, as administered by Reclamation and authorized by P.L. 98-569 and the Salinity Control Act, P.L. 93320 (Reclamation and U.S. Fish and Wildlife Service [USFWS] 2007).

Other organizations that are partners specific to this Supplemental EA-Plan include the Fire Mountain Canal and Reservoir Company, the North Fork Conservancy District, and the Crawford Water Conservancy District.

Project Overview

The Lower Gunnison Project is a large agricultural water efficiency project focused on the Gunnison River and its tributaries. The Lower Gunnison River Basin subwatersheds are generally defined as the Gunnison River and several of its significant tributaries below Morrow Point Dam to the confluence of the Colorado River near Grand Junction and includes portions of Montrose, Delta, and Gunnison Counties. The 2018 Plan-EA included four subwatersheds: Bostwick Park, Uncompahgre, North Fork, and Crawford (see **Figure I-1**) and the project as a whole addresses natural resource concerns by implementing a locally coordinated comprehensive strategy of maximizing agricultural water use efficiency through system-wide optimization techniques for irrigation water conveyance.

The project measures included in this supplemental Plan-EA include modernization of aging irrigation water delivery infrastructure through construction of an enclosed canal, construction of a water control facility, and installation of SCADA systems in the North Fork and Crawford subwatersheds. NRCS funding under the Watershed and Flood Prevention Operations Program (P.L. 83-566 Watershed Authority funding) would be applied to water management upgrades that address water quality degradation, insufficient water, soil quality degradation, or inadequate habitat for fish and wildlife in these two subwatersheds. The participating water conservancy districts and the water user association in each of the two subwatersheds are:

1) Fire Mountain Canal and Reservoir Company, near Paonia
2) North Fork Water Conservancy District, near Paonia and Hotchkiss
3) Crawford Water Conservancy District, near Crawford

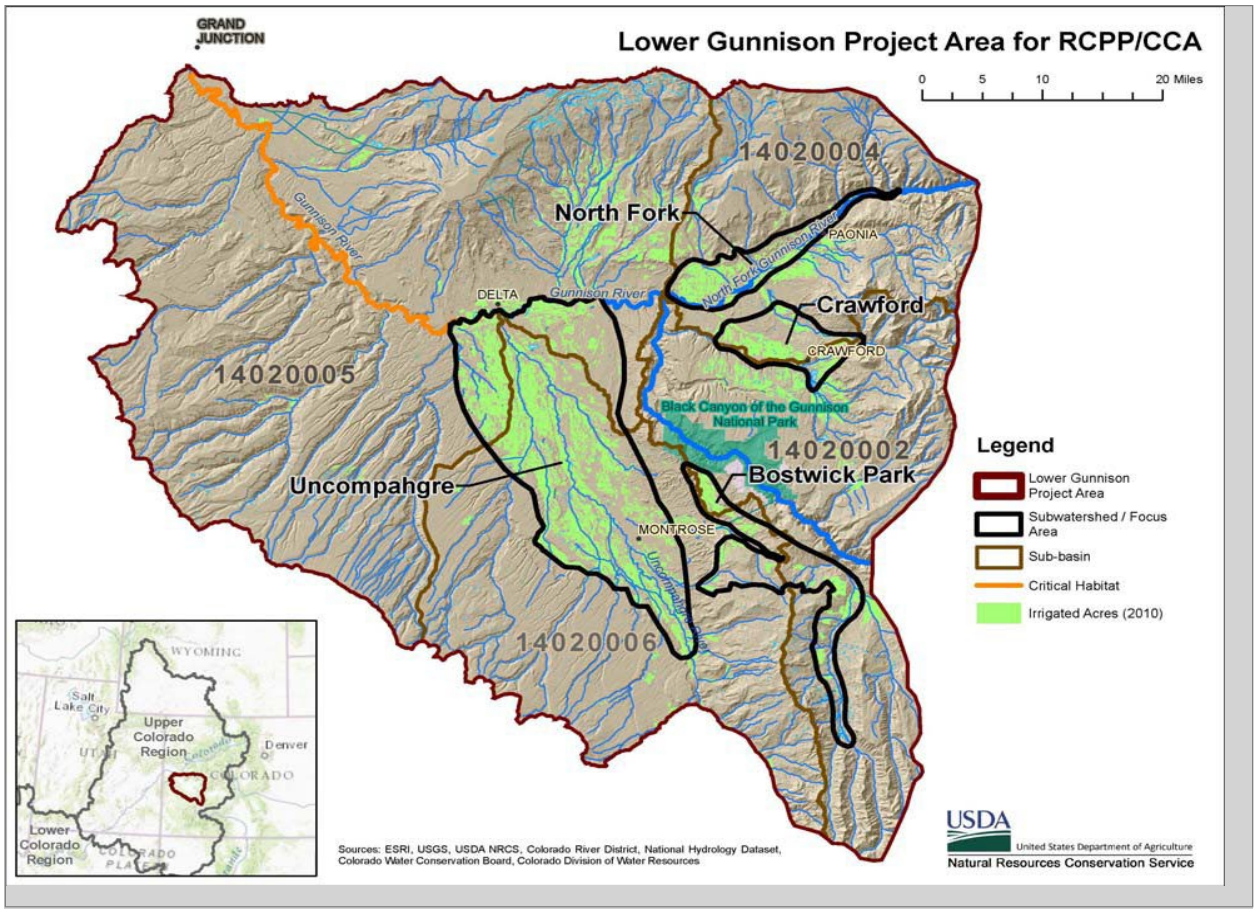

Figure I-1. Location of Project Area for Supplemental Plan-EA (Crawford and North Fork Subwatershed/Focus Areas Only).

The two subwatersheds were identified by the River District in collaboration with water users in the Lower Gunnison River Basin and meet the definition of a watershed as outlined in the NRCS's NWPM (NRCS 2015). To meet this definition, subwatersheds may be planned together if they are all a component of a larger watershed and do not exceed a combined total of 250,000 acres (NRCS 2015). The size of each of the two subwatersheds by county, and the amount of irrigated acreage in each of the two subwatersheds that make up the project area, are summarized below in **Table I-1.**

Table I-1. Size of Subwatersheds (in acres) by County.

Subwatershed	Delta County	Gunnison County	Montrose County	Total Size of Subwatershed	Total Amount of Irrigated Land in Subwatershed[1]
North Fork	30,443	310	—	30,753	12,220
Crawford	29,639	—	29	29,669	9,274
Total	***60,082***	***310***	***29***	***60,422***	***21,494***

[1.] Colorado Decision Support System (CDSS) 2015.

Baseline water quality data in the Lower Gunnison River Basin have been collected as part of the Lower Gunnison River Basin Water Quality Monitoring effort (River District 2015) for more than 30 years due to concerns identified under the Clean Water Act (CWA) and Endangered Species Act (ESA). The Lower Gunnison River Basin Water Quality Monitoring effort collects data at both short-

term/reconnaissance and long-term trend monitoring sites throughout the basin. This includes tributary sites and those on the mainstem of the Gunnison River that serve as critical habitat to several federally endangered fish species. The long-term trend monitoring site for the Gunnison River is located at Whitewater, Colorado, upstream of where the Gunnison River joins the Colorado River near Grand Junction. This site is also the compliance point for the Gunnison Basin Selenium Management Program (Salinity Control Program 2020), which is the conservation measure being implemented by Gunnison River Basin water users and Reclamation under the Aspinall Unit Re-Operations Record of Decision (ROD) for the benefit of aquatic endangered fish species. This site will serve as the single evaluation point for the Lower Gunnison Project as it integrates the beneficial impacts associated with the upstream project improvements.

Chapter 1. Purpose and Need for Action

1.1 Purpose of the Project

The purpose of the proposed project measures in the Supplemental Lower Gunnison Project (project) is to improve Agricultural Water Management by increasing overall irrigation efficiency in order to respond to the increased need for quality water supply in the Colorado River Basin. The proposed project measures will:

- Improve agricultural water use efficiency;
- Reduce system operational and maintenance burden; and
- Improve water quality to improve soil and fish and wildlife habitat.

The project will address one of the eight purposes listed in Title 390, NWPM, Part 500, Subpart A, Section 500.3. Agricultural Water Management (Purpose 5) will be addressed through modernizing infrastructure, piping open canals, and constructing automated regulation structures to conserve and improve water quality.

The project directly addresses multiple CCA resource concerns in the Colorado River Basin, including:

- Water Quality Degradation: Excessive salts (and selenium) in surface waters and groundwaters;
- Insufficient Water: Inefficient use of irrigation water; and
- Soil Quality Degradation: Concentration of salts and other chemicals.

The project would help irrigators use water more efficiently and reduce the amount of salts and selenium carried in the Colorado River and its tributaries. The Supplemental Lower Gunnison Project would stabilize water delivery systems and indirectly boost water use efficiency through improvements in the way water is delivered to crops (River District 2015; Reclamation 2016). Agricultural benefits, including rural communities, is more than 20 percent of the total benefits for the project.

An overall goal of the Lower Gunnison Project, of which this current Supplemental Plan-EA is a part, is to improve water quality and comply with Colorado Water Quality Standards, the Colorado River Basin Salinity Control Act, and the Gunnison Basin Selenium Management Program by reducing selenium and salt loading by piping irrigation laterals or canals and installing high-efficiency irrigation systems to eliminate seepage and deep percolation into saline shale-derived soils (River District 2015). Facilitation of replacement of flood irrigation systems with closed pipe and sprinkler systems greatly reduces water loss to seepage and evaporation. Water use efficiency also minimizes impacts (decreasing losses due to drought or inadequate water) for growers and enhances aquatic habitat by increasing flows and improving water quality. Improving soil health directly benefits/improves nutrient and water holding capacity of the soil, thereby improving efficiency, and reducing deep percolation (River District 2015).

1.2 Need for the Project

The waters of the Lower Gunnison River Basin flow into the Colorado River, which provides water to more than 40 million people, delivers water to Mexico pursuant to a 1944 Treaty, and irrigates more than 5.5 million acres of land (Reclamation 2012). Demand for water is expected to increase as the population in the Colorado River Basin increases. High selenium and salinity concentrations in the Colorado River Basin, including the Lower Gunnison River Basin, reduces the quality of water available to users. Both naturally occurring contaminants (salt and selenium) and contaminants from human activities such as agriculture and mining, in addition to evaporation from reservoirs and open canals, contribute to higher levels of salinity. Increased salinity reduces crop yields and reduces the value of the rivers as habitat for wildlife and threatened and endangered species. Dissolved selenium concentrations in water from the Gunnison River near Grand Junction from 1975 to 2016 ranged from 1 to 25 micrograms per liter (µg/L) (Mayo and Leib 2012). Dissolved solids concentrations in water from the Gunnison River near Grand Junction from 1965 to 2016 ranged from 179 to 2,750 milligram per liter (mg/L), and dissolved solids loads ranged from 329 to 23,534 tons per day (tons/d).

The Colorado River Basin Salinity Control Act of 1974 (P.L. 93-320) directed the Department of the Interior to establish salinity control programs to enhance and protect the quality of water in the Colorado River available for use in the United States and Mexico. In 1995, amendments to the act (P.L. 104-20) created the Basin Salinity Control Program, administered by Reclamation, and in 2008, P.L. 110-246 established the Basin States Program for salinity control activities. Under these regulations, the NRCS and Reclamation solicit new projects to reduce salt levels, evaluate applications for cost effectiveness, and award cost-share grants to landowners, water rights holders, ditch companies, and irrigation districts to construct salinity control projects.

Much of the selenium reduction accomplished in the Lower Gunnison River Basin to date is a result of salinity control projects completed by programs such as the Colorado River Basin Salinity Control Program. Canal piping projects have been prioritized to a certain extent where irrigation occurs on soils derived from the Mancos Shale in the Lower Gunnison River watershed, and serve to address multiple purposes of water conservation, water quality, and salinity and selenium reduction. The River District has provided water resource planners with the ability to target areas with high potential for increasing irrigation system efficiencies, while at the same time reducing deep percolation associated with selenium and salinity mobilization (River District 2010). Subwatersheds have been prioritized by the River District by 12-digit hydrologic unit code (HUC-12) for high salinity and selenium potential in the Lower Gunnison River Basin (River District 2010).

The Proposed Action (Alternative 3) involves an integrated approach to increasing efficiency of agricultural water use. The project would take steps to reduce seepage and deep percolation of agricultural waters and decrease associated salt and selenium loading and water loss by converting approximately 13,800 feet of open earthen canal to enclosed pipe and incorporating “smart” headgate diversion control structures and SCADA systems. Implementation of the project measures would result in an estimated 948 to 1,007 tons per year (tons/yr) of salinity reduction (Applegate Group, Inc. 2019), 14.2 to 15 pounds per year (lbs/yr) of selenium reduction, and 779 to 826 acre-feet (AF) per year (AF/yr) of water seepage prevention (please see Table 4-4 and Section 5.2.2.2 for more information).

1.3 Problems and Opportunities

1.3.1 Problems

As described above, increasing salinity and selenium concentrations in the Colorado River Basin, including the Lower Gunnison River Basin, reduces the quality of water available to users. Demand for water is expected to increase as the population in the Colorado River Basin increases. Naturally occurring contaminants (salt and selenium), contaminants from human activities such as agriculture and mining, and evaporation from reservoirs contribute to higher levels of salinity. Increased salinity reduces crop yields and reduces the value of the rivers as habitat for wildlife and threatened and endangered species.

Another problem in the Colorado River Basin is the inefficiency of flood irrigation systems. These systems use more water because water is lost to seepage and evaporation, and irrigation tailwater is created. Reclamation's 2016 SECURE Water Act Report (Reclamation 2016) identifies the upcoming challenges that the Colorado River Basin could likely face. Average temperatures in the Colorado River Basin are projected to increase by 5 to 6 degrees Fahrenheit (°F) during the twenty-first century, with slightly greater increases projected in the Upper Colorado River Basin. Additional potential problems in the Colorado River Basin include:

- Spring and early summer runoff reductions could translate into less water supply for meeting irrigation demands and adversely impact hydropower operations at reservoirs.
- Warming could also lead to significant reservoir evaporation, increased agricultural water demands, and increased losses during water conveyance and irrigation.
- Growing demands in the Colorado River system, coupled with the potential for reduced supplies due to climate change, may put water users and resources relying on the Colorado River at risk of prolonged water shortages in the future.

1.3.2 Opportunities

In 2017, the River District proposed an integrated approach to increasing efficiency of agricultural water use as the Lower Gunnison Project. The project took steps to reduce seepage and deep percolation of agricultural waters, decrease associated salt and selenium loading and water loss, better manage river diversions for farm use, decrease agricultural losses, and improve flows and riparian habitat. Additional projects proposed under this Supplemental Plan-EA will continue to meet these opportunities. This supplement to the Lower Gunnison Project proposes three types of improvements:

- Off-farm: conversion of open canals (see **Photograph 1.3-1**) to enclosed piped systems;
- Near-farm: addition of storage ponds and controls to regulate water delivery together with conversion of open laterals to piped systems; and
- Addition of "smart" headgate diversion control structures (see **Photograph 1.3-2**) and SCADA systems to better integrate irrigation systems.

SCADA systems are computer systems that gather and analyze real time data. SCADA systems improve operation efficiency through remote monitoring and control and can minimize unnecessary

over delivery or loss of water due to management spills and create additional available water supplies to extend the growing season or to respond to other resource needs (River District 2015).

The Lower Gunnison Project would also assist agricultural producers in the area with complying with the Selenium Management Program, a conservation measure that is described in the Gunnison Basin Programmatic Biological Opinion (USFWS 2009) and is required as part of the reoperation of Reclamation's Aspinall Unit. The Aspinall Unit of the Colorado River Storage Project is a federally owned reservoir system that controls a significant portion of the water resources in the Lower Gunnison River Basin.

Credit: River District

Photo 1.3-1. Typical unlined irrigation canal with vegetation supported by seepage.

Credit: Colorado River District

Photo 1.3-2. SCADA system component example.

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Chapter 2. Scope of the Supplemental Plan-EA

This Supplemental Plan-EA is scoped to analyze the No Action Alternative and two action alternatives and includes direct effects of the action itself as well as indirect actions, cumulative actions, and any connected actions. Alternative actions that were considered, but eliminated at a later time, are described in Chapter 4 (**Section 4.2**). Resources considered and analyzed, and justification for inclusion or exclusion of the resource for analysis, are listed in **Section 2.2**. The scoping process followed the general procedures contained in the NRCS National Watershed Program Handbook (NRCS 2014) and the NRCS NWPM (NRCS 2015). Both NRCS procedures and NEPA regulations (40 Code of Federal Regulations [CFR] 1500–1508) require that the NRCS use a scoping process early in the planning process to identify issues, concerns, and potential impacts that require detailed analysis.

The Supplemental Watershed Plan-EA Project (project) selection for Batch 2 was cooperatively developed by the SLO over a 9- to 12-month period using a project prioritization and selection process that included input meetings with more than 30 interested partners. During discussions with stakeholders, they identified their needs for the project as: (1) address constraints and challenges of infrastructure management and improvement by local ditch companies; and (2) address aging infrastructure, safety, and water and labor efficiency issues. Related to conservation and ecological protection, objectives include: (1) improve habitat conditions in downstream waters to benefit aquatic and riparian species by improving water quality; and (2) improve habitat conditions with water efficiency, thereby providing opportunities for increasing water quantity.

A call for projects was sent to River District stakeholders and submitted projects were considered for inclusion in this Supplemental Plan-EA. The project development process identified:

- Areas in the Lower Gunnison River Basin watershed where CCA natural resource concerns exist, including water quality degradation (e.g., selenium and salinity), wildlife habitat degradation, and soil health degradation;
- Willing and able partners that met the statutory definition of an eligible entity to receive P.L. 566 Watershed Authority funding;
- Highest priority irrigation improvement projects that addressed at least two or more of the CCA natural resource concerns;
- Highest priority delivery system projects that enabled on-farm irrigation system efficiency improvements that also address natural resource concerns; and
- Highest priority planning and implementation projects that increased the ability of partners to implement system improvements to address agricultural and natural resource improvements in the future.

The North Fork Irrigation Management Plan (J-U-B Engineers 2017) provides additional local planning context, and identifies the following conclusions and recommendations that are relevant to this project:

- Aging infrastructure associated with irrigation diversions and conveyance infrastructure could benefit from a small-scale water control structure grant program; and
- Support conveyance efficiency improvements that reduce salinity inflows, particularly the North Fork community and piping of open irrigation canals.

In addition, maintenance costs with aging infrastructure and manual measuring devices that require "boots on the ground" to document flows were identified as benefits of SCADA projects that are a priority for water management. Piping requires other infrastructure for supply regulation and sediment management, which were considered during the project selection process.

2.1 Agency, Tribal, and Public Outreach

2.1.1 Scoping Phase

Federal, state, and local agencies and representatives, as well as area nongovernmental organizations (NGOs), received an invitation to the scoping phase of this Supplemental Plan-EA once a list of potential project measures were developed. Advertisements announcing the scoping period and associated scoping meeting were also placed in local newspapers. The 30-day scoping period for this project began on June 16, 2020 and closed on July 15, 2020.

Tribal consultation was conducted in accordance with the National Historic Preservation Act (NHPA) of 1966 and Executive Order (EO) 13175, *Consultation and Coordination with Indian Tribal Governments* to maintain the NRCS's government-to-government relationship between native villages and tribes via a letter to three Indian tribes. On June 30, 2020, an email was sent to the Ute Indian Tribe-Uintah & Ouray Reservation, the Ute Mountain Ute Tribe, and the Southern Ute Indian Tribe notifying them of the scoping process and inviting input. Due to the Ute Mountain Ute Tribe's interest in consultation during the planning phase of the 2018 Plan-EA, a courtesy follow-up phone call to confirm receipt of the email was placed to Mr. Terry Knight, Tribal Historic Preservation Officer with the Ute Mountain Ute Tribe. No comments or responses regarding the project have been received from the tribes as of June 24, 2024 (the end of the public and agency comment period for the Draft Supplemental Plan-EA).

2.1.1.1 Scoping Meeting

A scoping meeting was held on Monday, June 15, 2020 at the Maloney House/Delta Fairgrounds at 575 River Lane in Hotchkiss, Colorado from 6:00 to 8:00 p.m. Due to social distance guidance from Delta County, the initial hour of the meeting was broadcast via Zoom and conference call, and participants were invited to pre-register for the meeting by email. A presentation was given by ERO Resources Corporation (ERO) and River District staff from 6:00 to 7:00 p.m. to describe the need for the project, the purpose and components of the project, the NRCS and Supplemental Plan-EA process, how to get involved, and potential environmental concerns. A question and answer session was held from 7:00 to 8:00 p.m. The meeting was attended by 5 people in person and 16 people via webinar, excluding contractor and project representative staff. Discussions and questions following the presentation at the scoping meeting were related to these topics:

- The structure of potential federal funding programs and interaction among federal agencies (specifically including Reclamation and NRCS) with regard to funding, regulatory approvals, and permits;
- Existing Lower Gunnison Project watershed area limits and how those limits were determined;
- Constraints and challenges of infrastructure management and improvement by local ditch companies; and
- Aging infrastructure and safety and efficiency issues.

2.1.1.2 Scoping Comments

During the scoping phase, four comments regarding the Supplemental Plan-EA were received. These comments were received from one individual and three agencies (BLM, U.S. Forest Service [USFS], and Colorado Parks and Wildlife [CPW]). Comments included these items:

- Request from an individual to consider the effects of potential loss of recreation access for reservoirs, if applicable;
- Request from BLM to obtain maps of project measures;
- Request from CPW to review the Draft Supplemental Plan-EA; and
- The USFS commented that numerous reservoirs on USFS lands may receive or need periodic maintenance that may tie to NRCS's projects and could affect, help, or hinder downstream efforts. Many reservoirs have water users that may also qualify for federal funding; reservoirs on USFS lands are often associated with ditches and other infrastructure on private land in the project area. Examples of ongoing salinity control projects were provided, including the Pilot Rock Ditch project and the Sweezy-Turner Ditch/Lone Cabin Ditch and Reservoir project.

2.1.1.3 Determination of Supplemental Plan-EA Project Measures

The scoping period also functioned as an outreach period to solicit irrigation infrastructure improvement projects from the Lower Gunnison River watershed, to potentially include as components in this Supplemental Plan-EA. This period was initiated on June 16, 2020 and extended until August 28, 2020.

In total, 24 potential projects were evaluated for suitability within the scope of this Supplemental Plan-EA. Projects were prioritized according to their location (within the boundaries of the watershed), design and potential funding status, and timeframe. After evaluation, the following projects were identified to be suitable based on their planning status and prioritized for inclusion in this Supplemental Plan-EA:

- North Fork subwatershed: Fire Mountain Canal (FMC) Piping Extension.
- North Fork subwatershed: two alternatives for a regulating reservoir on the FMC, Coal Road Regulating Reservoir, and 3300 Road Regulating Reservoir.
- North Fork subwatershed: Expanded SCADA Network (Coal Road Repeater tower and four additional SCADA system installations).
- Crawford subwatershed: 17 total sites for improved measurement and expanded monitoring/SCADA network in the Crawford Water Conservation District. Note: Of the 17 sites, 9 are around the town of Crawford, 1 would be co-located on an existing tower (KREX at Young's Peak), and 7 would be installed along the Aspen Canal.

2.1.2 Draft Supplemental Plan-EA Public Review Phase

A meeting to discuss the Draft Supplemental Plan-EA was held on Monday, June 11, 2024 at the Maloney House/Delta Fairgrounds at 575 River Lane in Hotchkiss, Colorado from 6:00 to 8:00 p.m. A link for virtual participation was provided, and participants were invited to pre-register for the meeting by email. A presentation was given by ERO Resources Corporation (ERO) and River District staff from 6:00 to 6:45 p.m. to describe the need for the project, the purpose and components of the project, the NRCS and Supplemental Plan-EA process, how to get involved, and potential environmental concerns. A question and answer session was held after the presentation. The meeting was attended by

10 people in person including contractor and project representative staff. Discussions and questions following the presentation at the meeting were related to next steps and timing for project implementation; specifically, funding, regulatory approvals, and permits. In addition, three agency comment correspondence documents were received. The responses to agency comments, as well as sign-in sheets and the legal notice for the meeting, can be found in **Appendix A**.

2.2 Identification of Resource Concerns

Based on the input received during the scoping phase for the 2018 Plan-EA and for this Supplemental Plan-EA, several resource concerns were identified. **Table 2-1** provides a summary of resource concerns and their relevancy to the Proposed Action. Resource items determined to not be relevant have been eliminated from detailed study, and those resources determined to be relevant have been carried forward for analysis.

Table 2-1. Summary of Resource Concerns.

Resource	Analyzed in 2018 Plan-EA?	Relevant to the Proposed Action?	Justification
SOILS			
Soil and Geologic Characteristics	X	X	Temporary and permanent impacts on soils could occur due to construction and installation of project measures. Geologic formations and soils in the subwatersheds support agricultural practices and contribute to elevated salinity and selenium concentrations in the subwatersheds.
Upland Erosion	X	X	Water use efficiency could reduce upland erosion of soils high in salt and selenium, which can contribute to increased water salinity.
Stream Bank Erosion	X	X	Stream bank erosion can contribute salt and selenium to river water.
Sedimentation	X	X	Sedimentation could increase temporarily during construction activities, and is discussed in the soils section (**Section 5.1**).
Prime and Unique Farmland	X	X	Prime and unique farmlands are present in the project area. Increased water use efficiency could have beneficial effects on these lands.
WATER			
Surface Water Quality	X	X	Construction activities could impact surface water quality due to erosion and sedimentation, while operation of the project could result in long-term beneficial effects by reducing salt and selenium loading in river water.
Hydrology	X	X	Reduced seepage and more efficient irrigation practices could affect hydrology.
Groundwater	X	X	Reduced seepage could affect groundwater quantity and quality.
Floodplain Management	X	X	Localized short-term adverse effects on floodplains could occur during construction activities.
Water Rights	X	X	The public may have concerns regarding water rights and how they may be impacted by potential reductions in water use due to increases in water use efficiency.
Wild and Scenic Rivers			No wild or scenic rivers exist in or directly adjacent to the project measures within the subwatersheds. Projects in the Crawford subwatershed would not impact a nearby Nationwide Rivers Inventory 14-mile stretch of the Gunnison River.
Coastal Zone Management Areas			No coastal zones occur in or near the subwatersheds.
AIR			
Air Quality	X	X	Implementation of the Lower Gunnison Project would include some air quality emissions from the proposed construction and maintenance activities.

Resource	Analyzed in 2018 Plan-EA?	Relevant to the Proposed Action?	Justification
VEGETATION			
Vegetation Communities and Habitat	X	X	Construction and operation of project measures could impact vegetation communities and habitat.
Wetlands and Riparian Areas	X	X	Construction and operation of project measures could impact wetlands and riparian areas.
Special Status Species	X	X	Potential impacts on special status species, threatened and endangered species, and BLM sensitive species.
Invasive Species	X	X	Existing seed and plant parts of noxious weeds and other invasive species could be spread during construction or could be carried into the project area on construction equipment and delivered to newly disturbed soils.
WILDLIFE			
Wildlife Communities	X	X	Construction and operation of project measures could impact wildlife.
Fish	X	X	Construction and operation of project measures could impact fish.
Coral Reefs			No coral reefs are present in or near the subwatersheds.
Essential Fish Habitat			No essential fish habitat is present in the subwatersheds.
Special Status Species	X	X	Construction and operation of project measures could impact special status species, including potential impacts on threatened and endangered species, migratory birds, bald and golden eagles, and BLM sensitive species.
HUMAN ENVIRONMENT			
Cultural and Historic Resources	X	X	Proposed construction activities could result in adverse effects on historic properties (36 CFR 800.6).
Environmental Justice			EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* requires all federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. No Environmental Justice populations are in the project area.
Land Use and Recreation	X	**X**	No land ownerships would change and no subdivision of public land would occur under the Proposed Action. Recreation resources are generally distant from the proposed project area. Impacts would be short-term (during construction) and minor or negligible. CPW coordination would occur for SCADA sites in Crawford State Park to minimize/avoid hunting impacts.
Scenic Beauty and Visual Resources	X	X	Impacts on visual resources could occur from construction and operation of project measures. The project measures are generally distant from public view or screened by vegetation.
Public Health and Safety			During construction, all applicable federal and state safety regulations would be followed by construction workers. No effects on public health and safety are anticipated from any of the proposed construction activities. Any high hazard dam alternatives would be designed to adequately address public health and safety concerns.
Socioeconomics	X	X	The proposed project involves an expenditure of public funds, and an evaluation of the effects of providing NRCS funding is included.
National Economic Development (NED)	X	X	NED is required by the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. An assessment of adding NRCS funding to the proposed project was completed to maximize the potential net benefits that could accrue in the planning area. The Principles Requirements, & Guidelines requirement has been waived.

Resource	Analyzed in 2018 Plan-EA?	Relevant to the Proposed Action?	Justification
OTHER CONCERNS (Identified in the 2018 Plan-EA by Cooperating Agencies or the Public) and the Current Supplemental Plan-EA			
Geologic Risks/ Minerals			No unique geologic features, minerals, or oil and gas resources in the project area would be impacted by the Proposed Action. Likewise, no risks from geologic hazards, such as faulting or slope instability, would affect the project.
Paleontology			The project would not impact any areas with a high potential for fossil yield, as indicated by BLM data.
Wilderness Areas and Characteristics			No designated wilderness, Wilderness Study Areas, or Areas of Critical Environmental Concern occur in or near the subwatersheds. Additionally, no areas with wilderness characteristics are found in or near the subwatersheds.
Lands and Realty		X	Under the Proposed Action, a right-of-way (ROW) from the BLM would be required for the Coal Road Regulating Reservoir. Coordination with Reclamation is in process for areas that overlap Reclamation-owned land. (No changes in land ownership or ROWs were associated with the project alternatives in 2018.)
Range Management	X		Project activities are not located in grazing allotments on public lands.
Noise			Proposed construction activities could temporarily increase the ambient noise level in the surrounding areas; however, all applicable federal, state, and local ordinances and regulations would be followed. As a result, noise impacts would be negligible.
Transportation/Access			The project alternatives would not have lasting impacts on transportation or access in the project area and would temporarily impact transportation/access along 3300 Road near the 3300 Road Regulating Reservoir during construction. The access road to this private property deadends near the proposed reservoir location. Piping activities would occur on the canal access road, which is not a public route. SCADA installation would not impact transportation. Transportation/access impacts would be negligible.
Wastes (Hazardous or Solid)			Construction activities associated with the action alternatives would generate construction debris waste, which would require proper disposal. Recycling or reuse of all discarded materials would be encouraged whenever possible. Any nonhazardous construction debris or other solid waste that could not be reused or recycled is anticipated to be disposed of by a contractor at a landfill. If portable restrooms are brought on-site for employee use during the construction period, they would be provided by a private contractor. Therefore, the impact of waste generated from the proposed project would be negligible and is not analyzed further in this Supplemental Plan-EA.
Climate Change	X	X	Anticipated increases in temperature and changes in river flow and other resources will be evaluated with respect to the action alternatives and the No Action Alternative under the respective water and biological resources sections.

Chapter 3. Affected Environment

3.1 Soils and Geology

Regional Geological Characteristics

The geology of the region is a complex mix of sedimentary formations, primarily including the Mancos Shale, Mesaverde, and Wasatch formations, which were uplifted by the tectonic forces associated with the creation of the Rocky Mountains and then interrupted by igneous materials (NRCS 1967).

The primary geologic formations in the Delta-Montrose area primarily include sedimentary rocks of Cretaceous age, such as the Burro Canyon, Dakota Sandstone, and Mancos Shale formations, and unconsolidated sediments of Quaternary age. The primary Lower Gunnison River Basin geological formation resulted when the region was inundated by a vast interior sea sometimes called the interior cretaceous seaway (U.S. Geological Survey [USGS] 2014).

Farmland Designations

The two subwatershed units encompassing the project area are well known for their contributions to state agriculture. The climate of the Colorado and Gunnison River Valleys include cold but calm winters, which are favorable for growing grapes, apples, peaches, pears, and apricots (Colorado Climate Center 2017).

The primary soil units underlying the subwatersheds for the project area were identified with NRCS soil mapping (NRCS 2017a). The soils in the project area are a mixture of non-prime farmland, prime farmland, farmland of local importance, farmland of statewide importance, and farmland of unique importance (NRCS 2017a, 2017b).

Prime Farmland. According to the USDA, prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. Within the prime farmland designation, soils can be further classified as:

- prime farmland if irrigated;
- prime farmland if irrigated and drained;
- prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season; and
- prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60.

Farmland of Local Importance. Land that is not identified as having national or statewide importance is considered “farmland of local importance” for the production of food, feed, fiber, forage, and oilseed crops. This land designation is definable by the appropriate local

agencies and may include tracts of land that have been designated for agriculture by local ordinance.

Farmland of Statewide Importance. Land that does not meet the criteria for prime and unique farmland is considered "farmland of statewide importance." This land includes areas of soils that nearly meet the requirements for prime farmland and, when managed correctly, will produce economically high yields of crops.

Farmland of Unique Importance. Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops such as citrus, tree nuts, olives, cranberries, fruits, and vegetables. This land has a combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the land to produce sustainable high yields of these crops under proper management.

Salinity and Selenium

Salinity and selenium are naturally occurring and prevalent in the Lower Gunnison River Basin, and are known to cause water quality impairments to streams and rivers downstream (Whittig et al. 1983; Selenium Management Program 2011). Salinity is generally defined as the concentration of dissolved mineral salts or dissolved solids in water.

Selenium is a naturally occurring trace nonmetal element, common in marine sedimentary rocks. Coal and organic-rich fine-grained sediments (e.g., claystone and shale) tend to have high selenium concentrations (Adriano 2001) and are also associated with volcanic input, such as bentonite claystones and shale containing volcanic ash (Kulp and Pratt 2004). The Mancos Shale formation contains high levels of selenium as a result of the unique conditions during the Cretaceous period and has been a large contributor to selenium loading of the Lower Gunnison River waterways (Whittig et al. 1983; Selenium Management Program 2011).

Selenium is an essential micronutrient for organisms, but at high concentrations it can be toxic. It bioaccumulates in aquatic food chains, and can cause deformities and reproductive issues in birds and fish (Lemly 2002). Complexes of selenium, including selenium in an oxidized state as selenite or selenate, can be soluble when complexed as a salt, and thus readily transported as dissolved ions by groundwater and surface water in the aquatic environment (USGS 2014). Due to this mobility, selenium transport is accelerated by irrigation practices. As groundwater and surface water move through selenium-rich soils, selenium oxidizes and can move through the watershed (Selenium Management Program 2011).

Similarly, when selenium-rich waters are stored in lakes or reservoirs, evaporation can greatly concentrate the element to high levels (Batzer and Baldwin 2012; Leib et al. 2012).

Farmers and ranchers in the Lower Gunnison River Basin in particular have flood irrigated for more than 100 years, which in this arid and saline environment has resulted in continual salt loading to the downstream Colorado River. The Gunnison River Basin annually contributes approximately 1.1 million tons of salinity to the Colorado River (Leib 2008). Unlined irrigation canals and laterals allow some irrigation water to seep into the ground. These irrigation canals have been identified as potential sources of seepage, which can contribute to salinity loading (Reclamation 1982). Salinity and selenium

concentrations can increase as water seeping through soils concentrates salts at the surface due to capillary action; subsequently, these salts can readily move to and through the aquatic ecosystem during flood irrigation and storm events (Moore 2011).

Erosion and Sedimentation

Soil erosion is a naturally occurring process that refers to the loss of topsoil by the forces of wind and water (NRCS 2017c). Soil compaction, low organic matter, loss of soil structure, poor internal drainage, salinization, and soil acidity are soil degradation issues that can accelerate the soil erosion process (NRCS 2011).

While erosion is a natural process, anthropogenic activities can accelerate soil erosion rates 10 to 40 times (National Research Council [NRC] 2010). Unsustainable agricultural practices, including overstocking and overgrazing, deep plowing, lack of crop rotation, monocropping, pesticide and herbicide applications, and planting across contour instead of along it, are the greatest contributors to the global increase in erosion rates (NRC 2010).

Studies on erosion suggest that increased precipitation and intensities associated with climate change will lead to greater rates of erosion (Goudie 2001).

Soil erosion is considered the leading cause of water pollution due to the effects of excess sedimentation. The sediments act as pollutants as well as being carriers for other pollutants such as excess nutrients, chemicals such as pesticides and herbicides, and heavy metals (Da Cunha 1991).

Streambank erosion can have a number of causes including geologic, climatic, vegetative, and hydraulic, which may work independently or in an interrelated manner (USDA 2017). However, direct anthropogenic activities such as channelization, confinement, or realignment, and denuding of riparian vegetation, are the major factors in streambank erosion (USDA 2017).

Water-induced soil erosion is a pervasive issue in irrigation ditches and canals and, consequently, increases sediment loading into waterways. Sedimentation in irrigation canals and ditches may cause issues with both water quantity and quality. Capacity losses in irrigation conveyance systems can be substantial, although a comprehensive study of capacity losses has not yet quantified these impacts (NRCS 1995).

3.1.1 North Fork

For more information on soils and geology, prime and unique farmland, salinity and selenium, and erosion and sedimentation in the North Fork subwatershed, see Section 3.1.1 of the 2018 Plan-EA (NRCS 2018).

3.1.2 Crawford

For more information on soils and geology, prime and unique farmland, salinity and selenium, and erosion and sedimentation in the Crawford subwatershed, see Section 3.1.2 of the 2018 Plan-EA (NRCS 2018).

3.2 Water

The Gunnison River is a major tributary to the Colorado River, with headwaters in the Rocky Mountains. It joins the Colorado River at Grand Junction, flowing onward through Utah, Arizona, California, and then on to Mexico and the Gulf of California. In the 1960s, concerns regarding high dissolved solids concentrations (salinity) in water of the Colorado River crossing into Mexico resulted in a 1973 amendment (Minute 242) to the 1944 Water Treaty between the United States and Mexico (DeMarsay 1991); this was followed by the Colorado River Basin Salinity Control Act of 1974 (P.L. 93-320) (Dregne 1975). The Salinity Control Act was promulgated to reduce salinity concentrations in the Colorado River Basin, as written in Title II, Sec. 202(2): *"The Secretary is authorized to construct, operate, and maintain measures and all necessary appurtenant and associated works to reduce the seepage of irrigation water from irrigated lands … into the groundwater and thence into the Colorado River. Measures shall include lining of canals and laterals, and the combining of existing canals and laterals into fewer and more efficient facilities."* Numerous canal piping projects have been undertaken to reduce salinity in the Colorado River Basin (Reclamation 2017a).

Hydrology and Water Quality

An overall goal of the Lower Gunnison Project is to improve water quality downstream of the watershed by complying with Colorado Water Quality Standards, the Colorado River Basin Salinity Control Act and the Gunnison Basin Selenium Management Program to reduce salt and selenium loading by piping irrigation laterals or canals and installing high-efficiency irrigation systems to eliminate seepage and deep percolation into saline shale-derived soils that predominate in the study area (River District 2015).

Salinity and selenium are naturally occurring and prevalent in the Lower Gunnison River Basin and are known to cause water quality impairments to streams and rivers downstream (Whittig et al. 1983; Selenium Management Program 2011). Salinity is generally defined as the concentration of dissolved mineral salts or dissolved solids in water. Selenium is an essential micronutrient for organisms, but at high concentrations it can be toxic. It bioaccumulates in aquatic food chains and can cause deformities and reproductive issues in birds and fish (Lemly 2002). Complexes of selenium, including selenium in an oxidized state as selenite or selenate, can be soluble when complexed as a salt, and thus readily transported as dissolved ions by groundwater and surface water in the aquatic environment (USGS 2014). Due to this mobility, selenium transport is accelerated by irrigation practices (Selenium Management Program 2011; Batzer and Baldwin 2012; Leib et al. 2012).

The damages caused by salinity in the Colorado River system are a major concern in both the United States and Mexico. As of 2014, annual salinity damages were estimated to be about $382 million per year. The Gunnison River Basin annually contributes approximately 1.1 million tons of salinity to the Colorado River (Leib 2008). Irrigation practices and irrigation infrastructure in the North Fork and Crawford sub-watersheds contribute to the salt export from the Gunnison River Watershed. Estimates suggest that the North Fork sub-watershed contributes up to eight percent of the Gunnison River Basin's annual salt exports (Reclamation 2006) and the Crawford sub-watershed has been noted for its Mancos Shale mud fans, which also contribute to high salinity loading downstream (WSE/WSCC 2016; Richards et al. 2014).

To reduce the downstream damages of nutrient and mineral transport, several federal programs have been created. NRCS began implementing salinity control projects in the Lower Gunnison Basin in 1988, including piping or lining irrigation ditches and small laterals and improving the on-farm irrigation systems, to reduce downstream damages. Later, the Selenium Management Program (USGS 2014) was designed to reduce selenium concentrations throughout the Lower Gunnison River Basin and to address three primary objectives: (1) achieve compliance with the state of Colorado aquatic-life standard for dissolved selenium of 4.6 µg/L in the Gunnison River at Whitewater, Colorado; (2) reduce selenium concentrations to improve water quality conditions to assist in the recovery of listed fish species in the Gunnison and Colorado Rivers (primarily Colorado pikeminnow and razorback sucker in critical habitat from Delta to Whitewater, Colorado); and (3) support continued water uses in the basin (USGS 2014).

Water draining from irrigation projects in the Upper Colorado River Basin, particularly irrigation projects on Cretaceous-age shale, have been shown to contribute high salinity (dissolved solids) and selenium concentrations to the river system (Seiler et al. 2003; Engberg 1996; Naftz 1996; Butler 1996; Butler et al. 1996). These and other studies resulted in a nationwide effort by the National Irrigation Water Quality Program (NIWQP) to determine sources of selenium in federal irrigation projects (Seiler et al. 2003; Engberg 1999). With information linking selenium to irrigation on Cretaceous shales such as the Mancos Shale, NIWQP was tasked with determining how to remediate selenium in the Upper Colorado River Basin (Reclamation 2017b). Through data collection and collaboration, it was realized that salinity control projects serve the purposes of conserving water, controlling salinity, and controlling selenium in irrigation drainage in the Upper Colorado River Basin (Mayo and Leib 2012). Trends of decreasing salinity and selenium concentrations and loads in the Gunnison and Colorado Rivers have been documented by the USGS (Butler 1996; Butler and Leib 2002; Mayo and Leib 2012; Schaffrath 2012), and have been documented more recently in Reclamation's Quality of Water, Colorado River Basin (Progress Report No. 25; Reclamation 2017c). The decreasing trends are likely related to investment in agricultural efficiency projects that decrease deep percolation, contributing to reductions in salt and selenium loads (Leib and Bauch 2008; Mayo and Leib 2012). Urban development and recreation (e.g., golf courses) also contribute selenium and salinity to the watershed; therefore, some of the gains achieved in reducing agricultural loads may be offset by increased selenium and salinity loads due to urbanization (Moore 2011).

Where irrigation occurs on the Mancos Shale, distribution of dissolved selenium in groundwater of the North Fork is affected by the aqueous geochemical environment of the shallow groundwater systems that consist of alluvium and shale residuum. The highest selenium concentrations can occur in wells completed in alluvium overlying Mancos Shale, and the lowest concentrations can be in terrace deposits receiving irrigation recharge (Wright and Butler 1993). Groundwater in shale residuum can have low or high selenium concentrations, depending on the oxidation-reduction conditions and the presence of dissolved nitrate (Wright 1999).

Selenium concentrations increase as water is concentrated by evaporation but may decrease if freshwater is available to dilute contaminants (Engberg 1996; Seiler et al. 2003). The evaporation index (EI) is an indicator of aridity that is calculated by dividing the annual free-water-surface evaporation by the annual precipitation. An EI value greater than 2.5 indicates arid to semiarid climatic conditions. The NIWQP established guidelines for where Cretaceous shales occur in the western

United States and where EI values are greater than 2.5, and selenium concentrations might be of concern in irrigation water (Seiler et al. 2003). NIWQP identified the Lower Gunnison River Basin as an area with high susceptibility for selenium contamination and an EI greater than 2.5. In the upper Crawford and North Fork watersheds, the EI values range from 2.5 to 4.5 (**Appendix C, Figure 3.2-1**). The Selenium Management Program (USGS 2014) was designed to reduce selenium concentrations throughout the Lower Gunnison River Basin and to address three primary objectives: (1) achieve compliance with the state of Colorado aquatic-life standard for dissolved selenium of 4.6 micrograms per liter (µg/L) in the Gunnison River at Whitewater, Colorado; (2) reduce selenium concentrations to improve water quality conditions to assist in the recovery of listed fish species in the Gunnison and Colorado Rivers (primarily Colorado pikeminnow and razorback sucker in critical habitat from Delta to Whitewater, Colorado); and (3) support continued water uses in the basin (USGS 2014). Colorado water quality standards have been established by the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Commission (CDPHE 2016a). As noted above, the chronic (long-term exposure) selenium standard for aquatic life is 4.6 µg/L, while the acute (short-term exposure) standard for dissolved selenium is 18.4 µg/L (CDPHE 2016a). While there are no enforceable U.S. standards for salinity or dissolved solids, the U.S. Environmental Protection Agency (USEPA) secondary drinking water standard for total dissolved solids is 500 mg/L (USEPA 2017), and the recommended agricultural standard to prevent high salinity hazard is an electrical conductivity (EC) of 1,000 microSiemens per centimeter (µS/cm) (U.S. Salinity Laboratory 1954). In addition, the Salinity Control Act and Plan of Implementation specifies that salinity must not exceed 879 mg/L at Imperial Dam (Pillsbury 1981).

The overall water quality conditions and watershed health of the Lower Gunnison River Basin can be measured at the USGS streamflow gaging station on the Gunnison River near Grand Junction (site number 09152500). Dissolved selenium concentrations in water from the Gunnison River near Grand Junction from 1975 to 2016 ranged from 1 to 25 µg/L (Mayo and Leib 2012; Reclamation 2017c). Elevated selenium concentrations contribute to degraded water quality conditions for listed fish species in the Colorado River Basin (Seiler et al. 2003; USFWS 2009). Dissolved solids concentrations in water from the Gunnison River near Grand Junction from 1965 to 2016 ranged from 179 to 2,750 mg/L, and dissolved solids loads ranged from 329 to 23,534 tons/d).

Much of the selenium reduction accomplished in the Lower Gunnison River Basin is a result of salinity control projects completed by programs such as the Colorado River Basin Salinity Control Program. A study conducted by the USGS in Montrose Arroyo (in the neighboring Uncompahgre subwatershed) determined that piping and replacement of earthen-lined canals can have direct and immediate water quality benefits in terms of selenium and salinity reductions (Butler 2001).

As noted previously, the North Fork sub-watershed is estimated to contribute up to eight percent of the Gunnison River Basin's annual salt exports (Reclamation 2006) and the Crawford sub-watershed has been noted for its Mancos Shale mud fans, which also contribute to high salinity loading downstream (WSE/WSCC 2016; Richards et al. 2014). Canal piping projects have been prioritized to a certain extent where irrigation occurs on soils derived from the Mancos Shale in the greater Lower Gunnison project area (**Appendix C, Figure 3.2-2**). The FMC extends through areas of Mancos Shale in the North Fork subwatershed. New measures in both sub-watersheds compliment other BOR-funded projects.

Subwatersheds have been prioritized by the River District by HUC-12 for high salinity and selenium potential in the lower Gunnison River Basin (River District 2010) as shown on **Figures 3.2-3** and **3.2-4** in **Appendix C**. Although the FMC piping project area is not in a high selenium/salinity priority area, the project measures occur in areas with Mancos Shale and in drainage basins that are on the Colorado 303(d) list for water quality impairment (**Appendix C**, **Figure 3.2-5**). Implementation of measures to improve endangered species habitat and water quality, according to the USFWS Programmatic Biological Opinion (USFWS 2009), are required to be evaluated at multiple points throughout the Gunnison River watershed, including the Gunnison River at Delta, Colorado (USGS 09144250) and at the outlet for the watershed of the Gunnison River near Grand Junction, Colorado (USGS 09152500). After its confluence with the Colorado River at Grand Junction, the Gunnison River flows into Utah where the selenium water quality standard is 4.6 µg/L and the proposed Total Maximum Daily Load (TMDL) goal is 49 pounds per day (lbs/d) (Utah Department of Environmental Quality 2014).

The Gunnison River at Delta streamflow gaging station is upstream from the confluence with the Uncompahgre River and, therefore, represents a measure of watershed activities between the Gunnison Gorge and Delta (Figure 3.2-5 in Appendix E of the 2018 Plan-EA (NRCS 2018)). Figure 3.2-6 in Appendix E of the 2018 Plan-EA (NRCS 2018) presents these datasets for the Gunnison River near Grand Junction. As shown on the figures, daily average streamflow discharges for the Gunnison River at Delta from 1976 to 2016 ranged from 268 to 13,520 cubic feet per second (ft^3/sec). Daily average streamflow discharge for the Gunnison River near Grand Junction from 1935 to 2016 ranged from 80 to 22,500 ft^3/sec. Dissolved selenium concentrations in water from the Gunnison River at Delta from 1987 to 2016 ranged from 0.5 to 13 µg/L, while dissolved selenium loads (concentration multiplied by discharge and a 0.0053978 conversion factor) ranged from 5.8 to 119 lbs/d. In comparison, dissolved selenium concentrations in water from the Gunnison River near Grand Junction from 1975 to 2016 ranged from 1 to 25 µg/L, and dissolved selenium loads ranged from 15 to 187 lbs/d. Concentrations of dissolved solids in water from the Gunnison River at Delta from 1976 to 2016 ranged from 49 to 1,507 mg/L, and dissolved solids loads ranged from 56 to 1,635 tons/d. In comparison, dissolved solids concentrations in water from the Gunnison River near Grand Junction from 1965 to 2016 ranged from 179 to 2,750 mg/L, and dissolved solids loads ranged from 329 to 23,534 tons/d. While these minimum and maximum values indicate differences between the two sites, and that salinity and selenium loads enter the river from tributaries between Delta and Grand Junction, about 93 percent of the salinity and selenium enter the Lower Gunnison River from upper basin areas, including the Uncompahgre subwatershed (CDPHE 2011).

Floodplains

Flood hazard areas are categorized by the Federal Emergency Management Agency (FEMA) and identified on Flood Insurance Rate Maps. Special flood hazard areas are defined as areas that have a 1 percent or greater chance of being inundated by a flood event in any given year. The 1 percent annual chance flood is also referred to as the base flood or 100-year flood (FEMA 2017). The 100-year floodplain for the North Fork and Crawford Watersheds are shown on **Figures 3.2-6** and **3.2-7**, respectively, in **Appendix C**.

Water Rights

According to Colorado water law, a water user has the right to use the waters of the state, and the rights are based on the prior appropriation system where *"first in time, first in right"* is the deciding factor for a water right (WaterInfo.org 2017). Agricultural irrigation accounts for 92 percent of all water diverted in Colorado and 95 percent of all water actually consumed (Browning and Bushong 1992). Agricultural water rights are legally assigned a point of diversion, a flow rate or water quantity, and a ranking of priority from the most senior rights (earliest date) to the more recent or junior rights. Many irrigation diversions (e.g., a headgate on a stream) can be assigned to an individual or private user; however, many of the water rights and irrigation diversions are assigned to special irrigation districts, and many of the irrigation districts include federally constructed irrigation systems.

In 1973, the Colorado legislature recognized the need to "correlate the activities of mankind with some reasonable preservation of the natural environment" and passed Senate Bill 97 creating the State's Instream Flow Program. This program, one of the first of its kind, vested the Colorado Water Conservation Board (CWCB) with exclusive authority to create and enforce minimum flow rates for the purposes of protecting the environment to a reasonable degree, protecting streamflow through a reach of stream rather than at just a single point, and protecting water levels in natural lakes (CWCB 2017).

3.2.1 North Fork

For more information on the hydrology and water quality, groundwater, floodplains, and water rights in the North Fork subwatershed, see Section 3.2.1 of the 2018 Plan-EA (NRCS 2018).

3.2.2 Crawford

For more information on the hydrology and water quality, groundwater, floodplains, and water rights in the Crawford subwatershed, see Section 3.2.2 of the 2018 Plan-EA (NRCS 2018).

3.3 Air Quality

The National Ambient Air Quality Standards (NAAQS) established by the USEPA under the Clean Air Act specify limits for criteria air pollutants. Criteria pollutants include carbon monoxide, particulate matter, ozone, sulfur dioxide, lead, and nitrogen. If the levels of a criteria pollutant in an area are higher than the NAAQS, the airshed is designated as a nonattainment area. Areas that meet the NAAQS for criteria pollutants are designated as attainment areas.

Review of USEPA air quality data indicates that the entire project area, which includes portions of Delta, Gunnison, Montrose, and Ouray Counties, is in attainment for all criteria pollutants (USEPA 2016a).

3.4 Vegetation

3.4.1 Vegetation Communities and Habitat

The two subwatersheds of the project area lie mostly in the sedimentary basins, benchlands, and shale salt-shrub deserts of the Colorado Plateaus Ecoregion, transitioning or reaching into the sedimentary

mid-elevation woodlands and shrublands of the Southern Rockies Ecoregion foothills to the east in the North Fork and Crawford subwatersheds (**Appendix C**, **Figure 3.4-1**).

In the project area vicinity, the Colorado Plateaus Ecoregion (Chapman et al. 2006) is characterized by relatively warm and dry summers, cold winters without persistent snowpack, and less than approximately 15 inches of precipitation annually. Soils derived from the Mancos Shale formation support irrigated croplands and semidesert salt-tolerant shrublands in the broad river valleys and low terraces of the Gunnison and North Fork Gunnison Rivers. On surrounding higher benchlands, bench breaks, and low foothills, the vegetation communities of sagebrush shrublands, pinyon-juniper woodlands, and mixed montane shrublands thrive on steeper, rockier soils. Many basin and benchland transition areas in the region contain sparsely vegetated, distinctive Mancos Shale badlands or "adobe hills." The riparian corridors of perennial streams typically feature cottonwood woodlands and forests with seminative understories containing significant components of invasive herbaceous and shrub species.

The Southern Rockies Ecoregion in the project area vicinity is characterized by a temperate semiarid climate of moderately warm summers and cold winters with persistent snowpack. Precipitation at the lower elevation is about 15 inches annually, whereas in the high mountains annual precipitation can exceed 40 inches. High-elevation snowpack provides a critical water source for the valleys in the project area's subwatersheds, where streams with headwaters in the Southern Rockies are diverted for agricultural irrigation. From the lower elevations of this ecoregion, mixed montane shrublands and pinyon-juniper woodlands on steep slopes grade into higher elevation montane and subalpine conifer and aspen woodlands and forests with interstitial meadows and parks. In some areas, rock outcrops and steep canyons interface with the high desert country of the Colorado Plateaus to the west. Soils are derived from sedimentary (Tertiary and Cretaceous) limestone, siltstone, shale, and sandstone (Chapman et al. 2006). The riparian corridors of perennial streams typically feature cottonwood or mixed cottonwood-conifer communities at lower elevations, conifer-aspen associations at mid- to subalpine elevations, and wet meadows and willow carrs in the alpine zone.

In the landscape context, the interface of the Colorado Plateaus and Southern Rockies ecoregions provides important habitat and range for big game and a variety of other wildlife species, both common and rare (Section 3.5 of the 2018 Plan-EA; NRCS 2018). In the local context, the climate and soil properties of the shale lowlands of the project area provide conditions that support several rare and endemic plant species found nowhere else in the world (see Special Status Species, Section 3.4.3 of the 2018 Plan-EA; NRCS 2018). Vegetation communities, in combination with geological formations and soil types, elevation, water resources, and landforms, can be significant predictors of the presence of rare plants and wildlife species.

The National Land Cover Dataset (NLCD), a 30-meter resolution (landscape scale) raster coverage created by satellite imagery interpretation, was used to characterize the spatial distribution of vegetation communities across the project area (USGS 2011). The NLCD identifies a total of 41 land cover classes across the subwatersheds of the project area. To improve the utility of the NLCD for display and discussion purposes on the programmatic scale, geographic information systems (GIS) software was used to consolidate the NLCD land cover classes into 10 vegetation communities based on similarity and habitat relevance. **Table 3-1** lists the vegetation communities in the North Fork and

Crawford subwatersheds. **Figures 3.4-2** and **3.4-3** in **Appendix C** depict the spatial distribution of vegetation communities in each of the two subwatersheds. See the 2018 Plan-EA (NRCS 2018) for descriptions of each vegetation community.

Note that the resolution of the NLCD limits its capability for mapping small, patchy, or discontinuous narrow linear vegetation features such as rocky outcrops or certain wetlands and riparian areas. Section 3.4.2 of the 2018 Plan-EA (NRCS 2018) describes the wetlands and riparian areas by subwatershed using other higher-resolution datasets.

Table 3-1. Vegetation Communities Expressed by Total Project Area and by Subwatershed.

Vegetation Community	Percent of the Project Area (Two Subwatersheds Combined)[1]	Percent of Subwatershed	
		North Fork	Crawford
Irrigated Agricultural Land	48.3%	56.2%	40.4%
Semi-Desert Shrubland	13.9%	8.1%	19.6%
Pinyon-Juniper Woodland	21.5%	19.9%	23.1%
Sagebrush Shrubland	6.8%	3.1%	10.5%
Mixed Montane Shrubland	1.8%	0.7%	2.8%
Developed and Disturbed Land	1.8%	3.2%	0.3%
Riparian Woodland or Forest	5.1%	7.9%	2.2%
Montane or Subalpine Woodlands or Forest	0.1%	0.1%	<0.1%
Open Water and Emergent Wetland	0.7%	0.4%	0.9%
Bedrock and Cliff	0.3%	0.4%	0.2%
Total	**100%**	**100%**	**100%**

[1.] Rounding error from rounding up to one decimal point.

3.4.1.1 North Fork

The SCADA system would be located above FMC in pinyon-juniper woodlands in the west part of the subwatershed north of Rogers Mesa in the area of Leroux Creek. The SCADA site would occupy an approximately 200-square-foot upland area in pinyon-juniper woodlands. Access would be along an existing 10-foot-wide all-terrain vehicle (ATV) access road branching off of the existing canal access road and new access road. The new portion of the access road, conduit, enclosures, SCADA tower and systems, and access would be located in pinyon-juniper woodlands. The project piping project is in existing ditch easements, with access along existing roads.

Staging would be within the construction corridor or in irrigated meadows or previously disturbed ground along the corridor. The canal supports a sparse wetland fringe. Disturbed lands and existing roads surround the canal.

The Coal Road Regulating Reservoir (Alternative 2) would be located in a low-lying wetland swale dominated by cattail and Baltic rush, with pinyon-juniper woodlands on the fringes. The 3300 Road Regulating Reservoir (Alternative 3) would be located on private land in undeveloped rangelands, scrub vegetation, and irrigated pasture.

3.4.1.2 Crawford

All measures in the Crawford subwatershed would be placed in existing disturbance zones; no new vegetation impacts would result from these measures.

3.4.2 Wetlands and Riparian Areas

The two subwatersheds in the project area contain numerous aquatic resources, including wetlands, seeps, springs, lakes, ponds, and ephemeral, intermittent, and perennial streams, as well as riparian areas.

Wetland definitions vary by government agency, but the USACE administers and enforces Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the CWA. Many water bodies and wetlands are waters of the United States and are subject to the USACE's regulatory authority.

Section 404 of the CWA defines wetlands as "those areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 U.S.C. 1251-1387).

NRCS defines wetlands as "land that has:

- A predominance of hydric soils;
- Is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and
- Under normal circumstances supports a prevalence of such vegetation" (16 U.S.C. 3801(a)(27)).

Reclamation defines a wetland as "An area characterized by periodic inundation or saturation, hydric soils, and vegetation adapted for life in saturated soil conditions. Any number of tidal and nontidal areas characterized by saturated or nearly saturated soils most of the year that form an interface between terrestrial and aquatic environments; including freshwater marshes around ponds and channels, and brackish and salt marshes" (Reclamation 2015).

BLM defines wetlands as "areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support and which, under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions" (BLM 1992).

Riparian areas occur as narrow bands within the flood zones of rivers, on islands, sand or cobble bars, and along streambanks. They can also form along major canals or ditches. Each federal agency has a unique definition of a riparian area, as shown in **Table 3-2**.

Table 3-2. Agency Riparian Definitions.

Agency	Riparian Definition
USEPA	Riparian areas are defined as transition areas between terrestrial and aquatic ecosystems (USEPA 2020).
NRCS	Riparian areas are ecotones that occur along water courses or water bodies. They are distinctly different from the surrounding lands because of unique soil and vegetation characteristics that are strongly influenced by free or unbound water in the soil. Riparian ecotones occupy the transitional area between the terrestrial and aquatic ecosystems. Typical examples would include perennial and intermittent stream banks, floodplains, and lake shores (NRCS 2010a).
BLM	Riparian areas are a form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are typical riparian areas (BLM 1992).
Reclamation	Living on or adjacent to a water supply such as a riverbank, lake, or pond. Of, on, or pertaining to the bank of a river, pond, or lake (Reclamation 2015).

Wetlands and riparian areas play a principal role in the ecology of a watershed, such as water storage, water filtration, and biological productivity (USEPA 2016b). The combination of shallow water, high levels of nutrients, and primary productivity is ideal for the development of organisms that form the base of the food web and feed many species of fish, amphibians, and insects (CNHP 2013). Approximately 48 percent of the CPW Tier 1 (priority) vertebrate species depend on wetland and aquatic habitats. In a recent analysis of the state's biodiversity, 41 percent of at-risk vertebrate species were wetland and aquatic dependent (Rondeau et al. 2011).

Freshwater emergent wetlands commonly occur in poorly drained areas such as low-lying depressions. Emergent wetlands in the subwatersheds are commonly dominated by cattails, giant reeds, spike rushes, bulrushes, sedges, and rushes. Precipitation, shallow groundwater, and irrigation return flows are the primary water sources. Riverine wetlands, another common aquatic resource type in the project area, typically support riparian areas adjacent to perennial or intermittent streams and are sustained by surface water and shallow groundwater or overbank flooding during spring runoff or after monsoonal storm events. Freshwater forested/shrub wetlands are commonly dominated by Drummond's willow, coyote willow, thinleaf alder, and red-osier dogwood (Lyon and Williams 1998). Riparian areas at lower elevations typically contain an overstory of narrowleaf or Fremont's cottonwood and coyote willow or skunkbush sumac. With increasing elevation, the cottonwoods of riparian zones are replaced by aspen and Douglas fir. The scientific names of plants mentioned in the text are provided in **Table E-2** of **Appendix E**.

Wetlands and riparian areas are susceptible to land use activities that affect water quality or hydrologic regimes. In the following sections, wetlands and other aquatic resources found in the subwatersheds are summarized in accompanying tables according to landownership; information is based on existing National Wetland Inventory (NWI) data.

3.4.2.1 North Fork

Table 3-3 shows the wetland and other aquatic resource types in the North Fork subwatershed, which includes a total of 30,753 acres (**Appendix C**, **Figure 3.4-4**). Aquatic resources make up approximately 6.0 percent of the total acreage of the subwatershed, with wetlands (freshwater emergent and freshwater forest/shrub types) accounting for approximately 3.0 percent of the subwatershed and other aquatic resources (freshwater ponds, lakes, and rivers) accounting for approximately 3.0 percent of the subwatershed.

Table 3-3. Wetland and Aquatic Resource Types in the North Fork Subwatershed.

Wetland/Aquatic Resource Type	BLM (Acres)	Private (Acres)	Local (State/County/City Recreation Lands) (Acres)	Other (Acres)	USFS (Acres)	Total (Acres)[1]
Freshwater Emergent Wetland	7.8	620.0	0.0	4.7	0.0	**632.5**
Freshwater Forested/ Shrub Wetland	2.9	277.9	0.0	5.7	0.0	**286.5**
Freshwater Pond	1.0	67.6	0.0	1.9	0.0	**70.4**
Lake	0	0	0.0	0	0.0	**0**
Riverine	34.3	799.7	0.0	9.6	0.0	**843.6**
Subwatershed Total[1]	**46.0**	**1765.2**	**0.0**	**21.9**	**0.0**	**1833.0**

Source: NWI Dataset: freshwater emergent wetlands, freshwater forested/shrub wetland, freshwater pond, lake, and riverine.
[1.] Totals may differ due to rounding.

3.4.2.2 Crawford

Table 3-4 shows the wetland and other aquatic resource types in the Crawford subwatershed, which includes a total of 29,669 acres (**Appendix C**, **Figure 3.4-5**). Aquatic resources make up approximately 6.6 percent of the total acreage of the subwatershed, with wetlands (freshwater emergent and freshwater forest/shrub types) accounting for approximately 3.8 percent of the subwatershed and other aquatic resources (freshwater ponds, lakes, and rivers) accounting for approximately 2.8 percent of the subwatershed.

Table 3-4. Wetland and Aquatic Resource Types in the Crawford Subwatershed.

Wetland/Aquatic Resource Type	BLM (Acres)	Private (Acres)	Local (State/County/City Recreation Lands) (Acres)	Other (Acres)	USFS (Acres)	Total (Acres)[1]
Freshwater Emergent Wetland	37.9	1,014.2	0.0	0.0	0.0	**1,052.1**
Freshwater Forested/ Shrub Wetland	15.5	71.3	0.0	0.0	0.0	**86.7**
Freshwater Pond	8.9	60.5	0.0	0.0	0.0	**69.4**
Lake	10.8	362.4	0.0	0.0	0.0	**373.2**
Riverine	80.9	294.8	0.0	0.0	0.0	**375.7**
Subwatershed Total[1]	**154.0**	**1,803.2**	**0.0**	**0.0**	**0.0**	**1,957.1**

Source: NWI Dataset: freshwater emergent wetlands, freshwater forested/shrub wetland, freshwater pond, lake, and riverine.
[1.] Totals may differ due to rounding.

3.4.3 Special Status Plant Species

Special status plants in the project area include plants protected under the ESA and plants recognized as sensitive species by the BLM. This discussion does not extend to special status plants on state-owned lands, or to federal lands in the project area other than BLM or Reclamation lands since no programmatic or project-specific activities are proposed to occur in those areas. As of June 24, 2024 (the end of the comment period for the Draft Supplemental Plan-EA), NRCS has not received a tribal plan for wildlife or plants in the state of Colorado (no tribal species are listed). CNHP tracks rare plant species in Colorado, including federally listed, BLM sensitive, and USFS sensitive plant species. CPW included Tier 1 and Tier 2 Plant Species of Greatest Conservation Need (PSGCN) in the 2015 Revised Colorado State Wildlife Action Plan (CPW 2015). ERO biologists reviewed the distribution for each Tier 1 PSGCN in relation to the project area (CNHP 2024). Except for federally listed species and BLM sensitive species that occur on the Tier 1 PSGCN list, no additional Tier 1 PSGCN species have potential to occur in the subwatersheds due to known distributions and habitat. Therefore, Tier 1 PSGCN species are not discussed further in this Supplemental Plan-EA.

For each specific project proposed under this Supplemental Plan-EA, the following lists of special status species must be confirmed and updated as necessary to reflect the current legal status or BLM status of plant species in the vicinity of the specific project.

Federally Protected Plants

Table 3-5 presents plants protected under the ESA that occur or potentially occur in the two subwatersheds. The list was generated using the USFWS Environmental Conservation Online System Information for Planning and Conservation (IPaC) in June 2020 and updated in July 2024, and a follow-up informal technical consultation with a BLM Uncompahgre Field Office (UFO) Biologist (Holsinger, pers. comm. 2020) to confirm the presence and absence of each species by subwatershed. The UFO actively maintains a spatial dataset of special status species for the UFO and Gunnison Gorge National Conservation Area, and provided data and local knowledge informing the following discussion. No designated critical habitats for plant species with ESA protection are present in either of the subwatersheds.

Table 3-5. ESA-Protected Plant Species Occurring (X) or Potentially Occurring (P) in the Subwatersheds.

Species	Legal Status	North Fork	Crawford	Habitat
Clay-loving wild buckwheat *Eriogonum pelinophilum*	Endangered	P	P	Mancos Shale-derived calcareous soils, usually in swales and bottoms in adobe hills. Associated with semidesert shrublands in south-central Delta County. Elevation of 5,220-6,400 feet. Critical habitat has been designated, but does not occur in the subwatersheds.
Colorado hookless cactus *Sclerocactus glaucus*	Threatened	P	--	Alluvial terraces and Mancos Shale formation (adobe hills) in the Gunnison and Colorado River valleys in Delta, Mesa, Montrose, and Garfield Counties. Associated with semidesert shrublands. Elevation of 4,600-7,130 feet. USFWS has not designated critical habitat for this species.

Two ESA-protected plant species have the potential to occur in the project area: clay-loving wild buckwheat and Colorado hookless cactus. Most of the documented range of Colorado hookless cactus lies outside the project area (**Appendix C**, **Figure 3.5-6**). Surveys of the project area in 2019-2020 did not document occurrences or habitat for clay-loving wild buckwheat or Colorado hookless cactus for any project measures. See **Appendix E** for detailed descriptions of these species (NRCS 2018).

Figure 3.4-7 in **Appendix C** maps the USFWS-modeled range and CNHP Potential Conservation Areas (PCAs) across the project area where documented occurrences of clay-loving wild buckwheat and Colorado hookless cactus are present or were historically present (NRCS 2018). See the subwatershed-specific sections (**Sections 3.4.3.1** and **3.4.3.2**) for more information about the ranges of special status species.

BLM and State Sensitive Plants

A listing (**Table 3-6**) of subwatershed BLM and state sensitive plants was compiled from the list of BLM sensitive species of the UFO (BLM 2019), the Gunnison Field Office entries from BLM's Statewide List of Sensitive Species (BLM 2015), and the CNHP rare plant tracking list (CNHP 2023).

Several plants on the BLM sensitive species and CNHP tracking lists were dismissed from further analysis based on a lack of habitat or range in the project area. Species assignments for these tables were confirmed with a UFO BLM Biologist (Holsinger, pers. comm. 2020), who maintains a spatial dataset of special status species for the UFO and Gunnison Gorge National Conservation Area, and provided data and local knowledge informing the following discussion (NRCS 2018).

Table 3-6. Presence (X) of BLM Sensitive Plant Species by Subwatershed.

Species	North Fork	Crawford	Habitat
Colorado desert parsley *Lomatium concinnum*	X	X	Mancos Shale-derived soils (adobe hills and flats), often on rocky or pebbly substrates. Most often associated with semidesert shrub communities dominated by shadscale, but also occurs with greasewood, sagebrush, or scrub oak. Elevation of 5,500-7,000 feet.

Colorado desert parsley, a BLM sensitive plant species, occurs in the project area. This species is found locally in appropriate habitat in both subwatersheds. Please refer to **Appendix E** for a complete description of this species.

Figure 3.4-7 in **Appendix C** maps the CNHP PCAs across the project area where documented occurrences of Colorado desert parsley are present or were historically present. Many of the PCAs intersect BLM lands. Several additional occurrences of Colorado desert parsley are mapped by BLM (but not depicted on **Figure 3.4-7** in **Appendix C**) on private lands in the North Fork subwatershed (Holsinger, pers. comm. 2020; NRCS 2018).

Several BLM sensitive plant species on the UFO were eliminated from further analysis (**Table 3-7**) because their documented ranges lie outside the subwatersheds, or no suitable habitat is present in the subwatersheds.

Table 3-7. BLM Sensitive Plant Species Dismissed from Further Analysis.

Species Dismissed from Further Analysis	BLM Field Office	Rationale for Dismissal from Further Analysis
Crandall's rockcress *Boechera crandallii (Arabis crandallii)*	Uncompahgre	In limestone chip-rock and stony areas, ridges, and steep hill slopes, sometimes in open windswept places. Primary association is sagebrush, but also associates with ponderosa pine, bitterbrush, and mountain mahogany. Ladyman (2005) cites occurrences in Delta, Gunnison, and Montrose Counties (without location references or voucher information). Holsinger (pers. comm. 2017; NRCS 2018) has no records in the UFO and indicated BLM will not require analysis of this species for the project area.
Grand Junction milkvetch *Astragalus linifolius*	Uncompahgre	In rocky soil on dry hillsides, in drainages, and along benches of perennial streams; often on the Chinle and Morrison formations with pinyon-juniper and sagebrush. Endemic to Montrose County, west Delta County, and southern Mesa County; populations are concentrated along the eastern and north sides of the Uncompahgre Plateau. Documented in the Roubideau Creek PCA (Lyon et al. 1999) and historically in the Escalante State Wildlife Area (Holsinger, pers. comm. 2017; NRCS 2018). Holsinger (pers. comm. 2017; NRCS 2018) has no records of this species in the subwatersheds and indicated BLM will not require analysis of this species for the project area.
Naturita milkvetch *Astragalus naturitensis*	Uncompahgre	Known only from Mesa, western Montrose, Dolores, San Miguel, and Montezuma Counties. Not documented in or near the subwatersheds (Holsinger, pers. comm. 2017; NRCS 2018).

Species Dismissed from Further Analysis	BLM Field Office	Rationale for Dismissal from Further Analysis
Paradox breadroot *Pediomelum aromaticum*	Uncompahgre	Known only from extreme western Montrose and Mesa Counties. Not documented in or near the subwatersheds (Holsinger, pers. comm. 2017; NRCS 2018).
Paradox Valley (Payson's) lupine *Lupinus crassus*	Uncompahgre	Known only from western Montrose County. Not documented in or near the subwatersheds (Holsinger, pers. comm. 2017; NRCS 2018).
Sandstone milkvetch *Astragalus sequiflorus*	Uncompahgre	Known only from extreme western Montrose County. Not documented in or near the subwatersheds (Holsinger, pers. comm. 2017; NRCS 2018).
San Rafael milkvetch *Astragalus rafaelensis*	Uncompahgre	Known only from western Montrose and Mesa Counties, on the west edge of the Uncompahgre Plateau. Not documented in or near the subwatersheds (Holsinger, pers. comm. 2017; NRCS 2018).
Uncompahgre ("good neighbor") bladderpod *Physaria vicina (Lesquerella vicina)*	Uncompahgre	Mancos Shale-derived soils at the ecotone between pinyon-juniper woodland and salt desert scrub, or sandy soils derived from Jurassic sandstones with sagebrush. Endemic to the east part of Montrose County and north part of Ouray County, with most documented populations occurring in the Uncompahgre Valley. Elevation of 5,705-7,536 feet.

3.4.3.1 North Fork

There are no documented occurrences of the ESA-protected clay-loving wild buckwheat or Colorado hookless cactus in the North Fork subwatershed (Holsinger, pers. comm. 2020). The nearest area of documented occurrences of clay-loving wild buckwheat lies about 3 miles west of the subwatershed, in and around designated critical habitat in the Lawhead Gulch area (Appendix C, Figure 3.4-10 of the 2018 Plan-EA). CNHP (Lyon and Williams 1998) checked for, but did not locate, a historic occurrence of Colorado hookless cactus in the Sulphur Mine PCA, adjacent to (and outside of) the west boundary of the North Fork subwatershed (Appendix C, Figure 3.4-10 of the 2018 Plan-EA). Surveys for these species in 2019-2020 in the project measures did not identify habitat or occurrences.

The BLM sensitive species Colorado desert parsley is documented in the subwatershed in several locations (CNHP 2013; Holsinger, pers. comm. 2020) in association with semidesert shrublands, sagebrush, and mixed montane shrublands. A small but dense population is on private land in the east part of the subwatershed (Appendix C, Figure 3.4-10 of the 2018 Plan-EA) on the north side of Cedar Hill near the town of Paonia, both upgradient and downgradient of the Stewart Ditch alignment. Other smaller occurrences not pictured on Figure 3.4-11 in Appendix C of the 2018 Plan-EA are documented on private lands south of Bell Creek (Holsinger, pers. comm. 2020). A few occurrences near J75 Road and Scenic Mesa Road on BLM land along the south edge of the subwatershed are part of the Hotchkiss Hills PCA population that extends southeast into the Crawford subwatershed (Appendix C, Figure 3.4-11 of the 2018 Plan-EA). CNHP (Lyon and Williams 1998) documented a poor quality occurrence of Colorado desert parsley in the Sulphur Mine PCA adjacent to (and outside of) the west boundary of the North Fork subwatershed (Appendix C, Figure 3.4-11 of the 2018 Plan-EA).

3.4.3.2 Crawford

There are no documented occurrences of the ESA-protected clay-loving wild buckwheat or Colorado hookless cactus in or near the Crawford subwatershed (Holsinger, pers. comm 2017; CNHP 2013). The Crawford subwatershed lies outside the current known range of either species (NRCS 2018).

The BLM sensitive species Colorado desert parsley is documented in the Crawford subwatershed in several locations (CNHP 2013; Holsinger, pers. comm. 2020) in association with semidesert

shrublands. CNHP (Lyon and Williams 1998) identified one of Delta County's highest quality and largest populations on a combination of private and BLM lands in the northwest part of the subwatershed (Appendix C, Figure 3.4-11 of the 2018 Plan-EA), and designated the Hotchkiss Hills PCA to encompass its extents. Significant potential habitat is present for Colorado desert parsley in this subwatershed on BLM lands north of Crawford and between the towns of Hotchkiss and Crawford. A few small occurrences (not pictured on Figure 3.4-11 in Appendix C of the 2018 Plan-EA) were observed in 2016 during a rare plant survey on BLM lands just east of the Hotchkiss Hills PCA (Reeder, pers. obs. 2020). Colorado desert parsley is not anticipated to occur south of the Smith Fork drainage in the Crawford subwatershed.

3.4.4 Invasive Species

Undesired invasive plant species (weeds) are present to some degree in every plant community across the subwatersheds. Typically, these species are exotic (from different continents or distant ecosystems)—introduced either intentionally or escaped into native plant communities as forage plants (pasture grasses, sweetclover, and redstem filaree); ground cover (crested wheatgrass); ornamental or landscaping plants (purple loosestrife, oxeye daisy, and Siberian elm); or erosion-control or windbreak plants (such as salt cedar and Russian olive). Other invasive species probably historically entered the area as contaminants in agricultural seed sources (downy brome [cheatgrass], jointed goat grass, and field bindweed). Many species (houndstongue, common cocklebur, and puncturevine) feature burs or spines that enable them to attach to wildlife, pets, people's clothing, and vehicle tires, and move great distances. Others can spread seeds great distances using the wind (tumbleweed [Russian thistle] and dandelion) or waterways (salt cedar).

The weeds in the region are exceedingly well adapted to the climate and soil conditions, and many can form monocultural stands due to their reproductive characteristics (e.g., the rhizomatous roots of Russian knapweed, hoary cress [whitetop], and Canada thistle, or the early-season seeding of downy brome). Many weeds are not palatable to livestock or wildlife. Others are toxic to livestock, reduce agricultural productivity, and generally diminish the function of native plant communities.

The distribution of weeds across the project area is largely tied to ground disturbance and human development. Weeds typically thrive along roadsides, around residential development, in the margins of agricultural fields, in feed yards, around stock ponds, along open ditches, and in many stream corridors. Each of these types of areas contribute to seed transport and conditions that allow weed species to outcompete native plants. Weeds are more common in the lower elevations of the subwatersheds.

Aside from continually disturbed or neglected areas near human developments, semidesert shrubland communities and low-elevation riparian areas host the highest number of weed species and the most widespread infestations in the subwatersheds, whereas fewer weed species are adapted to higher elevation conditions and there is less disturbance and fewer sources to spread them.

The most common weeds infringing on the lower-elevation native upland vegetation communities of the subwatersheds include various annual mustards, the perennial mustard hoary cress, Russian thistle, kochia, halogeton, Russian knapweed, and downy brome. In low- to mid-elevation riparian areas and along ditch banks, additional weed species occur and are often dominant including salt cedar, Russian

olive, Siberian elm, and several thistle species. The more common weeds in higher elevation montane and subalpine communities (both uplands and riparian areas) include houndstongue, scentless chamomile, oxeye daisy, various thistles, and toadflax. In recent years, BLM found that 46 percent of sampled riparian communities, 58 percent of sampled travel routes, and 70 percent of sampled ponds in the UFO contained at least some level of exotic species (BLM 2019). Despite active county and BLM-coordinated weed control efforts in the region, there is anecdotal and trend study evidence that undesirable exotic species are increasing overall, both in numbers and distribution (BLM 2019).

When a weed has been determined to pose a substantial economic threat, it is listed as "noxious" under the Colorado Noxious Weed Act in one of three categories. "List A" weeds are designated for eradication, and are usually less common or thought to be present at levels at which eradication is possible. "List B" weeds are typically well-established and mandated for control and containment. "List C" weeds are species for which the state supports local government's management on public and private lands, but for which there is no mandate for eradication or control. The three counties in the project area have adopted noxious weed management plans (as mandated by the Colorado Noxious Weed Act), established weed management programs, and set management priorities. BLM, as surface owner of nearly 12 percent of the project area, also participates in an integrated weed management program (BLM 2019).

Table E-1 in **Appendix E** presents the state-listed noxious weeds (Colorado Department of Agriculture 2016) currently known from and potentially occurring in the project area by county (Colorado State University [CSU] 2017; Delta County 2010; Montrose County 2011), along with the current management priority for each weed assigned by the counties and BLM UFO (BLM 2019). Several other exotic species mentioned elsewhere in this discussion but are not on the state noxious weed list are present and troublesome in the project area, although not currently prioritized by the state. One of these, Siberian elm, is a BLM UFO weed species of concern (BLM 2019). The scientific names for the plant species mentioned in this discussion are listed in **Table E-2** in **Appendix E**.

3.5 Wildlife

Wildlife in the project area includes big game, other mammals, reptiles, amphibians, fishes, and birds, including raptors, game birds, waterbirds, and migratory songbirds. An overview of wildlife habitat is presented in **Section 3.4** (Vegetation), and species-specific habitat requirements are discussed throughout this section as appropriate. Terrestrial wildlife, including big game, other mammals, reptiles and birds are discussed in **Sections 3.5.1** and **3.5.2**. Fish and amphibians are discussed in **Section 3.5.3**. The scientific names of wildlife species mentioned in the text are provided in **Table E-3** in **Appendix E**.

3.5.1 Terrestrial Wildlife

Wildlife in the project area includes habitat generalists and habitat specialists. Habitat generalists, such as mule deer and American robin, use a broad range of habitat types. Habitat specialists, such as the Gunnison sage-grouse, depend on a specific habitat type for their entire life cycle. Many species have specific requirements for nesting, hibernation, and other life functions (e.g., peregrine and prairie falcons nest on cliffs, and bats need caves or rock crevices for roosting or hibernation). Many habitat generalists are wide-ranging, such as the black bear, the home range of which can cover more than 70

square miles. Other generalists such as the striped skunk often have home ranges smaller than 1 square mile. These characteristics, along with whether a species is rare or common, or imperiled or secure, are important considerations in assessing the effects of proposed project measures on wildlife (**Section 5.8**).

Big Game

Big game species in both subwatersheds include elk, mule deer, moose, bighorn sheep, black bear, and mountain lion. Elk and mule deer are the most abundant big game in the subwatersheds and are of high public interest and economic importance to the state of Colorado and local economies due to hunting and tourism revenues. Elk and deer generally summer in higher elevation montane and subalpine woodlands and forests; winter in the valleys in lower elevation pinyon-juniper woodlands, sagebrush shrublands, riparian corridors, and agricultural areas; and spend the majority of their seasonal transition times in mid-elevation mixed montane shrublands. Resident populations of mule deer are found in many areas across the subwatersheds.

Figures 3.5-1 and **3.5-2** in **Appendix C** depict the CPW-mapped seasonal distribution of elk and mule deer across the project area (NRCS 2018). For both elk and mule deer, the North Fork and Crawford subwatersheds provide overall winter range, significant winter concentration areas, and severe winter range.[1] Neither the North Fork or Crawford subwatershed provides summer range for elk. Both subwatersheds have large percentages of area occupied by resident populations of mule deer (**Table 3-8**). Mule deer are present year-round in both subwatersheds, but are most abundant during winter, when herds move in from surrounding summer range in the mountains. Habitat quantity and quality on winter range is a limiting factor for mule deer and elk populations in the region (CPW 2014). Elk and mule deer are more vulnerable to starvation and predation during the winter months, especially during severe winters (NRCS 2018).

[1] A winter concentration area is that part of the overall range where higher quality habitat supports significantly higher animal densities than surrounding areas, and typically where densities are at least 200 percent greater than the surrounding winter range density during the same period in the average 5 winters out of 10. Severe winter range is the area where 90 percent of the individuals are located when the annual snowpack is at its maximum or winter temperatures are at a minimum in the 2 worst winters out of 10.

Table 3-8. Elk and Mule Deer Ranges in the Project Area, Expressed as Percentages of Each Subwatershed.

Range Type by Species	North Fork	Crawford
Elk		
Winter Range	97%	100%
Winter Concentration Area	36%	24%
Severe Winter Range	96%	99%
Migration Corridor	--	1%
Resident Population Area	--	--
Summer Range	--	--
Summer Concentration Area	--	--
Production Area (Calving)	--	--
Mule Deer		
Winter Range	100%	100%
Winter Concentration Area	61%	36%
Severe Winter Range	97%	99%
Concentration Area	35%	70%
Resident Population Area	98%	100%
Summer Range	99%	100%

CPW maps the overall range of moose in the east part of the North Fork subwatershed (CPW 2022a). CPW defines moose concentration areas as that part of the range where densities are at least 200 percent greater than the surrounding range density during the same period in the average 5 summer seasons out of 10. There were no records of breeding populations of moose in Colorado until their introduction to the state in 1978 (Armstrong et al. 2011). Moose favor forest edges near water. Bighorn sheep occur peripherally in the North Fork and Crawford subwatersheds and are discussed in **Section 3.5.2** (Special Status Species).

The black bear is a wide-ranging opportunistic omnivore with a relatively large territory size requirement. In the subwatersheds, the black bear is most often associated with montane shrublands, mesic drainages, and riparian areas, where acorns, nuts, and berries are plentiful. CPW (2022a) maps black bear summer concentration areas in the east extents of the North Fork and Crawford subwatersheds (CPW 2022a). Black bears hibernate in winter, beginning as early as October, in rock shelters or excavations under shrubs (Armstrong et al. 2011). The mountain lion, like the black bear, is widely distributed, wide-ranging, and has large territory size requirements. Mountain lions are relatively uncommon throughout both subwatersheds, favoring rough terrain and following the migratory patterns of mule deer, their primary prey (Armstrong et al. 2011).

Other Mammals

Other mammals in the subwatersheds include bobcat, coyote, red fox, yellow-bellied marmot, porcupine, badger, weasel, mountain and desert cottontail rabbits, white-tailed jackrabbit, raccoon, striped and spotted skunks, ringtail, and several species of mice, ground squirrels, chipmunks, woodrats, voles, and bats. Small mammals particularly associated with wetlands or riparian areas in the subwatersheds are beaver and muskrat, and less commonly, river otter and mink (Armstrong et al. 2011).

Reptiles

Common reptiles in the subwatersheds include bullsnake, western terrestrial garter snake, smooth green snake, sagebrush lizard, fence lizard, plateau striped whiptail (a lizard), short-horned lizard, and collared lizard (Hammerson 1999). Reptiles are more abundant and diverse in the lower elevations of the subwatersheds, and are most often associated with semidesert shrublands, sagebrush shrublands, pinyon-juniper woodlands, and less commonly with montane shrublands and woodlands. Many reptiles prefer rocky ground or canyon topography. The bullsnake is a habitat generalist and feeds on rodents and other small mammals, bird eggs, and nestlings. The western terrestrial garter snake is often found in any habitat near flowing or nonflowing water where amphibian, small fish, or small rodent prey is present. The smooth green snake feeds mainly on insects in grassy riparian areas but is also found away from water in montane shrublands. The lizard species generally prefer sparse vegetation at ground level, easy access to sunlight, rocky areas for basking and hiding, areas with rodent burrows, and patches of soft soil for burrowing. Each of these reptile species hibernates between approximately October and April in burrows, under rocks or other objects, or in rock crevices.

Birds

Up to 240 species of birds occur or potentially occur in the project area as residents or annual visitors (Lambeth and Reeder 2009), including raptors, game birds, waterbirds, and songbirds. Riparian and wetland vegetation communities host the highest number of species throughout the year, whereas the cliff and bedrock vegetation community has the lowest number. In the upland vegetation types, the mid- to high-elevation forests and woodlands support more bird species during spring, summer, and fall, whereas pinyon-juniper woodlands and lower-elevation shrublands support more bird species during winter than other vegetation types (Lambeth and Reeder 2009).

Raptors in both subwatersheds include eagles, falcons, hawks, and owls. The most ubiquitous raptors in the area are the red-tailed hawk and American kestrel. Other common raptors occurring in a variety of habitat types include the northern harrier, great-horned owl, golden eagle, Cooper's hawk, peregrine falcon, and prairie falcon. Turkey vultures are also fairly common, especially around canyon woodlands, but are rare breeders in the region. Bald eagles are fairly common winter residents throughout the subwatersheds (**Appendix C**, **Figure 3.5-3**), concentrating along river corridors, but also foraging in croplands and shrublands for rodents and carrion. CPW (2022a) maps numerous bald eagle roosts and a few recently active nest sites across the subwatersheds (**Appendix C**, **Figure 3.5-3**). Some raptors in the region initiate nesting as early as January (bald eagles and great-horned owls), but the majority initiate in March, depending on climate conditions. Most raptors typically fledge their young by mid-July, but some individual clutches could fledge as late as mid-August (Lambeth and Reeder 2009; CPW 2022a).

Common waterbirds (waterfowl and shorebirds) that breed in the wetland and riparian areas of the subwatersheds include mallard, green-winged teal, cinnamon teal, gadwall, bufflehead, Canada goose, American coot, great blue heron, killdeer, spotted sandpiper, American avocet, sora, and belted kingfisher (Lambeth and Reeder 2009). Several great blue heron rookeries and goose production and wintering areas are mapped along the North Fork River in the North Fork subwatershed (CPW 2022a). The majority of waterbirds in the area begin nesting in May, although documented nest records for

Canada geese and mallards occur early as March 11. The nesting season can last through August. Other waterbirds that migrate or overwinter in the area include greater sandhill crane, Wilson's phalarope, lesser yellowlegs, pied-billed grebe, western grebe, bufflehead, common merganser, and white-faced ibis. Game birds occurring in one or both of the subwatersheds include wild turkey, ring-necked pheasant, and dusky grouse.

Migratory songbirds that are common breeders in the subwatersheds include common nighthawk, black-chinned and broad-tailed hummingbirds, northern flicker, a variety of flycatchers, plumbeous vireo, black-billed magpie, common raven, horned lark, a variety of swallows, mountain chickadee, pygmy nuthatch, house wren, ruby-crowned kinglet, mountain bluebird, American robin, European starling, western meadowlark, Brewer's blackbird, red-winged blackbird, yellow warbler, spotted towhee, green-tailed towhee, song sparrow, and house sparrow (Lambeth and Reeder 2009). The majority of migratory songbirds in the region nest between April and mid-July, with a few records showing nesting initiated in March for horned lark, European starling, common raven, and black-billed magpie. Several of these species overwinter in the lower elevation areas of the subwatersheds. Common spring and fall migrants include western wood pewee, chipping sparrow, vesper sparrow, white-crowned sparrow, and yellow-rumped warbler.

All migratory birds in the project area (except nonnative species including introduced game birds) are protected under the Migratory Bird Treaty Act of 1918 (MBTA), which is enforced by the USFWS, and makes unlawful any "take" of a migratory bird. Further, EO 13186 of January 10, 2001 (66 Federal Register [FR] 3853–3856), regarding implementation of the MBTA, directs federal agencies "to ensure that environmental analyses of federal actions required by NEPA or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern." Additional protection is afforded to eagles under the Bald and Golden Eagle Protection Act (BGEPA) of 1940.

Table 3-9 presents migratory bird species of concern occurring or with the potential to occur in both subwatersheds. The table was compiled using the USFWS's Environmental Conservation Online System IPaC in July 2024 and BLM's Draft Resource Management Plan and Environmental Impact Statement for the UFO (BLM 2019). Several species of concern listed in **Table 3-9** are protected under the ESA or considered sensitive by BLM and are further discussed in **Section 3.5.2** (Special Status Species). Habitat notes, including nesting periods, were synthesized from Kingery 1998, Lambeth and Reeder 2009, and USFWS 2009.

Table 3-9. Migratory Bird Species of Concern Occurring or Potentially Occurring in the Subwatersheds.

Species of Concern	Season Present	Habitat Notes/Nesting Periods
American bittern *Botaurus letiginosus*	Spring/Summer	Wetlands (marshes); ground nester (no breeding records in the subwatersheds)
Bald eagle *Haliaeetus leucocephalus*[2]	Fall/Winter, Rare Nester	Winters in upland areas, especially low shrublands with nearby rivers or lakes; nests in snaggy cottonwoods along forested rivers and lakes; nesting January through July
Black rosy-finch *Leucosticte atrata*	Winter	Open country, mountain meadows, high deserts, valleys, and plains; nests in alpine zone near rocks and cliffs (no breeding records in the subwatersheds)
Black swift *Cypseloides niger*	Summer	Nests typically placed on recesses/ledges near waterfalls or dripping water cliffs at 7,000 to 11,000 feet elevation, often 8 to 10 feet above ground but up to 100 feet above ground

Species of Concern	Season Present	Habitat Notes/Nesting Periods
Brewer's sparrow *Spizella breweri*[2]	Summer	Large patches of sagebrush shrublands and shrubsteppe; nesting May through July
Brown-capped rosy-finch *Leucosticte australis*	Summer	Alpine meadows, cliffs, talus, high-elevation parks; nesting June 15 through August 25
Burrowing owl *Athene cunicularia*[2]	Spring/Summer/ Fall	Open grasslands, low shrublands, short vegetation often in prairie dog colonies; nesting April through July
California gull *Larus californicus*	Fall Migrant	Breeds on islands and levees in lakes and rivers; occurs in pastures, scrublands, and garbage dumps; nesting March through July.
Cassin's finch *Carpodacus cassinii*	Year-round	Open montane coniferous forests; breeds/nests in coniferous forests; migrates through other habitat types; nesting mid-April through mid-August
Chestnut-collared longspur *Calcarius ornatus*	Spring Migrant	Open grasslands and cultivated fields (no breeding records in the subwatersheds)
Clark's grebe *Aechomophorus clarkia*	Summer	Nests on large freshwater lakes and marshes with edges that have emergent vegetation such as reeds and rushes
Clark's nutcracker *Nucifraga columbiana*	Summer	Open subalpine forests near treeline; nesting January through July.
Evening grosbeak *Coccothraustes vespertinus*	Year-round	Breeds in coniferous forests; nesting May through August.
Ferruginous hawk *Buteo regalis*	Fall/Winter	Open country, grasslands, shrublands, croplands; nests on cliffs and outcrops (no breeding records in the subwatersheds)
Flammulated owl *Otus flammeolus*	Summer	Montane and subalpine forests, including ponderosa pine, Douglas fir, aspen, and aspen-conifer mix; nesting May through mid-August
Fox sparrow *Passerella iliaca*	Summer	Willow carrs and wet meadows above 7,500 feet in elevation; dense shrubby understories associated with water courses; nesting May through July
Golden eagle *Aquila chrysaetos*[2]	Year-round	Open country, grasslands, woodlands, barrens in hilly or mountainous terrain; nests on rock outcrops or large trees; nesting possible January through mid-August
Grace's warbler *Dendroica graciae*	Summer	Mature ponderosa pine forests; nesting May through July
Gray vireo *Vireo vicinior*	Summer	Pinyon-juniper woodlands and open juniper-grasslands; nesting mid-May through July
Greater sandhill crane *Grus canadensis*[2]	Summer/Fall; Year-round[3]	Emergent marshes, mudflats around reservoirs, wet meadows, and agricultural areas.
Gunnison sage-grouse *Centrocercus minimus*[1]	Year-round	Large patches of sagebrush shrublands are required to complete its life cycle (listed as threatened under the ESA – see **Section 3.5.2**); nesting March through July
Juniper titmouse *Baeolophus ridgwayi*	Year-round	Pinyon-juniper woodlands, especially juniper; nests in tree cavities; nesting mid-April through July
Lewis's woodpecker *Melanerpes lewis*	Year-round	Coniferous, aspen, riparian woodland and forests, orchards, and sometimes pinyon-juniper woodlands; nesting mid-April through July
Loggerhead shrike *Lanius ludovicianus*	Year-round	Greasewood, saltbush shrublands, grasslands, suburban areas with scattered trees and shrubs; nesting mid-April through mid-August
Long-billed curlew *Numenius americanus*[2]	Spring/Fall Migrant	Lakes and wetlands, and adjacent grass and shrub communities (no breeding records in the subwatersheds)
Long-eared owl *Asio otus*	Year-round	Roosts in dense vegetation and forages in open grasslands or shrublands; also open coniferous or deciduous woodlands
Olive-sided flycatcher *Contopus cooperi*	Summer	Coniferous forests and woodlands, near openings; early successional forests with standing snags; nesting June through July
Mexican spotted owl *Strix occidentalis lucida*[1]	Spring/Fall Migrant	Steep coniferous canyons; nesting April through August
Peregrine falcon *Falco peregrinus*[2]	Spring/Summer	Open country near cliff habitat, often near rivers, lakes, and marshes; nests on ledges and alcoves on cliffs and crags mid-March through mid-August
Pinyon jay *Gymnorhinus cyanocephalus*	Year-round	Pinyon-juniper woodlands; nesting late February through mid-August
Prairie falcon *Falco mexicanus*	Year-round	Open country in mountains, steppe, or prairie; winters on cultivated fields; nests on cliffs or embankments; nesting mid-March through July

Species of Concern	Season Present	Habitat Notes/Nesting Periods
Rufous hummingbird *Selasphorus rufus*	Summer	Breeds in open areas, yards, parks, and forests up to treeline
Mountain plover *Charadrius montanus*	Rare Spring/Fall Migrant	High plains, cultivated fields, desert scrublands, often in association with heavy grazing (no breeding records in the subwatersheds)
Sage thrasher *Oreoscoptes montanus*	Summer	Sagebrush and semidesert shrublands; nests in or beneath dense shrubs; nesting May through July
Short-eared owl *Asio flammeus*	Winter	Forages in treeless terrain (grasslands, shrublands, and wetlands), but may roost in trees in snowy conditions (no breeding records in the subwatersheds)
Snowy plover *Charadrius alexandrines*	Rare Spring Migrant	Sparsely vegetated sand flats with greasewood or saltgrass (no breeding records in the subwatersheds)
Swainson's hawk *Buteo swainsoni*	Rare Summer Resident	Grasslands, cultivated lands, lowland riparian woodlands; nests in a variety of trees, shrubs, or utility poles; nesting mid-April through mid-August
Veery *Catharus fuscescens*	Possible Summer Resident	Moist dense willow carrs or thickest of alders or cottonwood saplings along montane rivers or streams (no breeding records in the subwatersheds)
Virginia's warbler *Vermivora virginiae*	Summer	Gambel oak shrublands, mixed montane shrublands, pinyon-juniper woodlands; brushy cover for ground nests; nesting mid-May through mid-August
Western grebe *Aechmophorus occidentalis*	Spring/Fall Migrant	Open water with marshy shoreline; occasionally breeds in the subwatersheds; nesting mid-May through August
Western yellow-billed cuckoo[1] *Coccyzus americanus*	Summer	Cottonwood riparian forests and woodlands with shrubby understories (listed as threatened under the ESA with proposed critical habitat – see **Section 3.5.2**); nesting mid-June through August
Williamson's sapsucker *Sphyrapicus thyroideus*	Summer	Feeds almost exclusively in coniferous trees; nests in aspen and mixed conifer-aspen forest; nesting May through mid-August
Willow flycatcher *Empidonax trailii*	Summer	Riparian and moist shrubby areas; winters in shrubby openings with short vegetation; nesting June through July

[1.] ESA-projected species; see **Table 3-10**.
[2.] BLM UFO or CPW-listed sensitive species; see **Table 3-11**.
[3.] Historically species has been a summer/fall migrant, but recent wintering in Delta County has been observed (CPW 2020a).

3.5.1.1 North Fork

The North Fork subwatershed encompasses severe winter range and extensive winter concentration areas in the North Fork Valley for elk and mule deer herds migrating from summer range on Grand Mesa and the West Elk Mountains (**Appendix C, Figures 3.5-1** and **3.5-2**). Resident populations of mule deer occur throughout the subwatershed, with a major concentration area on Rogers Mesa, in the west end (**Appendix C, Figure 3.5-2**). Rogers Mesa is mostly in irrigated hay, pasture, and fruit orchards, with low-density residential development. Land use and movement patterns of both elk and deer on Rogers Mesa are affected by areas of big game crop-protection fencing, especially north of Highway 92. With the combination of mule deer resident population and winter deer and elk migrants, the highest numbers of mule deer and elk occur in the North Fork subwatershed in winter. Black bear and mountain lion are expected to be present seasonally at low densities throughout the subwatershed. The variety of small mammals, reptiles, and amphibians described in **Section 3.5.1** are expected to occur throughout the subwatershed in suitable habitats. The array of birds described in **Section 3.5.1** as well as migratory birds of concern described in **Table 3-9** could all reasonably be expected to occur in the subwatershed in suitable habitats, with the exception of Gunnison sage-grouse and brown-capped rosy-finch.

3.5.1.2 Crawford

Nearly the entire Crawford subwatershed encompasses severe winter range, and approximately one-quarter of the subwatershed provides winter concentration areas for elk and mule deer herds migrating

from summer range in the West Elk Mountains (**Appendix C, Figures 3.5-1** and **3.5-2**). Resident populations of mule deer occur throughout the subwatershed, with a major concentration area on Grandview and Crawford Mesas and in the Upper Smith Fork drainage (**Appendix C, Figure 3.5-2**). Black bear and mountain lion are expected to be present seasonally at low densities throughout the subwatershed. The variety of small mammals, reptiles, and amphibians described in **Section 3.5.1** are expected to occur throughout the subwatershed in suitable habitats. The array of birds described in **Section 3.5.1,** as well as migratory birds of concern described in **Table 3-9,** could all reasonably be expected to occur in the Crawford subwatershed in suitable habitat, with the exception of western yellow-billed cuckoo.

3.5.2 Terrestrial Special Status Wildlife Species

Special status wildlife species with the potential to be affected by the Proposed Action are animals protected or proposed for protection under the ESA and their designated or proposed critical habitats, and animals and insects recognized as BLM sensitive species. Under the implementing regulations (50 CFR 402) of the ESA, federal agencies must review their actions and determine if the action may affect federally listed and proposed species or proposed or designated critical habitat. Species and critical habitats proposed for protection under the ESA are not federally protected; however, potential impacts on these elements are being considered by this Supplemental Plan-EA so that these elements have been adequately analyzed should USFWS finalize the proposed rulings. This discussion does not extend to special status wildlife on state-owned lands, or to federal lands in the project area other than BLM or Reclamation lands since no programmatic or project-specific activities are proposed to occur in those areas. Special status fish and amphibians are discussed in **Section 3.5.3**.

As required by the 2018 Plan-EA, the specific projects proposed under this Supplemental Plan-EA have been analyzed for potential impacts on the following confirmed and updated lists of special status species and critical habitats designated or proposed under the ESA, and the updated and confirmed BLM status of wildlife in the vicinity of the specific project.

ESA-Protected Terrestrial Wildlife and Critical Habitat

Table 3-10 presents the three federally protected bird species, one federally protected mammal species, two insects proposed for federal protection, and their respective proposed or designated critical habitats potentially occurring in both subwatersheds (USFWS 2023). To confirm the presence or absence of each ESA-protected species by subwatershed, a follow-up informal technical consultation was held with a UFO BLM biologist (Holsinger, pers. comm. 2020). The UFO actively maintains a spatial dataset of special status species for the UFO and Gunnison Gorge National Conservation Area, and provided data and local knowledge informing the following discussion. Spatial range mapping datasets maintained by CPW (2022a) and other resources were also consulted. Descriptions of these species and their respective habitats are in **Appendix E**.

The monarch butterfly was designated as a candidate species in December 2020 (85 FR 81813-81822, December 17, 2020) due to widespread drought, habitat loss, fragmentation, and low population abundance. Candidate species are not afforded protection under the ESA (USFWS 1998); thus, no impact determination is made for this species. However, potential habitat for the monarch butterfly occurs in the subwatersheds, and NRCS policy dictates full consideration of candidate species. A description of the monarch butterfly and its respective habitat is provided in **Appendix E**.

The silverspot was listed as a threatened species in March 2024 (50 CFR Part 17, Federal Register Notice 2024-03042, effective March 18, 2024) due to habitat loss and fragmentation, hydrologic alteration, livestock grazing, genetic isolation, noxious weeds, climate change, and collecting. The subwatersheds occur within the range of the silverspot, though it is not known to occur in Delta County. A description of silverspot and its respective habitat is provided in **Appendix E.**

Table 3-10. ESA-Protected Wildlife Species Potentially Occurring in the Subwatersheds[1].

Element	Occurrence in Subwatershed[2]	
	North Fork	Crawford
Gunnison sage-grouse *(Threatened)*	--	P
Gunnison sage-grouse Designated Critical Habitat	--	5.9% of subwatershed
Mexican spotted owl *(Threatened)*	--	--
Mexican spotted owl Designated Critical Habitat	--	--
Western yellow-billed cuckoo *(Threatened)*	D	--
Western yellow-billed cuckoo Proposed Critical Habitat	7.6% of subwatershed	--
Lynx *(Threatened)*	--	--
Lynx Potential Habitat (not a legal status)		0.03% of subwatershed-
Monarch butterfly (*Candidate*)	P	P
Silverspot (*Threatened*)	--	--

[1.] USFWS 2023.

[2,] "--" indicates no documented occurrence; "D" indicates documented occurrence within last 10 years; "P" indicates potential to occur based on historic range or potentially suitable habitat.
Note that analysis of the gray wolf (*Canis lupus, Endangered*) is only required for predator management programs; therefore, this species is excluded from this Supplemental Plan-EA analysis.

BLM Sensitive Wildlife Species

BLM sensitive wildlife includes those species found on BLM lands for which BLM has the "capability to significantly affect the conservation status of the species through management" and the species is at risk of population decline or dependent on specialized or unique habitat (BLM 2019). BLM administers about 12 percent of the lands in both subwatersheds.

Table 3-11 presents BLM sensitive wildlife with potential to occur in each of the subwatersheds. The list was compiled using the current list of BLM sensitive species of the UFO (BLM 2019) and the Gunnison Field Office entries from BLM's Statewide List of Sensitive Species (BLM 2015). Species appearing in **Table 3-11** either have documented occurrences in, or the potential to occur in, the subwatersheds. Several BLM sensitive species have been dismissed from further analysis in this Supplemental Plan-EA based on lack of habitat or range in the subwatersheds (**Table 3-12**). Species assignments for **Table 3-11** and **Table 3-12** were confirmed with a UFO BLM biologist (Holsinger, pers. comm. 2017, 2020), who maintains a spatial dataset of special status species for the UFO and Gunnison Gorge National Conservation Area and provided data and local knowledge. Descriptions of these sensitive species and their respective habitats are provided in **Appendix E**.

CPW Sensitive Wildlife Species

CPW sensitive wildlife includes those species found within state borders for which CPW has the statutory charge for managing and conserving wildlife resources, including state-listed threatened and endangered species (CPW 2015). The state of Colorado lists 44 state threatened, endangered, and special concern wildlife species and 28 Tier 1 Species of Greatest Conservation Need (SGCN) wildlife species (CPW 2015, 2022b). Of this total (72 species), 17 wildlife species are listed on both the

threatened and endangered species list and the Tier 1 SGCN list for a total of 55 unique state-listed wildlife species. Of those 55 species, 15 have potential to occur in the subwatersheds.

Table 3-11 presents CPW sensitive wildlife with potential to occur in the subwatersheds. The list was compiled using the current list of CPW threatened and endangered species list (CPW 2022b) and Tier 1 SGCN species (CPW 2015). Species appearing in **Table 3-11** either have documented occurrences in, or the potential to occur in, the subwatersheds. Species' potential for occurrence was reviewed using the CPW species activity mapping data that are updated regularly (CPW 2022a). Descriptions of these species with potential to occur in the subwatersheds and their respective habitats are provided in **Appendix E**.

Table 3-11. BLM UFO and CPW Sensitive Wildlife Species Potentially Occurring in the Subwatersheds.

Species	BLM / CPW Status[1, 2]	Subwatersheds[3]	
		North Fork	Crawford
MAMMALS			
Fringed myotis *Myotis thysanodes*	BLM S, Tier 1	X	X
Little brown myotis *Myotis lucifigus*	Tier 1	X	X
Northern pocket gopher *Thomomys talpoides macrotis*	SC	X	X
River otter *Lontra canadensis*	ST	X	--
Desert bighorn sheep *Ovis canadensis nelsoni*	BLM S	X	X
Spotted bat *Euderma maculatum*	BLM S, Tier 1	X	X
Townsend's big-eared bat *Corynorhinus townsendii*	BLM S, Tier 1	X	X
White-tailed prairie dog *Cynomys leucurus*	BLM S, Tier 1	X	X
BIRDS			
Bald eagle *Haliaeetus leucocephalus*	BLM S, SC	X	X
Brewer's sparrow *Spizella breweri*	BLM S	X	X
Burrowing owl *Athene cunicularia*	BLM S, ST, Tier 1	X	X
Ferruginous hawk *Buteo regalis*	BLM S, SC	X	X
Golden eagle *Aquila chrysaetos*	BLM S, Tier 1	X	X
Greater sandhill crane *Grus canadensis tabida*	Tier 1, SC	X	X
Long-billed curlew *Numenius americanus*	SC	X	X
Peregrine falcon *Falco peregrines*	BLM S, SC	X	X
REPTILES			
Midget faded rattlesnake *Crotalus viridis concolor*	BLM S, SC	X	--

[1.] BLM S = BLM UFO Sensitive; SE = State Endangered; ST = State Threatened; SC = Special Concern; Tier 1 = CPW designated Tier 1 SGCN.
[2.] Species without documented range in the subwatersheds are eliminated from further analysis.
[3.] -- = no potential occurrence or habitat; X = potential occurrence or habitat.

BLM Sensitive Wildlife Species Dismissed from Further Analysis

Several BLM sensitive wildlife species in the UFO resource area (including the Gunnison Gorge National Conservation Area) were eliminated from further analysis (**Table 3-12**) because their documented ranges lie outside the subwatersheds, or no suitable habitat is present in the subwatersheds.

Table 3-12. UFO BLM Sensitive Wildlife Species Dismissed from Further Analysis.

Species Dismissed from Further Analysis	Rationale for Dismissal from Further Analysis
Allen's (Mexican) big-eared bat *Idionycteris phyllotis*	Only known from the west end of Montrose County in the UFO resource area (Holsinger, pers. comm. 2020).
Rocky Mountain bighorn sheep *Ovis canadensis canadensis*	No CPW-mapped occurrences were identified where project activities would occur (CPW 2022b).
Great Basin silverspot butterfly *Speyeria nokomis*	The nearest documented silverspot colony in the UFO resource area is in Unaweep Canyon in Mesa County. No populations are documented or expected in the subwatersheds (Holsinger, pers. comm. 2020).
Gunnison's prairie dog[1] *Cynomys gunnisoni*	No CPW-mapped occurrences were identified where project activities would occur (CPW 2022b).
Kit fox[1] *Vulpes macrotis*	Semidesert shrublands, sagebrush shrublands, and shrubby margins of pinyon-juniper woodlands. Denning tends to occur in bottoms of steep-walled washes, and occasionally among rock outcrops and below rimrock. Historic range in Colorado is the Gunnison and Colorado River drainages below about 6,000 feet in elevation. Nearest recently documented population (prior to the year 2000) in the subwatersheds was in Peach Valley near Delta. That population is considered extirpated (Holsinger, pers. comm. 2020).
Longnose leopard lizard[1] *Gambelia wislizenii*	Records are from extreme west and southwest Colorado (Hammerson 1999). No populations are documented or expected in the subwatersheds (Holsinger, pers. comm. 2020).
Northern goshawk *Accipiter gentilis*	Breeding habitat consists of mature coniferous, deciduous (i.e., aspen), or mixed conifer forests with dense canopy closure and open understories. In Colorado, goshawks occur in mature stands of aspen, lodgepole pine, and spruce-fir forests at elevations from 7,500 to 11,000 feet. The subwatersheds do not contain suitable habitat and are lower in elevation than known occurrences in Colorado. The nearest documented goshawk nest is near Little Alder Creek in the Grand Mesa, Uncompahgre, and Gunnison National Forest (CPW, unpublished data).

[1.] These species are also listed by the CPW as sensitive wildlife species (CPW 2015, 2022b).

CPW Sensitive Wildlife Species Dismissed from Further Analysis

Additional CPW sensitive species have been dismissed from further analysis in this Supplemental Plan-EA based on a lack of suitable habitat or range in the subwatersheds. A list of species dismissed from further analysis is provided in **Table E-2** in **Appendix E**. Species' potential for occurrence was reviewed using the CPW species activity mapping data that are updated regularly (CPW 2022a). Given the extensive list of species from the state threatened and endangered and Tier 1 SGCN list (39) dismissed from further analysis, these species are not discussed further in this Supplemental Plan-EA.

3.5.2.1 North Fork

The only ESA-protected wildlife species expected in the North Fork subwatershed (**Table 3-10**) is the western yellow-billed cuckoo (threatened). The subwatershed also encompasses proposed critical habitat unit 56: CO-3 (North Fork Gunnison River, Delta County) for this species (**Appendix C, Figure 3.5-4**). Surveys for western yellow-billed cuckoos conducted during the summers of 2008, 2011, and 2015 detected cuckoos in the North Fork Gunnison River corridor near the towns of Paonia and Hotchkiss, with one confirmed breeding record in Hotchkiss near the confluence of the North Fork Gunnison River and Leroux Creek, the Hotchkiss sewage lagoon, and its relatively noisy pumphouse

(Beason 2012; Beason, pers. comm. 2017). Survey detections in 2015 occurred in the subwatershed from June 9 to August 15, with the August 15 detection being a fledgling (Beason, pers. comm. 2017). Proposed critical habitat for yellow-billed cuckoo follows the forested riparian corridor of the North Fork Gunnison River for approximately 20 miles, from near Bowie in the northeast part of the subwatershed to the area of the Hotchkiss National Fish Hatchery (**Appendix C, Figure 3.5-4**). The critical habitat also occurs in about 1.5 miles of the Roatcap Creek drainage upstream of its confluence with the North Fork Gunnison River, as well as about 1.7 miles of cottonwood forests along the south edge of Hansen Mesa and up Short Draw near the town of Hotchkiss. Approximately 7.6 percent (2,327 acres) of the subwatershed is mapped as proposed yellow-billed cuckoo habitat (**Table 3-10**).

BLM and CPW sensitive wildlife species expected or with the potential to occur in the North Fork subwatershed are white-tailed prairie dog, the bat species listed in **Table 3-11**, desert bighorn sheep (only the extreme west end in the North Fork canyon), northern pocket gopher, river otter, the raptors listed in **Table 3-11**, Brewer's sparrow, greater sandhill crane, long-billed curlew, and the midget faded rattlesnake. Only 4.9 percent of the North Fork subwatershed is BLM land.

3.5.2.2 Crawford

No ESA-protected terrestrial wildlife species are expected to occur in the Crawford subwatershed (**Table 3-10**), although the subwatershed encompasses designated critical habitat for Gunnison sage-grouse (**Appendix C, Figure 3.5-4**). The Crawford subwatershed lies northeast of documented occupied range of the Crawford population of Gunnison sage-grouse on Fruitland Mesa. Designated critical habitat is mapped on approximately 6.4 percent (about 1,900 acres) of the subwatershed (**Table 3-10**) around the area of Crawford Reservoir, and it is classified by the USFWS as "potential/unoccupied." A small amount (less than 8 acres) of mapped potential lynx habitat intersects the far east part of the subwatershed (**Appendix C**, Figure 3.5-6 of the 2018 Plan-EA) on the lower northwest-facing slopes of Saddle Mountain's north peak. This area is on a steep slope of mixed montane shrublands and does not represent suitable primary or secondary habitat for lynx. No documented occurrences of lynx are known from the area and any individuals in the area would be considered a transient or dispersing individual.

BLM and CPW sensitive species expected in, or with the potential to occur in, the Crawford subwatershed are white-tailed prairie dog, the bat species listed in **Table 3-11**, desert bighorn sheep (only the extreme west end in the Smith Fork canyon), northern pocket gopher, all raptors listed in **Table 3-11**, Brewer's sparrow, greater sandhill crane, and long-billed curlew. Approximately 21 percent of the Crawford subwatershed is BLM land.

3.5.3 Fish and Amphibians

Fish and amphibians are found throughout the North Fork and Crawford subwatersheds. Fish species primarily occur in the larger streams and rivers such as the Uncompahgre River, the North Fork Gunnison River, and the Gunnison River as well as their smaller perennial tributaries, such as the Cimarron River and Smith Fork. Fish also occur in a number of lakes, including Crawford Reservoir, Sweitzer Lake, and numerous small lakes and ponds. Tributary ephemeral and intermittent streams in the subwatersheds offer limited habitat for fish species. Native stream-dwelling fish species that occur in the project area include bluehead sucker, flannelmouth sucker, roundtail chub, speckled dace, and mottled sculpin. Salmonid species include rainbow trout, brook trout, brown trout, native greenback

(GB)-lineage cutthroat trout, and Colorado (CO)-lineage cutthroat trout. Nonnative warm water fishes such as smallmouth and largemouth bass, green sunfish, black crappie, bluegill, channel catfish, northern pike, longnose dace, white sucker, and common carp migrate to the local streams from nearby reservoirs and ponds, or from the Colorado River drainage. Nonnative fish compete with native fish for food and space; some nonnative species prey on native fish. The Lower Gunnison River Basin, as described in the 2018 Plan-EA (NRCS 2018), is home to populations of wild and native trout that are valued recreation and economic resources and important indicators of the health of riparian ecosystems.

Wetlands, ponds, lakes, streams, rivers, and ditches in the two subwatersheds provide potential breeding grounds for numerous amphibian species. The three most common amphibians in the subwatersheds are tiger salamanders, which typically occur in wetland or riparian habitats, and Woodhouse's toad and western chorus frog, both of which are widespread and common throughout their range. Other species that are known to occur or have historically occurred in the project area include great basin spadefoot toad, bullfrog, and northern leopard frog (Lyon and Williams 1998).

3.5.3.1 Federally Protected Species

According to the USFWS Environmental Conservation Online System IPaC tool, four federally listed fish species should be considered in analysis of the project area, as shown in **Table 3-13**. Descriptions of these species are provided in **Appendix E**. IPaC does not recommend inclusion of any federally listed amphibian species in the analysis of the project area (NRCS 2018).

Table 3-13. Federally Protected Fish Species in the Subwatersheds.

Species[1]	Legal Status[2]	Documented Range in North Fork[3]	Documented Range in Crawford[3]
Bonytail chub (*Gila elegans*)	E	N	N
Colorado pikeminnow (*Ptychocheilus lucius*)	E	N	N
Humpback chub (*Gila cypha*)	T	N	N
Razorback sucker (*Xyrauchen texanus*)	E	N	N

[1.] This species list was compiled using USFWS Environmental Conservation Online System IPAC. Potential effects on the greenback cutthroat trout are not considered in this analysis.
[2]. Status explanation for species listed under the federal ESA or the Colorado Nongame, Endangered, or Threatened Species. Conservation Act: E = Federally or state-listed as endangered; T = Federally or state-listed as threatened.
[3.] N = no (CNHP 2015). Species without documented range in the subwatershed have been eliminated from further analysis.

Designated Critical Habitat

Critical habitat for the bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker was designated in 1994 under one rule, as shown in **Table 3-14** (USFWS 1994).

Table 3-14. Designated Critical Habitat for the Colorado River Listed Fishes.

Species	Critical Habitat Location Description[1]
Bonytail chub	Upper Colorado River Basin: portions of the Colorado, Green, and Yampa Rivers Lower Colorado River Basin: Colorado River
Colorado pikeminnow	Upper Colorado River Basin: portions of the Colorado, Green, Yampa, White, Gunnison, and San Juan Rivers Lower Colorado River Basin: none designated
Humpback chub	Upper Colorado River Basin: portions of the Colorado, Green, and Yampa Rivers Lower Colorado River Basin: Colorado and Little Colorado Rivers
Razorback sucker	Upper Colorado River Basin: portions of the Green, Yampa, Duchesne, Colorado, White, Gunnison, and San Juan Rivers Lower Colorado River Basin: portions of the Colorado, Gila, Salt, and Verde Rivers

[1.] Upper Colorado River Basin includes portions of Colorado, New Mexico, Utah, and Wyoming. Lower Colorado River Basin includes portions of Arizona, California, and Nevada (USFWS 1994).
Source: USFWS 1994.

Three primary constituent elements (PCEs) were used in determining critical habitat for the four Colorado River listed fishes, as described below (USFWS 1994):

(1) Water – each species requires water of sufficient quantity and quality that is delivered in accordance with the specific hydrologic regime required for each species' particular life cycle.
(2) Physical Habitat – portions of the Colorado River system that are inhabited or potentially habitable by each species throughout their life cycle, including river channels, bottom lands, side channels, secondary channels, oxbows, backwaters, and other areas within the 100-year floodplain of designated waterways.
(3) Biological Environment – includes appropriate food supply, predation, and competition for each listed species.

In addition to these three PCEs, additional selection considerations were used to evaluate critical habitat areas for the razorback sucker. These five additional selection considerations include (1) presence of known or suspected wild spawning; (2) areas with suitable nursery habitat or where juveniles have been collected; (3) areas presently occupied by the species that show potential for species reestablishment; (4) areas of water required for rangewide distribution and diversity; and (5) areas that need special management or protection to ensure species survival and recovery (USFWS 1994).

3.5.3.2 BLM Sensitive Fish and Amphibian Species

The UFO of the BLM maintains a list of fish and amphibian species that have been identified as sensitive species (BLM 2015, 2019). **Table 3-15** lists these species and their potential to occur in each subwatershed. Descriptions of these species and their respective habitats are provided in **Appendix E**.

3.5.3.3 CPW Sensitive Fish and Amphibian Species

The state of Colorado lists 30 state threatened, endangered, and special concern fish and amphibian species and 27 Tier 1 SGCN fish and amphibian species (CPW 2015, 2022b). Of those 57 fish and amphibian species, 23 are listed on both the threatened and endangered species list and the Tier 1 SGCN list, for a total of 34 unique state-listed fish and amphibian species. Five species have the potential to occur in the subwatersheds.

Table 3-15 presents CPW sensitive fish and amphibian species with potential to occur in the subwatersheds and project-specific component project areas. The list was compiled using the current list of CPW threatened and endangered species list (CPW 2022b) and Tier 1 SGCN species (CPW 2015). Species appearing in **Table 3-15** either have documented occurrences in, or the potential to occur in, the subwatersheds. Species' potential for occurrence was reviewed using the CPW species activity mapping data that are updated regularly (CPW 2022a). Descriptions of these species with potential to occur in the subwatersheds and their respective habitats are provided in **Table 3-15**. A list of CPW sensitive fish and amphibian species dismissed from further analysis is provided in **Table E-2** in **Appendix E**.

Table 3-15. BLM and CPW Sensitive Fish and Amphibian Species with Potential Range in the Subwatersheds.

Species	BLM / CPW Status[1]	Documented Range in North Fork[2]	Documented Range in Crawford[2]
Bluehead sucker (*Catostomus discobolus*)	BLM S, Tier 1	Y	Y
Colorado river cutthroat trout (*Oncorhynchus clarki pleuriticus*)	BLM S, SC, Tier 1	Y	Y
Flannelmouth sucker (*Catostomus latipinnis*)	BLM S, Tier 1	Y	Y
Roundtail chub (*Gila robusta*)	BLM S, SC, Tier 1	Y	Y
Canyon treefrog (*Hyla arenicolor*)	BLM S	Y	Y
Northern leopard frog (*Rana pipiens*)	BLM S, SC, Tier 1	Y	Y

[1.] BLM S = BLM UFO Sensitive; SE = State Endangered; ST = State Threatened; SC = Special Concern; Tier 1 = CPW designated Tier 1 SGCN (Reclamation 2015; CPW 2015, 2022b).
[2.] Y = yes (CNHP 2015). Species without documented range in the subwatershed have been eliminated from further analysis.

3.5.3.4 Project Area Fisheries

Federally Listed Warm Water Fish and Native Fishery Below Delta

Two of the four warm water, federally listed fish species associated with the Colorado River watershed are known to occur or have been documented in the lower Gunnison River; downstream from Delta, Colorado; and downstream of the subwatersheds. These include the endangered Colorado pikeminnow and razorback sucker. During 2016, 33 Colorado pikeminnows and 1 razorback sucker were collected in the Redlands fish passage (CRRP 2016). In addition, 33 bonytail chubs were documented ascending the fish passageway at the Redlands Diversion Dam on the Gunnison River in 2016 (32 of these fish were stocked by the Ouray National Fish Hatchery Grand Valley Unit in 2016; CRRP 2016).

The fish trap at the Redlands Diversion Dam also documented captures of native bluehead sucker and flannelmouth sucker, white (hybrid) suckers, and roundtail chub (CRRP 2016). Nonnative fish captures included channel catfish, white sucker, gizzard shad, black bullhead, smallmouth bass, and green sunfish.

North Fork Fishery

Figure 3.4-6 in Appendix C of the 2018 Plan-EA illustrates the fisheries in the North Fork subwatershed. Tributaries to the North Fork Gunnison River and the North Fork mainstem are cold water streams. Cold water releases from Paonia Reservoir regulate streamflow in the subwatershed. However, aquatic habitat in the North Fork is limited throughout the watershed due to agricultural activity, land development, road construction, gravel mining, and other anthropogenic activities.

Overall, instream aquatic habitat in the subwatershed is limited by morphological responses in the stream to anthropogenic activities (North Fork River Improvement Association [NFRIA] 2000).

Brown and rainbow trout are the most common game fish species (NFRIA 2000). Cutthroat and brook trout are less common but are known to occupy habitat in the subwatershed. Other native species include mottled sculpin, longnose dace, speckled dace, flannelmouth sucker, bluehead sucker, and roundtail chub. Northern pike and green sunfish have escaped Paonia Reservoir and have been captured in the stream (NRCS 2018).

Crawford Fishery

Fisheries in the Crawford subwatershed are shown on Figure 3.4-7 in Appendix C of the 2018 Plan-EA. The mainstem of the Smith Fork in the Crawford subwatershed is listed as a cold water fishery by the CDPHE Water Quality Control Division (CDPHE 2016b). The upper reach of the mainstem—above the confluence with Little Coal Creek—supports rainbow trout, cutthroat trout, cutbows (cutthroat trout hybridized with rainbow trout), and brown trout. Colorado River cutthroat trout occupy Second Creek, a tributary to the Smith Fork.

Downstream of the upper reach of the mainstem is limited water availability throughout much of the growing season (May through October). Limited streamflow results in increasing water temperature, limiting habitat suitability for native species. In addition to greatly reducing in-stream flow, the Feeder Canal and Clipper Canal stream diversions (Figures 3.2-9 and 3.4-9 in Appendix C of the 2018 Plan-EA) act as barriers to fish migration and movement (West Slope Environmental and Western Slope Conservation Center [WSE/WSCC] 2016).

The Crawford Reservoir on the Smith Fork is located in the Crawford subwatershed and is managed by Reclamation to benefit irrigation, fish and wildlife, and flood control (Reclamation 2008). Crawford Reservoir is classified as a warm water fishery containing yellow perch, black crappie, channel catfish, largemouth bass, common carp, and rainbow trout (CPW 2019). Northern pike and common carp, illegally introduced in the mid-1990s, impacted the fishery for many years due to predation, particularly to largemouth bass and rainbow trout populations. Removal efforts in 2014 and 2015 were effective at reducing northern pike numbers and the expected result is a more balanced fishery (CPW 2019). The spillway/outlet of Crawford Reservoir may inadvertently be releasing nonnative fish in the Smith Fork drainage, a potential detriment to native species (WSE/WSCC 2016). According to the 303(d) list, Crawford Reservoir is not attaining the aquatic life use designation due to impairment from low dissolved oxygen (CDPHE 2016b).

3.6 Human Environment

3.6.1 Cultural and Historic Resources

Cultural History of the Lower Gunnison Project Area

Colorado's Office of Archaeology and Historic Preservation and the Colorado Council of Professional Archaeologists have produced a set of prehistoric and historic contexts to guide research and management of the state's cultural resources. These documents provide a framework of regional contexts and themes. See Section 3.6.1 of the 2018 Plan-EA for extensive prehistoric and historic

period summaries for the North Fork and Crawford subwatersheds. Both prehistoric and historic resources are common throughout the two subwatersheds and represent thousands of years of occupation, landscape use, settlement, and development.

Class III cultural resource survey of all project measures described in **Section 4.3** was conducted in September 2020 including access roads, staging areas, borrow areas, and project construction limits (see **Figures 4.3-1**, **4.3-1A**, and **4.3-2** in **Appendix B**) (Engleman 2020). Cultural resources that have either been listed in the National Register of Historic Places (NRHP) or are eligible for listing in the NRHP would require treatment of any adverse effects resulting from impacts due to project activities and construction (refer to **Section 5.9.1**, which addresses adverse effects and the Memorandum of Agreement [MOA]). Any cultural resources that have been determined needs data (requiring additional information before a determination of NRHP eligibility can be made) are also treated as eligible for inclusion in the NRHP until demonstrated through further work that they are not eligible. Sites that have officially been determined not eligible by the NRCS and cooperating federal agencies for inclusion in the NRHP do not require further consideration of project effects. Isolated finds consist of a limited number of artifacts or isolated features that represent limited human activity and are generally considered not eligible for inclusion in the NRHP.

3.6.1.1 North Fork

For more information on previously recorded cultural resources in the North Fork subwatershed, see Section 3.6.1.1 of the 2018 Plan-EA (NRCS 2018). Two previous cultural resource surveys are associated with the North Fork project measures (**Table 3-16**). No previous sites were located in the North Fork project measures.

Table 3-16. Previous Cultural Resource Surveys Intersecting the Proposed Work in the North Fork Subwatershed Area of Potential Effects (APE).

State Project No.	Report Title (Date)	Institution
DT.SC.NR17	Delta Limited Results Cultural Resources Survey Report-Kelly Lyon (2009)	NRCS
MC.LM.R135	A Cultural Resource Survey of Approximately 4,155 Acres of Bureau of Land Management Land on the Western Slope of the Colorado Rocky Mountains (97-17), Cultural Resource Inventory-Ubra Project 1996, Delta, Gunnison, Montrose, Ouray, Saguache, and San Miguel Counties, Colorado (1997)	P-Aztlan Archaeology, Inc.

Twelve cultural resources were documented within or overlapping project measures in the North Fork subwatershed during the 2020 cultural resource survey. These resources consist of a segment of the FMC, one historic ranch, one trash scatter, one prehistoric open lithic scatter, five prehistoric isolated finds, and three historic isolated finds **(Table 3-17**). The FMC is eligible for the NRHP; this segment (5DT1277.9) is supporting of the eligibility. All other resources documented in the North Fork project measures are not eligible for the NRHP.

Table 3-17. Newly Recorded Cultural Resources in the North Fork Subwatershed APE.

Project Element	Site Number	Site Type	Site Name/ Description	NRHP Eligibility
Fire Mountain Canal Piping	5DT1277.9	Irrigation ditch	Fire Mountain Canal	Eligible, supporting
Fire Mountain Canal Piping	5DT2465	Open lithic scatter	Precontact	Not eligible
Fire Mountain Canal Piping	5DT2466	Trash scatter and precontact isolated find	Multicomponent	Not eligible
Fire Mountain Canal Piping; pressure regulating reservoir	5DT2469	Ranch	Historical	Not eligible
Fire Mountain Canal Piping	5DT2470	Precontact isolated find	Two flakes	Not eligible
Fire Mountain Canal Piping	5DT2471	Precontact isolated find	Two flakes	Not eligible
Fire Mountain Canal Piping	5DT2472	Precontact isolated find	Three flakes	Not eligible
Fire Mountain Canal Piping	5DT2474	Historical isolated find	Prince Albert tobacco tin	Not eligible
Fire Mountain Canal Piping	5DT2475	Historical isolated find	Amethyst bottle	Not eligible
Fire Mountain Canal Piping	5DT2476	Historical isolated find	Hole-in-cap can	Not eligible
Fire Mountain Canal Piping	5DT2477	Precontact isolated find	Four basalt flakes and a tested cobble	Not eligible
Fire Mountain Canal Piping	5DT2478	Precontact isolated find	Four basalt flakes and a uniface	Not eligible

3.6.1.2 Crawford

For more information on previously recorded cultural resources in the Crawford subwatershed, see Section 3.6.1.2 of the 2018 Plan-EA (NRCS 2018). Ten previous cultural resource surveys and four previously documented ditch segments overlap the project measures (**Table 3-18** and **Table 3-19**, respectively). Resources consist of two segments of the Aspen Canal (5DT1584.2 and 5DT1584.3), a segment of the Southern Cottonwood Lateral (5DT1594.1), and a segment of the Zanni Lateral of the Crawford Clipper Ditch (5DT1811.3).

Table 3-18. Previous Cultural Resource Surveys Intersecting Project Measures in the Crawford Subwatershed APE.

State Project No.	Report Title (Date)	Institution
DT.LM.NR180	A Class III Cultural Resources Inventory for the Young's Peak Communications Site Access Road, Delta County, Colorado	Unspecified
DT.LM.NR29	Young's Peak Communication Site Inventory, Delta County, Colorado (1981)	BLM Montrose District Office
DT.LM.R85	A Class III Cultural Resources Inventory for the Aspen Ditch Access Roads Right-of-Way, Delta County, Colorado	Unspecified
DT.R.NR8	A Cultural Resources Clearance Survey of the Smith Fork Project, Delta County, Colorado (1981)	Reclamation - Western Colorado Grand Junction
DT.R.R12	Cultural Resource Inventory of the South Cottonwood Lateral of the C Ditch, Delta County, Colorado (2014)	Alpine Archaeological Consultants
DT.R.R23	Cultural Resource Inventory of the Zanni Lateral of the Crawford Clipper Ditch and Six Block Areas for Staging or Borrows: Delta County, Colorado	Alpine Archaeological Consultants
MC.E.R106	A Cultural Resource Inventory of Portions of the Curecanti-Rifle 230-Kv Transmission Line and Access Roads Western Area Power Administration, Delta, Garfield, and Montrose Counties, Colorado	Alpine Archaeological Consultants
MC.E.R74	A Cultural Resources Inventory for the Western Area Power Administration's Curecanti-Rifle 230-Kv Transmission Line Access Roads and Right-of-Way Vegetation Clearing, Delta, Mesa, and Garfield Counties, Colorado (2005)	Alpine Archaeological Consultants
MC.R.R13	Class III Archaeological Survey of 370 Acres in the Crawford Recreational Area, Delta and Montrose Counties, Colorado (1993)	4-Corners Archaeological Services
-	A Class III Cultural Resource Survey for the Lower Gunnison Project, Delta, Gunnison, and Montrose Counties, Colorado (2017)	HDR

Table 3-19. Previously Documented Resources Overlapping the Project Measures in the Crawford Subwatershed APE.

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)	Status
5DT1584.2	DT.R.R12; MC.E.R74	Aspen Canal segment	Officially not eligible (2013)	Revisited
5DT1584.3	DT.R.R23	Aspen Canal segment	Officially not eligible, nonsupporting (2015)	Revisited
5DT1594.1	MC.E.R74; DT.R.R20; DT.R.R12	Southern Cottonwood Lateral/Hice/Needlerock Ditch segment	Officially eligible, supporting (2013)	Documented new segment
5DT1811.3	DT.R.R23	Crawford Clipper Ditch Segment Zanni lateral	Officially eligible, nonsupporting (2015)	Documented new segments

Five cultural resources were documented within or overlapping project measures in the Crawford subwatershed during the survey. Resources consist of the Aspen Canal, one segment of the South Cottonwood Lateral of the Hice Ditch, and three segments of the Crawford Clipper Ditch (**Table 3-20**). The Aspen Canal is determined eligible for the NRHP and two of the segments of the Crawford Clipper Ditch (5DT1811.7 and 5DT1811.8) are supporting of the eligibility. The remaining ditch segments documented within or overlapping Crawford subwatershed project measures are nonsupporting of the eligibility of the resource.

Table 3-20. Newly Recorded Cultural Resources in the Crawford Subwatershed APE.

Project Element	Site Number	Site Type	Site Name/ Description	NRHP Eligibility
SCADA Aspen Canal	5DT1584	Irrigation Ditch	Aspen Canal	Officially eligible
SCADA Aspen Gates 6 and 7	5DT1594.3	Irrigation Ditch	C Ditch/South Cottonwood Lateral of the Hice Ditch/Needlerock Ditch segment	Officially eligible, nonsupporting
SCADA at Crawford Clipper Headgate	5DT1811.7	Irrigation Ditch	Crawford Clipper Ditch segment	Officially eligible, supporting
SCADA Clipper/Aspen Splitter, Clipper Sedimentation Basin Expansion, Clipper Piping Project	5DT1811.8	Irrigation Ditch	Crawford Clipper Ditch segment	Officially eligible, supporting
SCADA Aspen Canal to Zanni Turnout	5DT1811.9	Irrigation Ditch	Crawford Clipper Ditch segment (Zanni Lateral)	Officially eligible, nonsupporting
SCADA access road	5DT2467	Trash Scatter	None	Officially needs data

3.6.2 Land Use and Recreation

3.6.2.1 Land Use

Land uses in the subwatersheds primarily include farmland, ranch and pasture land, forested lands, grasslands, and residential/developed lands (USGS 2011). **Table 3-21** shows the percentage of the primary land use categories in the watershed area by subwatershed.

Agriculture uses include forage for livestock (primarily cattle), field and sweet corn, onions, beans, small grains, and orchards (River District 2015). The ranch and pasturelands category groups include lands that may be used for dryland grazing and include sagebrush shrublands and semidesert shrublands.

Grasslands include mixed montane shrublands and open water/emergent wetlands. The forest category includes montane or subalpine woodlands/forest, pinyon-juniper woodlands, and riparian woodlands/forests. Residential and developed lands include urban and rural residences, as well as

associated infrastructure such as water and utility lines and roads. The project area is generally sparsely populated, except for those areas on the margins of towns with higher population density, including Hotchkiss and Crawford (USGS 2017). Rural residences typically include parcels of associated farmable land approximately 10 acres or larger to accommodate agriculture, primarily raising forage for cattle feed and animal husbandry. On publicly owned or managed lands, ranchers can lease federal land from the USFS and BLM for livestock grazing (River District 2015).

Table 3-21. Land Use Category by Subwatershed.

Subwatershed	Land Use Type			
	Agriculture	Residential/ Developed	Grasslands	Forest
North Fork	55.8%	3.2%	5.2%	27.5%
Crawford	40.2%	0.3%	5.1%	25.5%

BLM-managed lands are located in both subwatersheds; portions of BLM-managed lands in the subwatersheds lie within the UFO of the BLM, and the UFO is the lead BLM office. According to the BLM statewide land classification, other land ownership in the two watersheds include the National Park Service (NPS), Local (State Wildlife Areas and Crawford State Park), and Other (National Fish Hatchery). Refer to **Table 3-22** for a breakdown of land ownership in each subwatershed (BLM 2017).

Table 3-22. Land Ownership by Subwatershed.

Subwatershed	Private	BLM	NPS (Hotchkiss National Fish Hatchery)	Local (Crawford State Park)	Other
North Fork	95%	4%	0.3%	—	<1
Crawford	77%	20.5%	—	2.5%	—

Approximately 11,184 acres of grazing allotments on BLM-managed lands occur in the two subwatersheds (including 1,671 acres in the North Fork subwatershed and 9,513 acres in the Crawford subwatershed). No designated wilderness areas or wilderness study areas are in the subwatersheds. However, one BLM Area of Environmental Concern (83.5 acres of the Needle Rock Outstanding Natural Area) lies within the Crawford subwatershed (NRCS 2018). Project activities would not occur on or affect lands owned by the USFS, NPS, local, or other entities. Therefore, these lands are not discussed further.

3.6.2.2 Recreation

Recreation resources are those places or amenities set aside or used as parklands; beaches; trails (e.g., hiking, skiing, bicycling, and equestrian); recreation fields; open spaces; aesthetically pleasing landscapes; and a variety of other locales. National, state, and local jurisdictions typically have designated land areas with defined boundaries for recreation. Other less-structured activities, such as cross-country skiing, are performed in broad less-defined locales. A recreational setting might consist of natural or human-made landscapes and can vary in size from a roadside monument to a designated sport area to a multimillion-acre wilderness area. For the purpose of this analysis, only outdoor recreation resources are described (NRCS 2018).

Recreational opportunities on privately owned land include municipal parks, team sports, hunting, fishing, and floating on inflatable tubes in irrigation canals. Tubing in irrigation canals is not authorized and poses a safety risk, particularly when crossing over low head dams, check dams, and other structures in the irrigation canals. The Stewart Ditch access road, which runs parallel along the ditch's north side through Paonia, is a popular walking route for residents having permission to use the

easement. Similarly, limited portions of the FMC are also used by residents for walking, running, and horseback riding. These are privately owned access points and are not open to the public (NRCS 2018).

Recreation on BLM-managed lands includes hiking, camping, fishing, horseback riding, hunting, mountain biking, off-highway vehicles, rock climbing, water recreation, and winter sports (BLM 2017).

Crawford Reservoir, located south of Crawford in the Crawford subwatershed, is a popular recreation amenity in Delta County and is managed by CPW. During summer months, camping, jet skiing, motor boating, water skiing, fishing, biking, walking, and picnicking are common activities. Waterfowl hunting is allowed in the fall, beginning with teal and Canada goose in September (CPW 2024).

3.6.3 Scenic Beauty and Visual Resources

Visual resources are a composite of basic topography, geologic features, water features, vegetative patterns, man-made features, and land uses that typify an area and influence the visual appeal that an area might have to viewers. Although scenic quality of a given landscape is subjective, that quality is derived from several objective characteristics. These characteristics include the diversity of elements comprising the landscape, the degree of harmony or order of landscape elements, focal points that naturally draw attention, and unique visual or aesthetic characteristics that may not be seen or experienced elsewhere.

Scenic quality is a measure of visual appeal based on the visual elements of landform, vegetation, water, and color, as well as scarcity or uniqueness, cultural modification, and the influence of adjacent scenery. Visual sensitivity is a measure of public concern for scenic quality and considers the types of viewers, amount of use, public interest, and land use (BLM 1986a).

As described in the 2018 Plan-EA (NRCS 2018), the North Fork subwatershed is a narrow agricultural region along the river corridor (North Fork Gunnison River) with agricultural, residential, and community development around and between surrounding hills. The landscape of the Barrow Mesa area, located in the northern subwatershed and where the Proposed Action would be located, is characterized by steeply rising hills covered in pinyon-juniper woodlands and more native vegetation than surrounding agricultural areas to the south. On top of the mesa, the Barrow Mesa area is flat, arid, open saltbush scrub with very little vegetation present. The Proposed Action activities would be concentrated in the central and southern portions of the Crawford subwatershed. Several SCADA sites would be installed along the northern edge of the Young's Peak foothills, characterized by rolling terrain, dark gray exposed Mancos Shale soils, with dense pinyon-juniper woodlands. A radio repeater would be added to an existing SCADA tower on the top of Young's Peak, the prominent peak near Crawford. Several SCADA towers would be installed east and south of Crawford State Park and Highway 92. These areas are associated with waterways and contain dense willows, cottonwoods, and one open shoreline area. Proposed Action activities west of the town of Crawford would be located in rolling agricultural fields bordered by native pinyon-juniper woodlands.

For more information on the scenic and visual resources in the greater North Fork and Crawford subwatersheds, see Section 3.6.3 of the 2018 Plan-EA (NRCS 2018).

In the North Fork subwatershed, a small portion of the access road for the Coal Road Regulating Reservoir is located on BLM land with a Visual Resource Management (VRM) Class II objective, which aims to "preserve the existing character of the landscape," allowing for limited management activity and low levels of change to the characteristic landscape that do not attract attention (BLM 2009). In the Crawford subwatershed, SCADA Gates 1 and 2 and the radio repeater addition to the existing SCADA tower on Young's Peak would be located on BLM land with a VRM Class III objective, providing for moderate levels of change to the characteristic landscape (BLM 2009).

3.6.4 Socioeconomics

Socioeconomics for the project area can be assessed at the state and regional (county) scale. For this study, the socioeconomic considerations are presented for the primary counties where the subwatersheds are located (Delta, Gunnison, and Montrose), as well as the state of Colorado. The amount of each subwatershed located in the counties is shown in **Table 3-23**. Note that while all project measures occur in Delta County, the other counties are provided for context in the sections that follow.

The following sections and tables present the current status of key social and economic indicators for the project area including agricultural production, population demographics, and employment income and poverty.

3.6.4.1 Agricultural Statistics

Table 3-23 presents summarized agricultural information for each county from the 2012 USDA Census of Agriculture (USDA 2012). The top crop item produced in all three counties by acreage is forage (defined as all hay and haylage, grass silage, and greenchop). In Delta County, the next two largest crops produced are corn for grain and silage. In Montrose County, corn for grain, dry edible beans, corn for silage, and harvested vegetables were the remaining top crops.

Table 3-23. Agricultural Statistics by County.

	2017	2012	Percent Change
Delta County			
Number of Farms	1,615	1,250	29%
Land in Farm (acres)	236,846	250,761	-6%
Average Size of Farm (acres)	147	201	-27%
Market Value of Products Sold	$67,117,000	$55,639,000	21%
Crop Sales	45%	42%	7%
Livestock Sales	55%	58%	-5%
Average per Farm	$41,558	$44,511	-7%
Gunnison County			
Number of Farms	309	244	27%
Land in Farm (acres)	266,922	190,243	40%
Average Size of Farm (acres)	864	780	11%
Market Value of Products Sold	$24,117,000	$12,986,000	86%
Crop Sales	23%	14%	64%
Livestock Sales	77%	86%	-10%
Average per Farm	$78,047	$53,222	47%
Montrose County			
Number of Farms	1,135	1,128	1%
Land in Farm (acres)	330,523	329,653	0%
Average Size of Farm (acres)	291	292	0%
Market Value of Products Sold	$81,226,000	$103,221,000	-21%
Crop Sales	23%	33%	-30%
Livestock Sales	77%	67%	15%
Average per Farm	$71,565	$91,508	-22%

Source: USDA 2017.

3.6.4.2 Population Demographics

Table 3-24 presents the total population with percent breakdowns for gender and age for each county, the state of Colorado, and the United States for comparison from the 2020 Decennial U.S. Census (USCB 2020). The populations of Delta, Gunnison, and Montrose Counties have all increased since 2015 (USCB 2015).

Table 3-24. Population Characteristics by County, State, and U.S. (2020 Decennial Census).

Population Criteria		Delta County	Gunnison County	Montrose County	Colorado (State)	United States
Total Population		31,196	16,918	42,679	5,773,714	331,449,281
Gender	Female	48.9%	46.1%	50.2%	49.7%	50.5%
	Male	49.6%	55.1%	48.9%	51.0%	49.6%
Age	Under 18	19.5%	17.1%	21.3%	21.4%	22.1%
	65 and older	25.9%	13.8%	23.8%	15.1%	16.8%

Source: USCB 2020.

Ethnicity and race are shown for the project area in **Table 3-25** and **Table 3-26.** Delta and Gunnison Counties contain a lower percentage of persons identifying as non-Hispanic or Latino than the state average. In Montrose County, the number of persons identifying as Hispanic or Latino exceeds the national level but is just below the state percentage.

Table 3-25. Ethnicity by County, State, and U.S. (2020 Decennial Census).

Population Criteria		Delta County	Gunnison County	Montrose County	Colorado (State)	United States
Total Population		31,960	16,918	42,679	5,773,714	331,449,281
Hispanic or Latino	Number	4,329	1,604	9,027	1,263,390	62,080,044
	Percent	13.5%	9.5%	21.2%	21.9%	18.7%
Non-Hispanic or Latino	Number	27,631	15,314	33,652	4,510,324	269,369,237
	Percent	86.5%	90.5%	78.8%	78.1%	81.3%

Source: USCB 2020.

The population of all three counties is predominantly white with all other races accounting for 8 to 29 percent of the population.

Table 3-26. Race by County, State, and U.S. (2020 Decennial Census).

Population Criteria		Delta County	Gunnison County	Montrose County	Colorado (State)	United States
Total Population		31,960	16,918	42,679	5,773,714	331,449,281
White	Number	26,117	14,652	33,395	4,082,927	191,697,647
	Percent	81.7%	86.6%	78.2%	70.7%	57.8%
Black or African American	Number	145	88	181	234,828	39,940,338
	Percent	0.5%	0.5%	0.4%	4.1%	12.1%
Asian	Number	243	122	338	199,827	19,618,719
	Percent	0.8%	0.7%	0.9%	3.5%	5.9%
American Indian and Alaska Native	Number	294	203	577	74,129	2,251,699
	Percent	0.9%	1.2%	.8%	1.3%	0.7%
Native Hawaiian and Pacific Islander	Number	9	7	36	10,287	622,018
	Percent	0.03%	0.4%	0.1%	0.2%	0.2%
Two or More Races	Number	2,627	1,174	4,282	707,670	12,637,189
	Percent	8.2%	6.9%	10%	12.3%	3.8%

Source: USCB 2020.

3.6.4.3 Employment, Income, and Poverty

Table 3-27 demonstrates labor force characteristics for the counties and Colorado. Unemployment is lower in all three counties than the state average.

Table 3-27. Labor Force Characteristics (2020 Decennial Census).

Indicator	Delta County	Gunnison County	Montrose County	Colorado (State)
Labor Force	12,077	10,518	19,425	3,212,836
Employed	11,242	10,074	18,381	3,002,106
Unemployed	835	444	1,034	168,571
Unemployment Rate	3.3%	3%	3%	3.6%

Source: USCB 2020.

Table 3-28 summarizes employment by industry classification. The primary sectors of employment in all three counties include: “Retail trade”; “Finance and insurance, and real estate and rental and leasing”; “Professional, scientific, management, administrative, and waste management services”; “Educational services, and health care and social assistance”; and “Public administration.” Delta County has a higher rate of employment in the seasonal category “Agriculture, forestry, fishing and hunting, and mining.” Gunnison County has nearly one-quarter of its employment in “Arts, entertainment, and recreation, and accommodation and food services.”

Table 3-28. Employment by Industry (2020 Decennial Census).

Employment Sector	Delta County	Gunnison County	Montrose County	Colorado (State)
Agriculture, forestry, fishing and hunting, and mining	12.4%	2.8%	4.8%	1.8%
Construction	10.5%	11.6%	12.9%	8.1%
Manufacturing	5.9%	1.7%	7.2%	7%
Wholesale trade	2.9%	1%	2%	2.4%
Retail trade	10.7%	13.9%	13.4%	10.8%
Transportation and warehousing, and utilities	4.3%	2.7%	4.1%	5.1%
Information	1.7%	1.6%	1.3%	2.5%
Finance and insurance, and real estate and rental and leasing	4.2%	4.2%	5.1%	7.5%
Professional, scientific, management, administrative, and waste management services	7%	9.4%	7.7%	15.1%
Educational services, and health care and social assistance	23.3%	17.5%	21.3%	21.8%
Arts, entertainment, and recreation, and accommodation and food services	9.1%	23.4%	9.2%	8.4%
Other services, except public administration	4.9%	4.4%	5.6%	5%
Public administration	3.1%	5.8%	5.3%	4.6%

Source: USCB 2020.

Household income and persons living below the poverty level are summarized in **Table 3-29** (USCB 2020). Incomes in all three counties are below incomes for the state of Colorado. The percentage of persons living below the poverty level in all three counties is higher than the state average.

Table 3-29. Income and Poverty Rates.

Indicator	Delta County	Gunnison County	Montrose County	Colorado (State)
Median Household Income	$47,968	$60,557	$54,611	$82,254
Persons in Poverty	18.1%	12.4%	12.3%	9.7%

Source: USCB 2020.

Environmental Justice communities are not present in the counties of the project area. For all three counties, the percentage of minorities is less that the state and national averages (see **Table 3-25** and **Table 3-26**). In addition, while the poverty rates for all three counties is higher than the state average (see **Table 3-29**), it is not meaningfully greater than the state average (less than 10 percent difference).

Chapter 4. Alternatives

4.1 Alternative Formulation Process

The improvement projects listed under the action alternatives in **Table 4-2** and **Table 4-3** were identified and prioritized in terms of cost-effective benefits relative to the four natural resource concerns identified in the description of the Colorado River CCA (insufficient water availability, degraded water quality, poor soil conditions, and impaired aquatic habitats). Logistics, timing and design status, and other variables also were considered in eliminating and including projects. A total of 19 project measures were considered; 13 were eliminated and the remaining 6 were carried forward in the analysis in two action alternatives. Three alternatives were carried forward for further study in this Supplemental Plan-EA: Alternative 1 (No Action Alternative), Alternative 2, and Alternative 3. Formulating alternatives determines all possible measures that could be used to address the problems and meet objectives. A description of these alternatives is presented below. Additional information is included in the NRCS 9-Step Process Memo (see **Appendix E**).

4.2 Alternatives Considered but Eliminated from Detailed Study

A memo summarizing the NRCS 9-step conservation planning process is included in **Appendix E**, **Section E.1**. **Table 4-1** includes measures that were considered and eliminated, along with a description of the rationale for elimination.

Table 4-1. Measures Considered but Eliminated.

Measure Considered	Selection Decision and Rationale
Grandview diversion structure and gate rebuild	Exclude; the project required completion more quickly than the P.L. 566 process could support. Other funding secured.
Grandview storage regulating pond, sedimentation, and clean-out structure on the Grandview Canal	Exclude; the project required completion more quickly than the P.L. 566 process could support. Other funding secured.
Clipper regulating water pond, piping, and expanded sediment basin	Exclude; the project required completion more quickly than the P.L. 566 process could support. Other funding secured.
SCADA at three water trade sites (Saddle Mountain, Virginia, and at the "Clear Fork" site where return flows come into the reservoir)	Exclude; communication between SCADA locations and tower would be problematic topographically.
Fire Mountain diversion structure replacement	Exclude; additional planning and engineering studies required; not financially feasible and lower priority.
Fire Mountain additional SCADA locations	Excluded extraneous and redundant SCADA once decisions were made for piping sections.
Paonia Ditch improvements and SCADA - improvements to diversion structure, better spill, keeping water split out	Exclude; lack of consensus by stakeholders for most effective project.
Fire Mountain additional pipeline in Wolf Park area - Wolf Park siphon	Exclude, this section is in an area with highest salinity; Reclamation salinity funding more appropriate.
Piping Rogers Mesa East (no consensus, under study)	Exclude; lack of consensus by stakeholders for most effective project; additional planning and engineering studies required.
Overland and Highline piping (above Rogers Mesa)	Exclude; lack of consensus and property owner concerns.
Farmers Ditch - Improvement to manage flows in Hotchkiss; safety improvement to diversion	Funded with state and Reclamation funds.
Terror Creek Ditch improvements and SCADA	Exclude; not within planning boundary.
Bostwick Park East Lateral	Included as part of Bostwick Park's P.L. 566 request.

4.3 Alternatives Considered for Detailed Study

Additional information on the scoping, alternative formulation, alternative evaluation, and comparison and screening process is in **Sections 2.1.1.3** and **4.1**. Three alternatives are considered for the project that were carried forward for further study in this Supplemental Plan-EA: Alternative 1 (No Action), Alternative 2, and Alternative 3. Alternatives 2 and 3 have common measures with the exception of the regulating reservoir location in the North Fork subwatershed and slight changes in associated piping and SCADA locations. Alternative locations for the regulating reservoir are needed because of uncertainties related to land or easement acquisition on private land. Both a federal land option and private land option were included in the analysis to provide flexibility in case of an unwilling landowner; the current landowner for the 3300 Road Regulating Reservoir location previously was not open to negotiation for purchase of the needed land. A description of these alternatives is presented below. A breakdown of project installation costs for the alternatives described below is provided in **Section 4.3.4**.

Permitting and authorizations for action alternatives project measures would be required by Reclamation. Alternatives 2 and 3 would require both a License Agreement and Letter of Consent from Reclamation. Alternatives 2 and 3 would require a use authorization for the new access to SCADA and the Coal Road Repeater Tower, in addition to the use authorizations for the piping of FMC and SCADA installs (including Crawford State Park). For Alternative 2, Coal Road Regulating Reservoir, use authorization would be required if the reservoir is built on Reclamation land. Additional details are discussed below.

4.3.1 Alternative 1–No Action (Future without Federal Investment)

The No Action Alternative assumes that with no NRCS funds, implementation of all the supplemental measures of the Lower Gunnison Project would not occur in the reasonably foreseeable future. Therefore, for purposes of this Supplemental Plan-EA, the No Action Alternative is the near-term continuation of the status quo, including the continuation of inefficient water use and associated conditions of insufficient water availability, degraded water quality, poor soil conditions, and impaired aquatic habitats.

4.3.2 Alternative 2–Coal Road Regulating Reservoir

Alternative 2 consists of a batch of supplemental measures that are irrigation water efficiency upgrades within two of four approved Lower Gunnison subwatersheds (North Fork and Crawford) that were delineated by the River District in the 2018 Plan-EA and meet the definition of a watershed as outlined in the NRCS's NWPM (NRCS 2015). See **Appendix B, Figure 4.3-1, and Figure 4.3-1A** for maps of Alternative 2 project measures). These improvements would create an integrated irrigation system that would improve the efficiency of agricultural water use. For example, the regulating reservoir would capture snowmelt before it flows into the FMC, thereby improving agricultural water supplies by aligning water availability with water demand and reducing seepage and deep percolation of agricultural waters, thereby reducing associated salt and selenium loading. The piped sections of the FMC would also reduce seepage and deep percolation, thereby enhancing agricultural water supplies and reducing costs to control salt and selenium loading that result in downstream damages. This Supplemental Plan-EA assumes that the water saved by implementing project measures will be

available to the water users and most often they will choose to use it for irrigating existing cropland, as discussed in detail in Section D.3 of the Investigation and Analysis Report (Appendix D).

4.3.2.1 North Fork Subwatershed

The batch of project measures proposed in the North Fork subwatershed include piping 13,800 feet of the FMC, installing the Coal Road Regulating Reservoir on Reclamation lands, and installing four SCADA systems (see **Photograph 4.3-1**) and a Repeater Tower (**Table 4-2**). These improvements would create an integrated irrigation system that would improve the efficiency of agricultural water use. For example, the regulating reservoir would capture snowmelt before it flows into the FMC, thereby improving agricultural water supplies by aligning water availability with water demand and reducing seepage and deep percolation of agricultural waters, thereby reducing associated salt and selenium loading. The piped sections of the FMC would also reduce seepage and deep percolation, thereby enhancing agricultural water supplies and reducing costs to control salt and selenium loading that result in downstream damages. Piping the canal would reduce the O&M costs because piped ditches require less maintenance and repair.

The Coal Road Regulating Reservoir would require a new federal ROW or easement; this process would be initiated once this option is selected via an SF-299 process administered by the BLM UFO. Authorization for use of land owned by Reclamation (as described above) and operated by the state of Colorado (CPW), and Reclamation-owned land, would be obtained prior to project construction. Otherwise, no new federal ROWs or easements are anticipated to be needed as part of the project.

Table 4-2. North Fork Project Measures.

Component	Location	Description
Fire Mountain Piping Project	The east end of the Segment 47 Piping Project to the Regulating Reservoir Site	13,800 feet of 72-inch Spirolite pipe would be installed in a 60-foot-wide ROW. Staging areas required for storing equipment and pipe would be established within the footprint of the Coal Road Regulating Reservoir.
Fire Mountain Regulating Reservoir	Coal Road Regulating Reservoir on Reclamation Land 0.5 mile east of 3300 Road	The project would consist of a 44- to 60-AF reservoir and associated inlet and outlet works. The maximum stored water footprint/construction disturbance is 4.7 to 6.7 acres. Construction access would be along Canal Road. The water depth would be about 28 feet (please see Appendix E for the complete Feasibility Study; Applegate Group, Inc. 2019).
SCADA Network	SCADA Coal Road Repeater Tower and FM New Access to SCADA	A SCADA network, consisting of a tower site and four SCADA sites would be installed to support the regulating reservoir and pipeline. A single SCADA site generally includes water level sensors, buried conduit, relay antenna (telemetry equipment), solar power, and panels; and would occupy about 20 square feet or less after construction.
	Inlet	
	Outlet	
	Coal Road Drop Site	
	SCADA Site 10	

Source: Applegate Group, Inc. 2019, 2020; pers. comm. 2020.

4.3.2.2 Crawford Subwatershed

Project measures proposed in the Crawford subwatershed consist of installation of 16 SCADA sites and a repeater antenna on an existing tower (**Table 4-3**). Most measures would be situated on private lands, four SCADA sites would be located on Reclamation land operated by CPW, and three SCADA sites and the KREX on an existing tower would be located on BLM land (see **Figure 4.3-2, Appendix B**).

Table 4-3. Crawford Project Measures.

Component	Location	Description
SCADA Network	Crawford Clipper Headgate	Each SCADA system generally includes gate control equipment, a stilling well, water level sensors, 1-inch buried conduit, a relay antenna (telemetry equipment), solar power, and panels. Increased water use efficiency would occur based on the modernization and conversion of the existing direct delivery irrigation systems (using an "always-on" supply-driven system) to a more well-timed irrigation and producer "demand-driven" system. Each SCADA system would occupy a maximum footprint of about 20 square feet after construction.
	Aspen Canal to Zanni Turnout[1]	
	Aspen Canal[1]	
	Clipper/Aspen Splitter	
	Grandview Diversion	
	Alkali Creek Inlet	The SCADA components are as described above but without the gate control equipment, and including a stilling well, a water level sensor, 1-inch buried conduit, a relay antenna (telemetry equipment), solar power, and panels.
	Muddy/Iron Creek Inlet	
	Feeder Canal/Daisy Ditch	
	Clear Fork Inlet	
	SCADA Gates 1 through 7 on the Aspen Canal (seven total)[1]	The SCADA components are as described above but without a stilling well or water level sensor, and with a turbine or differential flow transmitter.
	KREX on Existing Tower	This component is installation of a radio repeater antenna.

Source: Harward, pers. comm. 2020; Ligrani, pers. comm. 2020.
[1]. Note that the Aspen Canal is a component of the Smith Fork Project and would require Reclamation authorization.

4.3.2.3 SCADA Systems

SCADA systems are proposed to be installed in each subwatershed to improve system efficiency through remote monitoring and data acquisition and remote control. SCADA systems are computer-controlled irrigation systems that gather and analyze real time data on operational parameters of the irrigation distribution system to remotely control the system to ensure it operates as efficiently as possible. Their use improves the operational effectiveness and efficiency of irrigation systems and reduces water losses by relaying real-time data to a central location where system operators can monitor conditions and use remote control of system infrastructure used to regulate water distributions. In the absence of SCADA systems, the canal operators must physically travel the length of the canal systems to monitor conditions and regulate flows. Installation of the SCADA systems in the North Fork and Crawford subwatersheds would provide an operational savings to canal operators by reducing daily trips to monitoring sites and reducing water loss. Specifically, SCADA will also automate alarm notifications, improve diversion flow measurement, streamline daily water operations via more remote monitoring and control sites, improve the emergency notification system in canal failure and blockage scenarios, improve the level of service to growers and other downstream users, prepare for future regulatory reporting requirements, and implement an independent, in-house communications system (Irrigation Training and Research Center [ITRC] 2017).

SCADA systems in the North Fork subwatershed would generally include water level sensors, buried conduit, a relay antenna (telemetry equipment), solar power, and panels. Each SCADA system would occupy about 20 square feet or less after construction. In addition to enhancing the benefits of the regulating reservoir and piped canal in the North Fork subwatershed, the SCADA system would reduce O&M costs of operating the canals because ditch riders, farmers, and ranchers would not have to monitor the canal and laterals as frequently.

SCADA infrastructure would be installed in the Crawford subwatershed at the Crawford Clipper Headgate, the Aspen Canal to Zanni Turnout, the Aspen Canal, the Clipper/Aspen Splitter, and the Grandview Diversion. For these four areas, each SCADA system would generally include gate control equipment, a stilling well, water level sensors, 1-inch buried conduit, a relay antenna (telemetry

equipment), solar power, and panels. Increased water use efficiency would occur based on the modernization and conversion of the existing direct delivery irrigation systems (using an “always-on” supply-driven system) to a more well-timed irrigation and producer “demand-driven” system.

Additional SCADA infrastructure would be installed at the Alkali Creek Inlet, the Muddy/Iron Creek Inlet, the Feeder Canal/Daisy Ditch, and the Clear Fork Inlet. These SCADA components would be the same as the SCADA infrastructure installed in the North Fork system, as described above, but without the gate control equipment. SCADA infrastructure excluding a stilling well or water level sensor, but with a turbine or differential flow transmitter, would be installed at gates 1 through 7 on the Aspen Canal. To ensure all of the SCADA systems can receive and transmit information, a radio repeater antenna would be installed at the existing tower at KREX.

The SCADA infrastructure in the North Fork and Crawford systems are integrated infrastructure and, therefore, are analyzed as a single work of improvement. For example, without the radio repeater antennas, the SCADA systems would not be able to operate because they could not send or receive data from the monitoring station. As another example, SCADA systems at the inlet of the regulating reservoir would not serve any purpose without a SCADA system at the outlet that could monitor and regulate outflows in harmony with the inlet SCADA system’s ability to regulate inflows. As a result of this integration, the benefits of the SCADA systems are evaluated as a single unit.

The SCADA systems would generally be installed on previously disturbed ground and would not disturb native riparian vegetation. SCADA systems would not be placed in wetlands. Existing roads and ROWs would be used for access to sites, and no borrow material would be required for SCADA installation. Existing offices would generally be used for these monitoring stations.

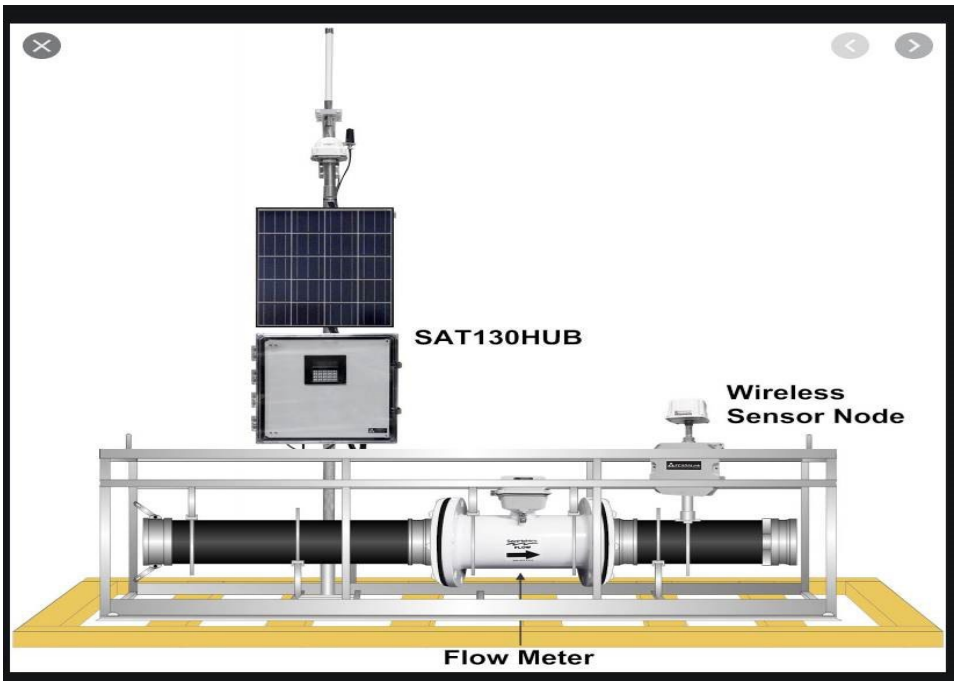

Photo 4.3-1. Schematic of typical SCADA installation.

4.3.2.4 Construction Details, Timing, and Staging

Construction would occur during the off-irrigation season (October 31 through April 1) beginning in the Fall of 2024 and with an anticipated end date of 2026, unless a funding deadline is imminent, and the projects must be completed during the summer. The construction phase of each project component is anticipated to require one or two nonirrigation construction seasons to complete. If construction timing changes from what is disclosed in this Supplemental Plan-EA, preconstruction environmental review would be completed to ensure timing and location do not present additional impacts not disclosed in this Supplemental Plan-EA, and to ensure mitigating measures/design features are considered in the planning.

Installation of SCADA systems involves hand tools or light/portable equipment (e.g., post auger, small trencher, and post driver). Installation would require up to two days with two workers, and workers would travel to the site in a light-duty work truck. The SCADA system would be installed from the fall of 2024 through the spring of 2026.

Water facility construction, canal closure, and pipeline installation projects would require some borrow or fill material and storage areas for pipe and other materials. Material storage areas are along the ROW or on private land in the subwatersheds and would not be placed on federal land. Access to construction and storage areas would use existing disturbed access routes as much as possible. These areas have been identified and surveyed and were evaluated in this Supplemental Plan-EA.

4.3.3 Alternative 3–3300 Road Regulating Reservoir

Alternative 3 would have the same measures for both subwatersheds as Alternative 2 with the exception of the location of the proposed regulating reservoir and associated inlet and outlet SCADA along the FMC in the North Fork subwatershed. The 3300 Road Regulating Reservoir would be constructed on private land as shown on **Figure 4.3-1B** in **Appendix B**. The 3300 Road Regulating Reservoir would consist of a 44- to 60-AF reservoir and associated inlet and outlet works. The maximum stored water footprint/construction disturbance would be 6.3 to 9.1 acres. Construction access would be along Canal Road. The water depth would be about 13 feet. The Coal Road Repeater Tower and FM New Access to SCADA would be in the same location as Alternative 2. For Alternative 3, the SCADA locations for the inlet and outlet would be different than Alternative 2 due to the different reservoir location. For Alternative 3, the length of pipe for the FMC would be 13,000 feet. This Supplemental Plan-EA assumes that the water saved by implementing project measures will be available to the water users and most often they will choose to use it for irrigating existing cropland, as discussed in detail in Section D.3 of the Investigation and Analysis Report (Appendix D).

Alternative 3 would require the acquisition of private property necessary to construct the 3300 Road Regulating Reservoir. The current owner of the subject property has not committed to selling the property. The CRD and the North Fork Water Conservancy District are not interested in exercising their rights of eminent domain for this project – which is based on the voluntary participation of stakeholders. Negotiations will continue with the landowner; however, if the landowner is unwilling to sell at the time of project implementation, the NRCS has determined the plan can be modified using an exchange of correspondence to build the reservoir at the Coal Rd. site per National Watershed Manual Section 503.4.

All other proposed project measures in both the North Fork and Crawford subwatersheds are common to both action alternatives (**Table 4-2** and **Table 4-3**). The SCADA descriptions and schematic presented under Alternative 2 (**Section 4.3.2.3** above) are also relevant for Alternative 3 as well as construction timing and description.

4.3.4 Comparison of Alternatives

A summary comparison of the No Action Alternative and action alternatives is presented in **Table 4-4**.

Table 4-4. Summary and Comparison of Alternatives.

	Item or Concern	No Action Alternative[1]	Alternative 2 with Coal Road Regulating Reservoir	Alternative 3 with 3300 Road Regulating Reservoir
NED Account	**Total Cost**	$0	$16,061,450	$13,226,650
	Annual Benefits	$0	$896,600	$875,700
	Annual Costs	$0	$548,300	$479,100
	Annual Net Benefits	$0	$348,300	$396,600
	Annual Remaining Flood Damage	Not Applicable	Not Applicable	Not Applicable
Environmental Quality (EQ) Account	**Soil and Sedimentation**	Continuation of status quo for the reasonably foreseeable future without realized benefits of the Proposed Action.	Short-term minor adverse impacts on about 51.3 acres of soil during construction activities. Long-term moderate beneficial impacts on soil resources from reduction of erosion and sedimentation issues associated with the current irrigation systems.	Short-term minor adverse impacts on about 45.7 acres of soil during construction activities. Long-term moderate beneficial impacts on soil resources from reduction of erosion and sedimentation issues associated with the current irrigation systems.
	Prime Farmland	No impacts on the amount or location of classified farmlands for the reasonably foreseeable future.	No impacts on the amount of farmlands classified as prime; however, irrigation of farmlands could become more efficient.	No impacts on the amount of farmlands classified as prime; however, irrigation of farmlands could become more efficient.
	Water Surface – Quality Surface – Quantity Groundwater – Quantity Waters of the U.S. Floodplain Management Wetlands	No realization of benefits with piping implementation (salinity and selenium reduction). No realization of benefits from SCADA systems.	Long-term major beneficial impacts on water quality. Minor to negligible impacts on other water resources. Implementation of the project measures would result in an estimated 1,007 tons/yr of salinity reduction (Applegate Group, Inc. 2019), 15 lbs/yr of selenium reduction, and 826 AF/yr of water seepage prevention (NRCS 2018). These data are presented in **Table 5-1** and **Table 5-2**.	Long-term major beneficial impacts on water quality. Minor to negligible impacts on other water resources. Implementation of the project measures would result in an estimated 948 tons/yr of salinity reduction (Applegate Group, Inc. 2019), about 14.2 lbs/yr of selenium reduction, and 779 AF/yr of water seepage prevention (NRCS 2018). These data are presented in **Table 5-1** and **Table 5-2**.
	Air	No impacts for the reasonably foreseeable future.	Short-term negligible impacts during construction. No long-term impacts.	Short-term negligible impacts during construction. No long-term impacts.
	Plants Invasive Species Riparian Areas	No impacts for the reasonably foreseeable future.	Short-term minor adverse impacts on about 6.8 acres of vegetation during construction. Long-term moderate beneficial impacts on wetlands and riparian habitat from improvements in water quality.	Short-term minor adverse impacts on about 9.2 acres of vegetation during construction. Long-term moderate beneficial impacts on wetlands and riparian habitat from improvements in water quality.

	Item or Concern	No Action Alternative[1]	Alternative 2 with Coal Road Regulating Reservoir	Alternative 3 with 3300 Road Regulating Reservoir
	Animals Fish Habitat Wildlife Habitat Threatened and Endangered Species	No impacts for the reasonably foreseeable future.	Short-term minor adverse impacts during construction as approximately 13,800 linear feet of existing open ditches would be converted to enclosed pipeline (pressurized where appropriate). Long-term moderate beneficial impacts on fish and aquatic species habitat from improvements in water quality.	Short-term minor adverse impacts during construction as approximately 13,000 linear feet of existing open ditches would be converted to enclosed pipeline (pressurized where appropriate). Long-term moderate beneficial impacts on fish and aquatic species habitat from improvements in water quality.
	Flood Damages	No impacts.	No impacts.	No impacts.
	Historic, Cultural, and Scientific Resources	No impacts for the reasonably foreseeable future.	Long-term adverse impacts on one historic canal segment following implementation of all applicable Best Management Practices (BMPs). Impacts will be mitigated according to the MOA provided in **Appendix E**.	Long-term adverse impacts on one historic canal segment following implementation of all applicable BMPs. Impacts will be mitigated according to the MOA provided in **Appendix E**.
	Potable Water Supply	No impacts.	No impacts.	No impacts.
	Public Health and Safety	No impacts.	No impacts. All applicable federal and state safety regulations would be followed by construction workers. No effects on public health and safety are anticipated from any of the proposed construction activities. The high hazard dam would be designed to adequately address public health and safety concerns.	No impacts. All applicable federal and state safety regulations would be followed by construction workers. No effects on public health and safety are anticipated from any of the proposed construction activities. The 3300 Road Regulating Reservoir is anticipated to be a low hazard dam.
	Recreation	No impacts for the reasonably foreseeable future.	Short-term negligible impacts during construction. No long-term impacts.	Short-term negligible impacts during construction. No long-term impacts.
Other Social Effects (OSE) Account	**Visual Resources**	No impacts for the reasonably foreseeable future.	Short-term negligible impacts during construction. No long-term impacts.	Short-term negligible impacts during construction. No long-term impacts.
	Tribal, Religious, Sacred, or Cultural Sites	No impacts.	No tribal, religious, or sacred sites were identified through tribal consultation as of June 24, 2024, the end of the comment period on the Draft Supplemental Plan-EA. One historic canal segment will be adversely impacted; effects will be mitigated through stipulations outlined in the signed MOA provided in **Appendix E**.	No tribal, religious, or sacred sites were identified through tribal consultation as of August 2023. One historic canal segment will be adversely impacted; effects will be mitigated through stipulations outlined in the signed MOA provided in **Appendix E**.

[1.] The benefits of the action alternatives are calculated as the additional value that would be created as a result of the Proposed Action. The benefits of the action alternatives are not estimates of total damages under the No Action Alternative.

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Chapter 5. Environmental Consequences

5.1 Soils and Geology

Protection of unique geological features, minimization of soil erosion, and the siting of project measures in relation to potential geologic hazards are considered when evaluating potential effects of the action alternatives on geological resources. Alternative 2 and Alternative 3 would have similar impacts on these resources. Differences in acreages of impacts between the action alternatives are included in the sections below.

Effects on geology and soils would be significant if they would alter the lithology, stratigraphy, and geological structures that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability; or change the soil composition, structure, or function (including prime farmland and other unique soils) in the environment.

5.1.1 Alternative 1–No Action

Under the No Action Alternative, there would be no effect on the size or distribution of prime farmland, farmland of statewide importance, or farmland of unique importance in the North Fork and Crawford subwatersheds. Farmlands in the project area would continue to produce as in the past. However, salinity and selenium loading from irrigation seepage water in contact with Mancos Shale-derived soils in the current irrigation system would also continue as it has in the past, further diminishing soil health and agricultural productivity. Under the No Action Alternative, erosion and sedimentation issues associated with the current irrigation systems would continue, resulting in long-term adverse impacts on soil resources.

5.1.2 Alternative 2–Coal Road Regulating Reservoir

Soils and Geology

Under Alternative 2, soils would be disturbed, vegetation would be cleared, and backfilling and grading would occur within the boundaries of the regulating reservoir and the piping of the canal. The SCADA sites would be within existing disturbance. The non-SCADA project measures analyzed in this Supplemental Plan-EA would require clearing and disturbance of about 51.35 acres of soils (all in the North Fork subwatershed). Clearing, compaction, and construction of soils would increase erosion and sedimentation potential. Plans for controlling erosion and sediment would be developed and implemented during construction of the enclosed canals and laterals to contain soil and runoff on-site and would reduce potential for adverse effects associated with erosion and sedimentation and transport of sediments in runoff.

Soil disturbance on steep slopes has the potential to result in excessive erosion due to instability of the disturbed soils and high runoff energy and velocity (NRCS 2014). Construction BMPs would be implemented to minimize soil erosion; therefore, no significant adverse impacts on the soils would be anticipated. BMPs could include installing silt fencing, straw wattles, or geotextile filters; applying water to disturbed soil to prevent wind erosion; and revegetating disturbed areas as soon as possible after disturbance, as appropriate.

Under Alternative 2, topsoil would be segregated from subsoil prior to excavation and backfilling. Following pipe installations, the subsoil would be replaced first and topsoil then would be replaced on the ground surface. Outside of the reservoir footprint, portions of the disturbed area would be reseeded with hay or pasture seed mixes. NRCS and the sponsors will provide landowners with a native seed mix alternative and encourage private landowners to select this mix where appropriate for their intended land use. As appropriate, upland seed mixture would be used in noncultivated areas. Backfilled ditches and other disturbed areas would also be reseeded with an appropriate seed mixture.

Clearing of vegetation could result in short-term increases in soil erosion and sediment transport to nearby waters; however, BMPs would be implemented to minimize impacts from erosion and sedimentation, as described below in **Section 5.1.5**.

Long-term impacts could occur due to compaction of soils under the weight of vehicles and other construction equipment; however, BMPs would be implemented to reduce the impact of compaction.

BMPs could include aeration, mechanical loosening of compacted soil, or adding low-density organic matter to the soil following construction. Contractors would be required to follow standard BMP and compliance measures to quickly contain any leaks or spills occurring from construction vehicles or activities. If applicable under 40 CFR 112, a spill response plan would be prepared by the contractor prior to construction for areas of work where spilled contaminants could flow into water bodies.

Farmland and Unique Farmland

Under Alternative 2, installation of the buried pipelines, backfilling of irrigation ditches, and installation of water control facilities and SCADA systems would occur in the vicinity of farmland, including farmland of statewide importance, prime farmland if irrigated and drained, and farmland of unique importance. No farmlands would be permanently removed from production as a result of Alternative 2.

Construction of the action alternatives would occur during the nongrowing season to prevent disruption of normal farming operations.

No long-term adverse impacts would be expected on any federal- or state-level farmland designations. Short-term negligible to minor impacts on agriculturally important soils would be expected during construction, but adherence to BMPs would minimize these impacts. There would be long-term beneficial impacts on farmlands due to improved irrigation water quality and quantity.

Salinity and Selenium

Under Alternative 2, installation of the buried pipeline would minimize water contact with the Mancos Shale-derived soils, which would reduce salinity and selenium loading in the Lower Gunnison River Basin, resulting in long-term beneficial impacts on soils.

Erosion and Sedimentation

Erosion may occur on disturbed and cleared areas within the project area boundary during precipitation events. Under Section 402 of the CWA, a National Pollutant Discharge Elimination System (NPDES) Storm Water General Permit for Construction Activities is required for construction activities that

disturb more than 1 acre and discharge pollutants to surface waters. Proper BMPs would be installed to prevent and control soil erosion, and a Storm Water Pollution Prevention Plan would be developed by the contractor and submitted to the CDPHE Office of Environment Water Quality Control Division.

Soil disturbance and grading associated with construction of the action alternatives would have short-term negligible to minor adverse impacts on soils. Construction may cause a less than significant short-term increase in the rates of erosion and sedimentation in the subwatershed. However, in the long term, soil erosion and sedimentation from irrigation water conveyance would be greatly reduced where buried pipeline would replace open canals.

5.1.3 Alternative 3–3300 Road Regulating Reservoir

Most impacts from Alternative 3 are common with Alternative 2. All of the Crawford subwatershed measures are the same, and impact information is not repeated in this section. The 3300 Road Regulating Reservoir option and associated pipe length and location would require clearing and disturbance of about 45.7 acres of soils in the North Fork subwatershed.

5.1.4 Cumulative Impacts

Cumulative impacts on local geology and soils in the two subwatersheds would be the same as the 2018 Plan-EA. See Section 5.1.3 of the 2018 Plan-EA (NRCS 2018). Actions with the potential for cumulative effects on local geology and soils in the two subwatersheds would include existing and future Gunnison Basin Selenium Management projects, existing and future NRCS irrigation improvement projects, infrastructure development, livestock grazing, and residential development. Each of these activities could result in soil erosion or degradation of soil health; however, erosion control and reclamation would be required for most of these activities to reduce direct, indirect, and cumulative soil impacts.

Ground-disturbing activities and movement of construction vehicles and equipment during both action alternatives would contribute to a short-term minor disturbance and loss of soils. These impacts would be incremental to other regional effects occurring as a result of increased residential and industrial development, and ongoing agricultural land uses. Soil effects in the long term would be considered cumulatively incremental and minor.

5.1.5 Compliance and Best Management Practices

Avoidance, minimization, and mitigation measures that would be applied prior to, during, and after construction of project measures are described in **Section 7.4**, **Table 7-4**. During construction, work crews would carry spill cleanup kits, and in times of burn bans or wildfire concerns, each crew would have a fire suppression kit. Construction stormwater plans and measures that meet local, state, and federal guidelines and intent would be developed and implemented during construction and revegetation activities.

5.2 Water

5.2.1 Alternative 1–No Action

The water quality conditions described in greater detail in **Section 3.2** would not change under the No Action Alternative.

Under the No Action Alternative, water losses to seepage and evaporation and deterioration of soil health would continue in the Lower Gunnison project area.

5.2.2 Alternatives 2 and 3

Both action alternatives would be similar in terms of effects on water resources. For the Lower Gunnison Supplemental Watershed Plan-EA Project, the action alternatives include piping one canal, installing water control facilities, and installing SCADA systems (as described in **Table 4-2** and **Table 4-3**).

Canal piping projects serve multiple purposes to conserve water, reduce selenium concentrations and loads, and reduce salinity concentrations and loads. During the past 20 to 25 years, concerted efforts to reduce agriculture-related selenium and salinity loads in the Lower Gunnison River watershed have occurred (USGS 2014). Canal piping and on-farm modernization have proven to be effective, as shown by trends of decreasing selenium and salinity concentrations and loads in the Gunnison River (Butler 1996; Mayo and Leib 2012; Salinity Control Forum 2020). This Supplemental Plan-EA assumes that the water saved by implementing project measures will be available to the water users and most often they will choose to use it for irrigating existing cropland, as discussed in detail in **Section D.3** of the Investigation and Analysis Report (**Appendix D**).

5.2.2.1 Background for Water and Water Quality Impact Assessment

Methodologies employed to estimate salt, selenium, and water conservation benefits are subject to uncertainty. It should be recognized that these estimates are provided to be the independent basis for the economic analyses later in this Supplemental Plan-EA (**Appendix D**).

Estimates of Water Conservation

Irrigation ditches and canals are known to have conveyance losses due to evaporation, seepage, and root uptake (Fipps 2000; J-U-B Engineers 2016). When releasing irrigation water from storage reservoirs, conveyance losses are commonly added to the water quantities requested to fulfill the needs of irrigation, which is sometimes called the duty (or flow) of water required to overcome system inefficiencies.

Studies of conveyance losses have been done for the FMC (Delta Conservation District [DCD] 2001; J.U.B. Engineers 2016). Seepage loss rates for the FMC have been calculated at 0.95 ft^3/sec per mile of open canal. For the purposes of this Supplemental Plan-EA, the seepage losses are considered zero after the canals or ditches have been piped.

Recent innovations in low-voltage sensors and data communications, combined with advances in Internet technologies, offer opportunities for the development and application of real-time management systems for agriculture (Evans et al. 2013). SCADA is a system of computers and wireless network connections used to display and control water system operations. SCADA systems for agricultural water conservation have been implemented throughout the United States in conjunction with automated headgate operations; however, very few studies have documented the actual amount of water saved from agricultural water conservation efforts (Clemmons and Allen 2005). When implemented properly in irrigation districts, SCADA can lead to improved water delivery service to farms, more effective operations, reduced spill (and therefore reduced diversions), and in some cases

reduced costs of labor and energy, particularly for the FMC where flow adjustments at the diversion require about 30 miles of travel between operation gates and the headgate (Freeman and Burt 2009; Fletcher, pers. comm. 2020). Water savings from the use of SCADA systems generally range from about 7 to 10 percent of delivered water (Temido et al. 2014).

Estimates of Selenium and Salinity Load Reductions

Water quality impacts—specifically salinity and selenium prevention—were calculated using estimates provided in studies specific to the North Fork subwatershed detailed in Applegate Group, Inc. 2019, J-U-B Engineers 2016, and NRCS 2018. These values are shown in **Table 5-2** below. No impacts on salinity and selenium are expected in the Crawford subwatershed as a result of the SCADA system.

Groundwater

No groundwater resources would be extracted or consumptively used as part of the project; however, piping of irrigation canals and laterals may result in less bank storage and seepage, which could result in minor reductions in groundwater flow that may supply downgradient seeps and springs.

Floodplains

Within the Lower Gunnison River Basin, the canal piping projects, in general, would be located in upland areas, and would not affect any 100- or 500-year floodplains. Many of the SCADA platforms would likely be constructed in the 100- or 500-year floodplain. These structures would not permanently alter the floodplain. Coordination with the Delta County floodplain administrator would occur prior to construction of any SCADA sites within the floodplain.

Water Rights

For a comprehensive discussion of water rights, refer to Section 5.2.1 of the 2018 Plan EA and **Section 3.2** of this Supplemental Plan-EA. In summary, water saved by ditch piping can be analogized to wastewater because it remains on the surface and can be maintained in the physical control of the original appropriator.

Ditch easements also may be affected by canal piping projects. If the irrigation ditch is relocated or altered, there are vested easement rights of the ditch owners in the location, historic practice, and use of the ditch (Miller 2002). The Colorado Constitution and statutes embody the right of any person to obtain a ditch ROW for the conveyance of water across the lands of another person, upon payment of just compensation. Following traditional concepts of easement law, the land traversed by the ditch is often considered the “servient or burdened estate,” while the land benefitted by use of the ditch is considered the “dominant or benefitted estate,” relative to each other (Miller 2002). With relocation or moving of ditch easements, in some cases the precedent favors the owner of the original ditch, and in other cases the historical uses of the water were considered. There also have been cases in Colorado precedent as to whether the same principle applies to situations where the burdened estate owner sought to pipe, culvert, modify, or improve the ditch, but not relocate it. It could be argued that any change in the nature or character of the easement was an interference with the vested rights of the dominant estate holder. Therefore, piping or culverting what was historically an open ditch interfered with the vested rights of the dominant estate holder (Miller 2002). Pursuant to Colorado Revised Statutes § 37-86-103, “…a ditch right-of-way includes the right to construct, operate, clean, maintain,

repair, and replace the ditch and appurtenant structures, to improve the efficiency of the ditch, including by lining or piping the ditch…" Therefore, exercising the right would not constitute an impact.

While the water itself belongs to the state, a water right in Colorado is considered real property, which in many cases can be sold or transferred. To file a claim for the beneficial use of waters of the state of Colorado, a property owner must obtain a water right through the water court, which is called adjudication of the water right. Associated with the water right is a diversion structure, spring, or well, with an accurate location, specified quantity of the water right (frequently expressed as flow), and the stated beneficial use (e.g., domestic, agriculture, commercial, or industrial). If an appropriator feels that their water rights have been in some way injured (such as a reduction in flow), then an injury claim would be filed through the state water courts.

The piping of ditches and laterals under the Proposed Action may affect some springs and seeps that were established after construction of the ditch or lateral. It is possible that land owners may have adjudicated the water right consisting of a seep or spring affected by a leaking canal. **Figure 5.2-2** in **Appendix C** shows locations of adjudicated springs and seeps in the subwatersheds. None of these appear to overlap the project measures.

In 1973, the Colorado legislature created the State's Instream Flow Program. These instream flows are adjudicated water rights that are owned by the state. Several instream flow reaches upstream from the subwatersheds may affect diversions into the subwatershed projects (e.g., upper Smith Fork and Cimarron River below Silver Jack Reservoir). If water conservation through piping of canals and laterals means less duty of water is needed to reach the irrigated fields, then the water should stay in the stream, which would be beneficial for instream flow water rights in this water-short system. Importantly, water saved that remains in the stream would help to achieve the objectives of the Programmatic Biological Opinion for the Lower Gunnison River (USFWS 2009). Please note that the water efficiencies created by the measures proposed in Alternative 3 (the Preferred Alternative) as laid out in this Supplemental Plan-EA provide the opportunity to either divert less water (i.e., leave water in the stream) or use the water gained through efficiencies to provide a more reliable water supply to ditch company users. This Supplemental Plan-EA analysis assumes that the water efficiencies would provide better opportunities for agricultural water uses.

5.2.2.2 North Fork

Project-specific components in the North Fork subwatershed are described in **Chapter 4** and listed in **Table 4-2**. The following sections describe the estimates of water conservation; estimates of selenium and salinity load reductions; and groundwater, floodplains, and water rights impact analysis relative to the North Fork subwatershed measures.

Based on the average seepage loss rates for the FMC, the proposed piping project would reduce seepage by 826 AF/yr for Alternative 2 and 779 AF/yr for Alternative 3 (**Table 5-1**). The water conservation savings for the North Fork subwatershed for the regulating reservoir was estimated by the ITRC (2017). It is estimated that either the Coal Road or 3300 Road Regulating Reservoir and its associated SCADA system would save approximately 1,400 AF/yr. When splitting the reservoir and SCADA measures, 75 percent (1,050 AF/yr) of the water conservation can be assigned to the reservoir and 25 percent (350 AF/yr) to the SCADA system. The ITRC (2017) also estimated that the pipeline

would conserve up to approximately 980 AF/yr. The seepage loss rate from the 2001 Delta Conservation District Management Plan (DCD 2001) has been used in the current analysis.

Table 5-1. Estimated Seepage Prevention Using FMC Seepage Rates.

Canal	Nominal Discharge, ft^3/sec	Annual Yield (irrigation season), AF/yr	Seepage Rate, ft^3/second/mile	Length of Canal Replaced, miles	Seepage Reduction, AF/yr
Fire Mountain Canal (Alt 2)	135	44,985	0.95	2.61	826
Fire Mountain Canal (Alt 3)	135	44,985	0.95	2.46	779

Source: Seepage loss study by J-U-B Engineers (2016).

Water quality impacts—specifically salinity and selenium prevention—from the action alternatives are shown in **Table 5-2**. These numbers were calculated using studies from Applegate Group, Inc. 2019, J-U-B Engineers 2016, and NRCS 2018. The ratio of selenium to salt loading (Se/salt ratio) is used to anticipate selenium reductions relative to anticipated salt reductions resulting from canal piping projects. The Se/salt ratio varies from basin to basin, and depends on many different factors. With the availability of historical water quality samples, the Se/salt ratio can be calculated for each subwatershed (NRCS 2010b).

Table 5-2. Water Quality Impacts from the Action Alternatives in the North Fork Subwatershed.

Project Measure	Environmental Consequences			
	Median Salinity Seepage Reduction, tons/yr	Median Selenium Seepage Reduction, lbs/yr	Water Seepage Reduction from Canal Piping or Replacement, AF/yr[1]	Water Savings, AF/yr[1]
Canal piping and replacement (Alt 2)	1,007	15	826	--
Canal piping and replacement (Alt 3)	948	14.2	779	
Regulating Reservoir (action alternatives)	--	--	--	1,050
SCADA Implementation[2]	--	--	--	350

[1.] Based on canal-specific study (Applegate Group, Inc. 2019; J-U-B Engineers 2016; NRCS 2018) rate of 0.95 ft^3/sec per mile of piped canal, and about 13,000 to 13,800 linear feet of piped canal (Alternative 2—13,800 and Alternative 3—13,000 linear feet).

[2.] 25 percent of water savings (350 AF/yr) is attributed to the SCADA system (see **Section 5.2.2.2**).

5.2.2.3 Crawford

Project-specific measures in the Crawford subwatershed are described in Chapter 4, listed in **Table 4-3**, and shown on **Appendix B, Figure 4.3-2**. Because no piping is included in the Crawford subwatershed measures, water seepage, salinity, and selenium reductions are not expected. SCADA water conservation for the Crawford system has not been specifically calculated. General studies suggest that water savings from the use of SCADA systems generally range from about 7 to 10 percent of delivered water (Temido et al. 2014). The current analysis used 3 percent of delivered water (891 AF) as a conservative estimate to determine the potential water savings benefit by the Crawford SCADA network. The Crawford system has an estimated 29,700 AF/yr. The proposed SCADA system is expected to result in a water savings of 891 AF/yr.

5.2.2.4 Cumulative Impacts

Salinity and selenium concentrations and loads for the Gunnison River near Grand Junction have shown statistically significant downward trends over the last several decades (Leib and Bauch 2008; Mayo and Leib 2012; Salinity Control Forum 2020). Through a statistical analysis of partial residuals (Mayo and Leib 2012), selenium concentrations in water from the Lower Gunnison River Basin have

decreased significantly (**Appendix E, Section E.2, Figure 5.2-1**). Annual selenium loads for the Gunnison River near Grand Junction have decreased significantly over a 22-year period and were estimated to be 23,196 pounds in 1986 and 16,560 pounds in 2008, a 28.6 percent decrease. Kircher et al. (1984) reported downward trends in salinity load (significance level of 0.05) in water from the Gunnison River. The trends of decreasing selenium and salinity concentrations and loads are generally attributed to accomplishments by the Colorado River Basin Salinity Reduction Program, which has included canal piping, winter water programs for livestock, and on-farm improvement projects (USGS 2014). Cumulative impacts of this Supplemental Plan-EA will be the continued improvement of water quality conditions and continuing efforts working toward recovery of listed fish species in the Lower Gunnison River Basin.

The cumulative impacts of canal piping would mean less groundwater recharge to local shallow aquifers. With seepage occurring through the Mancos Shale, water quality of the shallow aquifers would likely be poor and the water unusable for human consumption (Wright and Butler 1993). Therefore, cumulative impacts of canal seepage prevention include reduction in the quantity of poor quality groundwater in shallow aquifers. Since some of this canal-recharged water could percolate to streams and rivers, there would be a reduction in poor quality groundwater discharging to streams. On the other hand, springs in proximity to the leaking canals may have been historically used by land owners along the ditch (**Appendix C, Figure 5.2-2**). Drying up of the seeps or springs could deprive the land owners of the historical use of the spring water, which is driven by canal seepage. No springs with active water rights are within the extent that likely would be influenced by the canal piping project (CDWR 2024). There are remaining lengths of unpiped canal, as well as tailwater, that likely provide benefits similar to seepage. The cumulative effects of canal piping would not be significant. No specific threshold of significance has been set due to the unlikelihood of effects.

Reductions in canal seepage, while reducing percolation through poor quality soils and reducing poor quality return flows to streams, could also reduce water availability to downgradient water users if canal seepage has historically been intercepted by these users' systems. These reductions could affect adjacent vegetation and spring flows that have ecosystem and aesthetic benefits and could increase the amount of water left in streams if less water is diverted, since less water would seep from canals. The water efficiencies created by the measures proposed in Alternative 3 (the Preferred Alternative) as laid out in this Supplemental Plan-EA provide the opportunity to either divert less water (i.e., leave water in the stream) or use the water gained through efficiencies to provide a more reliable water supply to ditch company users. This Supplemental Plan-EA analysis assumes that the water efficiencies would provide better opportunities for agricultural water uses.

Downstream water users are afforded some protection under Colorado's water law and water administration from changes in water use. If a downgradient water user claims an injurious effect on the historic pattern of water availability to the subject water rights, that water right holder can claim injury with the Colorado Division of Water Resources (CDWR). The state would need to determine if the interception of the canal seepage is legally defensible. A standard requirement in Colorado water rights is that a point, or points, of diversion must be specified. Interception of upgradient canal seepage may or may not be included in the downgradient water right; however, typically it is not included. The downgradient water user may have benefitted over the years from an upgradient water user's canal seepage, but that does not necessarily mean that there is a continued legal right to benefit from it.

Conversely, a downgradient water user can be adversely affected by canal seepage passing through poor quality soils as that water is being conveyed to irrigated areas located on better quality soils. In this case, an upgradient piping project may greatly benefit the downgradient water user. The most economically feasible canal piping projects are typically located on off-farm systems that serve a considerable portion of an irrigation district. These larger canals provide the economies of scale needed to make these projects even marginally feasible. In locating potential projects, it is typical for an irrigation district or a larger umbrella water management agency, such as the River District, to assist in locating the canal segments that can be piped without creating turmoil within or along the delivery system by pitting water users against each other as a result of real or alleged impacts from reduced canal seepage. There is thus a strong motivation for the districts to locate systems to avoid adverse impacts on downgradient water users.

Alternatives 2 and 3 do not include any increases in irrigated acreages. Therefore, the possibility exists that the water left in streams could increase in amounts that approximate the amount of water that has historically seeped from the canals. Western irrigation systems are generally termed water short, meaning typically there is the possibility of greater crop production if a fuller water supply is available. It is unknown if more water would be left in the stream or if the diversions would equal or approximate the historic diversions because individual farmers may choose to deliver more water to the same acreage to increase their crop yields. Colorado water law allows farmers to make these decisions as long as the water being diverted is for the purposes provided for in the water right and that it is considered beneficial in the context of current water law (meaning that it is not considered excessive in relation to the purposes of the diversion). Furthermore, water users have flexibility to vary their diversions with time and they often do vary them for reasons not solely related to crop production or water availability. For example, a farmer may reduce diversions from year-to-year based on expected crop prices, fuel and equipment costs, and programs to let parcels rest and recover. The Proposed Action does not include provisions that would require changes in water rights or implement constraints in the ability of the owners of existing water rights to use water with any less flexibility than they have in the past. To the degree that less water is diverted, there would be a positive effect on streamflows downstream of the diversion points and in associated riparian habitats. However, speculating the manner and degree to which farmers may change their practices strictly as a result of piping canal systems is not defensible nor would it be appropriate, given irrigators' authorities under Colorado water administration. In summary, the water efficiencies created by the measures proposed in Alternative 3 (the Preferred Alternative) as laid out in this Supplemental Plan-EA provide the opportunity to either divert less water (i.e., leave water in the stream) or use the water gained through efficiencies to provide a more reliable water supply to ditch company users. This Supplemental Plan-EA analysis assumes that the water efficiencies would provide better opportunities for agricultural water uses.

5.2.3 Compliance and Best Management Practices

Avoidance, minimization, and mitigation measures that would be applied prior to, during, and after construction of project measures are described in **Section 7.4**, **Table 7-4**. Permits, compliance, and consultation required are outlined in **Section 7.5**.

5.3 Air Quality

5.3.1 Alternative 1–No Action

The No Action Alternative would result in no changes to existing air quality in the project area. Maintenance activities would continue to result in temporary impacts, including vehicle and equipment emissions and dust entrainment.

5.3.2 Alternatives 2 and 3

No long-term impacts are anticipated to result from the action alternatives. Temporary localized construction impacts would result from airborne dust from excavation activities and vehicle movements on unpaved roads, as well as a localized increase in emissions from construction equipment and vehicles. Delays associated with travel through construction zones, in instances where a project affects an adjacent road, would increase emissions from on-road vehicles.

Upon completion of construction, it is anticipated that air quality would return to preconstruction levels. Long-term O&M activities would result in isolated temporary impacts on air quality, which include airborne dust and vehicle emissions. This would be a negligible change when compared to existing conditions.

Greenhouse gas emissions associated with the proposed project measures would consist of emissions from construction equipment and vehicles. Such emissions would be low, sporadic, and short-term in the sparsely populated project areas. Current science cannot establish or quantify a cause-effect relationship between greenhouse gas emissions and climate change on a local level. Although there appears to be a cause-effect relationship at a global scale, it is not possible to connect greenhouse gas emissions and climate change at a local or a regional spatial scale (USGS 2008). The temporary small-scale increase in greenhouse gas emissions associated with the action alternatives would not have a measurable effect on climate and, therefore, would be negligible.

5.3.3 Cumulative Impacts

Cumulative effects on regional or local air quality may result from future construction associated with increased development. Emissions associated with proposed construction activities could have short-term adverse cumulative impacts if they occur at the same time and in the same area as the action alternatives. However, the regional air quality is good, the project area is in attainment for all criteria pollutants, and construction activities would be localized and short-term. In addition, BMPs would be implemented to reduce construction emissions. Short-term minor cumulative impacts on local and regional air quality could occur from the action alternatives.

5.3.4 Compliance and Best Management Practices

The CDPHE Air Pollution Control Division requires reporting of air emissions of criteria pollutants if the emissions are anticipated to be above 2 tons/yr for each criteria pollutant. For the action alternatives, the emissions are anticipated to be well below that threshold; therefore, no reporting or permitting requirements are anticipated. Avoidance, minimization, and mitigation measures that would be applied prior to, during, and after construction of project measures are described in **Section 7.4**, **Table 7-4**.

5.4 Vegetation

5.4.1 Alternative 1–No Action

Under the No Action Alternative, the artificial wetland and riparian habitat created by the network of open irrigation ditches in the subwatersheds would persist, and adjacent native upland vegetation would remain in its current condition. Wildlife dependent on wetland and riparian areas in the subwatersheds would not benefit from reductions in salt and selenium loading to aquatic systems created by conversion of open irrigated ditches to enclosed pipe and on-farm irrigation efficiency projects.

5.4.2 Alternatives 2 and 3

Effects on vegetation communities and habitat resulting from incremental implementation of the proposed subwatershed improvements (described in **Section 4.3.1.1**) would be direct and indirect, localized and farther-reaching, and short-term and long-term.

At the subwatershed scale, converting open irrigation ditches to enclosed pipe would result in a reduction of salt and selenium loading in the Lower Gunnison River Basin. The resulting water quality improvements would improve the health of aquatic, wetland, and riparian vegetation communities and habitat function in the natural riverine systems of the project area.

Open irrigation ditch networks (including on-farm ditches) provide ribbons of artificial wetland and riparian habitat across the landscape. Where open ditch networks are piped and artificial wetlands transition to uplands following on-farm efficiency projects, the distribution of wetlands and riparian patterns of vegetation across the landscape would change. The long-term loss of artificial local wetland and riparian habitat resulting from ditch conversions would be offset by gains in water quality and wetland and riparian habitat function in the project area's natural riverine systems (see **Section 5.4.2** for further discussion of impacts on wetlands and riparian areas). For Alternative 3, the 3300 Road Regulating Reservoir would convert open meadow to an open water/riparian/wetland community. For the regulating reservoir, this would be an insignificant effect because the project would replace the community with a similar (or more functional) community. Construction footprints of buried pipe alignments through native upland vegetation communities would temporarily affect those communities until they are reestablished. Disturbed areas would be reseeded with approved appropriate seed mixes of native grasses, forbs, and shrubs, and eventually colonized by adjacent native plant species. Weed management would be implemented according to county standards, at a minimum.

Installation of SCADA systems in irrigated farmlands and developed areas are not anticipated to cause measurable long-term negative impacts on vegetation communities and habitat. Soil health practices, such as use of cover crops, would benefit certain wildlife species by providing forage and shelter. Due to their small footprint size and siting at previously disturbed locations and near existing irrigation infrastructure, SCADA installations would not result in appreciable vegetation or habitat loss. SCADA systems would not be installed in wetlands or in areas that would require removal of riparian vegetation.

5.4.2.1 North Fork

Project-specific components in the North Fork subwatershed are described in **Chapter 4** and listed in **Table 4-2**. Most access would be via existing roads and there would be limited new disturbance from new roads.

Approximately 0.1 acre of previously undisturbed pinyon-juniper woodland vegetation would be removed for the proposed SCADA tower and access. The additional four SCADA sites would be installed along the piping project and no additional disturbance would occur.

For the piping project, the construction corridor would be primarily in existing disturbance and road corridors. An intermittent wetland fringe presumed along the existing canal would be permanently impacted by the proposed piping project.

The Coal Road Regulating Reservoir (Alternative 2) would impact approximately 6.7 acres of riparian and irrigated meadow vegetation. The riparian communities are solely supported by irrigation water and typically are a monoculture of cattail with noxious weed species such as tamarisk and Canada thistle. The impact would not be significant as a similar community would likely be created by the new reservoir. The 3300 Road Regulating Reservoir would impact approximately 9.1 acres of irrigated pasture. As previously noted, replacing irrigated pasture with seasonal open water/riparian areas would be an insignificant change.

Compliance measures and BMPs would be implemented (**Section 5.4.1.1.3**). Following installation, weed management would be implemented in accordance with county standards.

5.4.2.2 Crawford

Project-specific components in the Crawford subwatershed are described in **Chapter 4** and listed in **Table 4-3**. These include the SCADA network. Three SCADA sites and the KREX on an existing tower are located on BLM land, and four SCADA sites are located on Reclamation land, operated by CPW.

The SCADA sites would occupy an approximately 200-square-foot area for each site. The SCADA site on Young's Peak would be installed on previously disturbed ground (i.e., existing tower) and accessed via existing roads. The remaining SCADA sites would be located in previously undisturbed terrain in pinyon-juniper woodlands, sagebrush shrublands, cottonwood and coyote willow stands, and irrigated meadows. Minor amounts of ground and vegetation disturbance could occur in upland areas during setting the equipment, burying conduit, and constructing an enclosure.

For all project-specific components in the subwatershed, compliance measures and BMPs would be implemented (**Section 5.4.1.1.3**). The project construction footprints would be limited to the smallest practical area and reseeded in a timely manner (within one growing season) following construction with a seed mix consistent with the surrounding vegetation community. Affected irrigated agricultural lands would be put back into production following construction. Weed management would be implemented according to county standards.

Effects on wetland and riparian habitat for project-specific components in the subwatershed are discussed in **Section 5.4.2**.

5.4.3 Cumulative Impacts

This cumulative impacts analysis uses a 50-year period for vegetation community and habitat resources in the general area of the subwatersheds. Present and future activities in the analysis area affecting this resource include ongoing and future irrigation improvement projects, subdivision and residential development, infrastructure development and maintenance (including public and private roads and energy transmission corridors), timber harvest, firewood cutting, vegetation management activities (such as pinyon-juniper or sagebrush treatment projects and weed management programs), livestock grazing, motorized recreation, and conversion of native shrublands and woodlands to agricultural or other uses. Climate change, drought, wildfire, and wildfire suppression also will continue to affect the region's vegetation communities and habitat in the future, possibly with increasing intensity.

Subwatershed improvements would affect distribution patterns of artificially induced wetland and riparian resources on the landscape, and artificially induced wetland and riparian vegetation communities would be lost. However, these losses would be offset by gains in water quality and wetland and riparian habitat function in the project area's natural riverine systems (see **Section 5.4.2** for further discussion of impacts on wetlands and riparian areas). Negative effects on upland vegetation communities and habitat from the subwatershed improvements would be temporary and of relatively small magnitude, and would not result in a substantial contribution to cumulative area-wide impacts on vegetation communities. Irrigated agricultural lands affected by the projects would be returned to irrigated production within one growing season of construction, and pipe alignments would be revegetated in a manner consistent with surrounding native vegetation communities. Both temporary and long-term impacts would be mitigated by design features, compliance measures, and BMPs described throughout this Supplemental Plan-EA.

Under the No Action Alternative, there would be no contribution to cumulative impacts on vegetation communities and habitat in the subwatersheds.

5.4.4 Compliance and Best Management Practices

Avoidance, minimization, and mitigation measures that would be applied prior to, during, and after construction of project measures are described in **Section 7.4**, **Table 7-4**. Permits, compliance, and consultation required are outlined in **Section 7.5**.

5.5 Wetlands and Riparian Areas

5.5.1 Alternative 1–No Action

Under the No Action Alternative, existing riparian vegetation or wetland habitat would continue to persist along the region's network of irrigation ditches. Wetland and riparian areas in the subwatersheds would not benefit from reductions in salt and selenium loading to the aquatic system created by conversion of open irrigated ditches to enclosed pipe and on-farm irrigation efficiency projects.

5.5.2 Alternatives 2 and 3

Impacts on wetland and riparian habitat from the construction and operation of the Proposed Action would be both short- and long-term (more than five years). **Table 7-4** lists the BMPs and compliance measures that would be implemented under the Proposed Action to minimize impacts on wetland and

riparian areas. Access, temporary use areas, and borrow areas would be designed to avoid impacts on wetlands, waters of the U.S., and riparian resources in the project area. SCADA equipment would be placed outside wetland or riparian areas.

Short-term impacts include potential erosion from the construction sites, access, and temporary use areas during construction. There is the potential for spills or leaks of industrial fluids during construction, which could impact wetland and riparian vegetation and soils. Construction and ground disturbance could result in the introduction or spread of invasive weeds into adjacent wetland and riparian habitats.

As stated in **Section 5.4.2**, converting open irrigation ditches to enclosed pipe would result in a considerable reduction of salt and selenium loading in the Lower Gunnison River Basin. The resulting water quality improvements would improve the health of aquatic, wetland, and riparian vegetation communities and habitat function. Implementation of the action alternatives would result in long-term loss of artificial wetland and riparian habitat as ditch seepage would no longer provide wetland hydrology to adjacent areas, and ditch channels and banks would no longer support a riparian environment. There would be long-term benefits to water quality and habitat function in the project area's natural riverine systems from the action alternatives.

5.5.2.1 North Fork

Project-specific components in the North Fork subwatershed are described in **Section 4.1.1.2** and listed in **Table 4-2**.

Construction of the SCADA tower and additional SCADA sites have the potential to result in short-term impacts on wetlands and riparian habitats from erosion and increased potential for introduction of invasive plant species adjacent to the construction sites: potential impacts would be minimized by implementation of the BMPs and compliance measures listed in **Table 7-4.**

Construction of Alternative 2–Coal Road Regulating Reservoir would inundate approximately 4.7 acres of a 12.7-acre wetland swale (ERO 2019). No impacts on wetland or riparian resources are anticipated from Alternative 3–3300 Road Regulating Reservoir. Wetlands along the piping section of the FMC would be evaluated prior to construction based on current USACE regulations.

5.5.2.2 Crawford

Construction of these project measures has the potential to result in short-term impacts on wetlands and riparian habitats from erosion and increased potential for introduction of invasive plant species adjacent to the construction sites. Potential impacts would be minimized by implementation of the BMPs and compliance measures listed in **Table 7-4**.

5.5.3 Cumulative Impacts

Actions with the potential to cumulatively affect wetland and riparian resources in the subwatersheds include existing and future Colorado River Basin Salinity Control Program projects, Gunnison Basin Selenium Management projects, existing and future NRCS irrigation improvement projects, livestock grazing, and residential and commercial development. Climate change, drought and wildfire also could impact the region's vegetative resources and natural habitat in the future. When added to past, present, and reasonably foreseeable activities, the Proposed Action would not result in significant cumulative

impacts on wetlands or riparian areas. Alternative 3 (the Preferred Alternative) would only have impacts on the wetland fringe along an artificial irrigation ditch. Quality and ecosystem benefits are low for these artificial wetlands as they have only existed since the construction of the man-made feature and are subject to regular canal maintenance activities. The USACE also considers these cumulative impacts minor.

5.5.4 Compliance and Best Management Practices

Avoidance, minimization, and mitigation Measures that would be applied prior to, during, and after construction of project measures are described in **Section 7.4**, **Table 7-4**. Permits, compliance, and consultation required are outlined in **Section 7.5**. If Alternative 2 were to become the Preferred Alternative, and the USACE determines that the wetland swale in the Coal Road Regulating Reservoir is not solely supported by the application of irrigation water and therefore an exempt category (B), it is likely that compensatory wetland mitigation would be required. However, Alternative 2 is not the Preferred Alternative and no wetland impacts are associated with Alternative 3 (3300 Road Regulating Reservoir). Regulations have changed and an additional wetland delineation would be completed prior to construction to determine if jurisdictional waters are present and would be impacted, and what CWA permitting would be required.

5.6 Special Status Species

5.6.1 Alternative 1–No Action

Under the No Action Alternative, there would be no effect on special status plants.

5.6.2 Alternatives 2 and 3

Plant species protected by the ESA with the potential to be affected by the action alternatives are clay-loving wild buckwheat and Colorado hookless cactus. Clay-loving wild buckwheat designated critical habitat was dismissed from further analysis because it lies outside the subwatersheds. No critical habitat has been designated for Colorado hookless cactus. Background information for these species and their critical habitats is provided in **Section 3.4.3** and **Appendix E**. Subwatershed improvements are described in **Section 4.3.1.1**.

Table 5-3 (below) presents preliminary effects determinations for each ESA-protected plant species for each type of subwatershed improvement, assuming the improvement would take place in *the USFWS-modeled range* (**Appendix C, Figure 3.4-10**) *and potential habitat* of the species. Where conditional statements in the preliminary determinations are met in **Table 5-3**, consultation under Section 7 of the ESA or clearance surveys would be required before activities could be initiated. Any ground-disturbing activities ancillary to the subwatershed improvements analyzed in **Table 5-3**, such as creation of or widening of access roads to project areas, establishment of staging or borrow areas on nonirrigated ground, or habitat conservation or mitigation actions, could trigger a need for Section 7 consultation or clearance surveys if these actions would occur in the range and potential habitat of a special status plant species.

For subwatershed improvements taking place outside a species' range or inside the species' range but not in or near suitable habitat, a finding of "no effect" would apply to the activity.

Note that ESA-protected species presented on **Table 5-3** are current as of the preparation date of this Supplemental Plan-EA, and both the species and their potential to occur should be confirmed and updated as necessary during the planning phase of each subwatershed improvement.

Table 5-3. Effects Determinations for Federally Protected Plants in the Project Area.

Subwatershed	SCADA	Ditch Conversion to Enclosed Pipe	Water Control Facilities
Clay-Loving Wild Buckwheat			
North Fork	No effect; the project measures occur outside of the modeled range for this species	No effect; the project measures occur outside of the modeled range for this species	No effect; the project measures occur outside of the modeled range for this species
Crawford	No effect; there are no documented occurrences in or near the subwatershed (Holsinger, pers. comm. 2020)	N/A	N/A
Colorado Hookless Cactus			
North Fork	No effect; there are no documented occurrences in or near the subwatershed (Holsinger, pers. comm. 2020)	No effect; there are no documented occurrences in or near the subwatershed (Holsinger, pers. comm. 2020)	No effect; there are no documented occurrences in or near the subwatershed (Holsinger, pers. comm. 2020)
Crawford	No effect; the project measures occur outside of the modeled range for this species	N/A	N/A

Table 5-4 (below) summarizes potential impacts on BLM sensitive plant species for each type of subwatershed improvement that may occur on BLM-managed lands. As a part of the planning process for subwatershed improvements on BLM-managed lands, the BLM UFO would be consulted for concurrence with **Table 5-4**, and for clearance survey requirements. All potentially ground-disturbing elements of a proposed project would be considered for potential impacts on sensitive species, including access ways, borrow sites, and material staging areas.

For subwatershed improvements taking place on BLM-managed lands outside a species' range or inside the species' range but not in or near suitable habitat, a finding of no impact/no effect would apply to the activity.

BLM sensitive species presented in **Table 5-4** are current as of the preparation date of this Supplemental Plan-EA, and should be confirmed and updated as necessary during the planning phase of each subwatershed improvement.

Table 5-4. Effect Determinations for BLM Sensitive Plant Species in the Project Area.

Subwatershed	SCADA	Ditch Conversion to Enclosed Pipe	Water Control Facilities
Colorado Desert Parsley			
North Fork	No effect; the SCADA tower and access road is located in pinyon-juniper woodlands.	No effect; the project on BLM lands is located on previously disturbed ground	No effect; the water control facility is located in pinyon-juniper woodlands
Crawford	No effect; the SCADA at Young's Peak and the SCADA Gates 1, 2, and a portion of 3 are located on BLM lands in Mancos Shale. No habitat occurs at these sites due to previous disturbance and pinyon-juniper woodlands.	N/A	N/A

The USFWS concurred with each of these effects determinations in a consultation letter dated May 14, 2021 (TAILS 06E24100-2021-F-0366).

5.6.3 Cumulative Impacts

This cumulative impacts analysis uses a 50-year period for special status plants in the general area of the subwatersheds. Present and future activities in the analysis area affecting special status plants are similar to those described for vegetation in general in **Section 5.4.1.3**, but more strongly associated with subdivision and residential development and conversion of native shrublands to agricultural or other uses.

The subwatershed improvements and project-specific components are not anticipated to result in a substantial contribution to cumulative area-wide impacts on population trends of special status plants. None of the special status plants in the project area are associated with wetlands or riparian habitat; therefore, there would be no net loss of habitat for these species as a result of the Proposed Action.

Surveys have been conducted for special status plants in appropriate habitat in and near the footprint of planned ground disturbances (see **Section 3.4.3**), and no suitable habitat was identified. Any anticipated negative impacts on special status plants would be eliminated by design features, regulatory compliance measures, and BMPs described throughout this Supplemental Plan-EA.

Under the No Action Alternative, there would be no contribution to cumulative impacts on special status plants in the subwatersheds.

5.6.4 Compliance and Best Management Practices

Avoidance, minimization, and mitigation measures that would be applied prior to, during, and after construction of project measures are described in **Section 7.4**, **Table 7-4**. Permits, compliance, and consultation required are outlined in **Section 7.5**.

5.7 Invasive Species

5.7.1 Alternative 1–No Action

Under the No Action Alternative, there would be no effect on the status and management of invasive species in the subwatersheds.

5.7.2 Alternatives 2 and 3

The impacts of the project measures from both action alternatives on invasive species (including noxious weeds) would be a mix of impacts and benefits.

Because ditch conversions to enclosed pipe are anticipated to cause more ground disturbance, they have the highest potential to introduce or spread invasive plant species, including noxious weeds. Many open irrigation ditch corridors in the subwatersheds have substantial existing infestations of nonnative plants and noxious weeds. The infestations include water-loving weeds along the ditch waterlines and in wet areas downgradient from leaking ditches, and upland weeds that thrive on dry upper ditch banks, access roads, and other nearby disturbed areas. Flowing water in the ditch systems contribute to the continued spread of weeds. Vehicles, people, livestock, and wildlife traveling on the

ditch access roads can also help weeds spread along ditch alignments. For ditches that flow through native plant communities, construction footprints are likely to extend into previously undisturbed ground, creating conditions for weeds to spread. Construction BMPs would help minimize the risk of such infestations, and ongoing weed management efforts by project proponents would be necessary during revegetation of construction alignments.

Conversion of open ditches to enclosed pipe would remove an important source for weed seed transport—water. In some areas, the need for maintained access roads along the buried pipe corridor would also be eliminated, lowering the potential for the continued spread of weeds. Downgradient seeps from ditches that support salt cedar, Russian olive, and herbaceous noxious weeds would be dried and the ability of the environment to support these weeds would be diminished.

Where ditches would be converted to enclosed pipe through irrigated farmland, the areas of invasive plants would likely decrease because the ground over the newly buried pipe alignments could be irrigated and farmed with the surrounding area. On-farm efficiency upgrades would occur in irrigated farmlands, and would also eliminate some weed-dominated on-farm ditch alignments that could be incorporated into agricultural production. Areas receiving excess irrigation water adjacent to farmlands would be dried and the ability to support water-loving noxious weeds would be diminished.

SCADA installations would have a relatively small footprint on previously disturbed and undisturbed ground, and would therefore not be anticipated to contribute to the spread of invasive plants when appropriate BMPs are implemented.

The project proponents would be responsible for weed management at their respective project sites. The following weed management priorities would apply to each subwatershed improvement and project-specific component:

> Priority #1. Prevent introduction of noxious weeds and other invasive plants to intact native plant communities.
>
> Priority #2. In previously disturbed areas and areas with existing weed infestations, prevent introduction of new nonnative species, with special attention to noxious weeds.
>
> Priority #3. In areas with existing noxious weed infestations, manage and control their spread according to priorities outlined in current weed management plans for the county or counties in which the project is located.

5.7.3 Cumulative Impacts

Present and future activities in the analysis area that would promote the spread of invasive species include the continued maintenance and management of irrigation infrastructure (especially open ditches); subdivision and residential development; infrastructure development and maintenance (public and private roads, energy transmission corridors, timber harvest, firewood cutting, and vegetation management activities such as pinyon-juniper or sagebrush treatment projects); livestock grazing; and recreation.

Climate change, drought, wildfire, and wildfire suppression also will continue to affect the region's vegetation communities and habitat in the future, making conditions for the spread of invasive plant species more favorable.

Through the use of BMPs and continued weed management programs of the project proponents, the subwatershed improvements and specific project measures proposed under this Supplemental Plan-EA are not expected to contribute significantly to the cumulative spread of invasive species in the subwatersheds.

5.7.4 Compliance and Best Management Practices

Avoidance, minimization, and mitigation measures that would be applied prior to, during, and after construction of project measures are described in **Section 7.4**, **Table 7-4**. Permits, compliance, and consultation required are outlined in **Section 7.5**.

5.8 Wildlife

5.8.1 Terrestrial Wildlife Communities

5.8.1.1 Alternative 1–No Action

Under the No Action Alternative, the wildlife communities in the project area would continue to use the artificial wetland and riparian habitat created by the network of open irrigation ditches in the subwatersheds. Wildlife dependent on wetland and riparian areas in the subwatersheds would not benefit from reductions in salt and selenium loading to the aquatic system created by conversion of open irrigated ditches to enclosed pipe.

5.8.1.2 Alternatives 2 and 3

Effects on terrestrial wildlife communities resulting from incremental implementation of the proposed subwatershed improvements (described in **Section 4.3.1.1**) would be direct and indirect, localized and farther-reaching, and short-term and long-term.

At the subwatershed scale, converting open irrigation ditches to enclosed pipe would result in a reduction of salt and selenium loading in the Lower Gunnison River Basin. The resulting water quality improvements would generally benefit wildlife by improving the health of aquatic, wetland, and riparian habitats.

Open irrigation ditch networks provide ribbons of artificial wetland and riparian habitat across the landscape, and a source of drinking water for wildlife. Where open ditch networks are piped and artificial wetlands transition to uplands following piping projects, the distribution patterns of wildlife across the landscape would change. Big game may alter their land use patterns in response to removal of these water sources and associated vegetation. Densities of smaller species dependent on wetlands or riparian habitat, especially of amphibians and certain reptiles, waterbirds, and certain small mammals, would decrease locally and shift to other more suitable habitat on the landscape. The effects of subwatershed improvements on amphibians and fish are discussed in **Section 5.8.3**.

Piping of open irrigation canals and installation of SCADA systems in large blocks of relatively undeveloped areas would potentially reduce human presence in the associated habitats since fewer trips to maintain ditches and headgates would be necessary (one trip per day compared to two to four trips

per day under the No Action Alternative). This would improve seclusion opportunities for big game and other wide-ranging wildlife. Small ground-dwelling mammals and reptiles associated with surrounding upland habitats would also benefit from an increase in habitat and removal of movement barriers by the drying and piping of ditch alignments.

Several direct and indirect short-term impacts on wildlife would occur during and following project construction. Locally, movements and forage patterns of big game would be temporarily disrupted due to human presence and machinery noise. Direct impacts on big game, especially mule deer and elk, may include habitat avoidance; increased daily movements and movement rates; and higher probabilities of flight response; as well as the increased chance for injury or mortality (BLM 2019). Although big game can readily disperse across the landscape to other suitable habitat in response to disturbance, increased movement results in increased energy demands, and if these demands are not met, a reduction of survival fitness or reproductive success of individuals or herds could occur. The quantity and quality of winter range is a limiting factor on mule deer and elk populations in the region (**Section 3.5.1**), and the majority of subwatershed improvements would occur in big game winter range. SCADA installations taking place in winter range are not anticipated to have measurable long-term effects on local mule deer or elk populations due to the short duration and low level of activity involved. For pipeline and water control facility construction projects, which are of longer duration and create significant noise and disturbance, impacts on wintering mule deer and elk could result if construction occurs during winter months, especially during severe winters. In general, completing construction of individual project measures in the shortest practical timeframe would minimize direct disturbance impacts on big game.

Direct short-term impacts on migratory birds would include disturbance and displacement during construction activities. Wintering or migrating birds are not expected to be measurably affected by construction disturbance or displacement because they have the flexibility to move away from disturbances to other suitable areas. There would be no direct effect on breeding migratory songbirds or waterbirds when construction activities would occur outside the April through July 15 nesting season. For project activities involving vegetation disturbance that would occur during the nesting season, surveys for nesting birds would be conducted before vegetation-disturbing activities could begin to prevent “take” of birds protected by the MBTA, to the extent practicable. Nesting raptor surveys would be conducted as necessary to provide clearance for construction during raptor nesting season. Construction activities in the vicinity of active raptor nests would follow CPW-recommended buffer distances (CPW 2020b), buffer distances in another USFWS-approved guidance (if a more current guidance becomes available), or buffer distances specified by coordinating with a USFWS biologist. Roosting bald eagles and nesting golden eagles during any season are protected by the BGEPA, and construction activities would respect CPW-recommended buffer distances (CPW 2020b) near bald eagle roosts and golden eagle nests mapped by CPW or identified during surveys.

Direct impacts on small animals, especially burrowing mammals, amphibians, and reptiles, could include mortality or displacement during construction activities, and stress from human presence and construction noise. Small animal species may experience localized reduced populations in direct proportion to the amount of habitat disturbed. Restricting ground disturbance to the smallest practical footprint for individual project measures would reduce the direct loss of small burrowing animals and temporal loss of their habitat. The Proposed Action would disturb about 27.51 acres of land (about 18.9

acres in the North Fork subwatershed and 8.6 acres in the Crawford subwatershed). Reseeding of disturbed areas would occur in a timely manner (within one growing season) and would be consistent with the surrounding vegetation community. NRCS or BLM would approve seed mixes prior to use. Weed management would be implemented according to county standards, at a minimum.

Installation of SCADA systems in irrigated farmlands and developed areas are not anticipated to cause measurable long-term negative impacts on wildlife. Installation of SCADA systems in areas surrounded by natural habitat is anticipated to cause temporary disturbance and displacement of wildlife. Due to their small footprint size and siting at previously disturbed locations and near existing irrigation infrastructure, SCADA installations would not result in appreciable wildlife habitat loss.

Table 5-5 summarizes impacts on wildlife communities that would result from subwatershed improvements. BMPs or other measures are paired with each impact to reduce or eliminate negative consequences or comply with applicable laws.

Table 5-5. Terrestrial Wildlife Impacts Resulting from Subwatershed Improvements.

Wildlife Community	Time-frame	Impact Type	Impact Description	BMP or Measure to Comply with Applicable Laws
All	Short-term	Direct	Stress, disturbance, and displacement of wildlife in the project area due to machinery operating and human presence during construction.	Minimize direct disturbance impacts by completing construction of individual project measures in the shortest practical timeframe.
Big game	Short-term	Direct	Stress, disturbance, and displacement of wintering big game in the project area due to machinery operating and human presence during construction.	Avoid construction during the months of December through April. When project construction would occur on BLM land in an elk or mule deer winter concentration area or severe winter range between December 1 and April 30, the project proponent will request a project-long exception to BLM's timing limitations.
Big game	Short-term	Direct	Potential for big game animals to be trapped in pipeline trenches left open overnight during construction periods.	Secure trench covers in place that are strong enough to prevent large animals from falling through, or use wildlife escape ramps.
Small ground-dwelling mammals, reptiles, and amphibians	Short-term	Direct	Direct mortality of small ground-dwelling mammals, reptiles and amphibians hibernating or sheltering in the construction area; localized reduction in small animal populations in direct proportion to the amount of habitat disturbed.	Limit the construction footprint to the smallest area practicable.

Wildlife Community	Time-frame	Impact Type	Impact Description	BMP or Measure to Comply with Applicable Laws
Nesting raptors (hawks, falcons, owls)	Short-term	Direct	Potential for "take" under the MBTA (loss of eggs or young from nest abandonment) due to machinery operating and human presence during construction.	Complete construction activities outside of the primary raptor nesting period (April 1 through July 31). If construction activities are to occur during the primary raptor nesting period, complete a nesting raptor survey and operate outside of the CPW-recommended buffer distance (CPW 2020b) or other USFWS-approved guidance for buffer distances. If nesting raptors are present inside recommended buffer zones, work with the local USFWS biologist to adjust the buffer distance if warranted (i.e., if topographic or vegetative barriers protect the nesting raptors from disturbance, a shorter buffer distance may be acceptable); otherwise, work must not proceed until nesting is complete (young have fledged). Cease work if a nesting raptor is discovered within a recommended buffer distance during construction and consult the local USFWS biologist for next steps.
Bald and golden eagles	Short-term	Direct	Potential for "take" under the MBTA (loss of eggs or young from nest abandonment) due to machinery operating and human presence during construction. Potential to interfere with an eagle's "substantial lifestyle, including shelter, breeding, feeding" as defined by the BGEPA of 1940 – this can include disturbance of eagles on hunting roosts and night roosts. The closest bald eagle roost to project activities would be 0.4 mile from the Clipper Ditch Project in the Crawford subwatershed. Given the topography, there would be no direct line of sight between the roost and the project area. According to the CPW (unpublished data 2019; Le Fevre, pers. comm. 2020), a golden eagle nest is located in the Crawford subwatershed. This nest is located approximately 0.25 mile from the SCADA at the Crawford Clipper Headgate.	Bald and golden eagles typically use the same nest sites year after year; consult with the local CPW or USFWS biologist for the most recent understanding of the locations of active nests and operate outside the CPW-recommended buffer distance (CPW 2020b) or other USFWS-approved guidance for buffer distances. A nesting raptor survey would be conducted prior to construction activities to confirm the activity of the golden eagle nest. If active, no activities would occur within a 0.5-mile radius from February 1 through July 15 (CPW 2020b). No CPW-recommended buffer zones or seasonal restrictions would be required for bald eagle roosts in the Crawford or North Fork subwatershed (CPW 2022a). If additional golden eagle or bald eagle nests or bald eagle roost sites are observed during surveys or operations, CPW-recommended buffer zones and seasonal restrictions would be applied (CPW 2020b) or other USFWS-approved guidance for buffer distance from CPW-mapped bald eagle roosts (**Appendix C, Figure 3.5-3**).

Wildlife Community	Time-frame	Impact Type	Impact Description	BMP or Measure to Comply with Applicable Laws
Nesting migratory birds of concern (see **Table 3-9**) except raptors	Short-term	Direct	Potential for "take" under the MBTA (loss of eggs or young from nest abandonment or direct destruction).	Operate outside the primary nesting period for migratory birds of concern (April 1 through July 15). If planning to operate during the primary nesting season, conduct any vegetation clearing or grubbing prior to the primary nesting season. If planning vegetation-disturbing activities during the typical nesting season, the area must be surveyed for active nests no more than two weeks prior to commencement of work. If active nests are found during nest surveys, establish nest buffers in coordination with the local USFWS biologist. If an active nest is discovered during construction, cease work and consult the local USFWS biologist for next steps.
All	Short-term	Indirect	Temporary loss of functional habitat and displacement of wildlife from the construction area until the area is revegetated.	Complete timely and appropriate revegetation of the construction area (seed mixes would be approved by NRCS/BLM biologists). Limit the construction footprint to the smallest area practicable.
All	Long-term	Indirect	Introduction of invasive plant species to the construction area and surrounding native vegetation communities causing habitat degradation.	Implement weed management practices per current county weed management plans (Delta County 2010; CSU 2017). Clean construction equipment prior to bringing it on-site to reduce the risk of introducing weed seeds to the construction site. Ensure borrow material imported to the construction area is not infested with invasive plant species. Ensure seed sources for revegetation are weed-free.
All	Long-term	Indirect	Decrease in localized densities and populations of wetland and riparian-dependent species, especially of amphibians, and certain reptiles, waterbirds, and small mammals due to conversion of artificial riparian and wetland habitat to uplands. Increase in small mammals and reptiles associated with surrounding upland habitats resulting from an increase in local upland habitat and removal of movement barriers posed by open ditches. Changes in distribution patterns of mule deer, elk, and other mammals in response to removal of water resource.	Where other nearby surface wildlife drinking water resources are not available, potentially provide for wildlife "guzzlers" on pipe alignments.

Wildlife Community	Time-frame	Impact Type	Impact Description	BMP or Measure to Comply with Applicable Laws
All	Long-term	Indirect	Improvement in surface water quality and wetland, riparian, and aquatic habitat health due to reduction of salt and selenium loading in the subwatershed (following conversion of open ditches to enclosed pipe). Reduced disturbance to wildlife in remote areas because of the decrease in number of trips made by maintenance personnel to maintain ditches and adjust headgates (following conversion of open ditches to enclosed pipe and installation of SCADA systems).	None needed for beneficial impacts.

North Fork

Project-specific components in the North Fork subwatershed are described in **Chapter 4** and listed in **Table 4-2**. These include a new SCADA tower and four additional SCADA installations, a water control facility (Alternative 2–Coal Road Regulating Reservoir or Alternative 3–3300 Road Regulating Reservoir), and a piping project on FMC (Alternative 2–13,800 linear feet of piping or Alternative 3–13,000 linear feet of piping). All components are situated on private lands, with the exception of the water control facility (Coal Road Regulating Reservoir), which would be on Reclamation and BLM-managed lands.

All project-specific components are situated in elk and mule deer severe winter range, and installations could potentially take place while wintering deer and elk are in the area. Irrigation pipeline construction projects and water control facility construction projects have the potential to displace wintering mule deer and elk on severe winter range and to change their use patterns on surrounding lands for the duration of the activity. For SCADA installations, impacts on mule deer and elk are expected to be temporary and insignificant due to the nature and duration of construction. Construction of the project-specific components would temporarily disturb and displace nongame wildlife, including wintering and migrating migratory birds, and a variety of small animals in the immediate area (see **Section 3.5.1.2**) due to human presence and noise. Big game, birds, and certain small animals have the ability to move away from disturbances to similar nearby habitat, which is extensive in the project area. Impacts on breeding migratory birds of concern would be minimized since installations would take place outside the primary nesting seasons of songbirds and most raptors. Construction would have no effect on bald eagle nesting (which can begin as early as January) or roosting activities because the project area lies well outside the CPW-recommended buffer distances from documented nests and roosts (see **Section 3.5.1.2**).

To protect wintering big game, construction would be planned during the months of August, September, October, and November. If construction occurs in the winter months (December through April), projects would be accomplished in the shortest timeframe possible. During construction, pipeline trenches left open overnight would be kept to a minimum and covered to reduce potential for entrapment of big game. Covers would be secured in place and strong enough to prevent large animals from falling through. Where trench covers would not be practical, dirt wildlife escape ramps would be

used. The inundation footprint of the 3300 Road Regulating Reservoir would convert existing irrigated meadow to open water with wetland fringe. The loss in meadow habitat would be balanced by the additional water provided in the reservoir's dead pool as well as any riparian fringe that develops over time.

Direct impacts on small animals, especially burrowing rodents, amphibians, and reptiles, would include direct mortality and displacement during pipeline and water facility construction activities. To minimize these impacts, the construction footprint would be limited to the smallest practicable area. Several small animal species may experience reduced local populations in direct proportion to the amount of disturbed habitat. The construction corridor would be reseeded in a timely manner (within one growing season) with a seed mix consistent with the surrounding vegetation community, and weed management would be implemented according to county standards, at a minimum. Amphibians and other species dependent on wetland and riparian habitat that would be lost as a result of the project would experience a long-term loss of local habitat (see **Section 5.5.3**). Distribution patterns of big game and other wide-ranging species in the project area may change after the open ditch is piped.

Several nearby water sources provide drinking water for wildlife, including Leroux Creek and several livestock ponds. The enclosed pipe and SCADA system would require fewer maintenance visits than the traditional irrigation system, affording more seclusion to wildlife in this relatively remote area of the subwatershed.

About 625 square feet of ground and vegetation would be disturbed for each SCADA installation, for tasks such as setting the equipment, burying conduit, and constructing an enclosure. These tasks would be accomplished with hand tools or light/portable equipment (e.g., a post auger, a small trencher, and a post driver). Installation would require up to two days with two workers, and workers would travel to the site in a light-duty work truck. The SCADA installation would occur during the irrigation off-season (between October 31 and April 1) between fall 2024 and spring 2027.

Installation of the SCADA tower and access road in the subwatershed would temporarily disturb and displace terrestrial wildlife (see **Section 3.5.1.1**) in the immediate area due to human presence and intermittent noise of portable equipment; however, the duration of each installation would be relatively short, and the nature of the activities would not be unusual for agricultural areas and regular maintenance along the irrigation system they serve. The SCADA system lies in severe winter range and winter concentration area for elk and mule deer, and installations could potentially take place while wintering deer and elk are in the area. However, given the nature and duration of the typical SCADA installation, any impacts on mule deer and elk are expected to be temporary and insignificant. Impacts on breeding migratory birds of concern would be minimized since installations would take place outside the primary nesting seasons of songbirds and most raptors.

Installations would have no effect on bald eagle nesting (which can begin as early as January) or roosting activities because the sites lie well outside recommended buffer distances from documented nests and roosts (see **Section 3.5.1.1** and **Appendix E**). No other raptor nests have been recorded within 0.5 mile of the project measures. Once installed, SCADA systems operate silently and require occasional maintenance visits. The frequency of the visits would be less than normally required for traditional irrigation control systems.

Crawford

Project-specific components in the Crawford subwatershed are the same for both Alternative 2 and Alternative 3, are described in **Chapter 4**, are listed in **Table 4-3**, and are shown on **Appendix B, Figure 4.3-2**. These include 17 new SCADA sites in an integrated network for the Crawford Water Conservancy District ditch system. Sites are located at one of two different types system inputs: (1) Crawford Water Conservancy District "delivery points " or "headgates" to the ditch companies, and (2) inlets into the Crawford Water Conservancy District water system. One new SCADA antenna would be co-located on Young's Peak. Seven of the SCADA sites are associated with the Aspen Canal improvements (a piping project scheduled for winter 2020-2021 construction, and not part of this Supplemental Plan-EA Proposed Action). Three of the SCADA sites are associated with other projects (SCADA Aspen Canal, Clipper/Aspen splitter, and Clipper Ditch). An additional SCADA would be on the Smith Fork Feeder for the Grandview, and four SCADA sites would be installed at four points of inlets to the Crawford Reservoir (Feeder Canal/Daisy Ditch, Clear Fork, Alkali Creek, and Muddy/Iron Creek; **Figure 4.3-2** in **Appendix B**). Construction of all sites would be expected to take place during the irrigation off-season (between October 31 and April 1). Most components would be situated on private lands; four SCADA sites would be located on Reclamation land, operated by CPW; and three SCADA sites and the KREX on an existing tower would be located on BLM land.

All project-specific components in the Crawford watershed would be situated in elk and mule deer severe winter range, and installations could potentially take place while wintering deer and elk are in the area. The impacts and mitigation would be the same as described above for the North Fork watershed. Refer to the paragraph above for impacts analysis. To protect wintering big game, construction would be planned during the months of August, September, October, and November. If construction occurs in the winter months between December and April, projects would be accomplished in the shortest timeframe possible.

Project activities would have no effect on bald eagle nesting (which can begin as early as January) or roosting activities because the sites lie well outside the CPW-recommended buffer distances from documented nests and roosts (see **Section 3.5.1.1** and **Appendix E**). The closest project activity would be within 0.4 mile of a bald eagle roost. However, given the topography in the vicinity, there would be no direct line of sight between the roost and the project area. If there is no direct line of sight between the roost and the activity, CPW recommends no activity within 0.25 mile (CPW 2020b); the project area is outside this buffer.

According to unpublished CPW data (2019; Le Fevre, pers. comm. 2020), a golden eagle nest and alternate nest occurs approximately 0.25 mile from the SCADA at Crawford Clipper Headgate. An increase in noise and human presence can cause golden eagles to abandon their nest and cause nest failure. The nests are located near E50 Road, the town of Crawford, ranches, and residences. Given the existing disturbance near the nest location, eagles that use this nest location may be habituated to human presence. Raptor nest surveys conducted prior to construction would confirm the activity and location of the golden eagle nests. CPW recommends no activities within 0.5 mile of active nests from December 15 through July 15 (CPW 2020b).

Two separate red-tailed hawk (*Buteo jamaicensis*) nests are located within 0.25 mile of the SCADA at the Daisy Feeder Inlet (Le Fevre, pers. comm. 2020). An increase in noise and human presence can

cause red-tailed hawks to abandon their nest and cause nest failure. Raptor nest surveys conducted prior to construction would confirm the activity and location of the red-tailed hawk nests. CPW recommends no activities within 0.33 mile of active nests from February 15 through July 15 (CPW 2020b).

Once installed, SCADA systems operate silently and require occasional maintenance visits. The frequency of the visits would be less than normally required for traditional irrigation control systems.

5.8.1.3 Cumulative Impacts

The cumulative impacts analysis uses a 50-year period for wildlife resources in the general area of the subwatersheds. Present and future activities in the analysis area affecting wildlife include ongoing and future irrigation improvement projects, subdivision and residential development, infrastructure development and/or maintenance (including public and private roads energy transmission corridors), timber harvest, firewood cutting, and vegetation management activities (such as pinyon-juniper or sagebrush treatment projects and weed management programs), recreational hunting and outfitting, livestock grazing, motorized recreation, and conversion of native shrublands and woodlands to agricultural or other uses. Climate change, drought, wildfire, and wildfire suppression also will continue to affect the region's wildlife habitat in the future, possibly with increasing intensity.

The subwatersheds support important big game seasonal and year-round ranges and habitat for a variety of other wildlife, with habitat quantity and quality as limiting factors on many species. Human population growth and development in the subwatersheds in the next 50 years is anticipated to have the most dramatic effect on wildlife habitat and populations of any future activities anticipated. For instance, CPW estimates that mule deer numbers in Colorado have declined by approximately 36 percent in the past decade, to levels significantly below population objectives (CPW 2014). CPW identifies several factors contributing to the decline, namely the state's dramatic increase in human population, which has contributed to the direct loss and degradation of mule deer habitat due to housing developments, urban and suburban sprawl, and infrastructure (CPW 2014).

Under the No Action Alternative, there would be no contribution to cumulative impacts on wildlife communities in the subwatersheds. The action alternatives would affect distribution patterns of big game and other wildlife on the landscape as a result of the loss of artificial wetland and riparian resources. However, these losses would be partially offset by gains in water quality and wetland and riparian function in the Lower Gunnison River Basin and are therefore not expected to result in cumulative impacts on population trends of wildlife. Given the short-term nature of the project and adherence to avoidance, minimization, and mitigation measures (**Table 7-4**), impacts on wildlife are expected to be temporary and negligible.

5.8.1.4 Compliance and Best Management Practices

Avoidance, minimization, and mitigation measures that would be applied prior to, during, and after construction of project measures are described in **Section 7.4**, **Table 7-4**. Permits, compliance, and consultation required are outlined in **Section 7.5**.

5.8.2 Terrestrial Special Status Wildlife Species

5.8.2.1 Alternative 1–No Action

Under the No Action Alternative, the special status wildlife species in the project area would not benefit from reductions in salt and selenium loading to the aquatic system created by conversion of open irrigated ditches to enclosed pipe and on-farm irrigation efficiency projects.

5.8.2.2 Alternatives 2 and 3

Terrestrial wildlife species and critical habitats protected by the ESA with the potential to be affected by the project-specific measures defined in this Supplemental Plan-EA are the Gunnison sage-grouse and Gunnison sage-grouse designated critical habitat. The western yellow-billed cuckoo, western yellow-billed cuckoo proposed critical habitat, lynx, silverspot butterfly, Mexican spotted owl, and Mexican spotted owl critical habitat were dismissed from further analysis based on lack of documented occurrences in the specific project areas, or in the subwatersheds. Note that the western yellow-billed cuckoo is documented in **Table 5-6** below because it has potential habitat within 2 miles of project measures, while no other species (lynx or Mexican spotted owl) are documented within 10 miles. Background information for these species and their critical habitats is provided in **Section 3.5.2**. Subwatershed improvements are described in detail in **Section 4.3.1.1**.

Table 5-6 (below) presents preliminary/anticipated effects determinations for each ESA-protected species and critical habitat for each type of subwatershed improvement, assuming the improvement would take place in *occupied habitat*. **Appendix A** includes the USFWS consultation letter concurring with the determinations.

Table 5-6. Preliminary Effects Determinations for Federally Protected Terrestrial Wildlife Species and Critical Habitats.

ESA-Protected Element	SCADA	Ditch Conversion to Enclosed Pipe	Water Control Facilities
Gunnison sage-grouse	Installation activities may affect, and are likely to adversely affect this species if they are conducted during March 1 through July 15 breeding and nesting season within 4 miles of an active lek. The closest SCADA site is approximately 2.6 miles from occupied habitat and more than 4 miles from an active lek (Homan, pers. comm. 2017). No sagebrush occurs at the SCADA sites and no habitat would be removed during this activity. Therefore, installation activities would have no impact. May affect, but is not likely to adversely affect, habitat if structures provide hunting perches for birds of prey.	Construction activities would have no effect; project sites are greater than 4 miles from occupied habitat.	Construction activities would have no effect; project sites are greater than 4 miles from occupied habitat.
Gunnison sage-grouse designated critical habitat (potential)	No effect (assumes SCADA installation is in previously disturbed areas). May affect, but is not likely to adversely affect, habitat if structures provide hunting perches for birds of prey or collision opportunities with fences given the distance to occupied habitat (approximately 2.6 miles).	No effect; no project sites are located in potential or occupied habitat.	No effect; no project sites are located in potential or occupied habitat.
Western yellow-billed cuckoo	No effect; the proposed SCADA is not located near potential habitat.	No effect; the proposed pipe is not located near potential habitat.	No effect; the proposed water control facilities are not located near potential habitat.
Western yellow-billed cuckoo proposed critical habitat	No effect; the proposed SCADA is located approximately 1.5 miles north of proposed critical habitat.	No effect; the proposed pipe is located approximately 1.7 miles north of proposed critical habitat.	No effect; the proposed water control facilities are located approximately 1.5 miles north of proposed critical habitat.

Note that ESA-protected species presented on **Table 5-6** are current as of the preparation date of this Supplemental Plan-EA and should be confirmed and updated as necessary during the planning phase of each subwatershed improvement.

Table 5-7 (below) summarizes potential impacts on BLM sensitive species for each type of subwatershed improvement that may occur on BLM-managed lands, assuming the improvement would take place in *occupied habitat*. As a part of the planning process for subwatershed improvements on BLM-managed lands, the BLM UFO would be consulted for concurrence with **Table 5-7** and for clearance survey requirements.

For subwatershed improvements taking place outside a species' range or inside the species' range but not in or near suitable habitat, a finding of no impact would apply to the activity.

BLM and CPW sensitive species presented in **Table 5-7** are current as of the preparation date of this Supplemental Plan-EA.

Table 5-7. Anticipated Impacts on BLM and CPW Sensitive Terrestrial Wildlife Species.

BLM and CPW Sensitive Species ***(for BLM sensitive species, assumes activity would take place in occupied habitat on BLM-managed lands)***	**SCADA**	**Ditch Conversion to Enclosed Pipe / Water Control Facilities**
White-tailed prairie dog	Installation activities could temporarily disturb or alarm prairie dogs within a few hundred feet. Local populations could be impacted if SCADA structures provide hunting perches for birds of prey where such perches do not currently exist.	Construction activities could temporarily disturb or alarm prairie dogs within a few hundred feet. Direct mortality could result when burrows are within the construction corridor or in ditch banks. No long-term effects are anticipated; a beneficial effect could occur from creating more upland prairie dog habitat once the project footprint is revegetated.
Fringed myotis Little brown myotis Spotted bat Townsend's big-eared bat	No direct effect.	These bats could be expected to forage over ditches in spring, summer, and early fall, and could be displaced by construction activities overlapping their active months. Artificial riparian and wetland foraging habitat loss would be offset by water quality and habitat improvements to natural riverine systems in the project area.
Bighorn sheep	Installation activities could temporarily disturb bighorn sheep nearby. SCADA installation is unlikely to occur on BLM lands in bighorn sheep habitat in the subwatersheds, which is extremely limited. No long-term effects.	Construction activities could temporarily disturb nearby bighorn sheep. Ditch conversion is unlikely to occur on BLM lands in bighorn sheep habitat in the subwatersheds, which is extremely limited. No long-term effects.

BLM and CPW Sensitive Species ***(for BLM sensitive species, assumes activity would take place in occupied habitat on BLM-managed lands)***	**SCADA**	**Ditch Conversion to Enclosed Pipe / Water Control Facilities**
Northern pocket gopher	Installation activities could temporarily disturb or alarm pocket gophers within a few hundred feet. Local population could be impacted if SCADA structures provide hunting perches for birds of prey where such perches do not currently exist.	Construction activities could temporarily disturb or alarm pocket gophers within a few hundred feet. Direct mortality could result when burrows are within the construction corridor or in ditch banks. No long-term effects are anticipated; beneficial effects could occur from creating more upland pocket gopher habitat once the project footprint is revegetated.
River otter	Installation activities could temporarily disturb or alarm river otters within a few hundred feet. Construction activities could temporarily increase sediment entry into project area waterways. Beneficial effects may occur from long-term improvements to water quality and availability in the North Fork subwatershed.	Construction activities could temporarily disturb or alarm river otters within a few hundred feet. Construction activities could temporarily increase sediment entry into project area waterways. Beneficial effects may occur from long-term improvements to water quality and availability in the North Fork subwatershed.
Bald eagle Burrowing owl Ferruginous hawk Golden eagle Peregrine falcon	Potential direct effects could occur during installation if the site is located inside CPW-recommended buffer distances from active nests during the breeding season or active bald eagle roosts (CPW 2022b). No bald eagle roosts occur within the CPW-recommended buffer distances. A golden eagle nest occurs within 0.25 mile of a SCADA site in Crawford. Construction activities could cause nest abandonment and failure if conducted during the December 15 through July 15 nesting season. No measurable long-term effects from maintenance visits are anticipated (assuming maintenance visits would be of less frequency than prior to the SCADA installation).	Potential direct effects could occur during construction if the project footprint is located inside CPW-recommended buffer distances from active nests during the breeding season or active bald eagle roosts (CPW 2022b). Potential disruption of foraging patterns could occur during construction. No measurable long-term effects are anticipated.
Brewer's sparrow	Potential direct effects could occur if installation occurs during the April through July 15 breeding season near an active nest. No effects on migrating birds would occur during installation (would avoid the installation site). No measurable long-term effects are anticipated.	Potential direct effects could occur if construction occurs during the April through July 15 breeding season near an active nest. No effects on birds would occur from construction during spring or fall migration (would avoid the construction site). No long-term effects are anticipated; beneficial effects could occur from creating more upland nesting habitat once the project footprint is revegetated.

BLM and CPW Sensitive Species ***(for BLM sensitive species, assumes activity would take place in occupied habitat on BLM-managed lands)***	**SCADA**	**Ditch Conversion to Enclosed Pipe / Water Control Facilities**
Greater sandhill crane	No effects on breeding or nesting individuals are anticipated; none are known to occur in the subwatersheds (CPW 2022a). No effects on migrating birds are anticipated from installation (would avoid the installation site). No measurable long-term effects are anticipated.	No effects on breeding or nesting individuals are anticipated; none are known to occur in the subwatersheds (CPW 2022a). No effects on birds are anticipated from construction during spring or fall migration (would avoid the construction site). No measurable long-term effects are anticipated.
Long-billed curlew	No effects on breeding or nesting individuals are anticipated; none are known to occur in the subwatersheds (CPW 2022a). No effects on migrating birds are anticipated from installation (would avoid the installation site). No measurable long-term effects are anticipated.	No effects on breeding or nesting individuals are anticipated; none are known to occur in the subwatersheds (CPW 2022a). No effects on birds are anticipated from construction during spring or fall migration (would avoid the construction site). No measurable long-term effects are anticipated.
Midget-faded rattlesnake	Potential direct effects (stress and mortality) on active or hibernating individuals could occur during construction. No measurable long-term effects are anticipated.	Potential direct effects (stress and mortality) on active or hibernating individuals could occur during construction. No measurable long-term effects are anticipated.

The following tables (**Table 5-8** through **Table 5-12**) present preliminary anticipated effects determinations for each ESA-protected species and critical habitat, and for BLM sensitive species, for project-specific measures in each subwatershed. Where rationale statements for the preliminary determinations are not met in the tables, or where determinations are other than "No effect," NRCS has completed consultation under Section 7 of the ESA with the USFWS. The USFWS concurred with all of the effects determinations in a consultation letter dated May 14, 2021 (TAILS 06E24100-2021-F-0366).

Any vegetation or ground-disturbing activities ancillary to the subwatershed improvements analyzed in **Table 5-8** through **Table 5-12**, such as creation of or widening of access roads to project areas, establishment of staging or borrow areas on nonirrigated ground, or habitat conservation or mitigation actions, could trigger a need for additional Section 7 consultation or clearance surveys if these actions would occur in the range and suitable habitat of a special status wildlife species. BLM sensitive species impacts and the need for clearance surveys on BLM-managed lands would be evaluated with the BLM UFO.

North Fork

Table 5-8 provides preliminary/anticipated effects determinations for federally protected terrestrial wildlife species for project-specific measures in the North Fork subwatershed. The Coal Road

Regulating Reservoir, SCADA tower, and access are located on Reclamation lands; a small area of road realignment could affect BLM land and access.

Table 5-8. Preliminary Effects Determinations for Federally Protected Terrestrial Wildlife and Critical Habitats for Project-Specific Measures in the North Fork Subwatershed.

ESA-Protected Element	Effect Determination	Rationale
Gunnison sage-grouse	No effect	The project-specific measures are not within or near the documented range of the species.
Gunnison sage-grouse designated critical habitat (both occupied and potential)	No effect	No designated critical habitat exists in the subwatershed.
Western yellow-billed cuckoo	No effect	The installations would take place outside the June through August breeding season. The project-specific measures are not within breeding habitat of the species.
Western yellow-billed cuckoo proposed critical habitat	No effect	The project-specific measures are more than 1.5 miles north of proposed critical habitat.

Table 5-9 provides preliminary/anticipated effects determinations for BLM and CPW sensitive species for project-specific measures in the North Fork subwatershed. Effects for BLM sensitive species are for project activities that may occur on BLM-managed lands.

Table 5-9. Preliminary Effects Determinations for BLM and CPW Sensitive Terrestrial Wildlife in the North Fork Subwatershed.

BLM and CPW Sensitive Species	Effect Determination	Rationale
Fringed myotis Little brown myotis Spotted bat Townsend's big-eared bat	No effect	These bats may forage near the project component sites in spring, summer, and early fall; SCADA installation during active months is not expected to interfere with crepuscular feeding and bats would be hibernating during winter construction. No foraging habitat loss would occur.
Bighorn sheep	No effect	No project-specific measures are located near bighorn sheep habitat on BLM lands.
Northern pocket gopher	May affect, not likely to measurably affect	Installation activities could temporarily disturb or alarm prairie dogs within a few hundred feet. Local populations could be impacted if SCADA structures provide hunting perches for birds of prey where such perches do not currently exist; however, other communications facilities are in the area.
River otter	May affect, not likely to measurably affect	Installation activities could temporarily disturb or alarm river otters within a few hundred feet. Construction activities could temporarily increase sediment entry into project area waterways. Beneficial effects on water quality and availability in the North Fork subwatershed could occur from long-term improvements.
White-tailed prairie dog	May affect, not likely to measurably affect	Installation activities could temporarily disturb or alarm prairie dogs within a few hundred feet. Local populations could be impacted if SCADA structures provide hunting perches for birds of prey where such perches do not currently exist; however, other communications facilities are in the area.

BLM and CPW Sensitive Species	Effect Determination	Rationale
Bald eagle Golden eagle	No effect	CPW-mapped bald eagle nests or roosts are outside CPW-recommended buffer distances (CPW 2020b) from the SCADA site. No known golden eagle nests exist within the CPW-recommended buffer distances in the subwatershed (CPW 2020b). Foraging eagles have the flexibility to move to other areas of appropriate habitat in response to disturbance; the habitat at the project-specific component site is not exceptional or unique.
Burrowing owl	No effect	Construction of the project-specific component would take place during the irrigation off-season and is unlikely to coincide with primary nesting season for the species (April through July).
Ferruginous hawk	No effect	Migratory or wintering ferruginous hawks have the flexibility to move to other areas of appropriate habitat in response to disturbance; the habitat at the project-specific component site is not exceptional or unique.
Peregrine falcon	No effect	Foraging peregrine falcons have the flexibility to move to other areas of appropriate habitat in response to disturbance; the habitat at the project-specific component site is not exceptional or unique.
Greater sandhill crane	No effect	Migratory or wintering greater sandhill cranes have the flexibility to move to other areas of appropriate habitat in response to disturbance; the habitat at the project-specific component site is not exceptional or unique. No nests or breeding areas have been documented near project-specific measures.
Long-billed curlew	No effect	Migratory or wintering long-billed curlews have the flexibility to move to other areas of appropriate habitat in response to disturbance; the habitat at the project-specific component site is not exceptional or unique.
Midget faded rattlesnake	May affect, not likely to measurably affect	Construction activities could temporarily disturb active or hibernating individuals. Construction equipment could crush hibernating individuals.

Crawford

Table 5-10 provides preliminary/anticipated effects determinations for federally protected terrestrial wildlife species for project-specific measures in the Crawford subwatershed. The following SCADA networks are located on BLM lands: KREX, Gates 6 and 7 (and Gate 5 is on the border). Four SCADA sites (Feeder Canal/Daisy Ditch, Alkali Creek Inlet, and Muddy and Iron Creek Inlet are on Reclamation land, operated by CPW. The SCADA (KREX) is located on an existing tower.

Table 5-10. Preliminary Effects Determinations for Federally Protected Terrestrial Wildlife and Critical Habitats for Project-Specific Measures in the Crawford Subwatershed.

ESA-Protected Element	Effect Determination	Rationale
Gunnison sage-grouse	No effect	The project-specific measures are not within or near the current documented occupied range of the species (the nearest documented occurrence is more than 2.5 miles from the project-specific measures). The project-specific measures are not within areas of suitable breeding, nesting, brooding, or winter habitat for the species.
Gunnison sage-grouse designated critical habitat (both occupied and potential)	May affect, not likely to adversely affect No effect	Four SCADA networks (Feeder Canal/Daisy Ditch, Clear Fork Inlet, Alkali Creek Inlet, Muddy and Iron Creek Inlet) fall within designated critical habitat classified as potential/unoccupied in an area not meeting PCE requirements of sage-grouse habitat outlined in the listing rule at 79 FR 69311-69363 (November 20, 2014). Up to 10 sagebrush plants may be damaged or disturbed during construction access. SCADA construction would occur outside the March 1 to July 15 breeding season. The remaining project measures all fall outside designated critical habitat.
Western yellow-billed cuckoo	No effect	No documented occurrences of the species are in the subwatershed, and individuals in the area of the project-specific measures would be considered incidental (migrating or foraging). The project-specific measures are not within breeding habitat of the species, and would likely be constructed when irrigation water is off, outside the May through August breeding season.
Western yellow-billed cuckoo proposed critical habitat	No effect	The project-specific measures are not within or near the proposed critical habitat.

Table 5-11 provides preliminary/anticipated effects determinations for BLM and CPW sensitive species for project-specific measures in the Crawford subwatershed. Effects for BLM sensitive species are for project activities that may occur on BLM-managed lands.

Table 5-11. Preliminary Effects Determinations for BLM Sensitive Terrestrial Wildlife in the Crawford Subwatershed.

BLM Sensitive Species	Effect Determination	Rationale
Fringed myotis Little brown myotis Spotted bat Townsend's big-eared bat	No effect	These bats could be expected to forage near the project component sites in spring, summer, and early fall; SCADA installation during active months is not expected to interfere with crepuscular feeding and bats would be hibernating during winter construction. No foraging habitat loss would result.
Bighorn sheep	No effect	No project-specific measures are located near bighorn sheep habitat on BLM lands.
Northern pocket gopher	May affect, not likely to measurably affect	Installation activities could temporarily disturb or alarm pocket gophers within a few hundred feet. Local populations could be impacted if SCADA structures provide hunting perches for birds of prey where such perches do not currently exist; however, other communications facilities are in the area.

BLM Sensitive Species	Effect Determination	Rationale
White-tailed prairie dog	May affect, not likely to measurably affect	Installation activities could temporarily disturb or alarm prairie dogs within a few hundred feet. Local populations could be impacted if SCADA structures provide hunting perches for birds of prey where such perches do not currently exist; however, other communications facilities are in the area.
Bald eagle	No effect	CPW-mapped bald eagle nests or roosts are outside CPW-recommended buffer distances (CPW 2020b) from the SCADA and Clipper Ditch sites.
Burrowing owl	No effect	Construction of the project-specific component would take place during the irrigation off-season and is unlikely to coincide with the primary nesting season for the species (April through July).
Golden eagle	May affect, not likely to measurably affect	A golden eagle nest has been documented within 0.25 mile of the SCADA at Crawford Clipper Headgate. Increased noise and human presence could cause eagles to abandon the nest for the season, causing nest failure. A nesting raptor survey would be conducted prior to construction activities to confirm the activity of the golden eagle nest. If active, no activities would occur within a 0.5-mile radius from February 1 through July 15 (CPW 2020b). Foraging eagles have the flexibility to move to other areas of appropriate habitat in response to disturbance; the habitat at the project-specific component site is not exceptional or unique.
Ferruginous hawk	No effect	Migratory or wintering ferruginous hawks have the flexibility to move to other areas of appropriate habitat in response to disturbance; the habitat at the project-specific component site is not exceptional or unique.
Peregrine falcon	No effect	CPW-mapped peregrine falcon nesting areas are outside CPW-recommended buffer distances (CPW 2020b) from the SCADA and Clipper Ditch sites.
Greater sandhill crane	No effect	Migratory or wintering greater sandhill cranes have the flexibility to move to other areas of appropriate habitat in response to disturbance; the habitat at the project-specific component site is not exceptional or unique. No nests or breeding areas have been documented near project-specific measures.
Long-billed curlew	No effect	Migratory or wintering long-billed curlews have the flexibility to move to other areas of appropriate habitat in response to disturbance; the habitat at the project-specific component site is not exceptional or unique.

5.8.2.3 Compliance and Best Management Practices

Avoidance, minimization, and mitigation measures that would be applied prior to, during, and after construction of project measures are described in **Section 7.4**, **Table 7-4**. Permits, compliance, and consultation required are outlined in **Section 7.5**.

5.8.2.4 Cumulative Impacts

This cumulative impacts analysis uses a 50-year period for special status species in the general area of the subwatersheds. Present and future activities in the analysis area affecting special status species are similar to those described for wildlife in general in **Section 5.5.1.3**. Climate change and human population growth (and the development that accompanies it) would likely put more pressure on special status species and their habitats in the coming 50 years than any other factor.

Distribution patterns of special status wildlife species such as BLM sensitive bats could change as a result of the loss of artificial wetland and riparian resources created by open ditches to be converted to enclosed pipe. However, these losses would be offset by gains in water quality and wetland and riparian habitat function in the project area's natural riverine systems (see **Section 5.4.2** for further discussion of impacts on wetlands and riparian areas) and are therefore not expected to result in a substantial contribution to cumulative area-wide impacts on population trends of special status wildlife. Impacts would be mitigated by design features, compliance measures, and BMPs described throughout this Supplemental Plan-EA.

Under the No Action Alternative, there would be no contribution to cumulative impacts on special status wildlife species in the subwatersheds.

5.8.3 Fish and Amphibians

5.8.3.1 Alternative 1–No Action

Under the No Action Alternative, fish and amphibian habitat would remain in its current condition. The use of water for irrigation would continue at present rates, resulting in continued historic depletions in project area waterways and downstream. Soil conditions would not improve and irrigation-related surface runoff (tail water) would continue to infiltrate into aquatic resources, resulting in ongoing salinity and selenium loading in the Lower Gunnison River Basin. Selenium exposure and salinity loading would continue to impact water quality and contribute to habitat degradation for listed fish species in the Upper and Lower Colorado River Basins.

5.8.3.2 Alternatives 2 and 3

Both Alternatives 2 and 3, including converting open ditches to piped deliveries and installing SCADA technologies to irrigation water infrastructure, should not only improve habitat for critical species on the Gunnison and Colorado Rivers but also should be used as a tool to improve habitat for local rivers and streams. The same tools that are applied to increase irrigation efficiency are also necessary for sustaining and restoring fisheries in the Lower Gunnison River and implementing innovative water conservation projects that can be used to address local and regional water supply issues.

Direct effects on fishes and amphibians from incremental implementation of the proposed subwatershed improvements would be localized and temporary, while indirect effects would be long-term. BMPs and compliance measures (see **Section 7.4**) would serve to minimize or avoid impacts on fishes and amphibians. The effects of the Proposed Action (including measures common to Alternatives 2 and 3) have been fully analyzed in a Biological Assessment and addressed in consultation with the USFWS, as required under Section 7 of the ESA (see **Appendix A** for a consultation letter dated May 14, 2021). BLM sensitive species are discussed in **Appendix E**.

Fish

Construction of project-specific measures would be limited to project area ditches and canals; no construction is proposed along project area streams or rivers. Fish, especially individual fry or juveniles, may occasionally occur in project area irrigation canals; however, they are more likely to occur in streams or rivers in the project area. Construction of the proposed subwatershed improvements would take place outside of the irrigation season, when canals would be dry and fish would not be present; therefore, no direct mortality or disturbance is expected. Construction would result in a short-

term increase in potential for sediment loading into project area waterways, which may temporarily impact water quality. The project measures would result in long-term beneficial impacts on fish habitats, including improved water quality and availability for fish in the Lower Gunnison River Basin.

Amphibians

During construction of the proposed subwatershed improvements, an increase in noise, human presence, and equipment use in the project area may result in displacement of amphibians. Adult or juvenile amphibians occupying the project area would be expected to relocate into adjacent suitable habitat during construction; however, individual mortality of eggs, larva, or adults may occur. Amphibians that may use burrows in the construction areas, such as the tiger salamander, may be crushed or killed during construction.

Long-term impacts of the project measures would include the loss of wetland and riparian habitat along existing canals and ditches as described in **Section 5.5, Wetlands and Riparian Areas**. Amphibians occupying these habitat areas would either relocate to adjacent suitable habitat or could suffer mortality. The potential for mortality could be greater depending on the life stage of the species (e.g., amphibian eggs that are not mobile would likely not persist in areas where canals are abandoned).

Construction of the proposed subwatershed improvements would result in long-term beneficial impacts on amphibian habitats, including improved water quality and availability for amphibians in the Lower Gunnison River Basin.

5.8.3.2.1 Federally Listed Fish, Amphibians, and Designated Critical Habitat

Federally Listed Fish

The four Colorado River listed fishes (bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker) use aquatic habitats that are downstream of the project area; therefore, they have potential to be impacted by the Proposed Action.

The Gunnison River is included in the historic range for the Colorado pikeminnow and razorback sucker, and individuals of both species have been observed at the Redlands Diversion Dam on the Gunnison River downstream of the project area (CRRP 2016). These federally listed fish have the potential to occur in project area streams and rivers. However, based on their habitat preferences, federally listed fish species are not expected to use the irrigation canals or ditches in the project area. In addition, construction would take place outside of the irrigation season, when canals would be dry and fish would not be present. Construction of the subwatershed improvement projects could increase the potential for sediment entry into project area waterways. However, because these listed fish species are unlikely to occur in construction areas, the potential for direct impacts is considered discountable.

Indirect impacts of the subwatershed improvements would include improved water quality and availability in downstream waterways, beneficially impacting suitable habitats for federally listed fish. **Table 5-12** lists the preliminary effects determinations for listed fish species and their critical habitat. Implementation of the project measures may affect, but is not likely to adversely affect, the four Colorado River listed fishes. In a consultation letter dated May 14, 2021 (**Appendix A**), the USFWS concurred with the effect determinations that threatened or endangered species are not likely to be

adversely affected by the project measures, except water depletions could affect the four listed Colorado River fish. Based on the 2018 Plan-EA evaporative losses (3.8 AF per open acre, per year), it is assumed that water losses from the subwatershed improvements would be 31.36 AF/yr. The water control facilities would total 1.4 acres in new open water; the number includes the piped canals that would remove evaporative losses from about 1.86 acres. These water depletions have been fully addressed in Recovery Agreements prepared under the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (note that the humpback chub has since been downlisted from "Endangered" to "Threatened").

Table 5-12. Preliminary Effects Determinations for Federally Protected Fish and Amphibians.

Species[1]	Legal Status[2]	Preliminary Effects Species Determination	Critical Habitat	Preliminary Effects Critical Habitat Determination
Bonytail chub *Gila elegans*	E	May affect, but is not likely to adversely affect	Y	Will not destroy or adversely modify
Colorado pikeminnow *Ptychocheilus lucius*	E	May affect, but is not likely to adversely affect	Y	Will not destroy or adversely modify
Humpback chub *Gila cypha*	T	May affect, but is not likely to adversely affect	Y	Will not destroy or adversely modify
Razorback sucker *Xyrauchen texanus*	E	May affect, but is not likely to adversely affect	Y	Will not destroy or adversely modify

[1.] This species list was compiled using USFWS Environmental Conservation Online System IPaC (USFWS 2023).
[2.] Status explanation for species listed under the federal ESA or the Colorado Nongame, Endangered, or Threatened Species. Conservation Act: E = Federally or state-listed as endangered; T = Federally or state-listed as threatened.

Designated Critical Habitat

Designated critical habitat for the bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker has been identified (**Table 3-14**). In combination with ongoing water quality improvement efforts in the Colorado River Basin CCA, the subwatershed improvements are expected to result in positive benefits to water quality and availability in the Gunnison River, thereby improving habitat quality for the Colorado River listed fishes in the project area and downstream. The project measures are not expected to reduce the effectiveness of critical habitat for the Colorado River listed fishes, or negatively impact the PCEs of designated critical habitat. **Appendix A** includes a concurrence letter from the USFWS for this project.

5.8.3.2.2 BLM and CPW Sensitive Species

BLM and CPW Sensitive Fish

Four BLM and CPW sensitive fish species – the Colorado River cutthroat trout, bluehead sucker, flannelmouth sucker, and roundtail chub – may use suitable aquatic habitats in the project area. Based on their habitat preferences, these species are not expected to commonly occur in irrigation canals or ditches in the project area, although occasional use may occur, especially by fry or juvenile fish. However, construction of the project measures would take place outside of the irrigation season, when canals would be dry and fish would not be present. Construction would increase the potential for sediment entry into project area waterways. The project measures would result in long-term beneficial impacts on fish habitats, including improved water quality and availability. The project measures may impact individual Colorado River cutthroat trout, bluehead sucker, flannelmouth sucker, and roundtail chub, but is not likely to result in a loss of viability or cause a trend toward federal listing for these species.

BLM and CPW Sensitive Amphibians

The northern leopard frog, a BLM and CPW sensitive amphibian, may use riparian, wetland, or aquatic habitats in the project area. Construction may result in habitat removal and displacement or mortality of individuals that may be present in the project area during construction. Long-term impacts on northern leopard frogs from the project measures would include the removal of linear wetland features along project area irrigation canals. Installation of SCADA systems would result in decreased human traffic in wetland habitat along ditches and canals; however, these wetlands are expected to be lost over time as canals are abandoned. Long-term beneficial impacts would include improved water quality and availability for amphibian habitats in the Lower Gunnison River Basin. The project measures may impact individual northern leopard frogs, but is not likely to result in a loss of viability or cause a trend toward federal listing.

5.8.3.2.3 Project Area Fisheries

Federally Listed Warm Water Fish and Native Fishery Below Delta

While the project measures would not include the construction of project-specific measures in the native fishery below Delta, long-term benefits to the fishery are expected, including decreased salinity and selenium loading in the Gunnison River downstream of the project area. In addition, increases in irrigation efficiency in the project area would likely result in increased water availability. The project measures are not expected to impact species composition or utilization in the fishery.

Fisheries

Both subwatersheds in the project area support a fishery. The project measures would improve water quality and availability throughout the project area, resulting in long-term benefits to the fisheries. No construction is proposed along native streams or rivers in the project area, and channel morphology of streams and rivers in the project area would not be impacted by the project measures. The proposed subwatershed improvements are not expected to increase anthropogenic influences in the subwatersheds.

5.8.3.2.4 Project-Specific Measures

North Fork

Project-specific measures in the North Fork subwatershed are described in **Section 4.1.1.2** and listed in **Table 4-2**. These include a SCADA system including a tower (Coal Road Repeater), four SCADA sites, and a piping project on FMC. A portion of the FMC Coal Road Regulating Reservoir access road is located on BLM lands.

Construction of the Proposed Action has the potential to result in short-term impacts on the fishery in the North Fork subwatershed, including increased potential for sediment entry into project area waterways. The proposed activities are expected to result in long-term improvements to water quality and availability in the North Fork subwatershed.

Crawford

Project-specific components in the Crawford subwatershed are described in **Chapter 4**, listed in **Table 4-3**, and shown on **Appendix B, Figure 4.3-2**. These include a new SCADA system with 17 new SCADA sites. One new SCADA antenna would be co-located on Young's Peak. Seven of the SCADA systems are associated with the Aspen Canal improvements (a piping project scheduled for winter 2020-2021 construction, and not part of this Supplemental Plan-EA Proposed Action). Three of the SCADA systems are associated with other projects (SCADA Aspen Canal, Clipper/Aspen splitter, and Clipper Ditch). An additional SCADA would be installed on the Smith Fork Feeder for the Grandview, and four SCADA would be installed at four points of inlets to Crawford Reservoir (Feeder Canal/Daisy Ditch, Clear Fork, Alkali Creek, and Muddy/Iron Creek; **Appendix B, Figure 4.3-2**). Construction of all components would be expected to take place during the irrigation off-season (between October 31 and April 1). Most components are situated on private lands; four SCADA are located on state land, and three SCADA and the KREX on an existing tower are located on BLM land.

Construction of the project measures has the potential to result in short-term impacts on the fishery, including increased potential for sediment release into project area waterways. The proposed activities are expected to improve water quality and availability in the subwatershed and downstream waterways over the long term.

5.8.3.2.5 Compliance and Best Management Practices

Avoidance, minimization, and mitigation measures that would be applied prior to, during, and after construction of project measures are described in **Section 7.4**, **Table 7-4**. Permits, compliance, and consultation required are outlined in **Section 7.5**.

5.8.3.3 Cumulative Impacts

Past, present, and reasonably foreseeable future actions that may impact amphibians in the project area are similar to those described in the wetlands and riparian and wildlife sections of this Supplemental Plan-EA, while actions that may impact fishes are similar to those described in the aquatic resources section. Such actions include existing and future NRCS irrigation improvement projects, livestock grazing, and residential development. Residential development could result in conversion of irrigated agricultural or grazing rangelands, which may impact water availability and habitats for amphibians.

Both of the subwatersheds in the project area have a watershed plan that includes strategies or projects intended to improve water quality, water quantity, and system efficiency in the subwatersheds. In addition, the Lower Gunnison River Basin is included in three ongoing water quality improvement programs: (1) Colorado River Basin Salinity Control Program, (2) the Upper Colorado River Endangered Fish Recovery Program, and (3) the Gunnison Basin Selenium Management Program (discussed in more detail in **Section 5.4.2.5**). The proposed construction areas and duration of disturbance under the project measures are discrete and short-term, and long-term impacts are not expected to raise cumulative negative impacts on a significant level. The project measures are expected to work in combination with these ongoing programs to improve fish and amphibian habitats in the Lower Gunnison River Basin.

The project measures will comply with all relevant federal, state, and local permits (detailed in **Table 7-4**). In combination with other past, present, and reasonably foreseeable future actions, the project

measures are expected to contribute to improved water quality and availability, resulting in long-term beneficial impacts on fish and amphibian habitats.

5.9 Human Environment

5.9.1 Cultural and Historic Resources

5.9.1.1 Alternative 1–No Action

Under the No Action Alternative, none of the construction activities would occur. There would be no effects on the cultural and historic resources in the project area.

5.9.1.2 Alternatives 2 and 3

Construction associated with identified project actions has the potential to adversely affect historic resources that overlap the action alternatives. Converting canals to pipelines would destroy the integrity of design, materials, and workmanship for previously documented and evaluated or as yet to be documented and evaluated segments of NRHP-eligible ditches and canals. To evaluate the potential impacts of the project-specific components, a cultural resource survey of these project measures proposed under the action alternatives was conducted in September 2020 (Engleman 2020). Sites documented during the 2020 cultural resource survey were evaluated for eligibility and direct, indirect, or cumulative adverse effects as a result of the action alternatives. Potential adverse effects from the proposed project measures would include:

- Physical destruction
- Alteration through repair or maintenance
- Visual, audible, or atmospheric changes

The 2020 cultural resource survey for the proposed project measures under the action alternatives recommended a finding of "historic properties adversely affected." The SHPO concurred with this finding in a letter dated February 9, 2021 and consultation has been completed. Mitigation of project effects on these resources required that the consulting parties enter into an MOA, which specifies a method of treatment for the adverse effects that is acceptable to all of the consulting parties. The MOA was finalized on July 5, 2022. Treatment of adverse effects agreed upon in the MOA included creation of historic information in ArcGIS StoryMap format, posted to an interactive website and hosted for five years. The information will be targeted toward the public as well as historic researchers. The website will go live within six months of the execution of the MOA.

North Fork Watershed

Within the North Fork Water Conservancy District, a portion of the FMC would be replaced with 72-inch Spirolite pipe along a length of 13,545 feet of canal with a 60-foot ROW. Staging for the project would occur at the proposed Coal Road Regulating Reservoir site (Alternative 2). For Alternative 2, the Coal Road Regulating Reservoir would be a pressure-regulating reservoir. A SCADA tower with an associated access road would be installed, and four additional SCADA sites would be installed in the piped corridor. For Alternative 3, the 3300 Road Regulating Reservoir—a pressure-regulating reservoir—would be constructed.

Only one historic property, a segment of the Fire Mountain Canal (5DT1277.9), is in or overlaps the project area; this segment would be adversely affected by proposed project measures for both

Alternatives 2 and 3. There would be direct long-term effects on this segment from piping of the canal. These adverse effects would be mitigated as outlined in the signed MOA (see **Section 5.9.1.3** below and **Appendix E**; **Section E-4**).

Crawford Watershed

Within the Crawford Water Conservancy District, the project would include SCADA installation at the Crawford Clipper River Diversion, Aspen Canal, Aspen to Zanni Lateral, and Clipper/Aspen Splitter. Each SCADA site generally includes gate control equipment, a stilling well, water level sensors, 1-inch buried conduit, a relay antenna (telemetry equipment), solar power, and a panel. Measurement-only SCADA would be installed at the Alkali Creek Inlet, Muddy/Iron Creek Inlet (south side of Crawford Reservoir), Daisy Feeder Inlet, and Clear Fork Inlet (east side of Crawford Reservoir). A radio repeater antenna would be replaced at the SCADA location at the existing Young's Peak tower. Seven SCADA turnout gates would be installed along the C Ditch to Aspen Canal.

Construction of the SCADA system would not adversely affect any historic properties. The historic trash scatter that is "needs data" is located within the survey buffer of an existing access road; it would not be impacted by any construction activities.

5.9.1.3 Cumulative Impacts

Due to both the nature of the cultural resources known to be in the project area, it is assumed that adverse cumulative effects on historic properties would be related to the direct effects associated with construction of the project. Any cultural resources not eligible for inclusion in the NRHP cannot be adversely affected and no further work would be necessary.

5.9.1.4 Compliance and Best Management Practices

Avoidance, minimization, and mitigation measures that would be applied prior to, during, and after construction of project measures are described in **Section 7.4**, **Table 7-4**. Permits, compliance, and consultation required are outlined in **Section 7.5**.

5.9.2 Land Use and Recreation

5.9.2.1 Alternative 1–No Action

The No Action Alternative would not change land use or impact recreation in the project area.

5.9.2.2 Alternatives 2 and 3

Overall, the proposed measures under both Alternatives 2 and 3 would benefit agricultural land use by increasing water use efficiency and soil health. The proposed measures would not result in any changes from one type of land use to another. Installation of enclosed pipes would result in temporary disturbances to land during construction. This impact would be negligible as construction activities would only occur outside of the growing season.

Implementing high efficiency irrigation systems could divert less water than current practices, and reduce groundwater deep percolation, which contributes to increased salinity and selenium levels in the downstream waters. Incorporating "smart" headgate control structures and SCADA systems would improve operation efficiency through remote monitoring and control and could minimize unnecessary over delivery, minimize loss of water due to management spills, and create additional available water

supplies to extend the growing season or to respond to other resource needs (River District 2015). By conserving water and decreasing salinity and selenium, agricultural production may improve.

The analysis of impacts on land use and recreation is qualitative rather than quantitative, and professional judgment was used to reach reasonable conclusions as to the intensity, duration, and type of potential impact. Impacts could be temporary or short-term (e.g., delays and inconvenience caused by construction activities) or long-term (e.g., loss of recreation activity).

Under Alternative 2, no land ownership would change and no subdivision of public land would occur. Under Alternative 3, for the 3300 Road Regulating Reservoir, private lands would be purchased or easements acquired for this measure. The overall amount of irrigated land in each subwatershed would not be impacted by the proposed measures under both Alternatives 2 and 3, and grazing allotments and easements on public lands would not be impacted. No designated Wilderness Areas or Wilderness Study Areas are located in the subwatersheds; therefore, no such lands would be impacted by subwatershed improvements.

The Needle Rock Outstanding Natural Area is located in the Crawford subwatershed more than 1 mile from the project area. No BLM Area of Environmental Concern/Outstanding Natural Area is in the North Fork subwatershed. Should any subwatershed improvements in the future be located in a BLM Area of Environmental Concern/Outstanding Natural Area, coordination with the BLM would need to occur to ensure that appropriate BMPs and compliance measures are followed.

Several SCADA installations would be located in Crawford State Park (**Appendix B**, **Figure 4.3-2**). Installation at these sites would take a day or two days per site. SCADA sites would not be located near any established trails or campsites, and no disturbances are expected. Short-term and long-term negligible and minor impacts on land use and recreation resources could occur under the proposed measures under both Alternatives 2 and 3. Short-term indirect adverse impacts may occur during construction due to increased traffic. These impacts would be short-term and negligible and because construction would occur during the winter season, there would be low potential to discourage visitors from the area. Due to the potential to affect waterfowl hunting during the fall and winter at Crawford State Park, the following requirement has been added to **Table 7-4**: Coordination with CPW will occur for the SCADA sites proposed at Crawford State Park, as well as Coal Road access if Alternative 2 is selected, to avoid and minimize hunting effects. The 3300 Road Regulating Reservoir access road dead ends in private lands, and hunting effects are not anticipated for Alternative 3.

During construction, road and recreation path closures or detours may impact some limited recreational activities but these impacts are expected to be short-term and minor. Long-term minor beneficial impacts could occur from the removal of the open canals, which could pose a hazard for recreation land users. However, no impacts on recreation user days, and no long-term impacts on land use or recreation are anticipated to occur.

Indirect short-term negligible and minor impacts on recreation could occur during construction of the project-specific measures under the action alternatives. None of the proposed project measures would be located in a BLM Area of Environmental Concern that is located in the subwatersheds, and no impacts on recreation user days or long-term impacts on land use or recreation are anticipated to occur.

5.9.2.3 Cumulative Impacts

Overall, the proposed project would not substantially impact land use. Crop production could increase on agricultural lands in the project area, which would be a cumulatively beneficial impact on land use as agricultural land is increasingly developed into residential and urban areas in the subwatersheds.

5.9.2.4 Compliance and Best Management Practices

Avoidance, minimization, and mitigation measures that would be applied prior to, during, and after construction of project measures are described in **Section 7.4**, **Table 7-4**. Permits, compliance, and consultation required are outlined in **Section 7.5**.

5.9.3 Scenic Beauty and Visual Resources

Impacts on scenic beauty and visual resources occur when project activities visually contrast with existing settings. Beneficial impacts are possible if project activities remove obtrusive or contrasting elements, such as the stabilization and reclamation of an eroded slope. Adverse impacts occur when visually pleasing elements are removed or incongruent elements are introduced. Although the majority of land affected by the Proposed Action is private or Reclamation owned and only minimal areas are BLM-managed, the BLM VRM method of visual analysis is used to evaluate scenery impacts as a consistent method of assessing impacts for all lands in the project area. The BLM uses a Visual Contrast Rating matrix to compare the elements of form, line, color, and texture and determine the degree of contrast that would result from a proposed action. These levels of contrast are:

- None – the element contrast is not visible or perceived;
- Weak – the element contrast can be seen but does not attract attention;
- Moderate – the element contrast begins to attract attention and begins to dominate the characteristic landscape; and
- Strong – the element contrast demands attention, will not be overlooked, and is dominant on the landscape (BLM 1986b).

Project visibility and viewer sensitivity influence how contrasting project activities are seen and experienced, and therefore influence the magnitude of effect. For example, projects that would have high contrast but are surrounded by dense vegetation would have less visual impact. BMPs minimize visual impacts by reducing visual contrast.

5.9.3.1 Alternative 1–No Action

The No Action Alternative would have no impact on scenic beauty or visual resources. Canals would not be converted to buried pipelines and water features would remain visible where they can be seen from roads and other viewing locations. The North Fork and Crawford SCADA systems would not be installed. Long-term adverse impacts could occur if salinity were to continue to build up in agricultural soils and affect agricultural productivity and the visual quality of agricultural vegetation.

5.9.3.2 Alternatives 2 and 3

The subwatershed improvements under the proposed measures under both Alternatives 2 and 3 would have both beneficial and adverse effects on scenic beauty and visual resources. These effects would be similar to those described in the 2018 Plan-EA. See Section 5.6.3.1 of the 2018 Plan-EA (NRCS 2018). Conversion of canals from open linear surface water to piped water would remove visible water features from the landscape. This visual change would be noticeable to viewers close to the canals and likely only residents of the subwatershed. Background landform elements (tables, mesas, and ridges)

are dominant features of the landscape viewshed, drawing attention from viewers to focus on the overall view rather than details of the landscape. Short-term impacts on scenic quality would result during construction, including the addition of ground disturbance and related exposed soils and large construction equipment being present. Scenery effects of project-specific components of the Proposed Action are described below.

North Fork Subwatershed

Proposed project measures in the North Fork subwatershed consist of the FMC Piping Project, the FMC Regulating Reservoir (Coal Road—Alternative 2 and 3300 Road—Alternative 3), and installation of four SCADA sites and the SCADA tower (Coal Road Repeater). As described in **Section 3.6.3**, the visual environment of the proposed measures under both Alternatives 2 and 3 consists of steep hills vegetated with pinyon-juniper woodlands, native vegetation, and flat arid open areas on top of Barrow Mesa. Cultivated agricultural fields, with their linear and geometric regular forms, occur south of proposed measures under both Alternatives 2 and 3.

The new Fire Mountain Pressure Regulating Reservoir (Coal Road—Alternative 2 and 3300 Road—Alternative 3) would add a water body to the arid landscape. The location for both alternatives is remote and higher in elevation than the surrounding landscape; therefore, it would not be visible to viewers such as local residents. Travelers on remote county roads (Coal Road and 3300 Road) would see the new reservoir as the road would be rerouted by the reservoir (in the case of the Coal Road—Alternative 2 site) or near the road (in the case of the 3300 Road—Alternative 3 site). The addition of a water body would contrast with surrounding landforms strongly; however, the reservoirs would be small and most viewers—particularly in rural western Colorado—see water as a positive addition to a landscape.

The new approximately 20-foot-tall SCADA Repeater Tower would be located on a high point in pinyon-juniper woodlands, and the top of the tower may protrude above the surrounding trees. However, only a few feet of the top of the steel lattice tower may be visible. Nonreflective color-matched materials would be used as much as possible to minimize the visual prominence of the tower. Four 6- to 9-foot-tall SCADA systems would be installed along the FMC. These towers would be shorter than surrounding trees, located in a more natural environment, and would generally not be visible to viewers due to terrain, vegetation, and location along a private canal access road. SCADA towers along canals may add vertical lines but would be consistent with existing utility poles and fences. The level of contrast would be weak along the existing canal.

Crawford

Project-specific components in the Crawford subwatershed consist of installation of SCADA sites at up to 17 locations. Of these 17 locations, 9 would be around the town of Crawford and Crawford Reservoir, 1 would be co-located on the Young's Peak tower, and 7 would be along the Aspen Piping Project in the northern portion of the subwatershed. The subwatershed contains expansive views of gently rolling terrain and features landforms and water features that draw attention, including Young's Peak, Needle Rock, and Crawford Reservoir. Consistent with the description in **Section 5.6.3.1.1**, impacts on scenic beauty and visual resources from piping projects would be minor due to weak visual contrast.

SCADA equipment would be installed at 17 locations in the Crawford subwatershed, along the Aspen Canal, the northern Aspen Canal, and several inlets near Crawford Reservoir. The Clipper/Aspen, Crawford Clipper Ditch, and Feeder Canal/ Daisy Ditch SCADA equipment would not be visible from most locations due to dense vegetation or topography. Several SCADA sites near Crawford Reservoir may be visible from Highway 92 as cars drive by. However, the 6- to 9-foot-tall SCADA systems, solar panels, and electrical controls would be minor vertical additions to the landscape and hard to perceive from a fast-moving vehicle. Equipment at these locations would be in largely natural landscapes and would present weak visual contrast that would be noticeable, but would not attract attention or diminish scenic quality. Overall, this SCADA equipment is expected to have a negligible impact on scenic beauty, adding minor elements to the existing regional canal system.

Along the northern Aspen Canal, these towers would be shorter than surrounding trees, located in a more natural environment, and would generally not be visible to viewers due to terrain and vegetation. SCADA towers along canals may add vertical lines but would be consistent with existing utility poles and fences. The level of contrast would be weak along the existing canals.

The overall visual impact would be minor, and would be both adverse and beneficial, as some aspects would increase visual contrast whereas other elements of the project would add visual interest, such as new water features. Use of BMPs would reduce visibility of the SCADA systems in the Crawford subwatershed and further reduce impacts on scenic beauty.

On BLM lands, VRMs would be unaffected by the project measures.

5.9.3.3 Cumulative Impacts

The proposed measures would not be expected to contribute to cumulative impacts on scenic beauty and visual resources. Impacts from the proposed measures would be negligible to minor. Project measures would primarily occur in modified landscapes, and visual contrast would be weak to none. Visual elements of the proposed measures are consistent with the dominant agricultural quality in the subwatersheds.

5.9.3.4 Compliance and Best Management Practices

Avoidance, minimization, and mitigation measures that would be applied prior to, during, and after construction of project measures are described in **Section 7.4**, **Table 7-4**. Permits, compliance, and consultation required are outlined in **Section 7.5**.

5.9.4 Socioeconomics

5.9.4.1 Alternative 1–No Action

Under the No Action Alternative, no improvements would be implemented. As a result, none of the short- or long-term socioeconomic beneficial impacts associated with the proposed measures would be realized.

5.9.4.2 Alternatives 2 and 3

5.9.4.2.1 Demographic Effects

There would be no direct, indirect, or cumulative impacts on population and demographic trends in the counties or subwatersheds from the proposed measures under either Alternative 2 or 3. According to data from the 2020 Decennial Census, Environmental Justice communities do not exist in the project

area (USCB 2020). This would not change due to the project. Implementation of the project would provide direct and indirect effects on employment and farm production. Short-term economic benefits would occur due to additional employment in the subwatersheds during the off-season construction of the irrigation projects. There could be long-term adverse and negligible economic impacts from reduced O&M demands, but no loss of permanent jobs is anticipated to occur.

Implementation of the proposed measures under both Alternatives 2 and 3 in each subwatershed would improve water quality and irrigation efficiency. Farm net revenues would increase as a result of reduced farm operating costs and an extended irrigation season (e.g., for the North Fork watershed, the pipeline, reservoir, and SCADA improvements could extend the irrigation season by as many as two or three weeks (Fletcher, pers. comm. 2020). With a greater volume of water available in the system (from avoided losses), it is also possible that agricultural producers could change land use to higher valued crops or higher water use crops. The water efficiencies created by the measures proposed in Alternative 3 (the Preferred Alternative) as laid out in this Supplemental Plan-EA provide the opportunity to either divert less water (i.e., leave water in the stream) or use the water gained through efficiencies to provide a more reliable water supply to ditch company users. This Supplemental Plan-EA analysis assumes that the water efficiencies would provide better opportunities for agricultural water uses.

5.9.4.2.2 National Economic Development Benefits

A NED benefit-cost analysis (BCA) has been performed to evaluate the benefits of the proposed measures under both Alternatives 2 and 3. The evaluation includes identification of the Without Project economic damages, and estimation of the NED benefits of alternatives to the identified problems. The analysis uses NRCS guidelines for the evaluation of NED benefits as outlined in the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, and the NRCS Natural Resources Economics Handbook (NRCS 1998).

Economic benefits and impacts were calculated based on the expected effects of the proposed measures under both Alternatives 2 and 3 and the specific project measures. For the Lower Gunnison Project, the Proposed Action (Alternative 3) includes optimization techniques for irrigation water conveyance, piping of canals and laterals, and installation of SCADA systems. Conversion of the unlined canals to pipelines would reduce salinity and seepage and reduce regular O&M for the canal operators. Additionally, implementation of SCADA systems would reduce travel time to sites for regular monitoring. Finally, a cost avoidance benefit would be realized from avoiding expenditure of Reclamation federal monies that would need to be allocated for the No Action Alternative to be implemented.

All economic damages, benefits, and costs use the base fiscal year (FY) 2023 (September 2023). Benefits and costs have been discounted and converted to an average annual, following the FY 2023 federal interest rate of 2.5 percent. The effects of the action alternatives were evaluated over a 52-year time horizon including the 2 years required to complete installation and the 50-year useful life of the improvements. This analysis period is equal to the length of time over which the works of improvement are expected to have significant beneficial effects. Benefits are expected to begin accruing the year after the works of improvement are installed and continue to accrue until the end of the 52-year time horizon. The useful life of the project for the analysis is 50 years, replacement costs

for the SCADA were included as the project time horizon would likely exceed the life of the measures (The Economics Handbook, Part 611, 1.12; **Appendix D**).

The average annual NED costs of the project measures are shown in **Table 5-13**. Under the No Action Alternative, no expenditures would occur.

Table 5-13. Estimated Average Annual NED Costs of Proposed Action (FY 2023 $, 2.5% Discount Rate).[1]

Works of Improvement	Average Annual Cost
Alternative 2	
Fire Mountain Regulating Reservoir (Coal Road)	$140,694
Fire Mountain Piping Project	$326,859
Fire Mountain SCADA Network	$8,132
Crawford SCADA Network	$72,616
Total Alternative 2	$548,301
Alternative 3	
Fire Mountain Regulating Reservoir (3300 Road)	$71,520
Fire Mountain Piping Project	$326,859
Fire Mountain SCADA Network	$8,132
Crawford SCADA Network	$72,616
Total Alternative 3	$479,127

Notes: Totals may not sum due to rounding. Prepared: September 2023.
[1.] Price base: 2023 dollars amortized over 52 years at a discount rate of 2.5 percent.

An overall goal of the Lower Gunnison Project is to improve water quality downstream of the watershed by complying with Colorado Water Quality Standards, the Colorado River Basin Salinity Control Act[2], and the Gunnison Basin Selenium Management Program[3] to reduce salt and selenium loading by piping irrigation laterals or canals and installing high-efficiency irrigation systems to eliminate seepage and deep percolation into saline shale-derived soils that dominate the project area (River District 2015).

The action alternatives would help reduce salinity and selenium loading in the Colorado River Basin. There are two potential approaches to estimating the annual benefits from salinity reductions. Benefits could be estimated based on the reduction in salinity-related damages to water users downstream throughout the Colorado River system. Alternatively, benefits can be estimated based on the avoided cost of installing additional salinity control projects in the Gunnison Basin. The latter approach produces more "conservative" benefit estimates (e.g., lower values per ton) and was used in this analysis.

Each year, the NRCS publishes a Colorado River Salinity Control Program report documenting investments in salinity control projects throughout the Colorado River Basin designed to reduce downstream salinity damages from salinity-exporting watersheds. The most recent report, for FY 2020, showed that in the Lower Gunnison River Basin, salinity reduction treatments were applied to 1,656 acres and reduced salinity loads by 1,814 tons/yr at a total cost of $327,700 or approximately $180.65 per ton in 2020 dollars. This estimate was updated to a value of $211 per ton in 2023 dollars using the Consumer Price Index.

[2] https://www.nrcs.usda.gov/programs-initiatives/colorado-river-basin-salinity-project
[3] https://www.usbr.gov/uc/progact/Selenium/index.html

Table 5-14 shows the annual salinity reductions that would be achieved by the proposed project's action alternatives and the avoided cost of salinity control projects required to mitigate these loadings in the absence of the action alternatives.

Table 5-14. Avoided Salinity Control Costs Lower Gunnison Watershed, Colorado (FY 2023 $).

Subwatershed	Work of Improvement	Median Selenium Reduction, lbs/yr[1]	Median Salinity Reduction, tons/yr[1,2]	Cost of Salinity Control Treatments ($/ton)	Reduced Annual Salinity Control Costs
North Fork	Fire Mountain Piping Project (Alt 2)	15	1007	$211	$212,477
North Fork	Fire Mountain Piping Project (Alt 3)	14.2	948	$211	$200,028

[1.] North Fork Salinity Reduction Source: Applegate Group, Inc. 2019, pers. comm. 2020; ITRC 2017; NRCS 2018; *Progress Report No. 25.* U.S. Bureau of Reclamation. 2017; *Colorado River Salinity Control Program. State of Colorado Salinity Control Unit Summary. Fiscal Year 2020.* Natural Resources Conservation Service. 2020. and BLS Consumer Price Index Calculator, April 2023.

Alternatives 2 and 3 would replace open earthen canals with piped canals, reducing seepage and thereby reducing salinity loading by 986 to 1,007 tons/yr. The avoided cost of control is estimated at $211 per ton, which suggests Alternative 2 would reduce salinity loading damages by $212,477 per year and Alternative 3 would reduce damages by $200,028.

The canal operators have regular O&M costs associated with the canals to maintain their operability during the irrigation season. Maintenance items include cleaning and trash removal; spring burning, mowing, and spraying of vegetation; rodent controls; and miscellaneous repairs. These costs include materials, labor, and equipment, as well as travel time to the canals and project management. These costs would be avoided with the conversion to pipelines. Estimates of annual O&M costs were provided by the canal operators.

Canal operators in both subwatersheds estimated the annual reduction in O&M costs associated with each work of improvement included in the action alternatives. In the North Fork watershed, the canal operator estimated the annual reduction in O&M costs that would be expected as a result of installation of the FMC Regulating Reservoir and the FMC Piping Project (Fletcher, pers. comm. 2020). The expected cost reductions are shown in **Table 5-15**.

Table 5-15. Annual O&M Costs Reductions of Fire Mountain Regulating Reservoir and Piping Project Lower Gunnison Watershed, Colorado (FY 2023 $).

Subwatershed	Work of Improvement	Annual Reduced O&M Costs
North Fork	Water Control Facility-Fire Mountain Regulating Reservoir	$4,864
	Canal Piping Installation-FMC Piping Project	$14,298
Total		**$19,162**

Source: Fletcher, pers. comm. 2020.

SCADA systems are also anticipated to result in O&M savings due primarily to time and mileage savings for maintenance and measurement purposes. **Table 5-16** shows O&M savings for SCADA systems for Alternatives 2 and 3.

Table 5-16. Annual Savings from Reduced O&M Costs of SCADA Components of Alternatives 2 and 3 Lower Gunnison Watershed, Colorado (FY 2023 $).

SCADA Locations or Task	Labor Cost/ Visit[1]	Mileage Cost/Visit[2]	Current Number of Visits per Irrigation Season	Number of Visits with SCADA	Reduced Time and Mileage Expenses
Crawford Cost Savings					
Crawford Clipper Headgate	$28.40	$11.04	92	2	$3,550
Reservoir Inlet(s) (four locations)	$4.74	$0.69	42	2	$218
Clipper/Aspen Splitter	$28.40	$5.52	66	2	$2,170
Aspen Canal	$28.40	$6.90	66	2	$2,259
Grandview Diversion Structure	$4.74	$0.69	66	2	$347
Aspen Canal to Zanni Turnout	$4.74	$0.69	34	2	$173
Clearing Blockages	$56.79	unknown	10	0	$567
Total Crawford (dollars)					**$9,284.00**
Total North Fork[2]					**$28,308**
Grand Total					**$37,592**

[1.] Labor costs are based on $18.93/hr.
[2.] Mileage costs are based on $0.69/mile (Krai 2020); based on data from Fletcher, pers comm 2020; Krai, pers comm. 2020.

The works of improvement in the North Fork and Crawford subwatersheds are expected to save substantial amounts of water that are currently lost to leakage, seepage, and structural losses, thereby reducing agricultural damages in the watershed. In total, approximately 3,117 AF/yr for Alternative 2 and 3,070 AF/yr for Alternative 3 are projected to be saved and become available to provide additional irrigation for farmers and ranchers. **Table 5-17** shows the anticipated conservation savings from each work of improvement. The water efficiencies created by the measures proposed in Alternative 3 (the Preferred Alternative) as laid out in this Supplemental Plan-EA provide the opportunity to either divert less water (i.e., leave water in the stream) or use the water gained through efficiencies to provide a more reliable water supply to ditch company users. This Supplemental Plan-EA analysis assumes that the water efficiencies would provide better opportunities for agricultural water uses.

Table 5-17. Agricultural Water Conservation by Work of Improvement.

Work of Improvement	Water Conservation (AF/yr$^-$) (Alt 2)	Water Conservation (AF/yr$^-$) (Alt 3)
Fire Mountain Piping Project	826	779
Fire Mountain Regulating Reservoir	1,050	1,050
Fire Mountain SCADA Network	350	350
Crawford SCADA Network	891	891
Total Annual Savings	3,117	3,070

Source: Irrigation Training and Research Center 2017.

Most of the water conserved by the improvements is likely to be used to irrigate the primary crops grown with water delivered by the FMC: orchards, grapes, and grass hay. Orchards and grass hay each account for approximately 37.5 percent of the canal's irrigated acreage while vineyards account for approximately 25 percent.[4] The analysis modeled the benefits of the water conserved by the action alternatives assuming the water would be used to produce peaches (representative of fruit orchards in the project area), grass hay, and grapes according to the existing distribution of land dedicated to each use. Gross income per acre and net income per acre for each crop were estimated following the process described in the NED (see **Appendix D**).

[4] Personal communication, Steve Fletcher, Superintendent, FMC.

Table 5-18 summarizes the average annual NED benefits and costs for the Proposed Action in the Lower Gunnison watershed. Based on the values presented in **Table 5-18**, all of the increments of the proposed project measures are economically justified for funding with the P.L. 83-566 program. Under the No Action Alternative, no benefits would be realized.

Table 5-18. Economic Table 6—Comparison of Average Annual NED Costs and Benefits, Lower Gunnison Project Supplemental Watershed Plan EA, Colorado (2023 $).[1]

Works of Improvement	Agriculture-Related				Average Annual Benefit	Average Annual Cost	Benefit Cost Ratio
	Reduced Farm Income Damages	Reduced O&M Costs	Reduced Salinity Control Costs	Reduced Selenium Loading (lbs/yr)			
Alternative 2							
Fire Mountain Regulating Reservoir	$218,293	$4,540	-		$222,833	$140,694	1.6
Fire Mountain Piping Project	$170,209	$13,345	$198,308	15	$381,862	$326,859	1.2
Fire Mountain SCADA Network	$74,539	$26,420	-		$100,961	$8,132	12.4
Crawford SCADA Network	$182,296	$8,667	-		$190,963	$72,616	2.6
Total Alternative 2	**$500,311**	**$52,972**	**$198,308**		**$751,591**	$548,301	**1.6**
Alternative 3							
Fire Mountain Regulating Reservoir	$218,293	$4,540	-		$222,833	$66,558	3.3
Fire Mountain Piping Project	$160,886	$13,345	$186,698	14.2	$360,929	$277,312	1.3
Fire Mountain SCADA Network	$74,539	$26,422	-		$100,961	$7,566	13.3
Crawford SCADA Network	$182,296	$8,667	-		$190,963	$72,616	2.6
Total Alternative 3	**$490,988**	**$52,972**	**$186,698**		**$730,658**	**$479,127**	**1.8**

Notes: Totals may not sum due to rounding. Prepared: April 2023.
[1.] Price base: 2023 dollars amortized over 52 years at a discount rate of 2.5 percent.

5.9.4.3 Cumulative Impacts

The project measures under both Alternatives 2 and 3 would contribute minor beneficial cumulative impacts on area employment and income in the subwatersheds as a result of increased crop productivity and the anticipated damage reduction benefits presented in the sections above. However, overall socioeconomic trends (population, demographics, and poverty) in the counties or subwatersheds that comprise the project area are not anticipated to result in cumulative impacts. Cumulative impacts on socioeconomics would be similar to that described in the 2018 Plan-EA. See Section 5.6.3 of the 2018 Plan-EA (NRCS 2018).

Chapter 6. Consultation, Coordination and Public Participation

6.1 Public Participation

During the scoping phase, four comments regarding the Supplemental Plan-EA were received. These comments were received from one individual and three agencies (BLM, USFS, and CPW). The 30-day scoping period for this project began on June 16, 2020 and closed on July 15, 2020. The scoping meeting was held Monday, June 15, 2020 on Zoom and at the Maloney House/Delta Fairgrounds at 575 River Lane in Hotchkiss, Colorado from 6:00 to 8:00 p.m. The scoping process and scoping comments are summarized in **Section 2.1.1**.

During the Draft Supplemental Plan-EA review period, three comment letters were collected or received regarding the project. The 30-day review and comment period for the Draft Supplemental Plan-EA began on May 24, 2024 and closed on June 24, 2024. The Draft Supplemental Plan-EA public review meeting was held on June 11, 2024 virtually and in Hotchkiss, Colorado at the same location as the scoping meeting (Maloney House/Delta Fairgrounds at 575 River Lane).

6.2 Agency Coordination

Two cooperating agencies have provided input into this Supplemental Plan-EA – BLM UFO and Reclamation. Additionally, coordination or consultation has been completed with the following agencies:

- Preliminary coordination with the USACE has been conducted under SPK-2021-00138 indicating that the Proposed Action as defined in this Supplemental Plan-EA does not require 404 permitting at this time. Prior to construction, additional coordination will be needed depending on changes to the USACE definition of waters of the U.S. and permitting requirements.
- Consultation with the SHPO per Section 106 of the NHPA was completed. A MOA among invited consulting parties, SHPO, and NRCS was developed to address adverse impacts on cultural resources. Treatment of adverse effects agreed upon in the MOA included creation of historic information in ArcGIS StoryMap format, posted to an interactive website and hosted for five years. The information will be targeted toward the public as well as historic researchers. All parties will have the opportunity to provide comments and approve the final content.
- Consultation with the USFWS per Section 7 of the ESA was completed. A Biological Assessment was prepared and submitted to the USFWS on March 18 2021 (NRCS 2021). In a concurrence letter received on May 14, 2021 (TAILS 06E24100-2021-F-0366), the USFWS concurred with the effects determinations that threatened or endangered species in the subwatersheds are not likely to be adversely affected by the Proposed Action, except through water depletions on four listed Colorado River fish. These water depletions have been fully addressed in Recovery Agreements prepared under the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (USFWS 2009).

The following coordination and technical consultations were also conducted in support of development of the Biological Assessment:

- Nathan Seward, Wildlife Conservation Biologist, CPW, Area 16, regarding Gunnison sage-grouse
- Ken Holsinger, Botanist, UFO BLM, regarding Colorado hookless cactus and clay-loving wild buckwheat
- Neil Perry, Wildlife Biologist, UFO BLM, regarding big game (mule deer and elk)
- Brandon Diamond, Department of Natural Resources
- Stuart Sinclair, CPW
- Creed Clayton, USFWS Biologist, Western Colorado Ecological Services Field Office, regarding Gunnison sage-grouse, western yellow-billed cuckoo and proposed critical habitat, as well as bonytail chub, Colorado pikeminnow, humpback chub, razorback sucker and designated critical habitat.

Note: A floodplain permit or no rise certification will be obtained during the design phase for any SCADA sites that would occur in floodplains.

6.3 Tribal Coordination

In accordance with EO 13175, NRCS is responsible for assessing the impacts of activities, considering tribal interests, and assuring that tribal interests are considered in conjunction with federal activities and undertakings. NRCS recognizes that tribal governments are sovereign nations located in and dependent on the United States. NRCS has a responsibility to help fulfill the U.S. government's responsibilities toward tribes when considering actions that may affect tribal rights, resources, and assets.

Tribal consultation was conducted in accordance with the NHPA of 1966 and EO 13175 to maintain the NRCS's government-to-government relationship between native villages and tribes via a letter to three Indian tribes: the Ute Indian Tribe-Uintah & Ouray Reservation, the Ute Mountain Ute Tribe, and the Southern Ute Indian Tribe notifying them of the scoping process and inviting input. All three tribes were provided a copy of the Cultural Resources Survey Report (Engleman 2020) for this project and were invited to be consulting parties on the MOA. No tribal responses had been received as of the end of the public comment period, when additional letters were submitted to all tribes (June 24, 2024).

Chapter 7. The Preferred Alternative

7.1 Rationale for the Preferred Alternative

Alternatives were devised according to procedures outlined in the NWPM (NRCS 2015) and the National Watershed Program Handbook (NRCS 2014). The Preferred Alternative for the project is Alternative 3 and is based on the cost benefit analysis as well as the ability of the alternative to meet the purpose and need for the project as detailed in **Chapter 1** of this Supplemental Plan-EA and provide the most beneficial impacts on environmental and social resources, as detailed in **Chapter 5** of this Supplemental Plan-EA (**Table 7-1**). Alternative 2 also adequately meets the purpose and need for the project and but would be less beneficial in terms of cost. Alternative 3 would require the acquisition of private property necessary to construct the 3300 Road Regulating Reservoir. The current owner of the subject property has not committed to selling the property. Negotiations will continue with the landowner; however, if the landowner is unwilling to sell at the time of project implementation, the NRCS has determined the plan can be modified using an exchange of correspondence to build the reservoir at the Coal Road Site (Alternative 2) per the NWPM Section 503.4. The CRD and the North Fork Water Conservancy District are not interested in exercising their rights of eminent domain for this project – which is based on the voluntary participation of stakeholders.

The project addresses natural resource concerns by implementing a locally coordinated comprehensive strategy of maximizing agricultural water use efficiency through system-wide optimization techniques for irrigation water conveyance, including the construction of monitored, automated, and re-regulation structures; modernization of aging irrigation water delivery infrastructure including construction of enclosed canals and laterals; and installation of SCADA systems. The project would help irrigators use water more efficiently, improve water quality carried in the Colorado River and its tributaries, and reduce system operational and maintenance burden. Although the Preferred Alternative is not located within the high priority subwatersheds detailed in the 2018 Watershed Plan-EA, piping of the FMC would contribute to the overall reduction of salinity and selenium in the Lower Gunnison Watershed (see **Section 5.2.2**).

Table 7-1. Rationale for Measures Considered for Detailed Study.

Measure Considered	Selection Decision and Rationale
North Fork Subwatershed	
Fire Mountain pipeline extension (about 2.5 miles) between reservoir sites and lower piped section	Include; supports improved water management efficiency at reasonable cost; opportunities to complement projects that are already implemented on Fire Mountain. The canal through this section has many seeps and is difficult to maintain. This project would also remove an estimated 986 to 1,007 tons/yr of salt from the Colorado River Drainage (Applegate Group, Inc. 2019).
Fire Mountain Regulating Reservoir sites (two options–one Reclamation and one private), and short amount of piping between; and up to 4 SCADA (repeater tower site listed separately)	Include; supports improved water management efficiency; opportunities to complement projects that are already implemented on Fire Mountain. This regulating reservoir is designed to absorb the fluctuation of demand on the piped system as irrigators turn water on and off, storing water for later use that is currently spilled out of the canal system.
SCADA repeater tower installation to support Fire Mountain Reservoir	Include; supports improved water management efficiency at reasonable cost.
Crawford Subwatershed	
7 SCADA sites/gates for Aspen Piping Project	Include; provides improved water management efficiency at reasonable cost.
9 SCADA network sites, measurement and controls - including Muddy and Alkali Creek inlet	Include; provides improved water management efficiency at reasonable cost.
KREX Tower for SCADA on BLM land	Include; supports SCADA for improved water management efficiency at reasonable cost.

7.2 Measures to be Installed

A summary of the Alternative 3 measures is provided below in **Table 7-2**. The measures would primarily consist of installing one regulating reservoir, piping a segment of an open canal, and installing SCADA systems, and are described in detail in **Table 4-2**, **Table 4-3**, and **Section 4.3.3**, and shown on **Figures 4.3-1** through **4.3-1B** in **Appendix B**.

Table 7-2. Summary of Project Measures.

Project	Component	Description
North Fork Subwatershed Projects	Fire Mountain Piping Project	13,000 feet of 72-inch Spirolite pipe would be installed in a 60-foot-wide ROW. Staging areas required for storing equipment and pipe would be established within the footprint of the Coal Road Regulating Reservoir.
	3300 Road Regulating Reservoir	The 3300 Road Regulating Reservoir would consist of a 44- to 60-AF reservoir and associated inlet and outlet works. The maximum stored water footprint/construction disturbance would be 6.3 to 9.1 acres. Construction access would be along Canal Road. The water depth would be about 13 feet.
	SCADA Network	A SCADA network consisting of a tower site and four SCADA systems would be installed to support the regulating reservoir and pipeline. A single SCADA system generally includes water level sensors, buried conduit, a relay antenna (telemetry equipment), solar power, and panels; and would occupy about 20 square feet or less after construction.
Crawford Subwatershed SCADA Network	Crawford Clipper Headgate	Each SCADA system generally includes gate control equipment, a stilling well, water level sensors, 1-inch buried conduit, a relay antenna (telemetry equipment), solar power, and panels. Increased water use efficiency would occur based on the modernization and conversion of the existing direct delivery irrigation systems (using an "always-on" supply-driven system) to a more well-timed irrigation and producer "demand-driven" system. Each SCADA system would occupy a maximum footprint of about 20 square feet after construction.
	Aspen Canal to Zanni Turnout	
	Aspen Canal	
	Clipper/Aspen Splitter	
	Grandview Diversion	
	Alkali Creek Inlet	The SCADA components are as described above but without the gate control equipment, and including a stilling well, a water level sensor, 1-inch buried conduit, a relay antenna (telemetry equipment), solar power, and panels.
	Muddy/Iron Creek Inlet	
	Feeder Canal/Daisy Ditch	
	Clear Fork Inlet	
	SCADA Gates 1 through 7 on the Aspen Canal (seven total)	The SCADA components are as described above but without a stilling well or water level sensor, and with a turbine or differential flow transmitter.
	KREX on Existing Tower	This component is installation of a radio repeater antenna on an existing tower.

7.3 Installation Sequence

The project sponsor would obtain all approval and permits for the project prior to the start of construction. The project would be completed over a two-year period commencing in 2025 and ending by 2027. The project sponsor has developed an appropriate project phasing schedule based on engineering and funding constraints to meet the cooperating sponsor, patron, and community development needs. Reclamation authority has been added to the schedule to clarify what additional compliance work is needed prior to construction.

Table 7-3. Construction Timeline.

Project	Schedule	Component	Construction Time Frame
North Fork Subwatershed Projects	2025-2027	Fire Mountain Piping Project	Construction would be completed over two nonirrigation seasons (Note: Reclamation authorization would be required for piping activities).
	2025-2027	3300 Road Regulating Reservoir	Construction would be completed over two nonirrigation seasons. (Note: Reclamation authorization would be required for the regulating reservoir).
	2025-2027	SCADA Network	Each SCADAsystem location will take two days to complete installation. (Note: Reclamation authorization would be required for SCADA installation).
Crawford Subwatershed SCADA Network	2025	SCADA	Each SCADA system location will take two days to complete installation. (Note: Reclamation authorization would be required for SCADA installation on the Aspen Canal).

Note: schedule is dependent on authorizations from Reclamation as well as the availability of federal funding for this work.

7.4 Avoidance, Minimization, and Mitigation Measures

Avoidance, minimization, and mitigation measures (referred to throughout this Supplemental Plan-EA as avoidance, minimization, and mitigation measures or BMPS) include conservation measures stipulated by the USFWS that would be applied during construction of the project measures to avoid and minimize impacts on environmental and social resources; these measures are described in **Table 7-4**.

The River District is responsible for insuring compliance with all avoidance, minimization, and mitigation measures and impact minimization efforts described in **Table 7-4**, and for obtaining and complying with any permits, should they be required.

Table 7-4. Avoidance, Minimization, and Mitigation Measures.

Construction Phase	Avoidance, Minimization, and Mitigation Measures
Preconstruction	**General** • Ground disturbances would be limited to only those areas necessary to safely implement the Proposed Action. • Construction limits would be clearly flagged on-site to avoid unnecessary plant loss or ground disturbance. • Any changes to the disturbance extents identified in this Supplemental Plan-EA, including additional SCADA installation sites, would undergo additional environmental review in consultation with the NRCS, including surveying for cultural or biological resources as necessary to ensure compliance with applicable federal laws. At a minimum, a 90-day timeframe is anticipated for cultural review and clearance. • Topsoil shall be stockpiled and then redistributed after completion of construction activities. • Coordination with CPW will occur for the SCADA sites proposed at Crawford State Park to avoid and minimize hunting effects. **Water** • A stormwater management plan would be prepared, and a construction general permit would be obtained from CDPHE under Section 402 of the CWA. This would cover stormwater discharges from the project. • Stormwater structural BMPs would be installed and maintained in accordance with the stormwater management plan prior to clearing and grubbing and ground-disturbing activities. Inspections would occur according to CDPHE regulations. • Prior to construction, additional consultation with the USACE would be conducted to confirm the proposed projects are exempt from permitting. The local USACE office has drafted a Regional General Permit (RGP)-5 for Ditch Related Activities in the state of Colorado (USACE 2021), and

Construction Phase	Avoidance, Minimization, and Mitigation Measures
	projects proposed in this Supplemental Plan-EA that may not be exempt would fall under RGP-5, once final. The current draft RGP-5 requires notification to the USACE office 30 days prior to construction. **Vegetation** • If special status plants are identified in preconstruction surveys in or near the construction corridor, weed management strategies would prioritize the protection of special status plants (Mui et al. 2016). • Project staff and contractors working on-site would be made aware of and be able to identify special status plant and wildlife species with potential to occur in the project area footprint. • Prior to construction, vegetative material would be removed by mowing or chopping, and either hauled to a proposed staging area to be burned or chipped, or chipped and mulched on-site. Stumps would be grubbed and hauled to a proposed staging area to be burned. • Special status species lists should be updated as necessary during the planning phase of each watershed improvement. **Wetlands** • All access would be designated on project area maps, including along the construction corridor. No cross-country travel would occur in marked wetland areas. • Construction components including temporary use areas for material and equipment storage would be located outside of wetlands or riparian areas. • Coordination with the USACE would occur for any projects that may involve potential impacts on waters of the U.S. **Cultural Resources** • Any areas not surveyed during the 2019 cultural resource survey due to subsequent design changes would be surveyed and reported in an addendum report. • All stipulations outlined in the MOA to mitigate adverse impacts on cultural resources would be completed. • Prior to construction, all supervisory construction personnel would be instructed on the protection of cultural resources with reference to relevant laws and penalties and the need to cease work at the site if cultural resource items are discovered. • Pursuant to 36 CFR Part 800 of the NHPA (1966, as amended in 2000), and the regulations of the Advisory Council on Historic Preservation implementing Section 106 of the NHPA (54 U.S.C. 306108), federal agencies must take into account the potential effect of an undertaking on "historic properties," which refers to cultural resources listed in or eligible for listing in the NRHP. Three historic properties would be adversely affected by the project activities. To mitigate adverse effects, the consulting parties are required to enter into a MOA requiring a method of treatment for the adverse effect that is acceptable to all of the consulting parties, and treatment would be required to be successfully completed prior to the initiation of project construction.
During Construction	**General** • All access would be designated on project area maps, including along the construction corridor. No cross-country travel would occur in marked wetland areas. • Vegetation and topsoil removal would be confined to the smallest portion of the project area necessary for completion of the work. • Work would be confined within existing ROWs whenever possible to preserve existing vegetation and private property. The ROW would be clearly marked in the field. • Construction equipment and staging would be located in approved staging areas. • Work crews would carry spill cleanup kits, and in times of burn bans or wildfire concerns, each crew would have a fire suppression kit. • Equipment that develops a leak while working on the project would not be allowed to continue operating until the leak is repaired. • All construction equipment would be decontaminated by cleaning with high-pressure water before mobilization to the site. All wheels, tracks, undercarriages, fenders, blades, buckets, and the exterior body would be cleaned prior to entering the site to prevent releases into the aquatic environment and the spread of noxious weeds. • Stabilized construction entrances would be used to minimize tracking. • Any needed lane closures during peak travel periods including weekends and special events would be avoided to the extent practicable. • Road and work zone conditions would be communicated to travelers via websites, prerecorded messages, and other similar mechanisms. **Soils and Geology** • Compaction, grading, and clearing activities would be minimized to the extent practicable.

Construction Phase	Avoidance, Minimization, and Mitigation Measures
	• During construction, topsoil would be saved and then redistributed after completion of construction activities. • Straw wattles, silt curtains, cofferdams, dikes, straw bales, or other suitable erosion-control measures would be used to minimize soil erosion and prevent soil erosion from entering water bodies during construction. • Disturbed areas would be smoothed, shaped, contoured, and reseeded to as near their pre-project conditions as practicable. • Lands previously in agricultural production would be returned to agricultural production following construction. • For project-specific components that would disturb 1 acre of soil or more, the project coordinator or contractor would submit a Stormwater Management Plan to CDPHE for approval to reduce potential impacts of sedimentation on water bodies. **Water** • Concrete cleanup operations (if needed) would use a dedicated concrete wash-out pit in an upland location. The concrete remnants in the wash-out pit would be fully removed and legally disposed of off-site upon completion of all concrete operations, or as needed for maintenance. **Air Quality** • Water, other dust suppressant, or soil binder would be applied on unpaved roads and areas of ground disturbance to minimize dust mobilization. • Stabilized construction entrances would be used to minimize tracking. • Appropriate emission control devices would be required on all construction equipment. **Vegetation** • Work would be stopped if a special status plant species were discovered in the project area footprint, and the project manager would be notified. • Straw wattles, straw bales, off-site mulch, and other erosion-control materials would be free of weeds and weed seed. • Borrow material imported to the construction area would be free of weeds and weed seed. • All construction equipment would be cleaned before it is transported to another job site to avoid introducing weed species from the construction area to another job site. **Wetlands** • Impacts on wetland and riparian vegetation would be minimized, except where removal is necessary for completion of the work. • All temporary use areas would be located outside marked wetland boundaries. Ground disturbance would be limited to turning, parking, or storing equipment. These areas will be reclaimed, including re-seeding and weed control when construction is final. • Refueling would occur a minimum of 100 feet from wetland and riparian areas. • Fuel, oil, hydraulic fluid, lubricants, and other petrochemicals would not be stored within 200 feet of the wetland and riparian areas and would have a secondary containment system to prevent spills. Appropriate spill cleanup materials, such as booms and absorbent pads, would be available on-site at all times during construction. • Leaks that occur to equipment while working on the project would not be allowed to continue operating until the leak is fixed. Refueling would occur a minimum of 100 feet from wetland and riparian areas. • Concrete clean-up operations (if needed) would use a dedicated concrete wash-out pit in an upland location. The concrete remnants in the wash-out pit would be fully removed and legally disposed of off-site upon completion of all concrete operations, or as needed for maintenance. **Wildlife** • During construction, direct disturbance impacts on terrestrial wildlife would be minimized by completing construction of individual project measures in the shortest practical time frame. • Work would be stopped if a special status wildlife species were discovered in the project area footprint, and the project manager would be notified. • Construction would be avoided during the months of December through April. When project construction would occur on BLM land in an elk or mule deer winter concentration area or severe winter range between December 1 and April 30, the project proponent would request a project-long exception to BLM's timing limitations. For private lands, the proponent should coordinate with CPW. • Trench covers would be secured in place and be strong enough to prevent large animals from falling through, or wildlife escape ramps would be used.

Construction Phase	Avoidance, Minimization, and Mitigation Measures
	• Where other nearby surface wildlife drinking water resources are not available, potentially provide for wildlife "guzzlers" on the pipe alignments. • Construction activities would be completed outside of the primary raptor nesting period (April 1 through July 31). • If construction activities are to occur during the primary raptor nesting period, a nesting raptor survey would be completed and activities would be outside of the CPW-recommended buffer distance (CPW 2020b) or other USFWS-approved guidance for buffer distances. • If nesting raptors are present inside recommended buffer zones, work with the local USFWS biologist to adjust the buffer distance if warranted (i.e., if topographic or vegetative barriers protect the nesting raptors from disturbance, a shorter buffer distance may be acceptable); otherwise, work must not proceed until nesting is complete (young have fledged). • Work would cease if a nesting raptor is discovered within a recommended buffer distance during construction and consult the local USFWS biologist for next steps. • Bald and golden eagles typically use the same nest sites year after year; consult with the local CPW or USFWS biologist for the most recent understanding of the locations of active nests and operate outside the CPW-recommended buffer distance (CPW 2020b) or other USFWS-approved guidance for buffer distances. • A nesting raptor survey would be conducted prior to construction activities to confirm the activity of the golden eagle nest. If active, no activities would occur within a 0.5-mile radius from February 1 through July 15 (CPW 2020b). • No CPW-recommended buffer zones or seasonal restrictions would be required for bald eagle roosts in the Crawford or North Fork subwatershed (CPW 2020a, 2022a). • If additional golden eagle or bald eagle nests or bald eagle roost sites are observed during surveys or operations, CPW-recommended buffer zones and seasonal restrictions would be applied (CPW 2020b) or other USFWS-approved guidance for buffer distance from CPW-mapped bald eagle roosts. • Construction activities would be completed outside the primary nesting period for migratory birds of concern (April 1 through July 15). If construction is planned during the primary nesting season, vegetation clearing and grubbing would be conducted prior to the primary nesting season. If vegetation-disturbing activities are planned during the typical nesting season, the area must be surveyed for active nests no more than two weeks prior to commencement of work. If active nests are found during nest surveys, nest buffers would be established in coordination with the local USFWS biologist. If an active nest is discovered during construction, work would cease, and the local USFWS biologist would be consulted for next steps. **Cultural Resources** • During construction activities, the SHPO, NRCS, Reclamation, tribes, or CPW cultural resources staff, as applicable, would be notified if any inadvertent discoveries of cultural resources are made during construction, in accordance with applicable guidance and law. • During any ground-disturbing activities associated with construction or spill remediation, the SHPO or BLM cultural resources staff, as applicable, would be notified if unanticipated historic discoveries are made in accordance with applicable guidance and law. • Cultural Resources—Inadvertent Discovery: If any cultural resources are inadvertently unearthed or otherwise encountered during maintenance activities, work would cease in the area of the discovery until the resources can be identified and appropriate resource protection measures can be implemented. The proponent would follow the Post-Review Discovery Plan found in Appendix B of the MOA. • Cultural Resources—Human Remains Inadvertent Discovery: Pursuant to 43 CFR 10.4(g), the proponent would notify the authorized officer, by telephone with written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony or possible vertebrate fossils (see also Paleontology). Furthermore, pursuant to 43 CFR 10.4(c) and (d), the proponent would stop activities in the vicinity of the discovery and protect it until notified to proceed by the authorized officer. **Resources of Scientific Value Other Than Cultural Resources—Paleontology** • Paleontological Resources—Unanticipated Discovery Plan: (1) A description of and the location of paleontological deposits (fossils) discovered during the project implementation phase (design investigation or construction activities) would be recorded in the project records; (2) The landowner (federal, state, or private) and the Colorado NRCS state geologist would be notified of all findings as soon as practicable after the discovery; and

Construction Phase	Avoidance, Minimization, and Mitigation Measures
	(3) The handling and disposition of any findings would be in accordance with applicable federal and state laws. **Visual Resources** • Nonreflective or matte finishes that are tinted to an appropriate color based on the surroundings for SCADA equipment would be used to reduce visual impacts. • Screening, such as vegetative plantings, can help obscure built features and may be appropriate in natural landscapes.
Following Construction	**Soils and Geology** • Disturbed areas would be smoothed, shaped, contoured, and reseeded to as near their pre-project conditions as practicable. **Vegetation** • Reseeding would occur at appropriate times as soon as practicable following construction with certified weed-free seed mixes per NRCS, BLM, or Reclamation instructions, as appropriate. • NRCS and the sponsors will provide landowners with a native seed mix alternative and encourage private landowners to select this mix where appropriate for their intended land use. Seed sources used for revegetation would be weed-free. • Weed control would be implemented by the project proponent to county standards (at a minimum) (Delta County 2010; CSU 2017). • After any surface disturbance, proper rehabilitation procedures would be implemented to prevent the infestation of invasive riparian species. • All equipment shall be cleaned before it is transported to another job site to avoid introducing weed species from the construction area to another job site.

7.5 Permits and Compliance

Permits or authorizations that may be required prior to construction of project measures not analyzed in full in this Supplemental Plan-EA are described below (also see **Section 4.3**).

Bureau of Reclamation: Permitting and authorizations for action alternatives project measures would be required by Reclamation. Alternatives 2 and 3 would require both a License Agreement and Letter of Consent from Reclamation. Alternatives 2 and 3 would require a use authorization for the new access to SCADA and the Coal Road Repeater Tower, in addition to the use authorizations for the piping of FMC and SCADA installs (including Crawford State Park). For Alternative 2, Coal Road Regulating Reservoir, use authorization would be required if the reservoir is built on Reclamation land. To complete these authorizations, Reclamation would require Categorical Exclusions for authorizations related to the SCADA, repeater tower, and FMC piping. Reclamation anticipates that additional NEPA analysis would be needed to support authorization and federal decision-making for the 3300 Road Regulating Reservoir, but that level of effort has not been determined.

CDPHE Stormwater Construction Permit: Coverage is required by state and federal regulations for stormwater discharged from any construction activity that disturbs at least 1 acre of land, or is part of a larger common plan of development that will disturb at least 1 acre. Discharges of water encountered during excavation or work in wet areas may require a discharge permit. If the water is discharged to waters of the state, a Construction Dewatering Discharge Permit is required. If the water is discharged to land and allowed to infiltrate, approval from the CDPHE liaison is required (CDPHE 2017).

USACE: Normally, under Section 404(f)(1)(C) of the CWA, discharges of dredged or fill material associated with construction or maintenance of irrigation ditches, or the maintenance (but not construction) of drainage ditches, are not prohibited by or otherwise subject to regulation under Section 404 of the CWA. Other project

measures, including SCADA installations that may result in discharges of dredged or fill material associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant to and functionally related to irrigation ditches are also not prohibited by or otherwise subject to regulation under Section 404 of the CWA. Construction activities within the stream channel may be regulated by the local or regional USACE office, and consultation with the USACE may be necessary if temporary stream rerouting or cofferdams are needed for construction of instream diversion structures.

Preliminary coordination with the USACE has been conducted under SPK-2021-00138, indicating that the action alternative as defined in this Supplemental Plan-EA likely require some form of 404 permitting. Prior to construction, additional coordination with the USACE would be conducted to confirm the proposed project's need for permitting. Specifically, coordination with the USACE office would be conducted to determine if the 3300 Road Regulating Reservoir, FMC piping, or SCADA installation in wetland areas feeding the Crawford Reservoir require permitting or notification as these are areas where wetlands occur. The local USACE office has issued RGP-5 for Ditch Related Activities in the state of Colorado (USACE 2021), and projects proposed in this Supplemental Plan-EA that may not be exempt would fall under RGP-5. The current draft RGP-5 does not require wetland delineations or notification to the USACE office; however, permitting requirements may change prior to the project construction timeframe.

USFWS: For any potential impacts on special status species, clearance surveys and appropriate coordination with the BLM or consultation with the USFWS under Section 7 of the ESA is required before construction activities could be initiated. A Biological Assessment/Biological Evaluation was completed to address both short-term and long-term impacts of the subwatershed improvement projects, and consultation with the BLM and USFWS has been completed. If potential effects on Gunnison sage-grouse or Gunnison sage-grouse critical habitat are anticipated, appropriate planning/implementation conservation measures explained in the Biological Opinion (USFWS 2021) will be applied.

SHPO: Pursuant to 36 CFR Part 800 of the NHPA (1966, as amended in 2000), and the regulations of the Advisory Council on Historic Preservation implementing Section 106 of the NHPA (54 U.S.C. 306108), federal agencies must take into account the potential effect of an undertaking on "historic properties," which refers to cultural resources listed in, or eligible for listing in the NRHP. Unless project measures are modified, compliance with Section 106 of the NHPA will be complete upon completion of mitigation outlined in the MOA.

No compensatory mitigation is anticipated to be required for the Preferred Alternative. For the known project measures, NRCS would not require habitat replacement for the loss of artificial wetland and riparian habitat wetlands created by irrigation infrastructure. Thus, the statutory funding for projects performed under this Supplemental Plan-EA would not require habitat replacement. The long-term loss of artificial local wetland and riparian habitat resulting from ditch conversions would be offset by gains in water quality and habitat function in the project area's natural riverine systems.

7.6 Responsibilities

The NRCS is responsible for leading the planning efforts, providing engineering design and construction oversight assistance, and certifying completion of the project. The project sponsor would

be responsible for engineering design, project administration, acquiring all necessary land rights, environmental permitting, contracting, and construction implementation, in coordination with the NRCS requirements. The FMC and the CWCD is responsible for operating the project measures, performing maintenance and replacing system components that fail during the 50 year project lifespan. The project sponsors have the needed authorities to implement the actions described in this Supplemental Plan-EA.

7.6.1 Costs and Cost Sharing

Table 7-5 itemizes the costs for the Proposed Action and itemizes how the costs would be shared by the project sponsor and the NRCS.

Table 7-5. Cost-Share Table for the Proposed Action (Alternative 3).

Cost-Share Table for Watershed Operation or Rehabilitation Projects					
Works of Improvement Cost-Shareable Items	**NRCS**		**Sponsor**		**Total**
	Percent	**Cost**	**Percent**	**Cost**	**Cost**
Construction					
3300 Road Regulating Reservoir	75%	$1,060,275	25%	$353,425	$1,413,700
Fire Mountain Canal (FMC) Piping (13,000 ft)	75%	$5,630,175	25%	$1,876,725	$7,506,900
FMC SCADA System	75%	$127,500	25%	$42,500	$170,000
Crawford SCADA System	75%	$1,239,675	25%	$413,225	$1,652,900
Subtotal: Cost-Sharable	**75%**	**$8,057,625**	**25%**	**$2,685,875**	**$10,743,500**
Non-Cost-Sharable Items[2]					
NRCS Technical Assistance/Engineering	100%	$1,279,800	0%	$0	$1,279,800
Project Administration (10% of construction costs)	N/A	$805,758	N/A	$268,588	$1,074,350
Environmental Permitting	0%	$0	100%	$15,000	$15,000
Real Property Rights	0%	$0	100%	$114,000	$114,000
Land Treatment	0%	$0	N/A	$0	$0
Relocation[1]	0%	$0	100%	$0	$0
Subtotal: Non-Cost-Share Costs		**$2,085,558**		**$397,588**	**$2,483,150**
Total:		**$10,143,188**		**$3,083,463**	**$13,226,650**

[1.] Investigation of the watershed project area indicates that no displacements will be involved under present conditions. However, in the event that displacement becomes necessary at a later date, the cost of relocation assistance and payments will be cost-shared in accordance with the percentages shown.
[2.] If actual non-cost-sharable item expenditures vary from these figures, the responsible party will bear the change.

Construction costs account for all material, labor, and equipment necessary for installation of the Preferred Alternative. These costs were estimated based on costs for similar installations in Colorado. The planning construction costs are estimated using the best available information about the project without having detailed design information. Planning, engineering, design, and other administrative costs were estimated as a percentage of the cost of construction. Real property acquisition costs were estimated as $6,000/acre. The costs presented are planning level estimates and do not reflect final costs. Detailed designs and construction cost estimates would be completed prior to initiating the project. Final construction costs would only reflect the time and materials to perform the work.

7.6.1.1 Operation, Maintenance, and Replacement

The project sponsors would be responsible for the O&M of the project for 50 years of its design life. Prior to construction, a separate O&M agreement would be made among the NRCS, the River District, and project sponsors based on the NRCS's National Operation and Maintenance Manual. The

agreement would continue through the design life of the project and could be modified with NRCS's approval.

Annual inspections would be made by the River District and NRCS to assure the quality of ongoing O&M. The River District and project sponsors (FMC and CWCD) would be responsible for scheduling the O&M inspections and any necessary work. The O&M would consist of an infrastructure inspection program that would cover the inspection of the entire systems installed in each watershed over a period of several years.

Generally, each component of the project would operate between April and October, and work to maintain the components would be performed as needed. During winter months, the project sponsors would perform maintenance including, but not limited to, filter maintenance, valve repairs, meter maintenance, battery changes, and vegetation and weed management for disturbed areas. All procedures would be followed as specified in the O&M agreement between the project sponsors and NRCS.

7.6.1.2 Real Property Acquisition

Real property acquisition would be required for the 3300 Road Regulating Reservoir on private lands. Prior to construction of the reservoir, the project sponsors would communicate with the private landowner to acquire the land or obtain an easement. The project sponsors would be required to complete any additional NEPA and other environmental permitting for the project prior to construction. All remaining construction would be completed under either project sponsor's existing easements or newly obtain easement agreements. Following installation, as-built surveys would be completed and attached to easements.

7.7 Installation and Financing

NRCS would provide 75 percent of the total project cost for construction of the Preferred Alternative through P.L. 83-566. The River District and project sponsors are responsible for securing funding for the remaining 25 percent of costs, including funds that are not eligible under the National Watershed Program (project administration, technical assistance, and real property). **Table 7-11** (see also **Appendix D**) presents annual installation costs and the proportion of funding through P.L. 83-566 and other funding sources.

The majority of the required match funding is expected to be provided through grants. If necessary, a portion of the project costs would be financed through loans.

Conditions for the River District to receive program funds for the proposed project include completion of this Supplemental Plan-EA and NRCS issuing a Finding of No Significant Impact. The Chief of NRCS will authorize funding for post-planning assistance (NWPM 504.10.A). The Chief of NRCS acts on behalf of the Secretary to ensure the project meets 16 U.S.C. 1005.

7.8 Economic and Structural Information

The economic and structural tables that follow summarize the watershed project information. Economic analysis is provided in **Section 5.9.4** of this Supplemental Plan-EA, as well as **Appendix D**.

Implementation of the Preferred Alternative would result in an average annual benefit-cost ratio of 1.8, the result of approximately $875,676 total annual damage reduction benefit.

Table 7-6. (Economic Table 1) Estimated Installation Cost Supplemental Project, Lower Gunnison Watershed, Colorado ($).

Works of Improvement	Unit	Number			Estimated Cost (dollars)						
					P.L. 83-566 Funds			Other Funds			Total
		Federal Land	Non-Federal Land	Total	Federal Land	Non-Federal Land NRCS	Total	Federal Land	Non-Federal Land	Total	
Multiple Purpose Structure-Regulating Reservoir (3300 Road; Alternative 3)	Acre	0	14.33	14.33	$0	$1,621,203	$1,621,203	$0	$510,268	$510,268	$2,131,471
Channel Work-Fire Mountain Canal (FMC) Piping (3300 Road; Alternative 3)	Acre	0.03	32.04	32.07	$6,550	$6,987,543	$6,994,093	$1,931	$2,069,967	$2,071,898	$9,065,991
Irrigation Structures-FMC SCADA	Acre	5.03	0	5.03	$164,250	$0	$164,250	$46,750	$0	$46,750	$211,000
Irrigation Structures-Crawford SCADA	Acre	5.92	7.01	12.93	$624,344	$739,299	$1,363,643	$208,115	$246,433	$454,548	$1,818,191
Total (Alternative 3)		10.98	53.38	64.36	$795,144	$9,348,045	$10,143,188	$256,796	$2,826,668	$3,083,464	$13,226,652

Notes: Totals may differ due to rounding.
Total cost does not include NRCS Technical Assistance/Engineering calculated as 10% of total cost ($1,479,228). This cost is included in the cost sharing table (Table 7.6-1).
Source: Applegate Group, Inc. September 2023.

Table 7-7. (Economic Table 2) - Estimated Cost Distribution – Water Resource Project Measures Supplemental Lower Gunnison Watershed Project, Colorado ($).

Works of Improvement	Installation Cost – Public Law 83-566						Installation Cost – Other Funds							Total
	Construc-tion	Engineer-ing	Real Prop-erty	Reloca-tion Pay-ments	Project Admin	Total P.L.-83-566	Construction	Engineer-ing	Real Prop-erty	Reloca-tion Pay-ments	Permit ting	Project Admin	Total Other Funds	Installation Costs
Regulating Reservoir (3300 Road; Alternative 3)	$1,060,275	$454,900	$0	$0	$106,028	$1,628,703	$353,425	$0	$114,000	$0	$7,500	$35,343	$502,768	$2,131,471
Fire Mountain Canal (FMC) Piping (3300 Road; Alternative 3)	$5,630,175	$800,900	$0	$0	$563,018	$7,001,593	$1,876,725	$0	$0	$0	$7,500	$187,673	$2,064,398	$9,065,991
FMC SCADA	$127,500	$24,000	$0	$0	$12,750	$164,250	$42,500	$0	$0	$0	$0	$4,250	$46,750	$211,000
Crawford SCADA	$1,239,675	$0	$0	$0	$123,968	$1,363,643	$413,225	$0	$0	$0	$0	$41,323	$454,548	$1,818,190
Total	$8,057,625	$1,279,800	$0	$0	$805,763	$10,158,188	$2,685,875	$0	$114,000	$0	$15,000	$268,588	$3,068,463	$13,226,652

Table 7-8. Structural Table 3b - Canal Lining, Supplemental Lower Gunnison Watershed, Colorado.

Channel Name (reach)	Existing Channel Characteristics				Proposed Piping Characteristics		
	Reach Length (feet)	Maximum Discharge (ft^3/sec)	Existing Channel Type	Present Flow Condition	Material	Nominal Diameter (inches)	Required Structures/ Turnouts (no.)
Fire Mountain Canal Piping	13,000	124	Manmade	intermittent	Spirolite (HDPE)	72	14

The average annual NED costs of Alternative 3 (the Preferred Alternative) are shown below in **Table 7-9** (per NWPM 506.18).

Table 7-9. Economic Table 4—Estimated Average Annual NED Costs of Alternative 3, Supplemental Plan-EA, Colorado (2023 $).[1,2]

Work of Improvement	Total Project Outlays (Amortization of Installation Cost)
Fire Mountain Regulating Reservoir (Coal Road)	$71,520
Fire Mountain Piping Project	$326,859
Fire Mountain SCADA Network	$8,132
Crawford SCADA Network	$72,616
Total (Alternative 3)	**$479,127**

Notes: Totals may not sum due to rounding.
Source: Applegate Group, Inc. April 2023.
[1.] Price base: 2023 dollars, amortized over 52 years at a discount rate of 2.5 percent.
[2.] Other direct costs include annual O&M associated with installation, operation, or replacement of project structures.

The summary of the estimated average annual NED benefits for the Lower Gunnison watershed are presented below in **Table 7-10**. Alternative 3 (the Preferred Alternative) provides a total of $875,676 in average annual benefits from avoided salinity loading, O&M savings, cost avoidance, producer benefits, and reduced travel costs.

Table 7-10. Economic Table 5a—Estimated Average Annual Benefits of Alternative 3 of the Supplemental Plan-EA, Colorado (2023 $).[1]

Benefit	Agricultural-Related	Non-Agricultural-Related
On-site		
Reduced agricultural income damages	$636,006	0
Reduced O&M costs	$52,972	0
Reduced salinity and selenium mitigation costs	$186,698	0
Total Quantified Benefits (Alternative 2)	$875,676	

Notes: Totals may not sum due to rounding.
Source: Applegate Group, Inc. March 2023.
[1.] Price base: 2023 dollars amortized over 52 years at a discount rate of 2.5 percent.

Based on data presented in **Table 7-6** through **Table 7-10**, **Table 7-11** presents a comparison of the NED benefits and costs.

Table 7-11. Economic Table 6—Comparison of Average Annualized NED Costs and Benefits, Lower Gunnison Project Supplemental Watershed Plan-EA, Colorado (2023 $).[1]

Works of Improvement	Agriculture-Related				Average Annual Benefit	Average Annual Cost	Benefit Cost Ratio
	Reduced Farm Income Damages	Reduced O&M Costs	Reduced Salinity Control Costs	Reduced Selenium Loading (pounds/year^{-1})			
Fire Mountain Regulating Reservoir	$218,293	$4,540	-		$222,833	$71,520	3.1
Fire Mountain Piping Project	$160,886	$13,345	$186,698	14.2	$360,929	$326,859	1.1
Fire Mountain SCADA Network	$74,539	$26,422	-		$100,961	$8,132	12.4
Crawford SCADA Network	$182,296	$8,667	-		$190,963	$72,616	2.6
Total Alternative 3	**$490,988**	**$52,972**	**$186,698**		**$730,658**	**$479,127**	1.8

Notes: Totals may not sum due to rounding.
Source: Applegate Group, Inc. September 2023.
[1.] Price base: 2023 dollars amortized over 52 years at a discount rate of 2.5 percent.

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Short Cite	Full Reference
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Chapter 9. List of Preparers

This Supplemental Plan-EA was prepared by ERO Resources Corporation. and its subcontractor Applegate Group, Inc., under the direction of the NRCS and its cooperating agencies. Staff responsible for directing the preparation of this Supplemental Plan-EA are listed as follows.

Name	Title	Area of Responsibility
ERO		
Aleta Powers	Environmental Scientist	Project Management, Purpose and Need, Water Resources, Quality Control, Wetlands, Aquatic Species
Kathy Croll	Senior Archaeologist	Assistant Project Management, Cultural Resources
Aliina Fowler	Project Environmental Planner (Former)	Land Use, Socioeconomics (Former)
Wendy Hodges	GIS Specialist	GIS and Mapping
Heidi McGrath	Biologist	Vegetation, Wildlife
Aimee Way	Visual Resource Specialist (Former)	Visual (Former)
Carrie Tanner	Staff Environmental Planner	Document editing and incorporation of comments
Kay Wall	Senior Word Processor/Technical Editor	Editing
NRCS-CO		
Blongshia Cha	Watershed Program Specialist	Project Manager
John Andrews	Watershed Specialist (ACES Affiliate)	Assistant Project Manager
Krystal Phillips	Permitting Lead, Colorado State Biologist (Former)	Project Manager (Former), Biology/Biological Assessment
Eugene Backhaus	State Resource Conservationist	General
Todd Boldt	Assistant State Conservationist, Water Resources	General
Craig Dengel	Colorado State Cultural Resources Specialist	Cultural Resources
Reclamation – Western Colorado Area Office		
Jenny Ward	Environmental Protection Specialist	NEPA Compliance
Kristin Bowen	Archaeologist	NHPA Compliance
Katie Arntzen	Archaeologist	NHPA Compliance
Colorado River District		
Dave “DK" Kanzer	Director of Science & Interstate Matters	Project Sponsor
Raquel Flinker	Senior Water Resources Engineer	Project Manager
Grand Mesa Natural Resource Consulting, LLC.		
Shana Harness	Project Coordinator	Project Coordinator for Crawford Subwatershed
Short Line Design, Inc.		
Dan Prescott	Engineer	Measures to be Installed, Preferred Alternative, Appendix D
Fire Mountain Canal and Reservoir Company		
Steve Fletcher	Manager and Dam Tender	Measures to be Installed, Preferred Alternative, Appendix D
Applegate Group Inc.		
Craig Ullmann	Engineer	Measures to be Installed, Preferred Alternative, Appendix D
BBC Research & Consulting		
Michael Verdone	Director-Economics Specialist	Appendix D, Economic Tables

In addition, the following technical experts were consulted during the preparation of this Supplemental Plan-EA:

- Neil Perry, BLM UFO Wildlife Biologist
- Brandon Diamond, Wildlife Manager for Area 16, CPW
- Stuart Sinclair; District Wildlife Manager, Hotchkiss/Crawford

- Creed Clayton, Supervisory Fish and Wildlife Biologist, USFWS
- Aaron Waller, NRCS Economist
- Jeremy Cook, HDR Economist

Chapter 10. Distribution List

A Notice of Availability for the Draft Supplemental Plan-EA was distributed to federal, state, and local agencies; community representatives; and area NGOs. A similar notice for this Final Supplemental Plan-EA and decision document will be distributed to these same contacts. The agency, representative, and organizational contacts that are included on the mailing list are listed below:

- Black Canyon Audubon Society
- Black Canyon Regional Land Trust
- Bureau of Land Management
- Bureau of Reclamation
- Chamber of Commerce
- City of Delta
- Colorado Coalition of Land Trusts
- Colorado Department of Commerce
- Colorado Department of Indian Affairs
- Colorado Department of Natural Resources
- Colorado Department of Public Health and Environment
- Colorado Department of State
- Colorado Department of Transportation
- Colorado Energy Office
- Colorado Native Plant Society
- Colorado NRCS State Office
- Colorado Open Lands
- Colorado Parks and Wildlife
- Colorado River Water Conservation District
- Colorado State Farm Service Agency
- Colorado Trail Foundation
- Colorado Water Conservation Board
- Conservation Colorado
- Curecanti National Recreation Area, Black Canyon of the Gunnison
- Delta County
- Department of Agriculture
- Ducks Unlimited
- Federal Aviation Authority
- Grand Mesa, Uncompahgre, and Gunnison National Forests
- Great Old Broads for Wilderness
- Gunnison County
- Gunnison County Administration
- High Country Conservation
- Montrose County
- Montrose County Farm Service Agency
- Mountain Area Land Trust
- National Forest, Gunnison Ranger District
- National Forest, Ouray Ranger District
- National Forest, Paonia Ranger District
- North American Grouse Partnership

- Office of the Governor
- Project 7 Water Authority
- Rocky Mountain Wild
- Sierra Club, Rocky Mountain Chapter
- Southern Ute Indian Tribe
- State Historic Preservation Officer
- The Nature Conservancy
- Town of Crawford
- Town of Hotchkiss
- Town of Paonia
- Trout Unlimited
- Uncompahgre Valley Water Users Association
- United States Army Corps of Engineers
- United States Department of Agriculture Natural Resources Conservation Service
- United States Environmental Protection Agency, Region 8
- United States Fish and Wildlife Service
- United States Geological Survey
- United States House of Representatives
- United States Rocky Mountain National Forest Service
- United States Senate
- Upper Gunnison River Water Conservancy District
- Ute Indian Tribe-Uintah & Ouray Reservation
- Ute Mountain Ute Tribe
- Water Information Program

In accordance with EO 13175, *Consultation and Coordination with Indian Tribal Governments*, NRCS contacted the following tribes regarding scoping, the availability of the Cultural Resources Survey Report, and the Draft Supplemental Plan-EA: the Ute Indian Tribe-Uintah & Ouray Reservation, the Ute Mountain Ute Tribe, and the Southern Ute Indian Tribe. The names of private stakeholders and members of the public who received notice of this Draft Supplemental Plan-EA are not listed in this section for privacy. Tribes and other members of the mailing list will receive notice of the availability of this Final Supplemental Plan-EA and the associated decision document.

Chapter 11. Acronyms, Abbreviations, and Short Forms

BCA	Benefit-Cost Analysis
BLM	Bureau of Land Management
BMP	Best Management Practice
CCA	Critical Conservation Area
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNHP	Colorado Natural Heritage Program
CPW	Colorado Parks and Wildlife
CWA	Clean Water Act
CWCB	Colorado Water Conservation Board
EA	Environmental Assessment
EC	Electrical Conductivity
EE	Environmental Evaluation
EI	Evaporation Index
EO	Executive Order
EQIP	Environmental Quality Incentives Program
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FM	Fire Mountain
FMC	Fire Mountain Canal
FR	Federal Register
ft^3/sec	Cubic Feet per Second
FY	Fiscal Year
GIS	Geographic Information System
HUC	Hydrologic Unit Code
IPaC	Information for Planning and Conservation
lbs/d	Pounds per Day
lbs/yr	Pounds per Year
MBTA	Migratory Bird Treaty Act
µS/cm	microSiemens per Centimeter
µg/L	Micrograms per Liter
mg/L	Milligrams per Liter
MOA	Memorandum of Agreement
NAAQS	National Ambient Air Quality Standards
NED	National Economic Development
NEPA	National Environmental Policy Act
NGO	Non-Governmental Organization
NHPA	National Historic Preservation Act
NIWQP	National Irrigation Water Quality Program
NLCD	National Land Cover Dataset
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
NWPM	National Watershed Program Manual

PCA	Potential Conservation Area
PCE	Primary Constituent Element
PED	Planning, Engineering, Design
P.L.	Public Law
RCPP	Regional Conservation Partnership Program
Reclamation	Bureau of Reclamation
River District	Colorado River Water Conservation District
ROD	Record of Decision
ROW	Right-of-Way
SCADA	Supervisory Control and Data Acquisition
SHPO	State Historic Preservation Office
Supplemental Plan-EA	Watershed Plan-Environmental Assessment
SLO	Sponsoring Local Organization
TMDL	Total Maximum Daily Load
tons/d	Tons per Day
tons/yr	Tons per Year
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UFO	Uncompahgre Field Office
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRM	Visual Resource Management
°F	Degrees Fahrenheit

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Appendix A Comments and Responses

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
UNCOMPAHGRE FIELD OFFICE
2465 South Townsend
Montrose, CO 81401
blm.gov/colorado

In Reply Refer To: 2800

Clinton Evans
Natural Resources Conservation Service
Denver Federal Center
Bldg. 56, RM. 2604
P.O. Box 25426
Denver, CO 80225-0426

Dear Mr. Evans:

Thank you for your letter of August 20, 2020 inviting the Bureau of Land Management (BLM) to participate as a cooperating agency in the development of the Supplemental Watershed Plan Environmental Assessment (EA) for the Lower Gunnison Plan. Because portions of the projects proposed in the EA are located on or cross BLM, NEPA compliance will be required by our agency. BLM has special expertise in surface resource management on these lands and the surrounding area, as well as understanding potential cumulative environmental impacts in this area.

BLM accepts your invitation and designates Jedd Sondergard as the primary point of contact on behalf of the Uncompahgre and Gunnison field offices for our cooperation in development of the EA. Jedd may be reached at (970) 240-5342 or jsondergard@blm.gov. Because the BLM will need to write a decision to issue a right-of-way (ROW) for each of the proposed projects to be implemented on public land, we would like to discuss how best to meet our NEPA responsibilities through this cooperative process.

We look forward to participating with NRCS on the EA. If you have any questions, please contact me at (970) 240-5338.

Sincerely,

Suzanne Copping
Acting Field Manager

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

March 3, 2021

Regulatory Division (SPK-2021-00138)

Natural Resources Conservation Service
Attn: Ms. Krystal Phillips
P.O. Box 25426
Denver, Colorado 80225-0426
krystal.phillips2@usda.gov

Dear Ms. Phillips:

We are responding to your February 2, 2021, request for the U.S. Army Corps of Engineers (Corps) to participate as a cooperating agency under the National Environmental Policy Act for the preparation of an Environmental Assessment (EA) for the Lower Gunnison Project Area Supplemental Watershed Plan.

Based on the information submitted, it appears the proposed action would not require a permit under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act. Because we have determined other program commitments preclude the degree of involvement requested in the action, we are declining your request to be a cooperating agency on the EA at this time. A copy of this letter is being provided to the Council on Environmental Quality.

If you have any questions, please contact Travis Morse at the Grand Junction Regulatory Office, Colorado West Section, 400 Rood Avenue, Room 224, Grand Junction, Colorado 81501, by email at w.travis.morse@usace.army.mil, or telephone at (970) 243-1199, extension 1014. Please refer to identification number SPK-2021-00138 in any correspondence concerning this effort. For more information regarding our program, please visit our website at www.spk.usace.army.mil/missions/regulatory.aspx.

Sincerely,

Michael S. Jewell
Chief, Regulatory Division

cc:
Council on Environmental Quality, 730 Jackson Place NW, Washington, DC 20503

April 14, 2021
(revised from March 18, 2021)

Ann Timberman
Field Supervisor
U.S. Fish and Wildlife Service
Colorado Ecological Services
445 West Gunnison Ave, Suite 240
Grand Junction, Colorado 81501-5711

Subject: Lower Gunnison Watershed Plan Supplement of Projects – Batch 2
Re: Biological Assessment

Dear Ms. Timberman:

The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), in conjunction with North Fork Water Conservancy District; Crawford Water Conservancy District; Colorado River Conservation District; Bostwick Park Water Conservancy District; and Uncompahgre Valley Water Users Association, is proposing the Lower Gunnison Watershed Plan Supplement of Projects – Batch 2 (Project), located within the Gunnison River and its tributaries in Delta, Gunnison, and Montrose counties, Colorado (Enclosure B – Maps). We are currently preparing a Supplemental Lower Gunnison Watershed Plan and Environmental Assessment (Sup Plan-EA) for the Project. This letter documents the basis for our effect determinations of the proposed action on federally listed species or designated critical habitat afforded protection under the Endangered Species Act (ESA) of 1973 (7 U.S.C. 136, 16 U.S.C 1531 et seq.), as amended, as follows:

- **May Affect, Likely to Adversely Affect** for the Bonytail chub, Colorado pikeminnow, Humpback chub, and Razorback sucker.
- **May Affect, Not Likely to Adversely Affect** for the Gunnison sage-grouse.
- **No Effect** on all other the ESA species or proposed/designated critical habitat in Delta, Gunnison, and Montrose counties, Colorado.

This letter also serves as a request for the U.S. Fish and Wildlife Service (USFWS) concurrence with our effect determinations of the proposed action.

Project Coordination/Consultation

Lower Gunnison Project Biological Opinion (BO)
A Batch 1 BO, issued on November 30, 2017 (TAILS 06E24100-2018-F-0035) and attached to this document for reference (Enclosure C; USFWS 2017), determined the following:

- may affect, but is not likely to adversely affect:
  - Colorado hookless cactus (*Sclerocactus glaucus*),
  - Gunnison sage-grouse (*Centrocercus minimus*) and its designated critical habitat, and
  - Western yellow-billed cuckoo (*Coccyzus americanus*) and its proposed critical habitat.

Furthermore, the USFWS in the BO issued in November 2017 concurred that future sub watershed improvements are not likely to adversely affect the Colorado hookless cactus, Gunnison sage-grouse and

Continued Project Coordination/Consultation

its designated critical habitat, or the western yellow-billed cuckoo and its proposed critical habitat as future improvements will be similar in nature to those described in Batch 1.

Gunnison sage-grouse Programmatic Biological Opinion (PBO)
NRCS completed an ESA Section 7 Programmatic Consultation with the USFWS for the Gunnison sage-grouse in October 2015, resulting in a Gunnison sage-Grouse PBO (USFWS 2015; TAILS 06E24100-2015-F-0045) covering NRCS Farm Bill program activities in Gunnison sage-grouse habitat in Colorado and Utah. Effects determinations, consultation, coordination, and conservation measures for Gunnison sage-grouse in the project area for Batch 2 projects will occur in accordance with the 2015 PBO (USFWS 2015).

Colorado River Endangered Fish PBO
The Gunnison River Basin PBO issued by the USFWS in 2009 (USFWS 2009) addressed the depletions associated with the operation of Paonia Reservoir and Dam and the Crawford Reservoir, which covered an existing estimated average annual depletion of 10,000 acre-feet (AF) per year (TAILS 65413-2009-F-0044). The PBO also addressed depletions associated with the Crawford Reservoir and Dam (referred to as the Smith Fork Project) for about 6,000 acre-feet (AF) per year (TAILS 65413-2009-F-0044; see USFWS 2009 PBO, Table 3, page 13) The PBO found that the Upper Colorado River Endangered Fish Recovery Program (Recovery Program), established in 1988 is the reasonable and prudent alternative to avoid jeopardy to the endangered Colorado River fishes (bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker) and avoid adverse modification of designated critical habitat (USFWS 2002a, 2002b, and 2002c). The Recovery Program is a partnership of public and private organizations working to recover the four species while allowing continued and future water development. Ditch companies associated the Batch 2 Proposed Action have completed consultation on historic water depletions, and signed recovery agreements are on file for the ditch companies as listed in Table 1.

Table 1. Consultation records for historic water depletions.

Project/Company	Historic Water Depletion Amount (in acre-feet per year (AF/yr)	Date	TAILS Number
Grandview-Aspen Canal	5,455 AF/yr	June 10, 2010	65413-2010-F-0110
Crawford Clipper Ditch Company (CCDC) Smith Fork Diversion	5,776 AF/yr*	February 17, 2016	06E24100-2016-F-0022
Fire Mountain Canal and Reservoir Company	17,826 AF/yr	February 9, 2018	06E24100-2017-F-0464
Paonia Reservoir and Dam	10,000 AF/yr	2009 (USFWS 2009)	65413-2009-F-0044
Crawford Reservoir (Smith Fork Project)	6,000 AF/yr	2009 (USFWS 2009)	65413-2009-F-0044

*This is the total consumptive use for the CCDC and includes river and reservoir water (USFWS 2016).

Continued Project Coordination/Consultation

On September 9, 2020, ERO Resources Corporation (ERO; Aleta Powers and Cassandra Shenk) discussed the proposed project over the phone with USFWS biologist Creed Clayton to establish the scope and nature of this consultation (Clayton, pers. comm. 2020). It was determined during the phone call that potential impacts on sagebrush habitat would be studied, mitigated, and disclosed if present, and that potential evaporative losses and Colorado River endangered fish impacts would be calculated and disclosed, along with the status of recovery agreements and consultation status on historic depletions for ditch companies involved in the Proposed Action. No other endangered species concerns are identified for the Proposed Action.

A second meeting was held on November 9, 2020, with David Kanzer and Shana Harness from the Colorado River District to discuss and summarize the need for additional consultation, based on the consultation completed in 2018 for the Lower Gunnison Watershed Plan. The NRCS representative Krystal Phillips was invited but was unable to attend. The meeting was held over Zoom.

On November 18, 2020, USFWS, Supervisory Fish and Wildlife Biologist, Creed Clayton, in the Western Colorado Ecological Services Field Office and NRCS, Colorado State Biologist, Krystal Phillips, informally coordinated the consultation process to support this project. On February 8, 2020, and February 12, 2020, Krystal and Creed, informally coordinated and clarified the consultation process and Biological Assessment letter.

Proposed Action

The Project components are designed to address high levels of naturally occurring salt and selenium, and to create water efficiency improvements. Specific Batch 2 proposed actions include:

- Converting approximately 14,709 feet of canals or laterals in two (2) subwatersheds from open, earthen ditches to enclosed pipe, pressurized where appropriate, to minimize off-farm delivery system losses;
- Installing three regulating ponds in two (2) subwatersheds and expanding one sedimentation pond to enable piping system maintenance, pressure regulation, and control; and
- Incorporating ‘smart’ headgate diversion control structures and Supervisory Control and Data Acquisition (SCADA) systems within the two subwatersheds to better manage irrigation water supplies, including at least seventeen (17) installations initially with additional installations as appropriate and as budget allows.

Batch 2 projects are being planned within the boundaries of two (2) of the four (4) original subwatersheds - the North Fork Water Conservancy District and Crawford Water Conservancy District (Enclosure B - Figure 1). Batch 2 project descriptions and specific locations for the North Fork and Crawford subwatersheds are described in Table 2, Table 3, and Table 4 and shown on Figures 2 and 3 within Enclosure B.

Continued Proposed Action

Table 2. Legal locations.

Principal Meridian	Township	Range	Sections
New Mexico	51 North	7 West	13, 24
6th	14 South	93 West	13, 14, 22, 23
6th	15 South	91 West	18, 19, 31, 32, 36
6th	15 South	92 West	25

Table 3. North Fork project components of Batch 2.

Component	Location	Description
Fire Mountain Canal Piping Extension Project	The east end of the Segment 47 Piping Project to the Regulating Reservoir Site	13,545 feet of 72-inch Spirolite pipe will be installed in a 60-foot-wide right-of-way (ROW). Staging areas required for storing equipment and pipe will be established within the footprint of Reservoir Site A. The canal through this section has many seeps and is difficult to maintain. This project will also remove an estimated 765 tons of salt annually from the Colorado River drainage.
Fire Mountain Pressure Regulating Reservoir	Two potential locations on Hansen Mesa northwest of Hotchkiss: Option A (farthest upstream) on Bureau of Reclamation (Reclamation) land 0.5 mile east of 3300 Rd, and Option B on private land at the north end of 3300 Rd	This regulating reservoir is designed to absorb the fluctuation of demand on the piped system as irrigators turn on and off. The project will consist of a 44- to 60-AF reservoir and associated inlet and outlet works. The maximum stored water footprint/construction disturbance for Option A is 4.7/6.7 acres, and for Option B is 6.3/9.1 acres. Construction access will be along Canal Road. The water depth will be about 28 and 13 feet for Options A and B, respectively.
SCADA Network	SCADA Tower Site and Access Road Two additional SCADA sites at locations (TBD)	A SCADA tower site to support the regulating reservoirs will be installed. SCADA systems generally include water level sensors, buried conduit, relay antenna (telemetry equipment), solar power, and panels. Several systems will be measurement only. The purpose is to provide modernization and conversion of the existing direct delivery irrigation systems to a more well-timed irrigation and producer "demand-driven" system, and to integrate the improved conveyance system with automated and pressurized irrigation systems, where appropriate. Each SCADA system will occupy about 200 square feet.

Source: Applegate Engineering, pers. comm. 2020.

Continued Proposed Action

Table 4. Crawford project components of Batch 2.

Component	Location	Description
Grandview Diversion Structure and Gate Rebuild	South of the town of Crawford at the point of diversion from the Smith Fork River	This headgate replacement project and stream realignment SCADA system will be installed at the headgate. An existing spill gate will be replaced, and a rock loading channel will be replaced with concrete. A new grate will be installed at the head of the loading channel. The headgate replacement project will occur within the currently disturbed footprint, and an existing access road will be used. Improvements for fish migration will be considered in the design.
Grandview Regulating Pond and Sedimentation Clean-out*	South of the airport on Grandview Mesa, approximately 1 mile west of the town of Crawford	This component is a new regulating pond and associated inlet and outlet works with 10 AF of water storage capacity. The open pool (water surface) will be 2 acres and the average depth will be 5 feet. A sedimentation and clean-out structure will be installed along with an associated SCADA network.
Clipper Upper West Regulating Pond, Sedimentation Basin Expansion, and Piping Project*	West of the town of Crawford along the Upper West Lateral	This component is a new regulating pond and associated inlet and outlet works with 10 AF of water storage capacity. The open pool (water surface) will be 1.5 acres and the average depth will be 4 feet. Additional SCADA controls may be installed as part of this project. Construction access will be along the ditch, with an optional access route through a field north of the project area.
		An existing sedimentation basin (600 feet long) will be expanded by 20 to 30 feet (current width is 20 feet across; this will be expanded to 40 to 50 feet across).
		This component includes 964 feet of 15-inch PVC pipe along the upper west and 200 feet of 20-inch high-density polyethylene pipe at the Aspen Ditch crossing. A 6- by 9-foot concrete structure will be installed at the start of this piping project. Staging and access will be along existing ditch roads and staging areas. This project is projected to remove an estimated 131 tons of salt annually from the Colorado River drainage.
SCADA Network	Four SCADA installations at Crawford Clipper River Diversion, Aspen Canal, Aspen to Zanni, and Clipper/Aspen Splitter	Each SCADA system generally includes gate control equipment, a stilling well, water level sensors, 1-inch buried conduit, relay antenna (telemetry equipment), solar power, and panels. Increased water use efficiency will occur based on the modernization and conversion of the existing direct delivery irrigation systems (using an "always-on" supply-driven system) to a more well-timed irrigation and producer "demand-driven" system and to integrate the improved conveyance system with automated and pressurized irrigation systems, where appropriate. Each SCADA system will occupy about 200 square feet.
	Four SCADA (Measurement Only) at Alkali Creek Inlet, Muddy/Iron Creek Inlet (south side of Crawford Reservoir), Daisy Feeder Inlet, and Clear Fork Inlet (east side of Crawford Reservoir)	The project is as described above but without the gate control equipment. A stilling well, water level sensor, 1-inch buried conduit, relay antenna (telemetry equipment), solar power, and panels will be installed.
	Existing tower at Young's Peak north of Crawford	This component is installation of a radio repeater antenna.
	Seven SCADA at Turnout Gates along C-Ditch to Aspen	The SCADA components are as described above but without a stilling well or water level sensor, and with a turbine or differential flow transmitter.

Schedule

Construction activities are anticipated to occur over the next five (5) calendar years pending availability of funding.

Threatened, Endangered and Proposed Species and Designated Critical Habitat Considered and Analyzed

The USFWS Information, Planning, and Conservation System (IPaC) was accessed on October 19, 2020, and an IPaC resource list was obtained for the Project area. Additionally, the USFWS Environmental Conservation Online System (ECOS) was accessed on January 2, 2021, and updated on March 9, 2021, to obtain a list of ESA-listed species for Delta, Gunnison, and Montrose counties, Colorado (USFWS 2021) (Enclosure D).

Species known occurrence information within the Project area was requested from USFWS, Supervisory Fish and Wildlife Biologist, Creed Clayton, in the Western Colorado Ecological Services Field Office (Clayton, pers. Comm 2020). A Gunnison sage-grouse survey (Enclosure E) was conducted by ERO on September 24, 2020, and the results of this survey has been incorporated into this letter as a map and photo log of the SCADA sites within Gunnison sage-grouse habitat.

The Table 5 below identifies threatened, endangered, proposed, or candidate species acknowledged in the IPaC resource list (USFWS 2021) and the USFWS Delta, Gunnison, and Montrose counties, Colorado ESA-listed species list (USFWS 2021) that should be considered in an effects analysis for the proposed Batch 2 Project Proposed Action.

The Canada lynx *(Lynx canadensis*), Mexican spotted owl (*Strix occidentalis lucida*), western yellow-billed cuckoo (*Coccyzus americanus*), clay-loving buckwheat (*Eriogonum pelinophilum*), and Colorado hookless cactus (*Sclerocactus glaucus*) were dismissed from further analysis based on lack of documented occurrences in the specific project areas or in the subwatersheds. The Gunnison sage-grouse (*Centrocercus minimus*) and designated potential habitat, and four Colorado River endangered fish designated critical habitat have the potential to be impacted by Batch 2 construction activities.

Table 5. Federally listed threatened and endangered species potentially occurring in Project Area – Batch 2.

Common Name	*Scientific Name*	Status	Known/ Suspected to be Present?	Suitable Habitat Present?	Designated Critical Habitat Present or Could be Affected?	Rationale if Not Carried Forward for Analysis[1]
Canada lynx	*Lynx canadensis*	Threatened	No	No	No	Eliminated. The Canada lynx is not known to occur in the subwatersheds, and suitable habitat (high-elevation spruce-fir and mixed-conifer forests) is not present.
Gunnison sage-grouse	*Centrocercus minimus*	Threatened	Yes	Yes	Yes. The Crawford subwatershed crosses designated critical habitat (USFWS 2014).	Carried forward.
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	No	No	No	Eliminated. The Mexican spotted owl is not known to occur in the subwatersheds, and suitable habitat (mature to old-growth mixed conifer forests on steep slopes) is not present.
Yellow-billed cuckoo	*Coccyzus americanus*	Threatened	Yes	Yes	Yes. The North Fork subwatershed crosses proposed critical habitat (USFWS 2020b).	Eliminated. The projects will occur at least 1.5 miles north of proposed critical habitat, and construction will occur in winter when the bird is not present.
Bonytail	*Gila elegans*	Endangered	No	No	Yes	Carried forward.
Colorado pikeminnow	*Ptychocheilus Lucius*	Endangered	No	No	Yes	Carried forward.

Common Name	*Scientific Name*	Status	Known/ Suspected to be Present?	Suitable Habitat Present?	Designated Critical Habitat Present or Could be Affected?	Rationale if Not Carried Forward for Analysis[1]
Humpback chub	*Gila cypha*	Endangered	No	No	Yes	Carried forward.
Razorback sucker	*Xyrauchen texanus*	Endangered	No	No	Yes	Carried forward.
Clay-loving buckwheat	*Eriogonum pelinophilum*	Endangered	No	No	No	Eliminated. There are no documented occurrences of the clay-loving buckwheat in or near the subwatersheds.
Colorado hookless cactus	*Sclerocactus glaucus*	Threatened	No	No	No	Eliminated. There are no documented occurrences of the Colorado hookless cactus in or near the subwatersheds.

[1.] Source: NRCS 2018b; USFWS-IPAC 2021.

Environmental Baseline

The two subwatersheds of the project area lie mostly within the sedimentary basins, benchlands, and shale salt-shrub deserts of the Colorado Plateaus Ecoregion (Chapman et al. 2006) and drain from the sedimentary mid-elevation woodlands and shrublands of the foothills of the Southern Rocky Mountains (Enclosure B – Figures 1 through 3). The area is characterized by relatively warm and dry summers, cold winters without persistent snowpack, and less than approximately 15 inches of precipitation annually. The project area ranges from about 5,800 to 6,600 feet above sea level. Soils vary across the project area from well-drained gravelly sandy loam to well-drained silty clay loam. The surface geology is primarily sedimentary formations of Mancos Shale along with the Morrison, Wanakah, and Entrada Formations (Tweto 1979).

Projects proposed within the subwatersheds are located near or on agricultural fields surrounding the town of Crawford and Crawford Reservoir, as well as along the Fire Mountain Canal northwest of Hotchkiss. In the Crawford subwatershed, the project area is characterized by gently sloping agricultural fields on the east side of Crawford Mesa and along the Smith Fork (Enclosure B – Figure 3). In the North Fork subwatershed, proposed projects along the Fire Mountain Canal are located on dissected mesas between Barrow Mesa and Horse Park, overlooking Leroux Creek.

The vegetation community is dominated by pinyon, juniper, sagebrush, and bunch grasses; cottonwood trees occupy areas in the direct vicinity of the canals and ditches. Fauna includes mountain lions, cottontails, jackrabbits, foxes, raccoons, skunks, bobcats, rodents, golden and bald eagles, hawks, owls,

and other bird species. Mule deer, black bear, and elk are also abundant. The BA for the Lower Gunnison Project contains a detailed environmental baseline (NRCS 2018a).

Gunnison sage-grouse
The Crawford subwatershed lies northeast of documented occupied range of the Crawford population of Gunnison sage-grouse, but encompasses an area of potential/unoccupied designated critical habitat. The BA for the Lower Gunnison Project (NRCS 2018a) contains more information about species status, range, distribution, and habitat.

Colorado River Endangered Fish
The Gunnison River is included within the historic range for the Colorado pikeminnow and razorback sucker, and individuals of both species have been observed at the Redlands Diversion Dam on the Gunnison River downstream of the project area (Upper Colorado River Endangered Fish Recovery Program 2021). These species of federally listed fish have the potential to occur in project area streams and rivers. Critical habitat for the bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker was designated in 1994 under one rule, and occurs downstream of the project area, as shown in Table 6 (USFWS 1993).

Table 6. Designated critical habitat for the Colorado River endangered fishes.

Species	Critical Habitat Location Description*
Bonytail chub	Upper Colorado River Basin: portions of the Colorado, Green, and Yampa Rivers Lower Colorado River Basin: Colorado River
Colorado pikeminnow	Upper Colorado River Basin: portions of the Colorado, Green, Yampa, White, Gunnison, and San Juan Rivers Lower Colorado River Basin: none designated
Humpback chub	Upper Colorado River Basin: portions of the Colorado, Green, and Yampa Rivers Lower Colorado River Basin: Colorado and Little Colorado Rivers
Razorback sucker	Upper Colorado River Basin: portions of the Green, Yampa, Duchesne, Colorado, White, Gunnison, and San Juan Rivers Lower Colorado River Basin: portions of the Colorado, Gila, Salt, and Verde Rivers

*Upper Colorado River Basin includes portions of Colorado, New Mexico, Utah, and Wyoming. Lower Colorado River Basin includes portions of Arizona, California, and Nevada (USFWS 1993).

Based on their habitat preferences, federally listed fish species are not expected to use the irrigation canals or ditches in the project area, but could be affected by any water depletions associated with the project activities. The BA for the Lower Gunnison Project (NRCS 2018a) contains more information about species status, range, distribution, and habitat for each of the four Colorado River endangered fish.

Species Considered and Analysis of Effects

Potential Effects on the Gunnison sage-Grouse and Critical Habitat
Four SCADA installations, access, and construction will occur inside mapped potential unoccupied critical habitat for the Gunnison sage-grouse (Enclosure E). Two of the four SCADA sites inside mapped unoccupied potential habitat will occur near sagebrush vegetation communities, and some habitat disturbance may occur during construction access. There is no sagebrush associated with the remaining SCADA installations.

Noise from SCADA installation activities may affect, and is likely to adversely affect, sage-grouse individuals if the activities are conducted during the March 1 through July 15 breeding and nesting season within 4 miles of an active lek. The closest SCADA site is approximately 2.6 miles from known occupied habitat and more than 4 miles from a known lek (Way, pers. comm. 2020). Structures are low to the ground and will not provide hunting perches for birds of prey. SCADA installations in potential habitat may affect, but are not likely to adversely affect, habitat (Enclosure E). No sagebrush habitat occurs at

two of the SCADA sites on the east side of the reservoir near State Highway 92, but two SCADA sites at the southern end of the reservoir would require access through about 40 feet of sagebrush habitat, and may require damage to sagebrush plants associated with access, with the potential to temporarily remove habitat. Effects on no more than 10 plants are expected. Therefore, installation may affect, but is not likely to adversely affect, the Gunnison sage-grouse and its critical habitat.

Mitigating Measures
Impacts on Gunnison sage-grouse habitat will be minimized using the following measures:

- *SCADA installations in potential habitat will occur outside the March 1 through July 15 breeding and nesting season for Gunnison sage-grouse.*
- *The access route for SCADA installation will avoid permanent impacts on sagebrush. No clearing or grubbing will occur at the root zone; the brush will be driven over, if necessary, but not removed.*
- *Planned installations will avoid heavy equipment access as much as possible. For example, installation of precast stilling wells may be preferred to avoid on-site concrete work and associated potential disturbances.*

Potential Effects on Colorado River Endangered Fish
The four Colorado River endangered fishes (bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker) use aquatic habitats that are downstream of the project area; therefore, they have potential to be impacted by the Proposed Action. However, the fish are unlikely to be in the project area, and construction will take place outside of the irrigation season, when canals will be dry, and fish will not be present. Construction of the subwatershed improvement projects could temporarily increase the potential for sediment entry into project area waterways due to construction disturbance; however, mitigating measures will minimize temporarily increasing sediment. Furthermore, because these listed fish species are unlikely to occur in construction areas, the potential for direct impacts is considered negligible and discountable. The Proposed Action will result in long-term beneficial impacts on fish habitats, including improved water quality and availability for fish in the Lower Gunnison River Basin.

Indirect impacts of the subwatershed improvements will include improved water quality and availability in downstream waterways, beneficially impacting suitable habitats for federally listed fish.

Water depletions may affect Colorado River endangered fish through reduced water flows necessary to support their habitat. Based on the 2018 Plan-EA evaporative losses (3.8 AF per acre of open water per year), it is assumed that water losses from the subwatershed improvements will be 31.36 AF/yr. The water control facilities will total 1.4 acres in new open water; the number includes the piped canals that will remove evaporative losses from about 1.86 acres. These water depletions have been fully addressed in recovery agreements prepared under the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Table 1; USFWS 2016).

Designated Critical Habitat
Designated critical habitat for the bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker (Colorado River endangered fish) has been identified (Table 6). In combination with ongoing water quality improvement efforts in the Colorado River Basin (Colorado River Salinity Control Form 2020), the subwatershed improvements are expected to result in positive benefits to water quality and availability in the Gunnison River, thereby improving habitat quality for the Colorado River endangered fishes within the project area and downstream. The Proposed Action may affect, and is likely to adversely affect designated critical habitat for Colorado River endangered fish. Adverse effects are mitigated by participation in the recovery program for Colorado River endangered fish (USFWS 2009).

Water Depletions Analysis
Operation of the proposed water control facilities within the North Fork subwatershed and the Crawford subwatershed is estimated to result in 31.36 AF/yr of new water depletions to the Colorado River Basin (Colorado Division of Water Resources 2011). Current water evaporation and seepage/bank storage from unlined ditches in the subwatersheds are expected to be reduced by related piping projects (including Crawford Clipper Ditch Project B and Fire Mountain Canal Piping projects), potentially resulting in an offset of the new depletions that will be caused by the water control facilities.

Indirect impacts of the subwatershed improvements will include improved water quality and availability in downstream waterways, beneficially impacting suitable habitats for federally listed fish. Implementation of the Proposed Action, in accordance with the Gunnison River Basin PBO (USFWS 2009) may affect, and is likely to adversely affect, the four Colorado River endangered fishes.

Conclusion
Effects determination and rationale are presented in Table 7 below. A preliminary determination has been made that the Proposed Action ***may affect, but is not likely to adversely affect***, the Gunnison sage-grouse species or its critical habitat. Although four SCADA installations are in potential critical habitat, occupied critical habitat is more than 2 miles away. The project will occur outside breeding and nesting season. Mitigating measures will minimize impacts on sagebrush habitat by directing access routes around brush; an estimated 10 plants may be temporarily disturbed during access for SCADA construction. No critical habitat occurs in the project area for threatened and endangered species for the remaining components of the Proposed Action including piping projects, a ditch diversion, and water control facility installations.

In a BO dated November 30, 2017, the USFWS concurred with the effects determinations that threatened or endangered species are not likely to be adversely affected by the Proposed Action (USFWS 2017), except through water depletions resulting in impacts on four endangered Colorado River fish. Although new water control facilities will expose an additional 8.25 acres of surface water in the watershed to evaporative losses, new annual water depletions estimated at 31.35 AF are below the threshold of 100 AF, established in the 2009 PBO for Colorado River endangered fish (USFWS 2009). No direct or indirect effects will occur to the other listed species (Table 7). A preliminary determination has been made that the Proposed Action ***may affect, and is likely to adversely affect***, Colorado river endangered fish and its habitat.

Table 7. Preliminary effects determination.

Common Name	*Scientific Name*	Effects Determination	Rationale
Gunnison sage-grouse	*Centrocercus minimus*	May affect, not likely to adversely affect	Four SCADA sites will be installed within unoccupied critical habitat, and two SCADA sites may disturb an estimated 10 sagebrush plants. Impacts on critical habitat are minor and temporary, and no direct adverse impacts on the species will occur. Occupied critical habitat is more than 2 miles away. The construction project will occur outside the breeding and nesting season for this species.
Bonytail	*Gila elegans*	May affect, likely to adversely affect	No suitable habitat occurs in the project area and new annual water depletions (31.35 AF) are below the threshold of 100 AF, established in the 2009 PBO for Colorado River endangered fish (USFWS 2009).
Colorado pikeminnow	*Ptychocheilus Lucius*	May affect, likely to adversely affect	No suitable habitat occurs in the project area and new annual water depletions (31.35 AF) are below the threshold of 100 AF, established in the 2009 PBO for Colorado River endangered fish (USFWS 2009).
Humpback chub	*Gila cypha*	May affect, likely to adversely affect	No suitable habitat occurs in the project area and new annual water depletions (31.35 AF) are below the threshold of 100 AF, established in the 2009 PBO for Colorado River endangered fish (USFWS 2009).
Razorback sucker	*Xyrauchen texanus*	May affect, likely to adversely affect	No suitable habitat occurs in the project area and new annual water depletions (31.35 AF) are below the threshold of 100 AF, established in the 2009 PBO for Colorado River endangered fish (USFWS 2009).

Additional design features will be applied during construction of the proposed project components to avoid and minimize impacts on species protected by the ESA, including Colorado River endangered fish, as described below.

Design Features to Protect the Gunnison sage-grouse

- SCADA installations in potential habitat will occur outside the breeding and nesting season for Gunnison sage-grouse.
- The access route for SCADA installation will avoid permanent impacts on sagebrush. No clearing or grubbing will occur at the root zone; the brush will be driven over, if necessary, but not removed.

- Planned installations will avoid heavy equipment access as much as possible. For example, installation of precast stilling wells may be preferred to avoid on-site concrete work and associated potential disturbances.

General Preconstruction Design Features

- Ground disturbances shall be limited to only those areas necessary to safely implement the Proposed Action.
- Work will be confined within existing ROWs whenever possible to preserve existing vegetation and private property. The ROW will be clearly marked in the field.
- All access will be designated on project area maps, including along the construction corridor. No cross-country travel will occur in marked wetland areas.
- Construction components including temporary use areas for material and equipment storage will be located outside of wetlands or riparian areas.
- Construction limits shall be clearly flagged on-site to avoid unnecessary plant loss or ground disturbance.
- If special status plants are identified in preconstruction surveys in or near the construction corridor, weed management strategies shall prioritize the protection of special status plants.
- Ensure that project staff and contractors working on-site are aware of and can identify special status plant and wildlife species with potential to occur in the project area footprint; stop work if a special status plant or wildlife species is discovered in the project area footprint and notify the project manager.
- Prior to construction, vegetative material shall be removed by mowing or chopping, and either hauled to a proposed staging area to be burned or chipped, or chipped and mulched on-site. Stumps shall be grubbed and hauled to a proposed staging area to be burned.

General Design Features During Construction

- Vegetation and topsoil removal shall be confined to the smallest portion of the Proposed Action project area necessary for completion of the work.
- During construction, topsoil will be saved and then redistributed after completion of construction activities.
- Straw wattles, silt curtains, cofferdams, dikes, straw bales, or other suitable erosion-control measures will be used to minimize soil erosion and prevent soil erosion from entering water bodies during construction.
- Fuel, oil, hydraulic fluid, lubricants, and other petrochemicals will not be stored within 200 feet of the wetland and riparian areas and will have a secondary containment system to prevent spills. Appropriate spill clean-up materials, such as booms and absorbent pads, will be available on-site at all times during construction.
- Work crews will carry spill cleanup kits, and in times of burn bans or wildfire concerns, each crew will have a fire suppression kit.
- Leaks that occur to equipment while working on the project will not be allowed to continue operating until the leak is fixed. Refueling will occur a minimum of 100 feet from wetland and riparian areas.
- All construction equipment will be decontaminated by cleaning with high-pressure water before mobilization to the site. All wheels, tracks, undercarriages, fenders, blades, buckets, and the exterior body will be cleaned prior to entering the site to prevent releases into the aquatic environment and the spread of noxious weeds.
- Concrete clean-up operations (if needed) will use a dedicated concrete wash-out pit in an upland location. The concrete remnants in the wash-out pit will be fully removed and legally disposed of off-site upon completion of all concrete operations, or as needed for maintenance.

- Water, other dust suppressants, or soil binder on unpaved roads and areas of ground disturbance will be applied to minimize dust entrainment.
- Stabilized construction entrances will be used to minimize tracking.
- Appropriate emission-control devices are required on all construction equipment.

General Design Features Following Construction

- Reseeding shall occur at appropriate times with certified weed-free seed mixes per NRCS, Bureau of Land Management (BLM), or Reclamation instructions, as appropriate.
- Weed control shall be implemented by the project proponent to county standards (at a minimum).
- Disturbed areas will be smoothed, shaped, contoured, and reseeded to as near their pre-project conditions as practicable.
- Lands previously in agricultural production will be returned to agricultural production following construction.
- Note: All permits or authorizations required prior to construction of project components will be obtained; these permits are not analyzed in full in this Biological Assessment.

Coordination and Technical Consultation

The following agency experts were consulted during preparation of this Biological Assessment:

- Krystal Phillips, Colorado State Biologist, NRCS
- Neil Perry, Wildlife Biologist, BLM, Uncompahgre Field Office
- Brandon Diamond, Wildlife Manager for Area 16, Colorado Parks and Wildlife
- Stuart Sinclair, District Wildlife Manager, Hotchkiss/Crawford
- Creed Clayton, Supervisory Fish and Wildlife Biologist, USFWS

NRCS is requesting USFWS concurrence with the determinations above for impacts that may be associated with proposed action. If you have any questions, please contact Krystal Phillips, NRCS Colorado State Biologist, at (720) 281-1216 or at krystal.phillips2@usda.gov.

Sincerely,

Krystal Phillips, NRCS
Colorado State Biologist
Enclosures

- A – References
- B – Maps (Figures 1 thru 3)
    - Figure 1 – Map of Proposed Action Area for All Projects – Batch 2
    - Figure 2 – North Fork Projects – Batch 2
    - Figure 3 – Crawford Projects – Batch 2
- C – USFWS Biological Opinion for the Lower Gunnison Project – Batch 1
- D – USFWS IPaC Resource List and Delta, Gunnison, and Montrose counties ESA Species List
- E – Gunnison sage-grouse Survey

cc: Eugene Backhaus, NRCS State Resources Conservationist; Francine Lheritier, NRCS Area 1 Conservationist; Allison Hearne, Area 1 Biologist; Dave "DK" Kanzer, Colorado River District; Shana Harness, Colorado River District; Aleta Powers, ERO Resources Corporation; and Cassandra Shenk, ERO Resources Corporation

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Colorado Ecological Services

IN REPLY REFER TO:
FWS/R6/ES CO

Front Range:
Post Office Box 25486
Mail Stop 65412
Denver, Colorado 80225-0486

Western Slope:
445 W. Gunnison Avenue
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Grand Junction, Colorado 81501-5711

ES/GJ-6-CO-09-F-001-GP032
TAILS 06E24100-2021-F-0366

May 14, 2021

Krystal Phillips, Colorado State Biologist
Natural Resources Conservation Service
Denver Federal Center, Bldg. 56, RM 2400
Denver, Colorado 80225-0426

Dear Ms. Phillips,

This responds to your request, dated April 14, 2021 (revised from March 18, 2021), for formal consultation under section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et seq.). Your request is for the Natural Resources Conservation Service (NRCS)-Supplement to the Lower Gunnison Watershed Plan for Batch 2 Projects. Consultation on Batch 1 projects, and the long-term program in general, was completed on November 30, 2017 (TAILS 06E24100-2018-F-0035). These projects are all part of the Regional Conservation Partnership Program (RCPP) Lower Gunnison Project located within the Gunnison River Basin, centered primarily around Delta and Montrose counties, Colorado (further described in our 2017 biological opinion and associated NRCS biological assessment). For Batch 2 projects, you have requested consultation on the Gunnison sage-grouse (*Centrocercus minimus*), Colorado pikeminnow (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), humpback chub (*Gila cypha*), and bonytail (*Gila elegans*).

Batch 2 projects are being planned within the boundaries of two of the four original subwatersheds - the North Fork Water Conservancy District and Crawford Water Conservancy District. The components of the proposed Batch 2 projects are designed to address high levels of naturally occurring salt and selenium, and to create water efficiency improvements. Specific Batch 2 proposed actions include:

• Converting approximately 14,709 feet of canals or laterals in two subwatersheds from open, earthen ditches to enclosed pipe, pressurized where appropriate, to minimize off-farm delivery system losses;

• Installing three regulating ponds in two subwatersheds and expanding one sedimentation pond to enable piping system maintenance, pressure regulation, and control; and

• Incorporating 'smart' headgate diversion control structures and Supervisory Control and Data Acquisition (SCADA) systems within the two subwatersheds to better manage irrigation water supplies, including at least seventeen (17) installations initially with additional installations as appropriate and as budget allows.

For the Canada lynx *(Lynx canadensis*), Mexican spotted owl (*Strix occidentalis lucida*), western yellow-billed cuckoo (*Coccyzus americanus*), clay-loving buckwheat (*Eriogonum pelinophilum*), and Colorado hookless cactus (*Sclerocactus glaucus*), we acknowledge your determination of no effect, but neither 7(a)(3) of the Act, nor implementing regulations under section 7(a)(2) of the Act require the Service to review or concur with this determination; therefore the Service will not address these species further. However, we do appreciate you informing us of your analyses for these species.

Gunnison sage-grouse. You have requested our concurrence with your determination that the project may affect, but is not likely to adversely affect the Gunnison sage-grouse and its designated critical habitat. We concur with this determination for Batch 2 projects based, in part, on the following:

- None of the Batch 2 projects are located within or near habitat occupied by the Gunnison sage-grouse.

- SCADA installations will occur outside the March 1 through July 15 breeding and nesting season for Gunnison sage-grouse and will occur more than two miles from occupied habitat.

- None of the Batch 2 projects are located within occupied critical habitat.

- Four SCADA installations are planned to occur inside unoccupied critical habitat. SCADA systems are installed on ditch headgate diversions, which generally do not constitute Gunnison sage-grouse habitat. Two of the SCADA sites do not support any Gunnison sage-grouse habitat. The other two sites occur near sagebrush habitat. Minor, temporary habitat disturbance could occur during construction access. An estimated 10 plants may be temporarily disturbed during access for SCADA construction.

- The access route for SCADA installation will avoid permanent impacts on sagebrush. No clearing or grubbing will occur at the root zone; the brush will be driven over, if necessary, but not removed.

- Planned installations will avoid heavy equipment access as much as possible. For example, installation of precast stilling wells may be preferred to avoid on-site concrete work and associated potential disturbances.

Colorado River Endangered Fish. You have also requested consultation on project effects to the four endangered Colorado River fish and their critical habitats. The project area is outside of river habitat occupied by these fish, but does occur upstream. We agree that the project would not adversely affect these four fish, except through water depletions. Batch 2 projects would involve new water depletions totaling 31.36 AF/yr.

Batch 2 projects also involve historic water depletions. However, all ditch companies involved with Batch 2 projects have previously completed consultation on their historic water depletions and signed recovery agreements (Table 1, biological assessment).

We transmit this correspondence to serve as the final biological opinion (BO) for 31.36 AF/yr of new water depletions associated with Batch 2 projects. A Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin was initiated on January 22, 1988. The Recovery Program was intended to be the reasonable and prudent alternative for individual projects to avoid the likelihood of jeopardy to the endangered fishes from impacts of depletions to the Upper Colorado River Basin. In order to further define and clarify the process in the Recovery Program, a section 7 agreement was implemented on October 15, 1993, by the Recovery Program participants. Incorporated into this agreement is a Recovery Implementation Program Recovery Action Plan (RIPRAP) which identifies actions currently believed to be required to recover the endangered fishes in the most expeditious manner.

On December 4, 2009, the Service issued the Gunnison River PBO (this document is available for viewing at the following internet address: http://www.coloradoriverrecovery.org/documents-publications/section-7-consultation/GUPBO.pdf). The Service has determined that projects that fit under the umbrella of the Gunnison River PBO would avoid the likelihood of jeopardy and/or adverse modification of critical habitat for depletion impacts. The Gunnison River PBO states that in order for actions to fall within the umbrella of the PBO and rely on the RIPRAP to offset its depletion, the following criteria must be met.

1. A Recovery Agreement must be offered and signed prior to conclusion of section 7 consultation.

2. A fee to fund recovery actions will be submitted as described in the proposed action for new depletion projects greater than 100 acre-feet/year (AF/yr).

3. Reinitiation stipulations will be included in all individual consultations under the umbrella of this programmatic.

4. The Service and project proponents will request that discretionary Federal control be retained for all consultations under this programmatic.

Recovery Agreements have been signed by the Service and the Water Users (ditch companies listed in Table 1 of the biological assessment). New water depletions for Batch 2 projects total less than 100 AF/yr and, therefore, do not require the payment of depletion fees. The Natural Resources Conservation Service (NRCS) has agreed to condition its approval documents to retain jurisdiction should section 7 consultation need to be reinitiated. Therefore, the Service concludes that the subject project meets the criteria to rely on the Gunnison PBO to offset depletion impacts and is not likely to jeopardize the continued existence of the species and is not likely to destroy or adversely modify designated critical habitat.

The Service and the Recovery Program track all water depletions that are covered under the Gunnison PBO and other water depletion PBOs within the Upper Colorado River Basin on a quarterly basis. A summary of those depletions are available at: http://www.coloradoriverrecovery.org/documents-publications/section-7-consultation/consultation-list.html. Also, in accordance with the Section 7, Sufficient Progress, and Historic Projects Agreement, the Service reviews cumulative accomplishments and shortcomings of the Recovery Program in the upper Colorado River basin. Per that Agreement, the Service uses the following criteria to evaluate whether the Recovery Program is making "sufficient progress" toward recovery of the four listed fish species:

- actions which result in a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction;
- status of the fish populations;
- adequacy of flows;
- and magnitude of the impact of projects.

Through these bi-annual Sufficient Progress reviews the Service evaluates the best available and current information to determine if the Recovery Program continues to offset depletion effects identified in existing Section 7 consultations including the depletions covered by these PBOs. In the most recent assessment (dated February 12, 2021), the Service determined that sufficient progress has been made towards recovery. Sufficient Progress reports can be found at: http://www.coloradoriverrecovery.org/documents-publications/section-7-consultation/sufficient-progress-letters.html.

The reinitiation criteria for the Gunnison PBO apply to all projects under the umbrella of the PBO. For your information the reinitiation notice from the Gunnison River PBO is presented below.

REINITIATION NOTICE

This concludes formal consultation on the subject action. The proposed action includes adaptive management because additional information, changing priorities, and the development of the States' entitlement may require modification of the Recovery Action Plan. Therefore, the Recovery Action Plan is reviewed annually and updated and changed when necessary and the required time frames include changes in timing approved by means of the normal procedures of the Recovery Program, as explained in the description of the proposed action. Every 2 years, for the life of the Recovery Program, the Service and Recovery Program will review implementation of the Recovery Action Plan actions that are included in this BO to determine timely compliance with applicable schedules. As provided in 50 CFR sec. 402.16, reinitiation of formal consultation is required for new projects where discretionary Federal Agency involvement or control over the action has been retained (or is authorized by law) and under the following conditions:

1. **The amount or extent of take specified in the incidental take statement for this opinion is exceeded**. The terms and conditions outlined in the incidental take statement

are not implemented. The implementation of the proposed reoperation of Aspinall and the Selenium Management Program will further decrease the likelihood of take caused by water depletion impacts.

2. **New information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion**, such as impacts due to climate change. In preparing this opinion, the Service describes the positive and negative effects of the action it anticipates and considered in the section of the opinion entitled "EFFECTS OF THE ACTION."

3. **The identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the BO.** It would be considered a change in the action subject to consultation if the reoperation of Aspinall and the Selenium Management Program described in this opinion are not implemented within the required timeframes. If a draft Selenium Management Program document is not completed within 18 months of the final PBO and a final document within 24 months, reinitiation of consultation will be required. Reinitiating consultation could consist of an exchange of memoranda examining the progress made on the plan and evaluating the consequences of extending the timeframe. Also, at any time, if funding is not available to implement the Selenium Management Program reinitiation of consultation will be required.

   The analysis for this BO assumed implementation of the Colorado River Mainstem Action Plan of the RIPRAP because the Colorado pikeminnow (*Ptychocheilus lucius)* and razorback sucker *(Xyrauchen texanus*) that occur in the Gunnison River use the Colorado River and are considered one population. The essential elements of the Colorado River Plan are as follows: 1) provide and protect instream flows; 2) restore floodplain habitat; 3) reduce impacts of nonnative fishes; 4) augment or restore populations; and 5) monitor populations and conduct research to support recovery actions. The analysis for the non-jeopardy determination of the proposed action that includes about 37,900 af/yr of new water depletions from the Gunnison River Basin relies on the Recovery Program to provide and protect flows on the Gunnison and Colorado Rivers.

4. **The Service lists new species or designates new or additional critical habitat, where the level or pattern of depletions covered under this opinion may have an adverse impact on the newly listed species or habitat.** If the species or habitat may be adversely affected by depletions, the Service will reinitiate consultation on the PBO as required by its section 7 regulations. The Service will first determine whether the Recovery Program can avoid such impact or can be amended to avoid the likelihood of jeopardy and/or adverse modification of critical habitat for such depletion impacts. If the Recovery Program can avoid the likelihood of jeopardy and/or adverse modification of critical habitat no additional recovery actions for individual projects would be required, if the avoidance actions are included in the Recovery Action Plan. If the Recovery Program can't avoid the likelihood of jeopardy and/or adverse modification of critical

habitat then the Service will reinitiate consultation and develop reasonable and prudent alternatives.

If the annual assessment from Reclamation's reports indicates that the operation of the Aspinall Unit to meet flow targets or that the Selenium Management Program, as specified in this opinion has not been implemented as proposed, Reclamation will be required to reinitiate consultation to specify additional measures to be taken by Reclamation or the Recovery Program to avoid the likelihood of jeopardy and/or adverse modification of critical habitat for depletions and water quality. Also, if the status of all four fish species has not sufficiently improved, as determined by the Service in a formal sufficient progress finding under provisions of the Recovery Program, Reclamation will be required to reinitiate consultation. If other measures are determined by the Service or the Recovery Program to be needed for recovery prior to the review, they can be added to the Recovery Action Plan according to standard procedures. If the Recovery Program is unable to complete those actions which the Service has determined to be required, Reclamation will be required to reinitiate consultation in accordance with ESA regulations and this opinion's reinitiation requirements.

All individual consultations conducted under this programmatic opinion will contain language requesting the applicable Federal agency to retain sufficient authority to reinitiate consultation should reinitiation become necessary. The recovery agreements to be signed by non-Federal entities who rely on the Recovery Program to avoid the likelihood of jeopardy and/or adverse modification of critical habitat for depletion impacts related to their projects will provide that such non-Federal entities also must request the Federal agency to retain such authority. Non-Federal entities will agree by means of recovery agreements to participate during reinitiated consultations in finding solutions to the problem which triggered the reinitiation of consultation.

If you have any questions regarding this consultation or would like to discuss it in more detail, please contact Creed Clayton of our Western Slope Field Office at creed_clayton@fws.gov.

Sincerely,

J. Creed Clayton

for Ann Timberman
Western Slope Supervisor

cc: FWS/UCREFRP, Lakewood; Email: Kevin_McAbee@fws.gov

HISTORY COLORADO

Mr. Craig Dengel
State Cultural Resources Specialist
Natural Resources Conservation Service
US Department of Agriculture
Denver Federal Center
Bldg. 56, Room 2604
P.O. Box 25426
Denver, Colorado 80225-0426

RE: Lower Gunnison Supplemental Watershed Plan
Delta County, Colorado
History Colorado No. 78097

Dear Mr. Dengel:

Thank you for your correspondence dated December 3, 2020, which our office received on December 4, 2020, regarding the review of the aforementioned project under Section 106 of the National Historic Preservation Act of 1966, as amended (54 USC § 306108), and its implementing regulations, 36 CFR Part 800. At our request your office provided additional project information on January 13, 2021.

We have reviewed all documentation submitted for this project and agree the defined area of potential effect (APE) is appropriate for the undertaking. We concur with the majority of your determinations of eligibility. We do not concur that 5DT.2467 is not eligible for inclusion in the National Register of Historic Places. The provided documentation notes that portions of the resource extend outside the APE. The portions of the resource that extend outside the APE were not surveyed as part of the class III cultural resource inventory. Additional, previously unidentified cultural remains may sit outside the APE that could show evidence that the resource meets the criteria for the National Register. Until the additional portions of the resource are inventoried, we recommend that 5DT.2467 *needs data* to determine the eligibility of the resource for the National Register. Please see the following table for our determinations for all documented properties:

Smithsonian Site No.	Resource Type/Name	NRCS Eligibility Recommendation	SHPO Determination of Eligibility
5DT.1277.9	Fire Mountain Canal segment	Field eligible, supporting	Eligible, Supports integrity of overall linear resource
5DT.1584	Aspen Canal	Officially eligible	Eligible
5DT.1594.3	C Ditch/South Cottonwood Lateral of the Hice Ditch/ Needlerock Ditch segment	Officially eligible, non-supporting	Eligible, Does NOT support integrity of overall linear resource
5DT.1780.7 5DT.1780.8	Grand View Ditch segments	Field eligible, supporting	Eligible, Support integrity of overall linear resource
5DT.1811.7 5DT.1811.8	Crawford Clipper Ditch segments	Officially eligible, supporting	Eligible, Support integrity of overall linear resource
5DT.1811.9		Officially eligible, non-supporting	Eligible, Does NOT support integrity of overall linear resource
5DT.2465	Open lithic scatter	Field not eligible	Not Eligible

5DT.2466	Trash scatter and precontact IF	Field not eligible	Not Eligible
5DT.2467	Trash scatter	Field not eligible	**Needs Data**
5DT.2468	Skating rink	Field not eligible	Not Eligible
5DT.2469	Ranch	Field not eligible	Not Eligible
5DT.2470 through 5DT.2478	Isolated Finds/Features	n/a	n/a

We also generally concur with the assessments of effect outlined in your December 3 letter. Ultimately, we concur the proposed headgate reconstruction along the Grandview Canal (5DT1780.7) and piping of the Fire Mountain Canal (5DT1277.9) will *adversely affect* those resources. It is our opinion the proposed regulating pond along Grandview Canal (segment 5DT.1780.8) will also result in an *adverse effect*. Accordingly, consultation should proceed in accordance with 36 CFR §800.6 to mitigate those adverse effects. We will provide additional comments upon receipt of documentation to that effect.

Should unidentified archaeological resources be discovered in the course of the project, work must be interrupted until the resources have been evaluated in terms of the National Register eligibility criteria (36 CFR §60.4) in consultation with our office pursuant to 36 CFR §800.13. Also, should the consulted-upon scope of the work change, please contact our office for continued consultation under Section 106 of the National Historic Preservation Act.

We request being involved in the consultation process with the local government, which as stipulated in 36 CFR §800.3 is required to be notified of the undertaking, and with other consulting parties. Additional information provided by the local government or consulting parties might cause our office to re-evaluate our eligibility and potential effect findings. Please note that our compliance letter does not end the 30-day review period provided to other consulting parties.

Thank you for the opportunity to comment. If we may be of further assistance, please contact Mitchell K. Schaefer, Section 106 Compliance Manager, at (303) 866-2673 or mitchell.schaefer@state.co.us.

Sincerely,

Steve Turner, AIA
State Historic Preservation Officer
ST/mks

We are now accepting electronic consultation through our secure file transfer system, MoveIT. Directions for digital submission and registration for MoveIT are available at https://www.historycolorado.org/submitting-your-data-preservation-programs.

HISTORY COLORADO

Mr. Craig Dengel
State Cultural Resources Specialist
Natural Resources Conservation Service
US Department of Agriculture
Denver Federal Center
Bldg. 56, Room 2604
P.O. Box 25426
Denver, Colorado 80225-0426

RE: Lower Gunnison Supplemental Watershed Plan
Delta County, Colorado
History Colorado No. 78097

Dear Mr. Dengel:

Thank you for your correspondence dated January 27, 2021, which our office received also on January 27, 2021, regarding the review of the aforementioned project under Section 106 of the National Historic Preservation Act of 1966, as amended (54 USC § 306108), and its implementing regulations, 36 CFR Part 800.

As our offices agree a finding of *needs data* is appropriate for site 5DT.2467 and, as your January 27 letter indicated, the current project will occur outside the identified boundaries of that site, we concur the undertaking will result in *no historic properties affected* for that property.

As the undertaking will result in *adverse effects* to the Grandview Canal (5DT.1780) and the Fire Mountain Canal (5DT.1277) we look forward to developing a memorandum of agreement in consultation with your office and other consulting parties. We will provide additional comments upon receipt of documentation to that effect.

Should unidentified archaeological resources be discovered in the course of the project, work must be interrupted until the resources have been evaluated in terms of the National Register eligibility criteria (36 CFR §60.4) in consultation with our office pursuant to 36 CFR §800.13. Also, should the consulted-upon scope of the work change, please contact our office for continued consultation under Section 106 of the National Historic Preservation Act.

We request being involved in the consultation process with the local government, which as stipulated in 36 CFR §800.3 is required to be notified of the undertaking, and with other consulting parties. Additional information provided by the local government or consulting parties might cause our office to re-evaluate our eligibility and potential effect findings. Please

note that our compliance letter does not end the 30-day review period provided to other consulting parties.

Thank you for the opportunity to comment. If we may be of further assistance, please contact Mitchell K. Schaefer, Section 106 Compliance Manager, at (303) 866-2673 or mitchell.schaefer@state.co.us.

Sincerely,

Steve Turner, AIA
State Historic Preservation Officer
ST/mks

We are now accepting electronic consultation through our secure file transfer system, MoveIT. Directions for digital submission and registration for MoveIT are available at https://www.historycolorado.org/submitting-your-data-preservation-programs.

United States Department of Agriculture

Natural Resources Conservation Service
Denver Federal Center
Bldg. 56, RM. 2604
P.O. Box 25426
Denver, CO 80225-0426

December 3, 2020

Mr. Terry Knight
NAGPRA Representative/THPO
Ute Mountain Ute Tribe
P.O. Box 468
Towaoc, CO 81334

Reference: Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan: Delta County, Colorado

Mr. Knight:

Enclosed for your review is a cultural resources report, which is supplemental to the previously submitted report for the Lower Gunnison Watershed Plan in Delta County, Colorado. In brief, the enclosed Supplemental report is part of an upcoming Lower Gunnison Supplemental Watershed Plan Environmental Assessment (EA) to the Lower Gunnison Project. Consultation with your office for the original EA was completed and MOA signed on November 14, 2017 for that project. The Natural Resources Conservation Service (NRCS), is working in partnership with the Colorado River Water Conservation District to continue to identify projects that improve irrigation systems in the Colorado River Basin. Since 2018, additional specific irrigation system improvements have been identified in the North Fork Water Conservancy District and the Crawford Water Conservancy District, and are included in this Lower Gunnison Supplemental Watershed Plan (Supplemental Plan). Additional partners and project sponsors for the Supplemental Plan include the North Fork Water Conservancy District, Crawford Water Conservancy District, Delta Conservation District, and the Bureau of Reclamation (BOR).

Due to an increasing demand for water within the Colorado River Basin, the purpose of the Lower Gunnison Project is to improve the efficiency of water delivery to crops within the Gunnison River Basin, which flows into the Colorado River. Project components identified in the Supplemental Plan consist of converting segments of open canals to pressurized pipe systems, installation of water control facilities, and the installation of Supervisory Control and Data Acquisition (SCADA) systems to improve control of water flows. The Colorado River Conservation District (in coordination with the Fire Mountain Canal and Reservoir Company, the Grandview Canal and Irrigation Company, the Crawford Clipper Ditch Company, and the Crawford Water Conservancy District) defined the area of potential effect as 89.08 acres, including a 200-foot buffer around each SCADA site, a 100-foot buffer along piped areas, and a 50-foot buffer along access roads. Land is owned by the Bureau of Land Management Uncompahgre Field Office (BLM-UFO; 2.2 acres), Bureau of Reclamation (BOR; 13.99 acres), Crawford State Park (2.86 acres), and private parties (61.61 acres). Because the project is located on federal lands, the cultural resource survey was conducted in compliance with Section 106 (54 United States Code (USC) § 306108) of the National Historic Preservation Act (NHPA, 1966, as amended; 54 USC § 300101 et seq.). For the purposes of Section 106 consultation, the NRCS has assumed the role of lead Federal agency.

A cultural resources inventory of the APE was completed by ERO Resources Corporation in October, 2020. Within or overlapping the APE are 22 cultural resources: 13 sites and linear segments and nine isolated finds. One full extent of a linear resource (5DT1584) is officially eligible for listing in the National Register of Historic Places (NRHP). ERO has recommended that five segments are supporting to an eligible linear resource (5DT1277.9, 5DT1780.7, 5DT1780.8, 5DT1811.7, and 5DT1811.8). Two segments are recommended non-supporting to an eligible linear resource (5DT1594.3 and 5DT1811.9). Five sites and the nine isolated finds are recommended not eligible for listing in the NRHP. The NRCS has concurred with these findings. The table below summarizes the sites identified, NRHP eligibility, determination of effects, and management recommendations:

Smithsonian Site No.	Resource Type/Name	NRHP Eligibility Recommendation	Management Recommendations
5DT1277.9	Fire Mountain Canal segment	Field eligible, supporting	Resolve adverse effects
5DT1584	Aspen Canal	Officially eligible	No adverse effect
5DT1594.3	C Ditch/South Cottonwood Lateral of the Hice Ditch/ Needlerock Ditch segment	Officially eligible, non-supporting	No adverse effect
5DT1780.7	Grand View Ditch segment	Field eligible, supporting	Resolve adverse effects
5DT1780.8	Grand View Ditch segment	Field eligible, supporting	No adverse effect
5DT1811.7	Crawford Clipper Ditch segment	Officially eligible, supporting	No adverse effect
5DT1811.8	Crawford Clipper Ditch segment	Officially eligible, supporting	No adverse effect
5DT1811.9	Crawford Clipper Ditch segment (Zanni Lateral)	Officially eligible, non-supporting	No adverse effect
5DT2465	Open lithic scatter	Field not eligible	No adverse effect
5DT2466	Trash scatter and precontact IF	Field not eligible	No adverse effect
5DT2467	Trash scatter	Field not eligible	No adverse effect
5DT2468	Skating rink	Field not eligible	No adverse effect
5DT2469	Ranch	Field not eligible	No adverse effect

ERO recommends that the proposed SCADA monitoring systems will not adversely affect the supporting segments (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9). The Aspen Canal (5DT1584) was fully documented in 2018 during the Aspen Canal Piping Project (Bureau of Reclamation 2018). The NRCS has determined that no further work is necessary for any resources recommended not eligible. Additionally, the NRCS has determined that the SCADA monitoring systems have no adverse effect on the (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9) and requests a finding of "no historic properties effected". Finally, the NRCS has reviewed the terms of the 2018 MOA between BOR and SHPO and agrees that the terms of this MOA have been met and any effects on the Aspen Canal (5DT1584) have been mitigated.

The proposed headgate reconstruction along the Grandview Canal (5DT1780.7) and piping of the Fire Mountain Canal (5DT1277.9) will adversely affect these resources, and ERO recommends resolving for adverse effects. ERO recommends a determination of "adverse effect to historic properties" pursuant to 36 Code of Federal Regulations 800.6 of the NHPA.

The NRCS has determined that the proposed undertaking will result in an adverse effect to sites 5DT1780.7 and 5DT1277.9. The project will involve a rebuild of the existing Grand View diversion gates/structure and converting the Fire Mountain Canal segment from an aboveground canal to pressurized pipe systems, which

will destroy the integrity, design, materials, and workmanship of these segments, thus constituting an adverse effect. To mitigate the adverse effect, a treatment plan for the sites will be developed through consultation, resulting in a Memorandum of Agreement.

As the lead agency, the NRCS requests concurrence for the NRHP eligibility determination for the cultural resource sites, and requests concurrence for the determination of project effects for this undertaking. If you have any questions, comments, or concerns, please contact Craig Dengel, State Cultural Resources Specialist, at office:720-544-2840; cell: 719-749-8596 or craig.dengel@usda.gov at your earliest possible convenience.

Sincerely,

Craig Dengel

Craig Dengel
State Cultural Resources Specialist

Enclosure

- Cultural Resource Report. *Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan, Delta County, Colorado.* ERO Resources Corporation.

cc: (w/o encl)
Jennifer Ward, Environmental Protection Specialist, Bureau of Reclamation, Grand Junction, CO
Shane Rumsey, Archaeologist, Bureau of Land Management, Montrose, CO Krystal Phillips, Colorado State Biologist, NRCS, Denver, CO
Cassandra Shenk, Project Manager, ERO Resources Corporation, Hotchkiss, CO
Kathy Croll, Senior Cultural Resource Specialist, ERO Resources, Durango, CO

United States Department of Agriculture

Natural Resources Conservation Service
Denver Federal Center
Bldg. 56, RM. 2604
P.O. Box 25426
Denver, CO 80225-0426

December 3, 2020

Ms. Christine Sage
Southern Ute Indian Tribe of the Southern Ute Reservation, Colorado
P.O. Box 737
Ignacio, CO 81137

Reference: Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan: Delta County, Colorado

Ms. Sage:

Enclosed for your review is a cultural resources report, which is supplemental to the previously submitted report for the Lower Gunnison Watershed Plan in Delta County, Colorado. In brief, the enclosed Supplemental report is part of an upcoming Lower Gunnison Supplemental Watershed Plan Environmental Assessment (EA) to the Lower Gunnison Project. Consultation with your office for the original EA was completed and MOA signed on November 14, 2017 for that project. The Natural Resources Conservation Service (NRCS), is working in partnership with the Colorado River Water Conservation District to continue to identify projects that improve irrigation systems in the Colorado River Basin. Since 2018, additional specific irrigation system improvements have been identified in the North Fork Water Conservancy District and the Crawford Water Conservancy District, and are included in this Lower Gunnison Supplemental Watershed Plan (Supplemental Plan). Additional partners and project sponsors for the Supplemental Plan include the North Fork Water Conservancy District, Crawford Water Conservancy District, Delta Conservation District, and the Bureau of Reclamation (BOR).

Due to an increasing demand for water within the Colorado River Basin, the purpose of the Lower Gunnison Project is to improve the efficiency of water delivery to crops within the Gunnison River Basin, which flows into the Colorado River. Project components identified in the Supplemental Plan consist of converting segments of open canals to pressurized pipe systems, installation of water control facilities, and the installation of Supervisory Control and Data Acquisition (SCADA) systems to improve control of water flows. The Colorado River Conservation District (in coordination with the Fire Mountain Canal and Reservoir Company, the Grandview Canal and Irrigation Company, the Crawford Clipper Ditch Company, and the Crawford Water Conservancy District) defined the area of potential effect as 89.08 acres, including a 200-foot buffer around each SCADA site, a 100-foot buffer along piped areas, and a 50-foot buffer along access roads. Land is owned by the Bureau of Land Management Uncompahgre Field Office (BLM-UFO; 2.2 acres), Bureau of Reclamation (BOR; 13.99 acres), Crawford State Park (2.86 acres), and private parties (61.61 acres). Because the project is located on federal lands, the cultural resource survey was conducted in compliance with Section 106 (54 United States Code (USC) § 306108) of the National Historic Preservation Act (NHPA, 1966, as amended; 54 USC § 300101 et seq.). For the purposes of Section 106 consultation, the NRCS has assumed the role of lead Federal agency.

A cultural resources inventory of the APE was completed by ERO Resources Corporation in October, 2020. Within or overlapping the APE are 22 cultural resources: 13 sites and linear segments and nine isolated finds. One full extent of a linear resource (5DT1584) is officially eligible for listing in the National Register of Historic Places (NRHP). ERO has recommended that five segments are supporting to an eligible linear resource (5DT1277.9, 5DT1780.7, 5DT1780.8, 5DT1811.7, and 5DT1811.8). Two segments are recommended non-supporting to an eligible linear resource (5DT1594.3 and 5DT1811.9). Five sites and the nine isolated finds are recommended not eligible for listing in the NRHP. The NRCS has concurred with these findings. The table below summarizes the sites identified, NRHP eligibility, determination of effects, and management recommendations:

Smithsonian Site No.	Resource Type/Name	NRHP Eligibility Recommendation	Management Recommendations
5DT1277.9	Fire Mountain Canal segment	Field eligible, supporting	Resolve adverse effects
5DT1584	Aspen Canal	Officially eligible	No adverse effect
5DT1594.3	C Ditch/South Cottonwood Lateral of the Hice Ditch/ Needlerock Ditch segment	Officially eligible, non-supporting	No adverse effect
5DT1780.7	Grand View Ditch segment	Field eligible, supporting	Resolve adverse effects
5DT1780.8	Grand View Ditch segment	Field eligible, supporting	No adverse effect
5DT1811.7	Crawford Clipper Ditch segment	Officially eligible, supporting	No adverse effect
5DT1811.8	Crawford Clipper Ditch segment	Officially eligible, supporting	No adverse effect
5DT1811.9	Crawford Clipper Ditch segment (Zanni Lateral)	Officially eligible, non-supporting	No adverse effect
5DT2465	Open lithic scatter	Field not eligible	No adverse effect
5DT2466	Trash scatter and precontact IF	Field not eligible	No adverse effect
5DT2467	Trash scatter	Field not eligible	No adverse effect
5DT2468	Skating rink	Field not eligible	No adverse effect
5DT2469	Ranch	Field not eligible	No adverse effect

ERO recommends that the proposed SCADA monitoring systems will not adversely affect the supporting segments (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9). The Aspen Canal (5DT1584) was fully documented in 2018 during the Aspen Canal Piping Project (Bureau of Reclamation 2018). The NRCS has determined that no further work is necessary for any resources recommended not eligible. Additionally, the NRCS has determined that the SCADA monitoring systems have no adverse effect on the (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9) and requests a finding of "no historic properties effected". Finally, the NRCS has reviewed the terms of the 2018 MOA between BOR and SHPO and agrees that the terms of this MOA have been met and any effects on the Aspen Canal (5DT1584) have been mitigated.

The proposed headgate reconstruction along the Grandview Canal (5DT1780.7) and piping of the Fire Mountain Canal (5DT1277.9) will adversely affect these resources, and ERO recommends resolving for adverse effects. ERO recommends a determination of "adverse effect to historic properties" pursuant to 36 Code of Federal Regulations 800.6 of the NHPA.

The NRCS has determined that the proposed undertaking will result in an adverse effect to sites 5DT1780.7 and 5DT1277.9. The project will involve a rebuild of the existing Grand View diversion gates/structure and converting the Fire Mountain Canal segment from an aboveground canal to pressurized pipe systems, which will destroy the integrity, design, materials, and workmanship of these segments, thus constituting an adverse

effect. To mitigate the adverse effect, a treatment plan for the sites will be developed through consultation, resulting in a Memorandum of Agreement.

As the lead agency, the NRCS requests concurrence for the NRHP eligibility determination for the cultural resource sites, and requests concurrence for the determination of project effects for this undertaking. If you have any questions, comments, or concerns, please contact Craig Dengel, State Cultural Resources Specialist, at office:720-544-2840; cell: 719-749-8596 or craig.dengel@usda.gov at your earliest possible convenience.

Sincerely,

Craig Dengel

Craig Dengel
State Cultural Resources Specialist

Enclosure

- Cultural Resource Report. *Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan, Delta County, Colorado.* ERO Resources Corporation.

cc: (w/o encl)
Jennifer Ward, Environmental Protection Specialist, Bureau of Reclamation, Grand Junction, CO
Shane Rumsey, Archaeologist, Bureau of Land Management, Montrose, CO
Krystal Phillips, Colorado State Biologist, NRCS, Denver, CO
Cassandra Shenk, Project Manager, ERO Resources Corporation, Hotchkiss, CO
Kathy Croll, Senior Cultural Resource Specialist, ERO Resources, Durango, CO

United States Department of Agriculture

Natural Resources Conservation Service
Denver Federal Center
Bldg. 56, RM. 2604
P.O. Box 25426
Denver, CO 80225-0426

December 3, 2020

Ms. Betsy Chapoose, Director, Cultural Rights and Protection
Ute Indian Tribe – Uintah & Ouray Reservation
P.O. Box 190
Ft. Duchesne, UT
84026

Reference: Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan: Delta County, Colorado

Ms. Chapoose:

Enclosed for your review is a cultural resources report, which is supplemental to the previously submitted report for the Lower Gunnison Watershed Plan in Delta County, Colorado. In brief, the enclosed Supplemental report is part of an upcoming Lower Gunnison Supplemental Watershed Plan Environmental Assessment (EA) to the Lower Gunnison Project. Consultation with your office for the original EA was completed and MOA signed on November 14, 2017 for that project. The Natural Resources Conservation Service (NRCS), is working in partnership with the Colorado River Water Conservation District to continue to identify projects that improve irrigation systems in the Colorado River Basin. Since 2018, additional specific irrigation system improvements have been identified in the North Fork Water Conservancy District and the Crawford Water Conservancy District, and are included in this Lower Gunnison Supplemental Watershed Plan (Supplemental Plan). Additional partners and project sponsors for the Supplemental Plan include the North Fork Water Conservancy District, Crawford Water Conservancy District, Delta Conservation District, and the Bureau of Reclamation (BOR).

Due to an increasing demand for water within the Colorado River Basin, the purpose of the Lower Gunnison Project is to improve the efficiency of water delivery to crops within the Gunnison River Basin, which flows into the Colorado River. Project components identified in the Supplemental Plan consist of converting segments of open canals to pressurized pipe systems, installation of water control facilities, and the installation of Supervisory Control and Data Acquisition (SCADA) systems to improve control of water flows. The Colorado River Conservation District (in coordination with the Fire Mountain Canal and Reservoir Company, the Grandview Canal and Irrigation Company, the Crawford Clipper Ditch Company, and the Crawford Water Conservancy District) defined the area of potential effect as 89.08 acres, including a 200-foot buffer around each SCADA site, a 100-foot buffer along piped areas, and a 50-foot buffer along access roads. Land is owned by the Bureau of Land Management Uncompahgre Field Office (BLM-UFO; 2.2 acres), Bureau of Reclamation (BOR; 13.99 acres), Crawford State Park (2.86 acres), and private parties (61.61 acres). Because the project is located on federal lands, the cultural resource survey was conducted in compliance with Section 106 (54 United States Code (USC) § 306108) of the National Historic Preservation Act (NHPA, 1966, as amended; 54 USC § 300101 et seq.). For the purposes of Section 106 consultation, the NRCS has assumed the role of lead Federal agency.

A cultural resources inventory of the APE was completed by ERO Resources Corporation in October, 2020. Within or overlapping the APE are 22 cultural resources: 13 sites and linear segments and nine isolated finds. One full extent of a linear resource (5DT1584) is officially eligible for listing in the National Register of Historic Places (NRHP). ERO has recommended that five segments are supporting to an eligible linear resource (5DT1277.9, 5DT1780.7, 5DT1780.8, 5DT1811.7, and 5DT1811.8). Two segments are recommended non-supporting to an eligible linear resource (5DT1594.3 and 5DT1811.9). Five sites and the nine isolated finds are recommended not eligible for listing in the NRHP. The NRCS has concurred with these findings. The table below summarizes the sites identified, NRHP eligibility, determination of effects, and management recommendations:

Smithsonian Site No.	Resource Type/Name	NRHP Eligibility Recommendation	Management Recommendations
5DT1277.9	Fire Mountain Canal segment	Field eligible, supporting	Resolve adverse effects
5DT1584	Aspen Canal	Officially eligible	No adverse effect
5DT1594.3	C Ditch/South Cottonwood Lateral of the Hice Ditch/ Needlerock Ditch segment	Officially eligible, non-supporting	No adverse effect
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5DT1811.7	Crawford Clipper Ditch segment	Officially eligible, supporting	No adverse effect
5DT1811.8	Crawford Clipper Ditch segment	Officially eligible, supporting	No adverse effect
5DT1811.9	Crawford Clipper Ditch segment (Zanni Lateral)	Officially eligible, non-supporting	No adverse effect
5DT2465	Open lithic scatter	Field not eligible	No adverse effect
5DT2466	Trash scatter and precontact IF	Field not eligible	No adverse effect
5DT2467	Trash scatter	Field not eligible	No adverse effect
5DT2468	Skating rink	Field not eligible	No adverse effect
5DT2469	Ranch	Field not eligible	No adverse effect

ERO recommends that the proposed SCADA monitoring systems will not adversely affect the supporting segments (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9). The Aspen Canal (5DT1584) was fully documented in 2018 during the Aspen Canal Piping Project (Bureau of Reclamation 2018). The NRCS has determined that no further work is necessary for any resources recommended not eligible. Additionally, the NRCS has determined that the SCADA monitoring systems have no adverse effect on the (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9) and requests a finding of "no historic properties effected". Finally, the NRCS has reviewed the terms of the 2018 MOA between BOR and SHPO and agrees that the terms of this MOA have been met and any effects on the Aspen Canal (5DT1584) have been mitigated.

The proposed headgate reconstruction along the Grandview Canal (5DT1780.7) and piping of the Fire Mountain Canal (5DT1277.9) will adversely affect these resources, and ERO recommends resolving for adverse effects. ERO recommends a determination of "adverse effect to historic properties" pursuant to 36 Code of Federal Regulations 800.6 of the NHPA.

The NRCS has determined that the proposed undertaking will result in an adverse effect to sites 5DT1780.7 and 5DT1277.9. The project will involve a rebuild of the existing Grand View diversion gates/structure

and converting the Fire Mountain Canal segment from an aboveground canal to pressurized pipe systems, which will destroy the integrity, design, materials, and workmanship of these segments, thus constituting an adverse effect. To mitigate the adverse effect, a treatment plan for the sites will be developed through consultation, resulting in a Memorandum of Agreement.

As the lead agency, the NRCS requests concurrence for the NRHP eligibility determination for the cultural resource sites, and requests concurrence for the determination of project effects for this undertaking. If you have any questions, comments, or concerns, please contact Craig Dengel, State Cultural Resources Specialist, at office:720-544-2840; cell: 719-749-8596 or craig.dengel@usda.gov at your earliest possible convenience.

Sincerely,

Craig Dengel

Craig Dengel
State Cultural Resources Specialist

Enclosure

- Cultural Resource Report. *Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan, Delta County, Colorado.* ERO Resources Corporation.

cc: (w/o encl)
Jennifer Ward, Environmental Protection Specialist, Bureau of Reclamation, Grand Junction, CO
Shane Rumsey, Archaeologist, Bureau of Land Management, Montrose, CO
Krystal Phillips, Colorado State Biologist, NRCS, Denver, CO
Cassandra Shenk, Project Manager, ERO Resources Corporation, Hotchkiss, CO
Kathy Croll, Senior Cultural Resource Specialist, ERO Resources, Durango, CO

United States Department of Agriculture

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P.O. Box 25426
Denver, CO 80225-0426

December 3, 2020

Cassandra Atencio
NAGPRA Coordinator
P.O. Box 737 MS#88
Ignacio, CO 81137

Reference: Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan: Delta County, Colorado

Ms. Atencio:

Enclosed for your review is a cultural resources report, which is supplemental to the previously submitted report for the Lower Gunnison Watershed Plan in Delta County, Colorado. In brief, the enclosed Supplemental report is part of an upcoming Lower Gunnison Supplemental Watershed Plan Environmental Assessment (EA) to the Lower Gunnison Project. Consultation with your office for the original EA was completed and MOA signed on November 14, 2017 for that project. The Natural Resources Conservation Service (NRCS), is working in partnership with the Colorado River Water Conservation District to continue to identify projects that improve irrigation systems in the Colorado River Basin. Since 2018, additional specific irrigation system improvements have been identified in the North Fork Water Conservancy District and the Crawford Water Conservancy District, and are included in this Lower Gunnison Supplemental Watershed Plan (Supplemental Plan). Additional partners and project sponsors for the Supplemental Plan include the North Fork Water Conservancy District, Crawford Water Conservancy District, Delta Conservation District, and the Bureau of Reclamation (BOR).

Due to an increasing demand for water within the Colorado River Basin, the purpose of the Lower Gunnison Project is to improve the efficiency of water delivery to crops within the Gunnison River Basin, which flows into the Colorado River. Project components identified in the Supplemental Plan consist of converting segments of open canals to pressurized pipe systems, installation of water control facilities, and the installation of Supervisory Control and Data Acquisition (SCADA) systems to improve control of water flows. The Colorado River Conservation District (in coordination with the Fire Mountain Canal and Reservoir Company, the Grandview Canal and Irrigation Company, the Crawford Clipper Ditch Company, and the Crawford Water Conservancy District) defined the area of potential effect as 89.08 acres, including a 200-foot buffer around each SCADA site, a 100-foot buffer along piped areas, and a 50-foot buffer along access roads. Land is owned by the Bureau of Land Management Uncompahgre Field Office (BLM-UFO; 2.2 acres), Bureau of Reclamation (BOR; 13.99 acres), Crawford State Park (2.86 acres), and private parties (61.61 acres). Because the project is located on federal lands, the cultural resource survey was conducted in compliance with Section 106 (54 United States Code (USC) § 306108) of the National Historic Preservation Act (NHPA, 1966, as amended; 54 USC § 300101 et seq.). For the purposes of Section 106 consultation, the NRCS has assumed the role of lead Federal agency.

A cultural resources inventory of the APE was completed by ERO Resources Corporation in October, 2020. Within or overlapping the APE are 22 cultural resources: 13 sites and linear segments and nine isolated finds. One full extent of a linear resource (5DT1584) is officially eligible for listing in the National Register of Historic Places (NRHP). ERO has recommended that five segments are supporting to an eligible linear resource (5DT1277.9, 5DT1780.7, 5DT1780.8, 5DT1811.7, and 5DT1811.8). Two segments are recommended non-supporting to an eligible linear resource (5DT1594.3 and 5DT1811.9). Five sites and the nine isolated finds are recommended not eligible for listing in the NRHP. The NRCS has concurred with these findings. The table below summarizes the sites identified, NRHP eligibility, determination of effects, and management recommendations:

Smithsonian Site No.	Resource Type/Name	NRHP Eligibility Recommendation	Management Recommendations
5DT1277.9	Fire Mountain Canal segment	Field eligible, supporting	Resolve adverse effects
5DT1584	Aspen Canal	Officially eligible	No adverse effect
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5DT1811.8	Crawford Clipper Ditch segment	Officially eligible, supporting	No adverse effect
5DT1811.9	Crawford Clipper Ditch segment (Zanni Lateral)	Officially eligible, non-supporting	No adverse effect
5DT2465	Open lithic scatter	Field not eligible	No adverse effect
5DT2466	Trash scatter and precontact IF	Field not eligible	No adverse effect
5DT2467	Trash scatter	Field not eligible	No adverse effect
5DT2468	Skating rink	Field not eligible	No adverse effect
5DT2469	Ranch	Field not eligible	No adverse effect

ERO recommends that the proposed SCADA monitoring systems will not adversely affect the supporting segments (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9). The Aspen Canal (5DT1584) was fully documented in 2018 during the Aspen Canal Piping Project (Bureau of Reclamation 2018). The NRCS has determined that no further work is necessary for any resources recommended not eligible. Additionally, the NRCS has determined that the SCADA monitoring systems have no adverse effect on the (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9) and requests a finding of "no historic properties effected". Finally, the NRCS has reviewed the terms of the 2018 MOA between BOR and SHPO and agrees that the terms of this MOA have been met and any effects on the Aspen Canal (5DT1584) have been mitigated.

The proposed headgate reconstruction along the Grandview Canal (5DT1780.7) and piping of the Fire Mountain Canal (5DT1277.9) will adversely affect these resources, and ERO recommends resolving for adverse effects. ERO recommends a determination of "adverse effect to historic properties" pursuant to 36 Code of Federal Regulations 800.6 of the NHPA.

The NRCS has determined that the proposed undertaking will result in an adverse effect to sites 5DT1780.7 and 5DT1277.9. The project will involve a rebuild of the existing Grand View diversion gates/structure

and converting the Fire Mountain Canal segment from an aboveground canal to pressurized pipe systems, which will destroy the integrity, design, materials, and workmanship of these segments, thus constituting an adverse effect. To mitigate the adverse effect, a treatment plan for the sites will be developed through consultation, resulting in a Memorandum of Agreement.

As the lead agency, the NRCS requests concurrence for the NRHP eligibility determination for the cultural resource sites, and requests concurrence for the determination of project effects for this undertaking. If you have any questions, comments, or concerns, please contact Craig Dengel, State Cultural Resources Specialist, at office:720-544-2840; cell: 719-749-8596 or craig.dengel@usda.gov at your earliest possible convenience.

Sincerely,

Craig Dengel

Craig Dengel
State Cultural Resources Specialist

Enclosure

- Cultural Resource Report. *Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan, Delta County, Colorado.* ERO Resources Corporation.

cc: (w/o encl)
Jennifer Ward, Environmental Protection Specialist, Bureau of Reclamation, Grand Junction, CO
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United States Department of Agriculture

Natural Resources Conservation Service
Denver Federal Center
Bldg. 56, RM. 2604
P.O. Box 25426
Denver, CO 80225-0426

December 3, 2020

Andy Mueller, General Manager
Colorado River District
201 Centennial, Suite 200
Glenwood Springs, CO 81601

Reference: Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan: Delta County, Colorado

Mr. Mueller:

Enclosed for your review is a cultural resources report, which is supplemental to the previously submitted report for the Lower Gunnison Watershed Plan in Delta County, Colorado. In brief, the enclosed Supplemental report is part of an upcoming Lower Gunnison Supplemental Watershed Plan Environmental Assessment (EA) to the Lower Gunnison Project. Consultation with your office for the original EA was completed and MOA signed on November 14, 2017 for that project. The Natural Resources Conservation Service (NRCS), is working in partnership with the Colorado River Water Conservation District to continue to identify projects that improve irrigation systems in the Colorado River Basin. Since 2018, additional specific irrigation system improvements have been identified in the North Fork Water Conservancy District and the Crawford Water Conservancy District, and are included in this Lower Gunnison Supplemental Watershed Plan (Supplemental Plan). Additional partners and project sponsors for the Supplemental Plan include the North Fork Water Conservancy District, Crawford Water Conservancy District, Delta Conservation District, and the Bureau of Reclamation (BOR).

Due to an increasing demand for water within the Colorado River Basin, the purpose of the Lower Gunnison Project is to improve the efficiency of water delivery to crops within the Gunnison River Basin, which flows into the Colorado River. Project components identified in the Supplemental Plan consist of converting segments of open canals to pressurized pipe systems, installation of water control facilities, and the installation of Supervisory Control and Data Acquisition (SCADA) systems to improve control of water flows. The Colorado River Conservation District (in coordination with the Fire Mountain Canal and Reservoir Company, the Grandview Canal and Irrigation Company, the Crawford Clipper Ditch Company, and the Crawford Water Conservancy District) defined the area of potential effect as 89.08 acres, including a 200-foot buffer around each SCADA site, a 100-foot buffer along piped areas, and a 50-foot buffer along access roads. Land is owned by the Bureau of Land Management Uncompahgre Field Office (BLM-UFO; 2.2 acres), Bureau of Reclamation (BOR; 13.99 acres), Crawford State Park (2.86 acres), and private parties (61.61 acres). Because the project is located on federal lands, the cultural resource survey was conducted in compliance with Section 106 (54 United States Code (USC) § 306108) of the National Historic Preservation Act (NHPA, 1966, as amended; 54 USC § 300101 et seq.). For the purposes of Section 106 consultation, the NRCS has assumed the role of lead Federal agency.

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Smithsonian Site No.	Resource Type/Name	NRHP Eligibility Recommendation	Management Recommendations
5DT1277.9	Fire Mountain Canal segment	Field eligible, supporting	Resolve adverse effects
5DT1584	Aspen Canal	Officially eligible	No adverse effect
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ERO recommends that the proposed SCADA monitoring systems will not adversely affect the supporting segments (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9). The Aspen Canal (5DT1584) was fully documented in 2018 during the Aspen Canal Piping Project (Bureau of Reclamation 2018). The NRCS has determined that no further work is necessary for any resources recommended not eligible. Additionally, the NRCS has determined that the SCADA monitoring systems have no adverse effect on the (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9) and requests a finding of "no historic properties effected". Finally, the NRCS has reviewed the terms of the 2018 MOA between BOR and SHPO and agrees that the terms of this MOA have been met and any effects on the Aspen Canal (5DT1584) have been mitigated.

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Sincerely,

Craig Dengel

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State Cultural Resources Specialist

Enclosure

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cc: (w/o encl)
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P.O. Box 25426
Denver, CO 80225-0426

December 3, 2020

Mark LeValley, President, Grandview Canal and
Irrigation Company/Crawford Clipper Ditch Irrigation
Company
PO Box 835
Crawford, CO 81420

Reference: Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan: Delta County, Colorado

Mr. LeValley:

Enclosed for your review is a cultural resources report, which is supplemental to the previously submitted report for the Lower Gunnison Watershed Plan in Delta County, Colorado. In brief, the enclosed Supplemental report is part of an upcoming Lower Gunnison Supplemental Watershed Plan Environmental Assessment (EA) to the Lower Gunnison Project. Consultation with your office for the original EA was completed and MOA signed on November 14, 2017 for that project. The Natural Resources Conservation Service (NRCS), is working in partnership with the Colorado River Water Conservation District to continue to identify projects that improve irrigation systems in the Colorado River Basin. Since 2018, additional specific irrigation system improvements have been identified in the North Fork Water Conservancy District and the Crawford Water Conservancy District, and are included in this Lower Gunnison Supplemental Watershed Plan (Supplemental Plan). Additional partners and project sponsors for the Supplemental Plan include the North Fork Water Conservancy District, Crawford Water Conservancy District, Delta Conservation District, and the Bureau of Reclamation (BOR).

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Sincerely,

Craig Dengel

Craig Dengel
State Cultural Resources Specialist

Enclosure

- Cultural Resource Report. *Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan, Delta County, Colorado.* ERO Resources Corporation.

cc: (w/o encl)
Jennifer Ward, Environmental Protection Specialist, Bureau of Reclamation, Grand Junction, CO
Shane Rumsey, Archaeologist, Bureau of Land Management, Montrose, CO
Krystal Phillips, Colorado State Biologist, NRCS, Denver, CO
Cassandra Shenk, Project Manager, ERO Resources Corporation, Hotchkiss, CO
Kathy Croll, Senior Cultural Resource Specialist, ERO Resources, Durango, CO

United States Department of Agriculture

Natural Resources Conservation Service
Denver Federal Center
Bldg. 56, RM. 2604
P.O. Box 25426
Denver, CO 80225-0426

December 3, 2020

Dixie Luke, President
Fire Mountain Canal and Reservoir Company
PO Box 543
Hotchkiss, CO 81419

Reference: Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan: Delta County, Colorado

Ms. Luke:

Enclosed for your review is a cultural resources report, which is supplemental to the previously submitted report for the Lower Gunnison Watershed Plan in Delta County, Colorado. In brief, the enclosed Supplemental report is part of an upcoming Lower Gunnison Supplemental Watershed Plan Environmental Assessment (EA) to the Lower Gunnison Project. Consultation with your office for the original EA was completed and MOA signed on November 14, 2017 for that project. The Natural Resources Conservation Service (NRCS), is working in partnership with the Colorado River Water Conservation District to continue to identify projects that improve irrigation systems in the Colorado River Basin. Since 2018, additional specific irrigation system improvements have been identified in the North Fork Water Conservancy District and the Crawford Water Conservancy District, and are included in this Lower Gunnison Supplemental Watershed Plan (Supplemental Plan). Additional partners and project sponsors for the Supplemental Plan include the North Fork Water Conservancy District, Crawford Water Conservancy District, Delta Conservation District, and the Bureau of Reclamation (BOR).

Due to an increasing demand for water within the Colorado River Basin, the purpose of the Lower Gunnison Project is to improve the efficiency of water delivery to crops within the Gunnison River Basin, which flows into the Colorado River. Project components identified in the Supplemental Plan consist of converting segments of open canals to pressurized pipe systems, installation of water control facilities, and the installation of Supervisory Control and Data Acquisition (SCADA) systems to improve control of water flows. The Colorado River Conservation District (in coordination with the Fire Mountain Canal and Reservoir Company, the Grandview Canal and Irrigation Company, the Crawford Clipper Ditch Company, and the Crawford Water Conservancy District) defined the area of potential effect as 89.08 acres, including a 200-foot buffer around each SCADA site, a 100-foot buffer along piped areas, and a 50-foot buffer along access roads. Land is owned by the Bureau of Land Management Uncompahgre Field Office (BLM-UFO; 2.2 acres), Bureau of Reclamation (BOR; 13.99 acres), Crawford State Park (2.86 acres), and private parties (61.61 acres). Because the project is located on federal lands, the cultural resource survey was conducted in compliance with Section 106 (54 United States Code (USC) § 306108) of the National Historic Preservation Act (NHPA, 1966, as amended; 54 USC § 300101 et seq.). For the purposes of Section 106 consultation, the NRCS has assumed the role of lead Federal agency.

A cultural resources inventory of the APE was completed by ERO Resources Corporation in October, 2020. Within or overlapping the APE are 22 cultural resources: 13 sites and linear segments and nine isolated finds. One full extent of a linear resource (5DT1584) is officially eligible for listing in the National Register of Historic Places (NRHP). ERO has recommended that five segments are supporting to an eligible linear resource (5DT1277.9, 5DT1780.7, 5DT1780.8, 5DT1811.7, and 5DT1811.8). Two segments are recommended non-supporting to an eligible linear resource (5DT1594.3 and 5DT1811.9). Five sites and the nine isolated finds are recommended not eligible for listing in the NRHP. The NRCS has concurred with these findings. The table below summarizes the sites identified, NRHP eligibility, determination of effects, and management recommendations:

Smithsonian Site No.	Resource Type/Name	NRHP Eligibility Recommendation	Management Recommendations
5DT1277.9	Fire Mountain Canal segment	Field eligible, supporting	Resolve adverse effects
5DT1584	Aspen Canal	Officially eligible	No adverse effect
5DT1594.3	C Ditch/South Cottonwood Lateral of the Hice Ditch/ Needlerock Ditch segment	Officially eligible, non-supporting	No adverse effect
5DT1780.7	Grand View Ditch segment	Field eligible, supporting	Resolve adverse effects
5DT1780.8	Grand View Ditch segment	Field eligible, supporting	No adverse effect
5DT1811.7	Crawford Clipper Ditch segment	Officially eligible, supporting	No adverse effect
5DT1811.8	Crawford Clipper Ditch segment	Officially eligible, supporting	No adverse effect
5DT1811.9	Crawford Clipper Ditch segment (Zanni Lateral)	Officially eligible, non-supporting	No adverse effect
5DT2465	Open lithic scatter	Field not eligible	No adverse effect
5DT2466	Trash scatter and precontact IF	Field not eligible	No adverse effect
5DT2467	Trash scatter	Field not eligible	No adverse effect
5DT2468	Skating rink	Field not eligible	No adverse effect
5DT2469	Ranch	Field not eligible	No adverse effect

ERO recommends that the proposed SCADA monitoring systems will not adversely affect the supporting segments (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9). The Aspen Canal (5DT1584) was fully documented in 2018 during the Aspen Canal Piping Project (Bureau of Reclamation 2018). The NRCS has determined that no further work is necessary for any resources recommended not eligible. Additionally, the NRCS has determined that the SCADA monitoring systems have no adverse effect on the (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9) and requests a finding of "no historic properties effected". Finally, the NRCS has reviewed the terms of the 2018 MOA between BOR and SHPO and agrees that the terms of this MOA have been met and any effects on the Aspen Canal (5DT1584) have been mitigated.

The proposed headgate reconstruction along the Grandview Canal (5DT1780.7) and piping of the Fire Mountain Canal (5DT1277.9) will adversely affect these resources, and ERO recommends resolving for adverse effects. ERO recommends a determination of "adverse effect to historic properties" pursuant to 36 Code of Federal Regulations 800.6 of the NHPA.

The NRCS has determined that the proposed undertaking will result in an adverse effect to sites 5DT1780.7 and 5DT1277.9. The project will involve a rebuild of the existing Grand View diversion gates/structure and converting the Fire Mountain Canal segment from an aboveground canal to pressurized pipe systems, which

will destroy the integrity, design, materials, and workmanship of these segments, thus constituting an adverse effect. To mitigate the adverse effect, a treatment plan for the sites will be developed through consultation, resulting in a Memorandum of Agreement.

As the lead agency, the NRCS requests concurrence for the NRHP eligibility determination for the cultural resource sites, and requests concurrence for the determination of project effects for this undertaking. If you have any questions, comments, or concerns, please contact Craig Dengel, State Cultural Resources Specialist, at office:720-544-2840; cell: 719-749-8596 or craig.dengel@usda.gov at your earliest possible convenience.

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Craig Dengel

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December 3, 2020

Hank LeValley, Crawford Water Conservancy District
183 CO-92
Crawford, CO 81415

Reference: Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan: Delta County, Colorado

Mr. LeValley:

Enclosed for your review is a cultural resources report, which is supplemental to the previously submitted report for the Lower Gunnison Watershed Plan in Delta County, Colorado. In brief, the enclosed Supplemental report is part of an upcoming Lower Gunnison Supplemental Watershed Plan Environmental Assessment (EA) to the Lower Gunnison Project. Consultation with your office for the original EA was completed and MOA signed on November 14, 2017 for that project. The Natural Resources Conservation Service (NRCS), is working in partnership with the Colorado River Water Conservation District to continue to identify projects that improve irrigation systems in the Colorado River Basin. Since 2018, additional specific irrigation system improvements have been identified in the North Fork Water Conservancy District and the Crawford Water Conservancy District, and are included in this Lower Gunnison Supplemental Watershed Plan (Supplemental Plan). Additional partners and project sponsors for the Supplemental Plan include the North Fork Water Conservancy District, Crawford Water Conservancy District, Delta Conservation District, and the Bureau of Reclamation (BOR).

Due to an increasing demand for water within the Colorado River Basin, the purpose of the Lower Gunnison Project is to improve the efficiency of water delivery to crops within the Gunnison River Basin, which flows into the Colorado River. Project components identified in the Supplemental Plan consist of converting segments of open canals to pressurized pipe systems, installation of water control facilities, and the installation of Supervisory Control and Data Acquisition (SCADA) systems to improve control of water flows. The Colorado River Conservation District (in coordination with the Fire Mountain Canal and Reservoir Company, the Grandview Canal and Irrigation Company, the Crawford Clipper Ditch Company, and the Crawford Water Conservancy District) defined the area of potential effect as 89.08 acres, including a 200-foot buffer around each SCADA site, a 100-foot buffer along piped areas, and a 50-foot buffer along access roads. Land is owned by the Bureau of Land Management Uncompahgre Field Office (BLM-UFO; 2.2 acres), Bureau of Reclamation (BOR; 13.99 acres), Crawford State Park (2.86 acres), and private parties (61.61 acres). Because the project is located on federal lands, the cultural resource survey was conducted in compliance with Section 106 (54 United States Code (USC) § 306108) of the National Historic Preservation Act (NHPA, 1966, as amended; 54 USC § 300101 et seq.). For the purposes of Section 106 consultation, the NRCS has assumed the role of lead Federal agency.

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Within or overlapping the APE are 22 cultural resources: 13 sites and linear segments and nine isolated finds. One full extent of a linear resource (5DT1584) is officially eligible for listing in the National Register of Historic Places (NRHP). ERO has recommended that five segments are supporting to an eligible linear resource (5DT1277.9, 5DT1780.7, 5DT1780.8, 5DT1811.7, and 5DT1811.8). Two segments are recommended non-supporting to an eligible linear resource (5DT1594.3 and 5DT1811.9). Five sites and the nine isolated finds are recommended not eligible for listing in the NRHP. The NRCS has concurred with these findings. The table below summarizes the sites identified, NRHP eligibility, determination of effects, and management recommendations:

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ERO recommends that the proposed SCADA monitoring systems will not adversely affect the supporting segments (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9). The Aspen Canal (5DT1584) was fully documented in 2018 during the Aspen Canal Piping Project (Bureau of Reclamation 2018). The NRCS has determined that no further work is necessary for any resources recommended not eligible. Additionally, the NRCS has determined that the SCADA monitoring systems have no adverse effect on the (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9) and requests a finding of "no historic properties effected". Finally, the NRCS has reviewed the terms of the 2018 MOA between BOR and SHPO and agrees that the terms of this MOA have been met and any effects on the Aspen Canal (5DT1584) have been mitigated.

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December 3, 2020

Tom Alvey, North Fork Water Conservancy District
PO Box 217
Hotchkiss, CO 81419

Reference: Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan: Delta County, Colorado

Mr. Alvey:

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December 3, 2020

Suzie Bilberry, District Manager
Delta Conservation District
690 Industrial Blvd
Delta, CO 81416

Reference: Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan: Delta County, Colorado

Ms. Bilberry:

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December 3, 2020

Penny Bishop, District Manager
Shavano Conservation District
102 Par Pl
Montrose, CO 81401

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Ms. Bishop:

Enclosed for your review is a cultural resources report, which is supplemental to the previously submitted report for the Lower Gunnison Watershed Plan in Delta County, Colorado. In brief, the enclosed Supplemental report is part of an upcoming Lower Gunnison Supplemental Watershed Plan Environmental Assessment (EA) to the Lower Gunnison Project. Consultation with your office for the original EA was completed and MOA signed on November 14, 2017 for that project. The Natural Resources Conservation Service (NRCS), is working in partnership with the Colorado River Water Conservation District to continue to identify projects that improve irrigation systems in the Colorado River Basin. Since 2018, additional specific irrigation system improvements have been identified in the North Fork Water Conservancy District and the Crawford Water Conservancy District, and are included in this Lower Gunnison Supplemental Watershed Plan (Supplemental Plan). Additional partners and project sponsors for the Supplemental Plan include the North Fork Water Conservancy District, Crawford Water Conservancy District, Delta Conservation District, and the Bureau of Reclamation (BOR).

Due to an increasing demand for water within the Colorado River Basin, the purpose of the Lower Gunnison Project is to improve the efficiency of water delivery to crops within the Gunnison River Basin, which flows into the Colorado River. Project components identified in the Supplemental Plan consist of converting segments of open canals to pressurized pipe systems, installation of water control facilities, and the installation of Supervisory Control and Data Acquisition (SCADA) systems to improve control of water flows. The Colorado River Conservation District (in coordination with the Fire Mountain Canal and Reservoir Company, the Grandview Canal and Irrigation Company, the Crawford Clipper Ditch Company, and the Crawford Water Conservancy District) defined the area of potential effect as 89.08 acres, including a 200-foot buffer around each SCADA site, a 100-foot buffer along piped areas, and a 50-foot buffer along access roads. Land is owned by the Bureau of Land Management Uncompahgre Field Office (BLM-UFO; 2.2 acres), Bureau of Reclamation (BOR; 13.99 acres), Crawford State Park (2.86 acres), and private parties (61.61 acres). Because the project is located on federal lands, the cultural resource survey was conducted in compliance with Section 106 (54 United States Code (USC) § 306108) of the National Historic Preservation Act (NHPA, 1966, as amended; 54 USC § 300101 et seq.). For the purposes of Section 106 consultation, the NRCS has assumed the role of lead Federal agency.

A cultural resources inventory of the APE was completed by ERO Resources Corporation in October, 2020. Within or overlapping the APE are 22 cultural resources: 13 sites and linear segments and nine isolated finds. One full extent of a linear resource (5DT1584) is officially eligible for listing in the National Register of Historic Places (NRHP). ERO has recommended that five segments are supporting to an eligible linear resource (5DT1277.9, 5DT1780.7, 5DT1780.8, 5DT1811.7, and 5DT1811.8). Two segments are recommended non-supporting to an eligible linear resource (5DT1594.3 and 5DT1811.9). Five sites and the nine isolated finds are recommended not eligible for listing in the NRHP. The NRCS has concurred with these findings. The table below summarizes the sites identified, NRHP eligibility, determination of effects, and management recommendations:

Smithsonian Site No.	Resource Type/Name	NRHP Eligibility Recommendation	Management Recommendations
5DT1277.9	Fire Mountain Canal segment	Field eligible, supporting	Resolve adverse effects
5DT1584	Aspen Canal	Officially eligible	No adverse effect
5DT1594.3	C Ditch/South Cottonwood Lateral of the Hice Ditch/ Needlerock Ditch segment	Officially eligible, non-supporting	No adverse effect
5DT1780.7	Grand View Ditch segment	Field eligible, supporting	Resolve adverse effects
5DT1780.8	Grand View Ditch segment	Field eligible, supporting	No adverse effect
5DT1811.7	Crawford Clipper Ditch segment	Officially eligible, supporting	No adverse effect
5DT1811.8	Crawford Clipper Ditch segment	Officially eligible, supporting	No adverse effect
5DT1811.9	Crawford Clipper Ditch segment (Zanni Lateral)	Officially eligible, non-supporting	No adverse effect
5DT2465	Open lithic scatter	Field not eligible	No adverse effect
5DT2466	Trash scatter and precontact IF	Field not eligible	No adverse effect
5DT2467	Trash scatter	Field not eligible	No adverse effect
5DT2468	Skating rink	Field not eligible	No adverse effect
5DT2469	Ranch	Field not eligible	No adverse effect

ERO recommends that the proposed SCADA monitoring systems will not adversely affect the supporting segments (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9). The Aspen Canal (5DT1584) was fully documented in 2018 during the
Aspen Canal Piping Project (Bureau of Reclamation 2018). The NRCS has determined that no further work is necessary for any resources recommended not eligible. Additionally, the NRCS has determined that the SCADA monitoring systems have no adverse effect on the (5DT1780.8, 5DT1811.7, and 5DT1811.8) or non-supporting linear segments (5DT1594.3 and 5DT1811.9) and requests a finding of "no historic properties effected". Finally, the NRCS has reviewed the terms of the 2018 MOA between BOR and SHPO and agrees that the terms of this MOA have been met and any effects on the Aspen Canal (5DT1584) have been mitigated.

The proposed headgate reconstruction along the Grandview Canal (5DT1780.7) and piping of the Fire Mountain Canal (5DT1277.9) will adversely affect these resources, and ERO recommends resolving for adverse effects. ERO recommends a determination of "adverse effect to historic properties" pursuant to 36 Code of Federal Regulations 800.6 of the NHPA.

The NRCS has determined that the proposed undertaking will result in an adverse effect to sites 5DT1780.7 and 5DT1277.9. The project will involve a rebuild of the existing Grand View diversion gates/structure and converting the Fire Mountain Canal segment from an aboveground canal to pressurized pipe systems, which

will destroy the integrity, design, materials, and workmanship of these segments, thus constituting an adverse effect. To mitigate the adverse effect, a treatment plan for the sites will be developed through consultation, resulting in a Memorandum of Agreement.

As the lead agency, the NRCS requests concurrence for the NRHP eligibility determination for the cultural resource sites, and requests concurrence for the determination of project effects for this undertaking. If you have any questions, comments, or concerns, please contact Craig Dengel, State Cultural Resources Specialist, at office:720-544-2840; cell: 719-749-8596 or craig.dengel@usda.gov at your earliest possible convenience.

Sincerely,

Craig Dengel

Craig Dengel
State Cultural Resources Specialist

Enclosure

- Cultural Resource Report. *Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan, Delta County, Colorado.* ERO Resources Corporation.

cc: (w/o encl)
Jennifer Ward, Environmental Protection Specialist, Bureau of Reclamation, Grand Junction, CO
Shane Rumsey, Archaeologist, Bureau of Land Management, Montrose, CO
Krystal Phillips, Colorado State Biologist, NRCS, Denver, CO
Cassandra Shenk, Project Manager, ERO Resources Corporation, Hotchkiss, CO
Kathy Croll, Senior Cultural Resource Specialist, ERO Resources, Durango, CO

United States Department of Agriculture

Natural Resources Conservation Service
Denver Federal Center
Bldg. 56, RM. 2604
P.O. Box 25426
Denver, CO 80225-0426

December 3, 2020

Steve Turner, AIA
State Historic Preservation Officer
History Colorado Center
1200 Broadway
Denver, CO 80203

Reference: Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan: Delta County, Colorado

Mr. Turner:

Enclosed for your review are a cultural resources report, site forms, and project CD for the Lower Gunnison Supplemental Watershed Plan in Delta County, Colorado. In brief, the enclosed report is part of an upcoming supplemental Environmental Assessment (EA) to the Lower Gunnison Project. Consultation with your office for the original EA was completed and MOA signed on November 14, 2017, for that project. The Natural Resources Conservation Service (NRCS), is working in partnership with the Colorado River Water Conservation District to continue to identify projects that improve irrigation systems in the Colorado River Basin. Since 2018, additional specific irrigation system improvements have been identified in the North Fork Water Conservancy District and the Crawford Water Conservancy District, and are included in this Lower Gunnison Supplemental Watershed Plan (Supplemental Plan). Additional partners and project sponsors for the Supplemental Plan include the North Fork Water Conservancy District, Crawford Water Conservancy District, Delta Conservation District, and the Bureau of Reclamation (BOR).

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Sincerely,

Craig Dengel

Craig Dengel
State Cultural Resources Specialist

Enclosures:

- Cultural Resource Report. *Class III Cultural Resource Survey for the Lower Gunnison Supplemental Watershed Plan, Delta County, Colorado.* ERO Resources Corporation.
- Office of Archaeology and Historic Preservation Cultural Resource Management Forms
- Associated GIS files
- SCADA Design Schematic
- Sent by email:
    - 2018 NRCS Lower Gunnison Watershed Plan and Environmental Assessment;
    - 2018 Reclamation Memorandum of Agreement for the Aspen Canal

cc: (w/ encl)
Jennifer Ward, Environmental Protection Specialist, Bureau of Reclamation, Grand Junction, CO
Kristin Bowen, Archaeologist, Bureau of Reclamation, Durango, CO
Shane Rumsey, Archaeologist, Bureau of Land Management, Montrose, CO

cc: (w/o encl)
Krystal Phillips, Colorado State Biologist, NRCS, Denver, CO
Cassandra Shenk, Project Manager, ERO Resources Corporation, Hotchkiss, CO
Kathy Croll, Senior Cultural Resource Specialist, ERO Resources, Durango, CO

DELTA COUNTY
INDEPENDENT

See Proof on Next Page

AFFIDAVIT OF PUBLICATION

State of Texas, County of Bexar, ss:

Yuade Moore, being first duly sworn, deposes and says: That (s)he is a duly authorized signatory of Column Software, PBC, duly authorized agent of Delta County Independent, a newspaper printed and published in the City of Delta, County of Delta, State of Colorado, and that this affidavit is Page 1 of 2 with the full text of the sworn-to notice set forth on the pages that follow, and the hereto attached:

PUBLICATION DATES:
May. 30, 2024

NOTICE ID: E0W8BwQsdXMpuTK79BaB
PUBLISHER ID: DCI000465
NOTICE NAME: Notice of Availability
Publication Fee: 89.38

I declare under penalty of perjury under the law of Colorado that the foregoing is true and correct.

(Signed) Yuade Moore

VERIFICATION

State of Texas
County of Bexar

NOTARY PUBLIC STATE OF TEXAS

Robert Hollie III

ID NUMBER
133582194
COMMISSION EXPIRES
February 10, 2026

Subscribed in my presence and sworn to before me on this: 06/06/2024

Notary Public

Electronically signed and notarized online using the Proof platform.

PUBLIC NOTICE OF AVAILABILITY

The United States Department of Agriculture Natural Resources Conservation Service (NRCS) and project sponsor, the Colorado River District (CRD), announce the availability of the **Draft Supplemental Watershed Plan and Environmental Assessment (Plan-EA) for the Lower Gunnison Watershed Project** in Delta County, Colorado.

You are invited to attend a public meeting where project information will be provided, and comments collected for the Project. Interested parties may voice their comments, ideas, and concerns to NRCS (lead Federal agency) and Project Sponsor during this meeting.

DRAFT PLAN-EA MEETING

When:	June 11, 2024 – Tuesday	5:00 PM to 7:00 PM
Where:	Maloney House	(in person) Delta County Fairgrounds 403 S. 4th Street Hotchkiss, CO 81419

Use the project website link below to obtain instructions for participating virtually or by telephone.
An electronic copy of the Draft Plan-EA can be downloaded from the Project Website:
https://www.nrcs.usda.gov/conservation-basics/conservation-by-state/colorado/supplemental-lower-gunnison-watershed-project
A hard copy of the Draft Plan-EA is also available at the following locations:

Hotchkiss public library 149 E. Main Street Hotchkiss, CO 81419	NRCS-Delta 690 Industrial Blvd Delta, CO 81416

NRCS invites you to submit comments anytime during the open comment period **starting May 24, 2024 and ending on June 24, 2024.** Comments may be submitted by mail, email, telephone, or in person during the Draft Plan-EA meeting. Comments and questions should be directed to Blongshia "B" Lindsay at:

By Mail: USDA Natural Resources Conservation Service
P.O. Box 25486 DFC
Denver, Colorado 80225
By Email: blongshia.cha@usda.gov
By Phone: 970-872-3020

USDA is an equal opportunity provider, employer, and lender

Published Thursday, May 30, 2024

Sign-in Sheet

Please Print Legibly **Name/Agency or Organization**	**Mailing Address**	**Add to Project Mailing List? Y/N**
Name Blongshia Lindsay	Address 5610 Industrial Place City/Zip CO. Springs, CO Email blongshia.cha@usda.gov	
Name Raquel Flinker	Address City/Zip Email RFLINKER@CRWCD.org	
Name Steve Fletcher	Address City/Zip Email sfletcher@montrose.net	
Name P.S. Briscoe	Address City/Zip Email PSmagillacuddy@yahoo.com	
Name Cody Housewart	Address City/Zip Email Codyhousewart@GMail.com	
Name Ron Smith	Address City/Zip Email ronsmith@tds.net	

Sign-in Sheet

Please Print Legibly **Name/Agency or Organization**	**Mailing Address**	**Add to Project Mailing List? Y/N**
Name Shana Harness CWCD	Address 190 NW 2nd St City/Zip Cedaredge, CO Email shana.harness1920@outlook.com	
Name Sarah Erickson NRCS	Address 690 Industrial Blvd City/Zip Delta CO 81416 Email sarah.myers@usda.gov	
Name Joe Oglesby CWCD	Address Box 402 City/Zip Crawford Co 81415 Email jocoiw@yahoo.com	
Name Aleta Powers ERO Resources	Address City/Zip Email apowers@eroresources.com	
Name	Address City/Zip Email	
Name	Address City/Zip Email	

United State Department of Agriculture

May 24, 2024

Stephanie Connolly, District Manager
Bureau of Land Management
2465 S. Townsend
Montrose, CO 81401
sconnolly@blm.gov

RE: Agency and Public Review of Draft Watershed Plan and Environmental Assessment Supplemental Lower Gunnison Watershed Project, Delta County, Colorado.

The United States Department of Agriculture Natural Resources Conservation Service (NRCS) and the project sponsor, the Colorado River District, invite your agency to review and comment on the Draft Supplemental Watershed Plan and Environmental Assessment (Plan-EA) for the Lower Gunnison Watershed Project. This project supplements the initial Lower Gunnison Project Plan completed by NRCS and the Sponsor in 2018. This project is intended to increase irrigation water conveyance efficiency and reduce the contribution of salts and selenium to the Lower Gunnison River, and subsequently to the Colorado River. These project objectives will be accomplished by piping about 13,000 feet of the Fire Mountain Canal, building a regulating reservoir, and installing Supervisory Control and Data Acquisition (SCADA) systems in the North Fork subwatershed. SCADA components will also be installed in the Crawford Subwatershed. The project installation cost is estimated to be $13,227,000, with $10,158,200 of that cost coming from Federal funds.

NRCS proposes to partially fund this project through the Watershed Protection and Flood Prevention Act (Public Law [PL] 83-566). As the Lead Federal Agency NRCS must ensure the draft Plan-EA complies with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality's regulations at 40 CFR Parts 1500-1508, which require evaluation and disclosure of potential impacts associated with the proposed actions.

The project is currently in the Draft Plan-EA review phase. The comment period opens on May 24, 2024 and closes on June 24, 2024. An in-person and virtual public meeting to present and discuss the alternatives analyzed and potential impacts to the environment will be held at 5pm to 7pm on June 11, 2024 at Maloney House, Delta County Fairgrounds, 403 S. 4th Street, Hotchkiss, CO 81419.

I have enclosed the meeting notice which describes where you can obtain a copy of the draft Plan-EA, how to submit comments, and instructions for participating in the meeting remotely. If you have any questions regarding the draft Plan-EA review process, please contact Blongshia Lindsay, NRCS Watershed Specialist, by calling 719-600-4710 or emailing Blongshia.Cha@usda.gov .

Todd Boldt
Assistant State Conservationist
Enclosures

Supplemental Lower Gunnison Watershed Project Meeting Notice

cc: Raquel Flinker, Project Manager, Colorado River District, Glenwood Springs, CO

Clint Evans, State Conservationist – Water Resources, USDA NRCS, Fort Collins, CO
Eugene Backhaus, State Resource Conservationist, USDA NRCS, Denver, CO
Tee Jay Burr, P.E., Acting State Conservation Engineer, USDA NRCS, Denver, CO

United State Department of Agriculture

May 24, 2024

Jennifer Ward, Environmental Protection Specialist
Bureau of Reclamation, Western Colorado Area Office
445 W. Gunnison Ave., Suite 221
Grand Junction, CO 81502
jward@usbr.gov

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Todd Boldt
Assistant State Conservationist
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Supplemental Lower Gunnison Watershed Project Meeting Notice

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Eugene Backhaus, State Resource Conservationist, USDA NRCS, Denver, CO
Tee Jay Burr, P.E., Acting State Conservation Engineer, USDA NRCS, Denver, CO

United State Department of Agriculture

May 24, 2024

Jill Hunsaker Ryan, Executive Director, CDPHE
4300 Cherry Creek Drive South
Denver, CO 80246
jill.ryan@state.co.us

RE: Agency and Public Review of Draft Watershed Plan and Environmental Assessment
Supplemental Lower Gunnison Watershed Project, Delta County, Colorado.

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United State Department of Agriculture

May 24, 2024

Travis Black, Northwest Region Manager
Colorado Parks and Wildlife
711 Independent Ave.
Grand Junction, CO 81505
Travis.black@state.co.us

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United State Department of Agriculture

May 24, 2024

Hank LeValley, President
Crawford Water Conservancy District
183 CO-92
Crawford, CO 81415
Shana.harness1920@outlook.com, crawfordwaterconservancy@gmail.com

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Todd Boldt
Assistant State Conservationist
Enclosures

Supplemental Lower Gunnison Watershed Project Meeting Notice

cc: Raquel Flinker, Project Manager, Colorado River District, Glenwood Springs, CO

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Eugene Backhaus, State Resource Conservationist, USDA NRCS, Denver, CO
Tee Jay Burr, P.E., Acting State Conservation Engineer, USDA NRCS, Denver, CO

United State Department of Agriculture

May 24, 2024

Steve Fletcher, Superintendent
Fire Mountain Canal and Reservoir Company
P.O. Box 543
Hotchkiss, CO 81419
SFletcher@montrose.net

RE: Agency and Public Review of Draft Watershed Plan and Environmental Assessment Supplemental Lower Gunnison Watershed Project, Delta County, Colorado.

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United State Department of Agriculture

May 24, 2024

Dawn DiPrince, SHPO
History Colorado
1200 Broadway
Denver, CO 80203
oahp@state.co.us; dawn.diprince@state.co.us

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United State Department of Agriculture

May 24, 2024

Christine Sage, Chairperson
Southern Ute Indian Tribe
P.O. Box 737
Ignacio, CO 81137
csage@southernute-nsn.gov

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United State Department of Agriculture

May 24, 2024

Brad Crosson, Chief, Northwest Colorado Branch
Ben Wilson, Senior Project Manager, Northwest Colorado Branch
U.S. Army Corps of Engineers
400 Rood Avenue, Rm 224
Grand Junction, CO 81501
SPA-RD-CO@usace.army.mil

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May 24, 2024

Niccole Mortenson, Engineering and Minerals NEPA Specialist
Grand Mesa, Uncompahgre and Gunnison National Forests
2250 S. Main Street
Delta, CO 81416
niccole.mortenson@usda.gov

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May 24, 2024

Nathan Darnall, Western Colorado Supervisor
U.S. Fish and Wildlife Service
445 West Gunnison Ave., Suite 240
Grand Junction, CO 81501
GrandJunctionES@fws.gov

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United State Department of Agriculture

May 24, 2024

Terry Knight, THPO
Ute Mountain Ute Tribe
P.O. Box 468
Towaoc, CO 81334
tknight@utemountain.org

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May 24, 2024

Luke Duncan, Chairperson
Ute Indian Tribe of the Uintah & Ouray Reservation, Utah
P.O. Box 190
Fort Duchesne, UT 84026
luked@utetribe.com

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United State Department of Agriculture

May 24, 2024

Jared Polis, Governor
Office of the Governor, State Capitol Building
200 E. Colfax Ave, Rm 136
Denver, CO 80203
Governorpolis@state.co.us

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Todd Boldt
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Tee Jay Burr, P.E., Acting State Conservation Engineer, USDA NRCS, Denver, CO

Aleta Powers

Sent:
To:
Subject:

Attachments:

Good morning!

I am so sorry, I forgot to send this to you on Monday. I have attached our comments on the Draft EA. Please let me know if you would like to get together to discuss anything.

Thank you,
Jenny

From: Aleta Powers <apowers@eroresources.com>
Sent: Friday, May 24, 2024 12:44 PM
To: Ward, Jennifer K <jward@usbr.gov>
Subject: [EXTERNAL] Lower Gunnison Supplemental Watershed Plan-EA Notice of Availability and Public Meeting

-

.Dear Jenny,
On behalf of the NRCS and Colorado River District, I am providing correspondence regarding the Lower Gunnison Supplemental Watershed Plan-EA Notice of Availability and Public Meeting.
Please let me know if you have any questions.
Sincerely,
Aleta

Aleta Powers
Natural Resource Specialist/President, ERO Resources Corporation

303.830.1188 303.868.6361
www.eroresources.com
apowers@eroresources.com
715 Horizon Drive, Unit 301, Grand Junction, CO 81506

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REGION 8
DENVER, CO 80202

6/24/2024

Ref: 8EJC-NE

Blongshia Cha
U.S. Department of Agriculture
Natural Resources Conservation Service
Colorado State Office
Denver Federal Center Building 56, Room 2604
P.O. Box 25486 DFC
Denver, Colorado 80225
Transmitted by email to blongshia.cha@usda.gov

Dear Blongshia Cha,

The U.S. Environmental Protection Agency Region 8 has reviewed the NRCS's Draft Supplemental Watershed Plan and Environmental Assessment (EA) for the Lower Gunnison Project. In accordance with our responsibilities under Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act (NEPA), we are providing comments. The CAA Section 309 role is unique to EPA. It requires EPA to review and comment on the environmental impact of any proposed federal action subject to NEPA's environmental impact statement requirements and to make its comments public.

The NRCS is proposing to implement the Lower Gunnison Project (Project) to improve agricultural water management in the Lower Gunnison River watershed. The Project proposes to increase water efficiencies by converting approximately 13,800 feet of open ditch water delivery to pressurized pipe, installing automated regulation structures, converting flood irrigation to sprinkler irrigation, and constructing a 44-60 acre-feet regulating reservoir to achieve piping pressurization. The EA asserts that the Project will improve water quality by reducing salts and selenium infiltration in the watershed. The EPA offers the following recommendations for consideration in the Final Supplemental EA.

We recognize and appreciate the effort that has gone into configuring the build alternatives to avoid and minimize impacts to wetlands and riparian areas. According to the Supplemental Draft EA, under the preferred alternative (Alternative 3), it is anticipated that impacts to approximately 4.7 acres of swale wetlands are unavoidable (Section 5.5.2.1). Executive Order 11990 directs that proposed actions shall include all practicable measures to minimize harm to wetlands if impacts cannot be avoided. The EPA interprets such practicable measures to include compensatory mitigation; therefore, we recommend offsetting the unavoidable impacts to non-jurisdictional wetlands from the build alternative with compensatory mitigation. We encourage the compensatory mitigation to be

completed consistent with the EPA and U.S. Army Corps of Engineer's (Corps) 2008 Mitigation Rule (33 CFR § 332.4 and 40 CFR § 230.94, Compensatory Mitigation for Losses of Aquatic Resources).

The March 3, 2021, letter written by the Corps Sacramento District (page 171) states: "it appears the proposed action would not require a permit under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act." However, EPA recommends that a new jurisdictional determination be filed as waters of the U.S. regulations have changed since 2021.

Page 84 of the Supplemental Draft EA states: "Outside of the reservoir footprint, portions of the disturbed area would be reseeded with hay or pasture seed mixes." The EPA recommends that a native plant seed mix is used to create and/or replace disturbed habitat. We further recommend that the seed be validated to not contain non-native or invasive species.

The Supplemental Draft EA cites Regional General Permit 5 in the document, but the citation is not included in the references section. EPA recommends that the Final EA references and follows, where applicable, the conditions under RGP-5, which can be found here: https://www.spa.usace.army.mil/Portals/16/docs/civilworks/regulatory/publicnotices/Colorado/2021.07.27-RGP%205%20clean-202100064%20signed.pdf?ver=Nvh3gjYmeZwFH7Vf3IoNsA%3D%3D.

Page 41, paragraph 3 cites The Navigable Waters Protection Rule of 2020 (USEPA 2020). We recommend deleting this reference as the rule is vacated.

The Supplemental Draft EA states that the implementation of this project would result in "water savings" (page 5-5, e.g.). We recommend that the Supplemental Final EA clarify if the water saved would stay in the river or be returned to it, or if the saved water would be used for additional irrigation. If the latter is the case, we recommend changing the wording to "water use efficiency," and further identifying what measures, if any, would be taken to reduce water use and increase water quantity in the river.[1] If water savings would be utilized to increase irrigation capacity, we recommend evaluating the effects of the project on return flows and subsequently instream flows. The analysis should evaluate the impacts of any reduction in flows on the downstream aquatic environment.

Page 86, Section 5.2.2.1, paragraph 3 states: "Seepage loss rates for the FMC have been calculated at 0.95 ft^3/sec per mile of piped canal. For the purposes of this Supplemental Plan-EA, the seepage losses are considered zero after the canals or ditches have been piped." It is unclear if the Supplemental Draft EA is considering that there will be zero seepage losses in the piped canal even though there is a calculated 0.95 ft^3/sec per mile that can be used in the analysis, or if the document intended to identify that the seepage loss rate of 0.95 ft^3/sec per mile is for unpiped canal. We recommend clarifying or correcting this section, and if 0.95 ft^3/sec per mile is the seepage rate for the piped canal, updating the analysis to reflect this.

[1] Page 2-1 states, "Related to conservation and ecological protection, objectives include: (1) improve habitat conditions in downstream waters to benefit aquatic and riparian species by improving water quality; and (2) improve habitat conditions with water efficiency, thereby providing opportunities for increasing water quantity."

We appreciate the opportunity to review this Draft EA. These comments are intended to facilitate compliance with NEPA and assist in the decision-making process. If we may provide further explanation of our comments, please contact me at (303) 312-6155, or Matt Hubner of my staff at (303) 312-6500 or hubner.matt@epa.gov.

Sincerely,

Melissa W. McCoy, Ph.D., J.D.
Manager, NEPA Branch
Environmental Justice, Community Health, and
Environmental Review Division

Aleta Powers

Sent:
To:
Subject: -

Thanks, Aleta.

Here is our comment.

Thank you for providing the opportunity for the U.S. Army Corps of Engineers to comment on the proposed subject project or activity relative to potential impacts to aquatic resources. We have assigned this comment request to SPA-2024-173. Based on the available information, it appears that the project would require a Corps permit and that Colorado Regional General Permit #5 is likely applicable. Even though the project appears to qualify RGP 5, please fully consider any alternatives that would avoid and minimize impacts to wetlands, streams, or other waters of the United States. Please also ensure that the project is compliant with all General and Regional Conditions.

Respectfully,

Benjamin Wilson,
Senior Project Manager, NW Colorado Branch
Albuquerque District, U.S. Army Corps of Engineers
Grand Junction, Colorado 81501
Cell: (970) 893-1021
Benjamin.R.Wilson@usace.army.mil

RRS beta REGULATORY REQUEST SYSTEM
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rrs.usace.army.mil

From: SPA-RD-CO <SPA-RD-CO@usace.army.mil>
Sent: Tuesday, May 28, 2024 10:35 AM
To: Wilson, Benjamin R CIV USARMY CESPA (USA) <Benjamin.R.Wilson@usace.army.mil>
Subject: FW: Lower Gunnison Supplemental Watershed Plan-EA Notice of Availability and Public Meeting

From: Aleta Powers <apowers@eroresources.com>
Sent: Tuesday, May 28, 2024 8:04 AM

To: SPA-RD-CO <SPA-RD-CO@usace.army.mil>
Cc: Crosson, Steven B (Brad) CIV USARMY CESPA (USA) <Steven.B.Crosson@usace.army.mil>
Subject: [Non-DoD Source] RE: Lower Gunnison Supplemental Watershed Plan-EA Notice of Availability and Public Meeting

We are anticipating RGP 5 will apply, with NRCS water quality/watershed benefits providing any needed mitigation. Thank you Ben!

Aleta Powers
Natural Resource Specialist/President, ERO Resources Corporation

☐ 303.830.1188 ☐ 303.868.6361
☐ www.eroresources.com
☐ apowers@eroresources.com

From: SPA-RD-CO <SPA-RD-CO@usace.army.mil>
Sent: Tuesday, May 28, 2024 7:40 AM
To: Aleta Powers <apowers@eroresources.com>
Cc: Crosson, Steven B (Brad) CIV USARMY CESPA (USA) <Steven.B.Crosson@usace.army.mil>
Subject: RE: Lower Gunnison Supplemental Watershed Plan-EA Notice of Availability and Public Meeting

Hi Aleta,

Do you anticipate the need for an individual permit and/or an AJD for this project?

Respectfully,

Benjamin Wilson,
Senior Project Manager, NW Colorado Branch
Albuquerque District, U.S. Army Corps of Engineers
Grand Junction, Colorado 81501
Cell: (970) 893-1021
Benjamin.R.Wilson@usace.army.mil

RRS beta REGULATORY REQUEST SYSTEM
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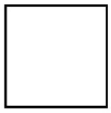
rrs.usace.army.mil

From: Aleta Powers <apowers@eroresources.com>
Sent: Friday, May 24, 2024 12:40 PM
To: SPA-RD-CO <SPA-RD-CO@usace.army.mil>; Wilson, Benjamin R CIV USARMY CESPA (USA)

<Benjamin.R.Wilson@usace.army.mil>
Subject: [Non-DoD Source] Lower Gunnison Supplemental Watershed Plan-EA Notice of Availability and Public Meeting

Dear Brad and Ben,
On behalf of the NRCS and Colorado River District, I am providing correspondence regarding the Lower Gunnison Supplemental Watershed Plan-EA Notice of Availability and Public Meeting.
Please let me know if you have any questions.
Sincerely,
Aleta



Aleta Powers
Natural Resource Specialist/President, ERO Resources Corporation

303.830.1188 303.868.6361
www.eroresources.com
apowers@eroresources.com
715 Horizon Drive, Unit 301, Grand Junction, CO 81506

USDA
United State Department of Agriculture

October 11, 2024

Jennifer Ward, Environmental Protection Specialist
Bureau of Reclamation, Western Colorado Area Office
445 W. Gunnison Ave., Suite 221
Grand Junction, CO 81502
jward@usbr.gov

RE: Agency Comments on Draft Watershed Plan and Environmental Assessment
Supplemental Lower Gunnison Watershed Project, Delta County, Colorado.

The United States Department of Agriculture Natural Resources Conservation Service (NRCS) and the project sponsor, the Colorado River District, appreciate the Bureau of Reclamation's review and comment on the Draft Supplemental Watershed Plan and Environmental Assessment (Plan-EA) for the Lower Gunnison Watershed Project. See attached table with responses to comments.

If you have any questions regarding the response to comments, please contact Blongshia Lindsay, NRCS Watershed Specialist, by calling 719-600-4710 or emailing Blongshia.Lindsay@usda.gov. For review of the Final Watershed Plan-EA, please visit this website: https://www.nrcs.usda.gov/conservation-basics/conservation-by-state/colorado/supplemental-lower-gunnison-watershed-project).

Todd Boldt
Assistant State Conservationist- Water Resources

Enclosures
Comment-Response Matrix

cc: Raquel Flinker, Project Manager, Colorado River District, Glenwood Springs, CO
Clint Evans, State Conservationist, USDA NRCS, Denver, CO
Eugene Backhaus, State Resource Conservationist, USDA NRCS, Denver, CO
Rex Stambaugh, P.E., Acting State Conservation Engineer, USDA NRCS, Denver, CO

United State Department of Agriculture

October 11, 2024

Ben Wilson, Senior Project Manager, Northwest Colorado Branch
U.S. Army Corps of Engineers
400 Rood Avenue, Rm 224
Grand Junction, CO 81501
SPA-RD-CO@usace.army.mil

RE: Agency Comments on Draft Watershed Plan and Environmental Assessment
Supplemental Lower Gunnison Watershed Project, Delta County, Colorado.

The United States Department of Agriculture Natural Resources Conservation Service (NRCS) and the project sponsor, the Colorado River District, appreciate the U.S. Army Corps of Engineer's review and comment on the Draft Supplemental Watershed Plan and Environmental Assessment (Plan-EA) for the Lower Gunnison Watershed Project.

Regarding your comment from May 28, 2024, pasted below:

> "Thank you for providing the opportunity for the U.S. Army Corps of Engineers to comment on the proposed subject project or activity relative to potential impacts to aquatic resources. We have assigned this comment request to SPA2024-173. Based on the available information, it appears that the project would require a Corps permit and that Colorado Regional General Permit #5 is likely applicable. Even though the project appears to qualify RGP 5, please fully consider any alternatives that would avoid and minimize impacts to wetlands, streams, or other waters of the United States. Please also ensure that the project is compliant with all General and Regional Conditions."

Thank you for your comment, NRCS concurs. Potential impacts to wetlands and riparian areas are discussed in Section 5.5 of the Supplemental Plan-EA. Selection of the preferred alternative in combination with implementing the BMPs in Table 7-4 will avoid or minimize impacts to wetlands, streams, and other WOTUS. In the OMB Factsheet (page "x") we have noted that permitting from the Corps may be required during the implementation phase and permitting costs have been anticipated in the project budget.

If you have any questions regarding the response to comments, please contact Blongshia Lindsay, NRCS Watershed Specialist, by calling 719-600-4710 or emailing Blongshia.Lindsay@usda.gov. For review of the Final Watershed Plan-EA, please visit this website: https://www.nrcs.usda.gov/conservation-basics/conservation-by-state/colorado/supplemental-lower-gunnison-watershed-project).

Todd Boldt
Assistant State Conservationist- Water Resources

cc: Raquel Flinker, Project Manager, Colorado River District, Glenwood Springs, CO
Clint Evans, State Conservationist, USDA NRCS, Denver, CO
Eugene Backhaus, State Resource Conservationist, USDA NRCS, Denver, CO
Rex Stambaugh, P.E., Acting State Conservation Engineer, USDA NRCS, Denver, CO

USDA
United State Department of Agriculture

October 11, 2024

Melissa McCoy, Manager, NEPA Branch
U.S. Environmental Protection Agency
Region 8
1595 Wynkoop Street
Denver, CO 80202

RE: Agency Comments on Draft Watershed Plan and Environmental Assessment
Supplemental Lower Gunnison Watershed Project, Delta County, Colorado.

The United States Department of Agriculture Natural Resources Conservation Service (NRCS) and the project sponsor, the Colorado River District, appreciate the U.S. Environmental Protection Agency's review and comment on the Draft Supplemental Watershed Plan and Environmental Assessment (Plan-EA) for the Lower Gunnison Watershed Project. See attached table with responses to comments.

If you have any questions regarding the response to comments, please contact Blongshia Lindsay, NRCS Watershed Specialist, by calling 719-600-4710 or emailing Blongshia.Lindsay@usda.gov. For review of the Final Watershed Plan-EA, please visit this website: https://www.nrcs.usda.gov/conservation-basics/conservation-by-state/colorado/supplemental-lower-gunnison-watershed-project).

Todd Boldt
Assistant State Conservationist- Water Resources

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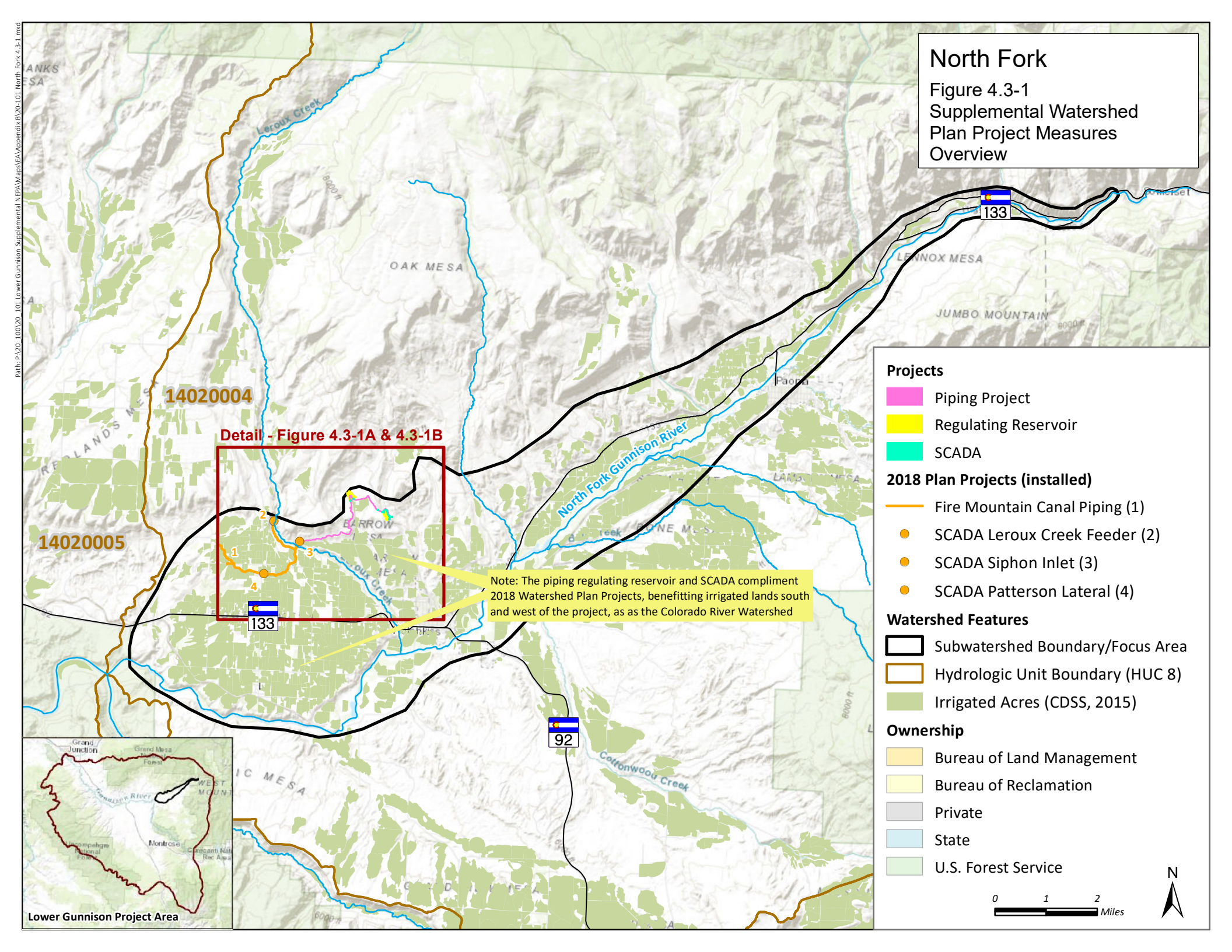
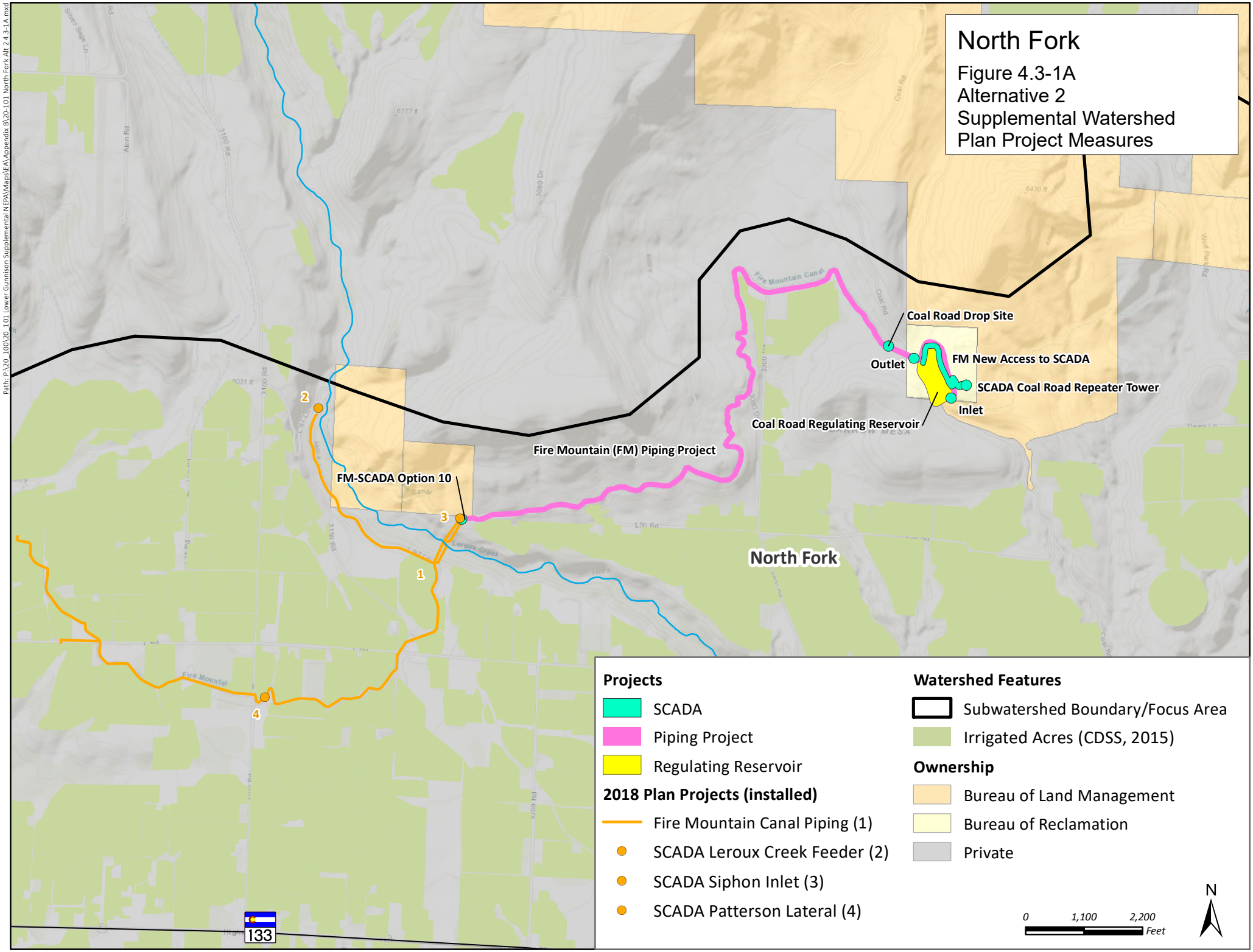
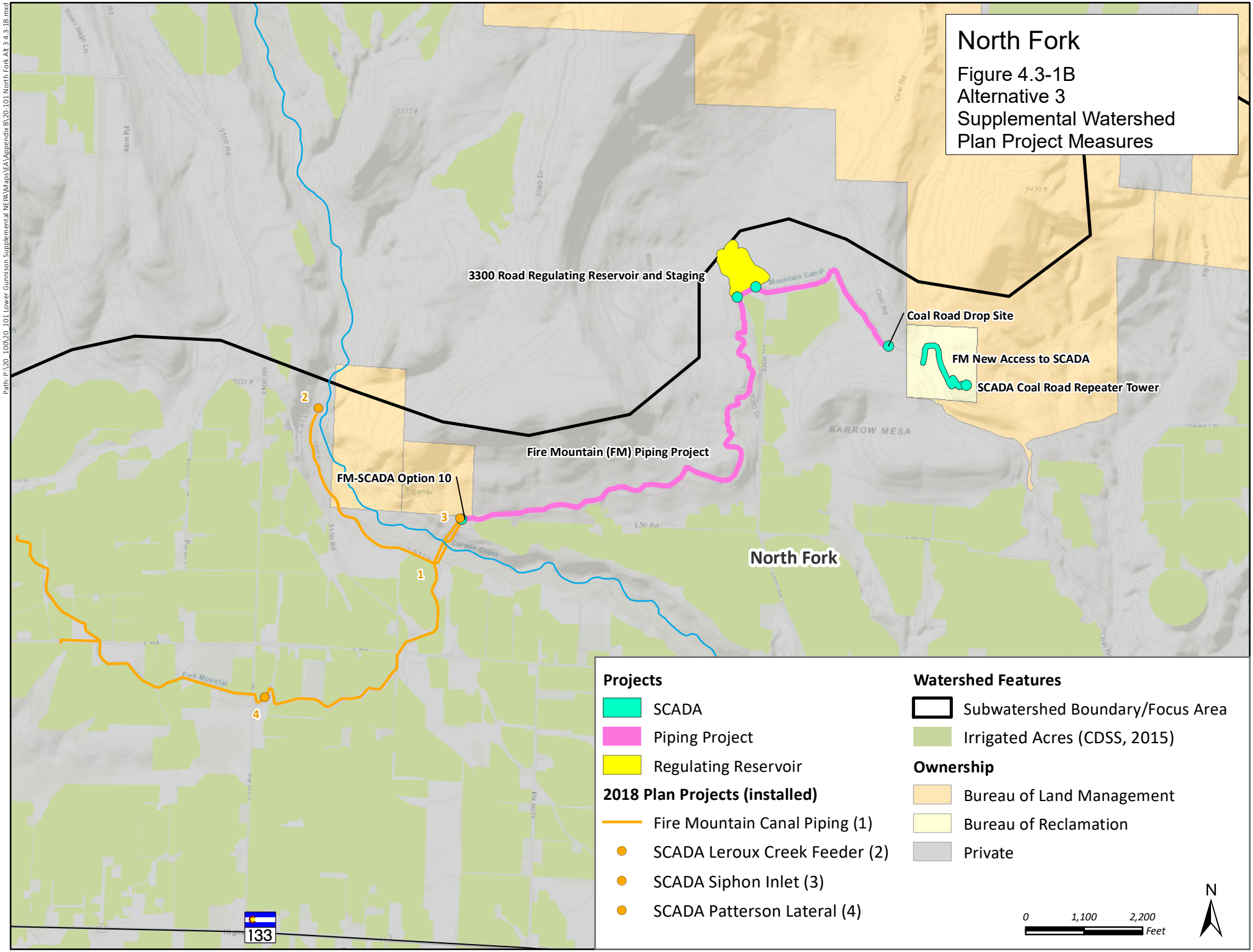
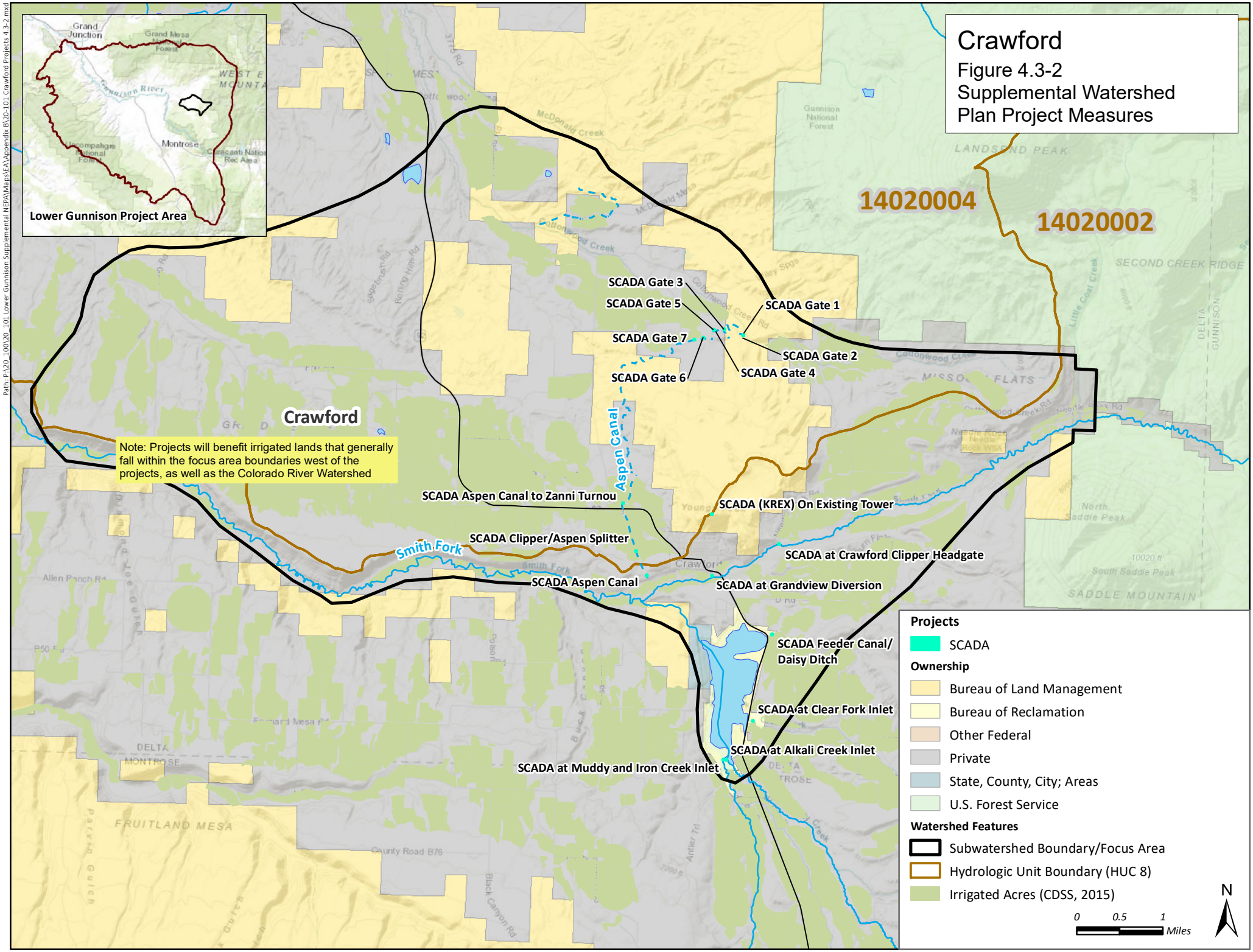
cc: Raquel Flinker, Project Manager, Colorado River District, Glenwood Springs, CO
Clint Evans, State Conservationist, USDA NRCS, Denver, CO
Eugene Backhaus, State Resource Conservationist, USDA NRCS, Denver, CO
Rex Stambaugh, P.E., Acting State Conservation Engineer, USDA NRCS, Denver, CO

Appendix B
Watershed Project Map(s)


North Fork
Figure 4.3-1
Supplemental Watershed Plan Project Measures Overview
Projects
Piping Project
Regulating Reservoir
SCADA
2018 Plan Projects (installed)
Fire Mountain Canal Piping (1)
SCADA Leroux Creek Feeder (2)
SCADA Siphon Inlet (3)
SCADA Patterson Lateral (4)
Watershed Features
Subwatershed Boundary/Focus Area
Hydrologic Unit Boundary (HUC 8)
Irrigated Acres (CDSS, 2015)
Ownership
Bureau of Land Management
Bureau of Reclamation
Private
State
U.S. Forest Service
Detail - Figure 4.3-1A & 4.3-1B
14020004
14020005
Note: The piping regulating reservoir and SCADA compliment 2018 Watershed Plan Projects, benefitting irrigated lands south and west of the project, as as the Colorado River Watershed
Lower Gunnison Project Area
OAK MESA
JUMBO MOUNTAIN
LEROUX CREEK
North Fork Gunnison River
Cottonwood Creek
133
92
0 1 2 Miles
N


North Fork
Figure 4.3-1A
Alternative 2
Supplemental Watershed
Plan Project Measures
Coal Road Drop Site
Outlet
FM New Access to SCADA
SCADA Coal Road Repeater Tower
Inlet
Coal Road Regulating Reservoir
Fire Mountain (FM) Piping Project
FM-SCADA Option 10
North Fork
Projects
SCADA
Piping Project
Regulating Reservoir
2018 Plan Projects (installed)
Fire Mountain Canal Piping (1)
SCADA Leroux Creek Feeder (2)
SCADA Siphon Inlet (3)
SCADA Patterson Lateral (4)
Watershed Features
Subwatershed Boundary/Focus Area
Irrigated Acres (CDSS, 2015)
Ownership
Bureau of Land Management
Bureau of Reclamation
Private
0
1,100
2,200
Feet
N
133


North Fork
Figure 4.3-1B
Alternative 3
Supplemental Watershed
Plan Project Measures
3300 Road Regulating Reservoir and Staging
Coal Road Drop Site
FM New Access to SCADA
SCADA Coal Road Repeater Tower
Fire Mountain (FM) Piping Project
FM-SCADA Option 10
BARROW MESA
North Fork
Projects
SCADA
Piping Project
Regulating Reservoir
2018 Plan Projects (installed)
Fire Mountain Canal Piping (1)
SCADA Leroux Creek Feeder (2)
SCADA Siphon Inlet (3)
SCADA Patterson Lateral (4)
Watershed Features
Subwatershed Boundary/Focus Area
Irrigated Acres (CDSS, 2015)
Ownership
Bureau of Land Management
Bureau of Reclamation
Private
0
1,100
2,200
Feet
N
133



Temporary access/staging is not included on this figure.

Appendix C

Support Maps

(currently effective flood insurance rate maps, floodplain maps developed for planning (minimally 100-yr & 500-yr for urban flooding), breach inundation maps, wetland impacts, etc.)

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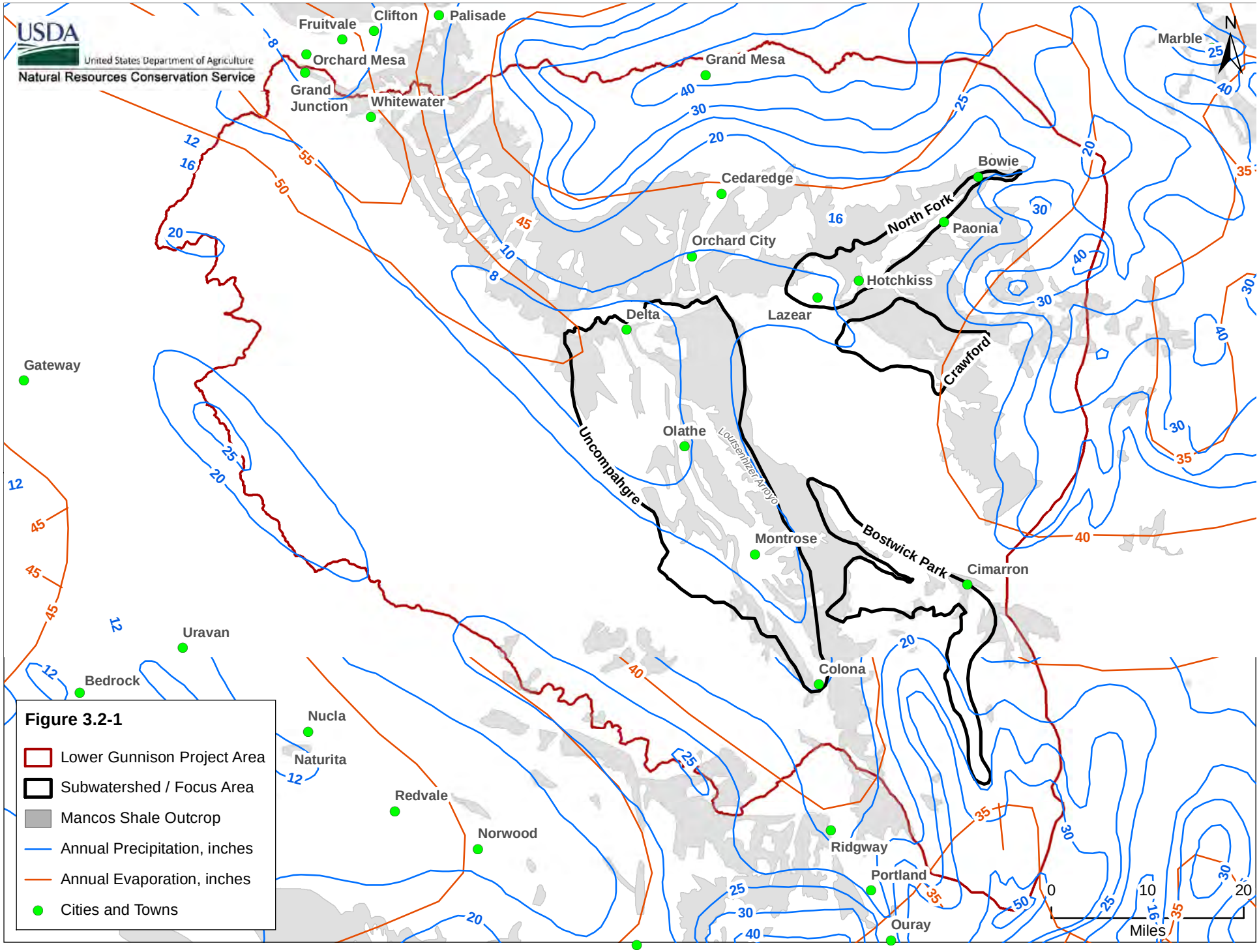


Figure 3.2-1. Annual Precipitation and Evaporation.

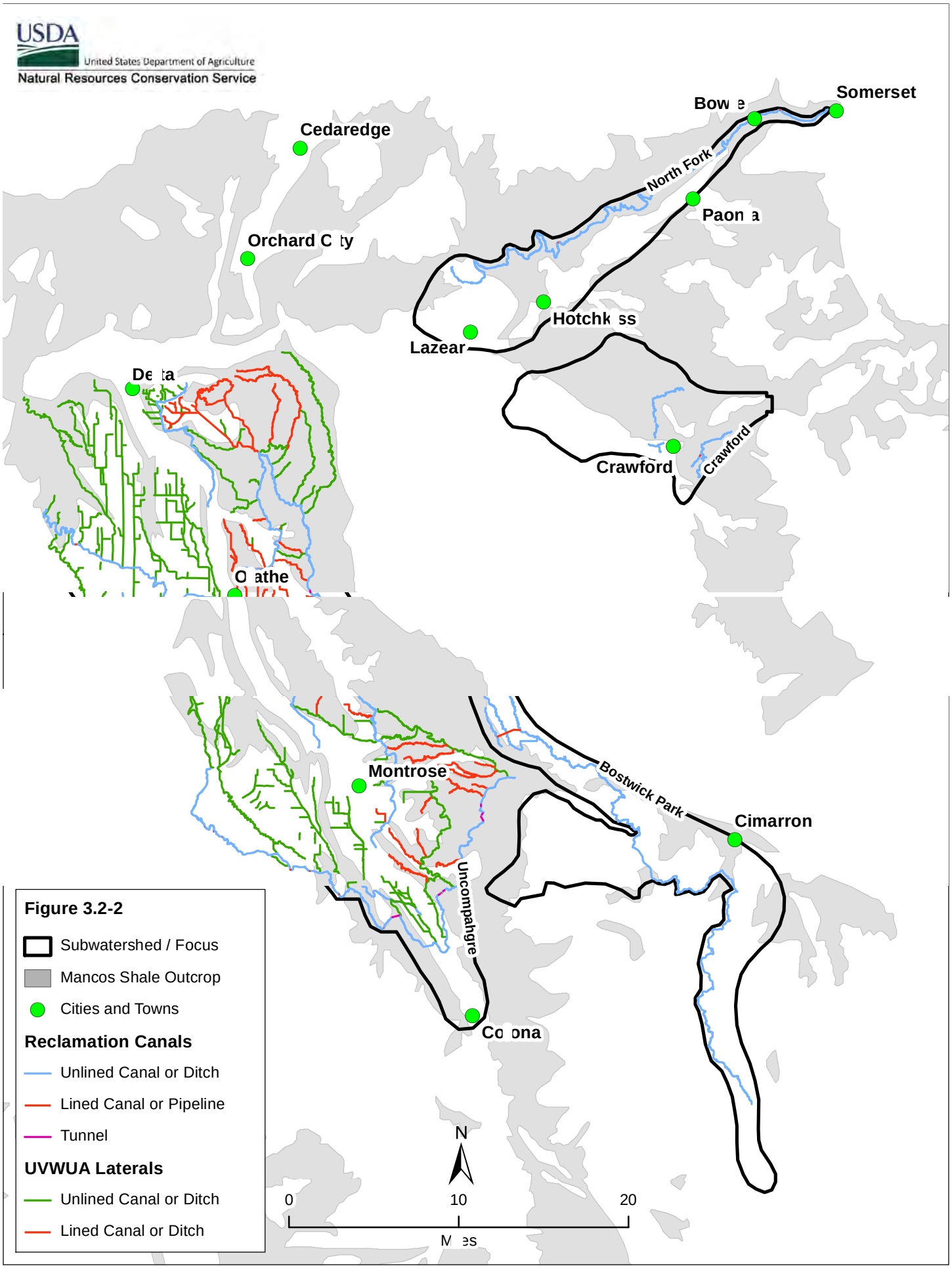


Figure 3.2-2. Canal Piping and Lining Projects in the Greater Lower Gunnison project area.

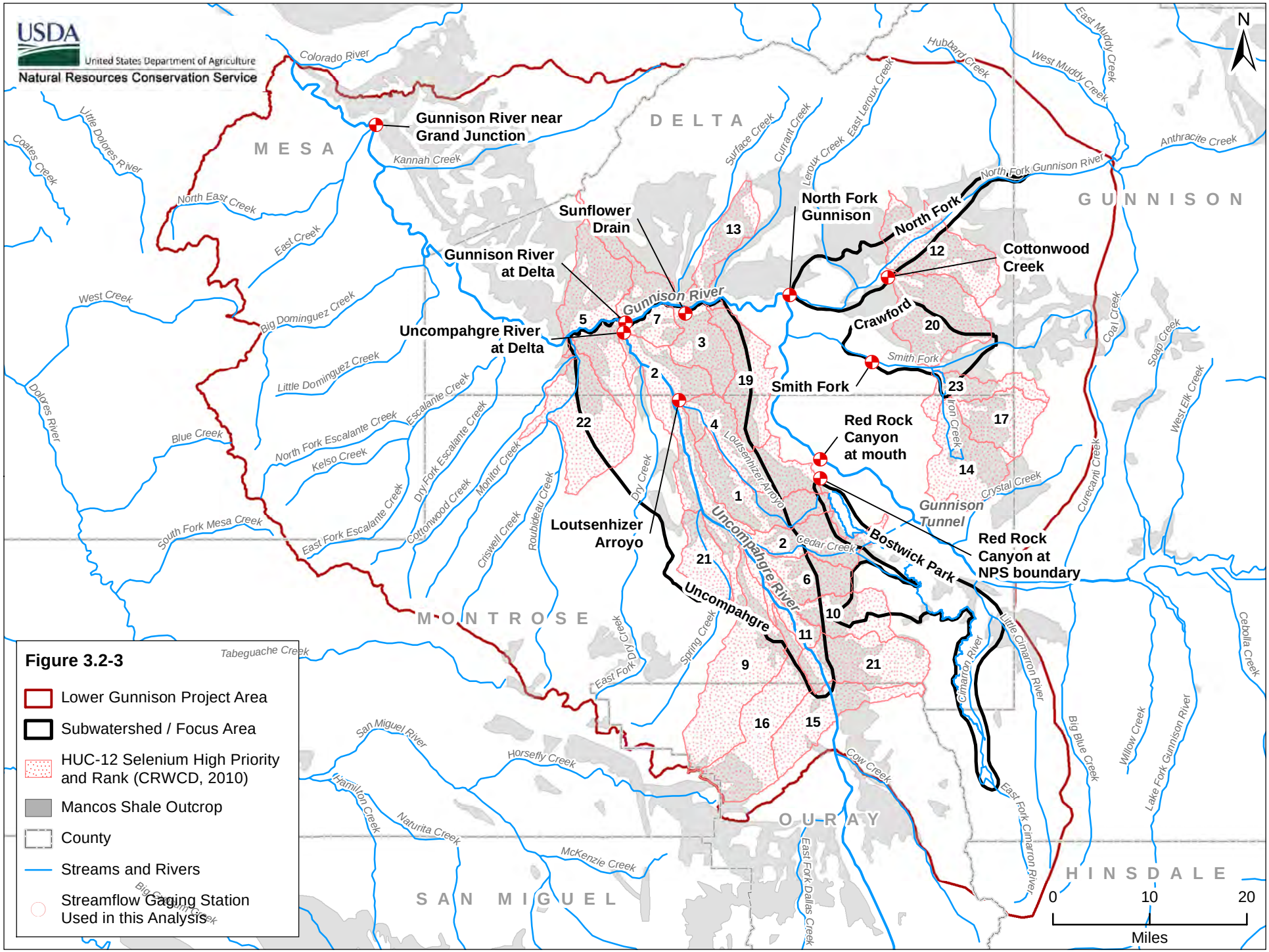


Figure 3.2-3. High-Priority Selenium HUC -12 Subwatersheds.

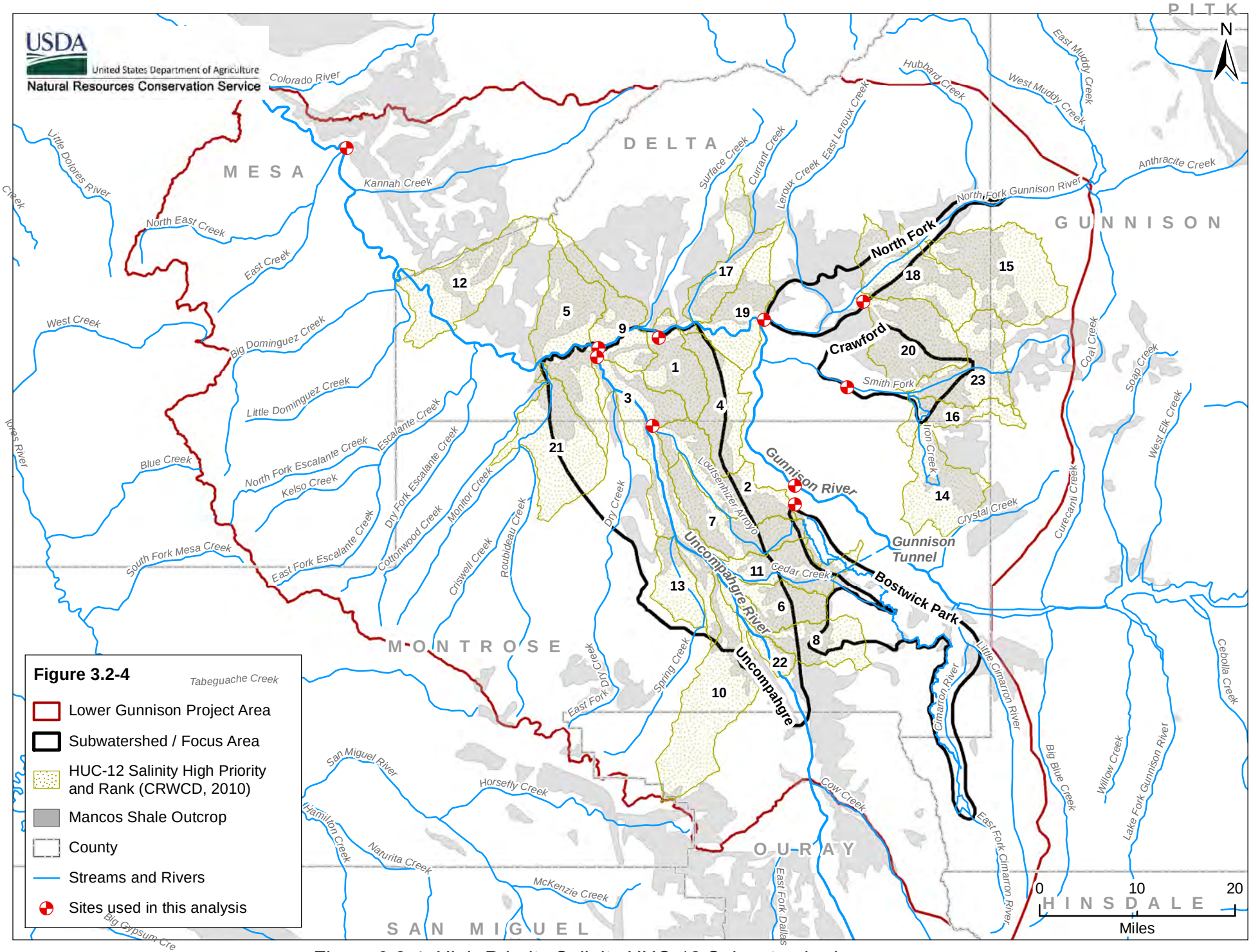


Figure 3.2-4. High-Priority Salinity HUC-12 Subwatersheds.

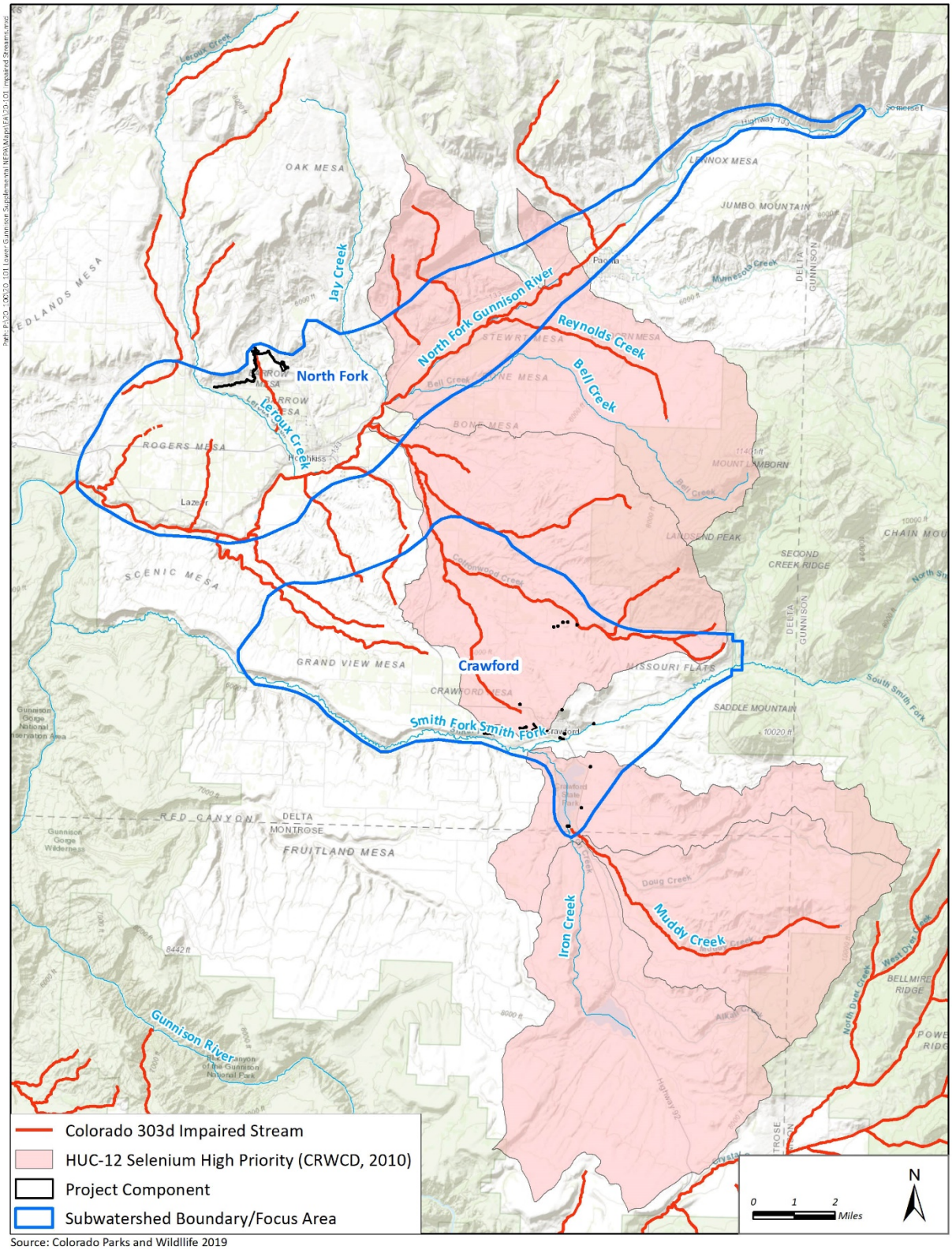


Figure 3.2-5 Colorado 303d Impaired Waters- Lower Gunnison Supplemental Watershed Plan-EA.

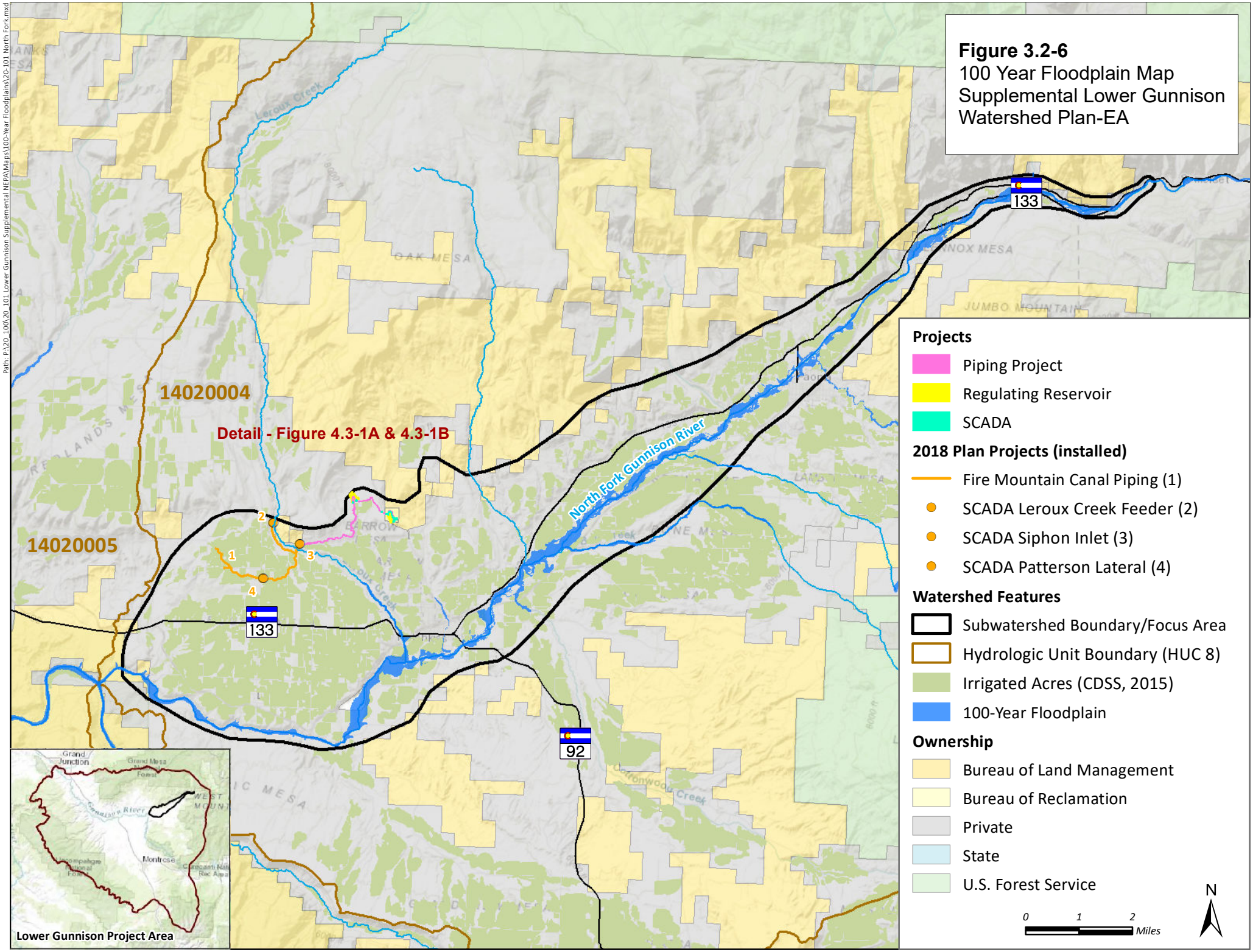
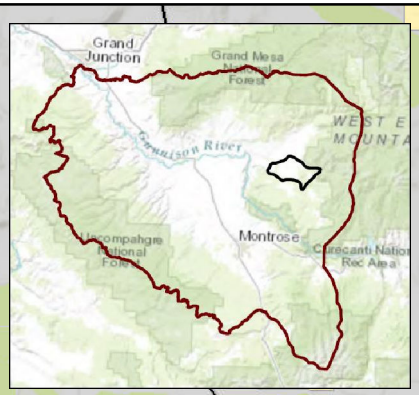


Figure 3.2-6
100 Year Floodplain Map
Supplemental Lower Gunnison
Watershed Plan-EA
14020004
14020005
Detail - Figure 4.3-1A & 4.3-1B
North Fork Gunnison River
133
92
Projects
Piping Project
Regulating Reservoir
SCADA
2018 Plan Projects (installed)
Fire Mountain Canal Piping (1)
SCADA Leroux Creek Feeder (2)
SCADA Siphon Inlet (3)
SCADA Patterson Lateral (4)
Watershed Features
Subwatershed Boundary/Focus Area
Hydrologic Unit Boundary (HUC 8)
Irrigated Acres (CDSS, 2015)
100-Year Floodplain
Ownership
Bureau of Land Management
Bureau of Reclamation
Private
State
U.S. Forest Service
0 1 2 Miles
N
Lower Gunnison Project Area

14020002

Figure 3.2-7 Crawford
100 Year Floodplain Map
Supplemental Lower Gunnison
Watershed Plan-EA



SCADA Gate 3
SCADA Gate 5
SCADA Gate 7
SCADA Gate 6
SCADA Gate 1
SCADA Gate 2
SCADA Gate 4
Aspen Canal
Crawford
SCADA Aspen Canal to Zanni Turnou
SCADA (KREX) On Existing Tower
SCADA Clipper/Aspen Splitter
SCADA at Crawford Clipper Headgate
Smith Fork
SCADA Aspen Canal
SCADA at Grandview Diversion
SCADA Feeder Canal/Daisy Ditch
SCADA at Clear Fork Inlet
SCADA at Alkali Creek Inlet
SCADA at Muddy and Iron Creek Inlet
Cottonwood Creek
Needle Rock WSA
North Saddle Peak
South Saddle Peak
10020 ft
SADDLE MOUNTAIN
County Road B76

Projects
- SCADA

Ownership
- Bureau of Land Management
- Bureau of Reclamation
- Private
- U.S. Forest Service

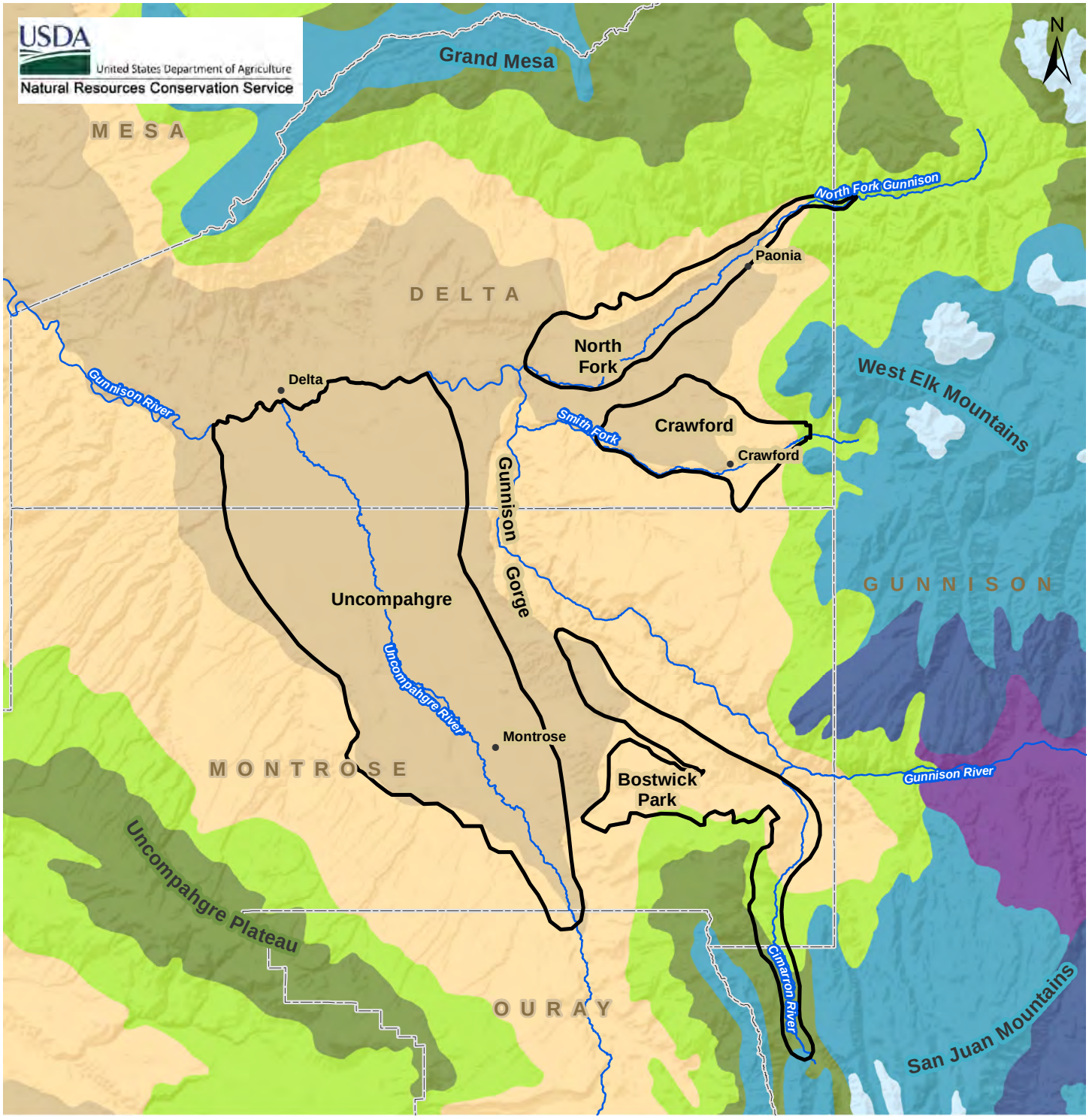
Watershed Features
- Subwatershed Boundary/Focus Area
- Hydrologic Unit Boundary (HUC 8)
- Irrigated Acres (CDSS, 2015)
- 100-Year Floodplain

N

0 0.5 1 Miles

Path: P:\20_100\20_101 Lower Gunnison Supplemental NEPA\Maps\100-Year Floodplains\20-101 Crawford Projects.mxd

Temporary access/staging is not included on this figure.



Ecoregions of the Project Area

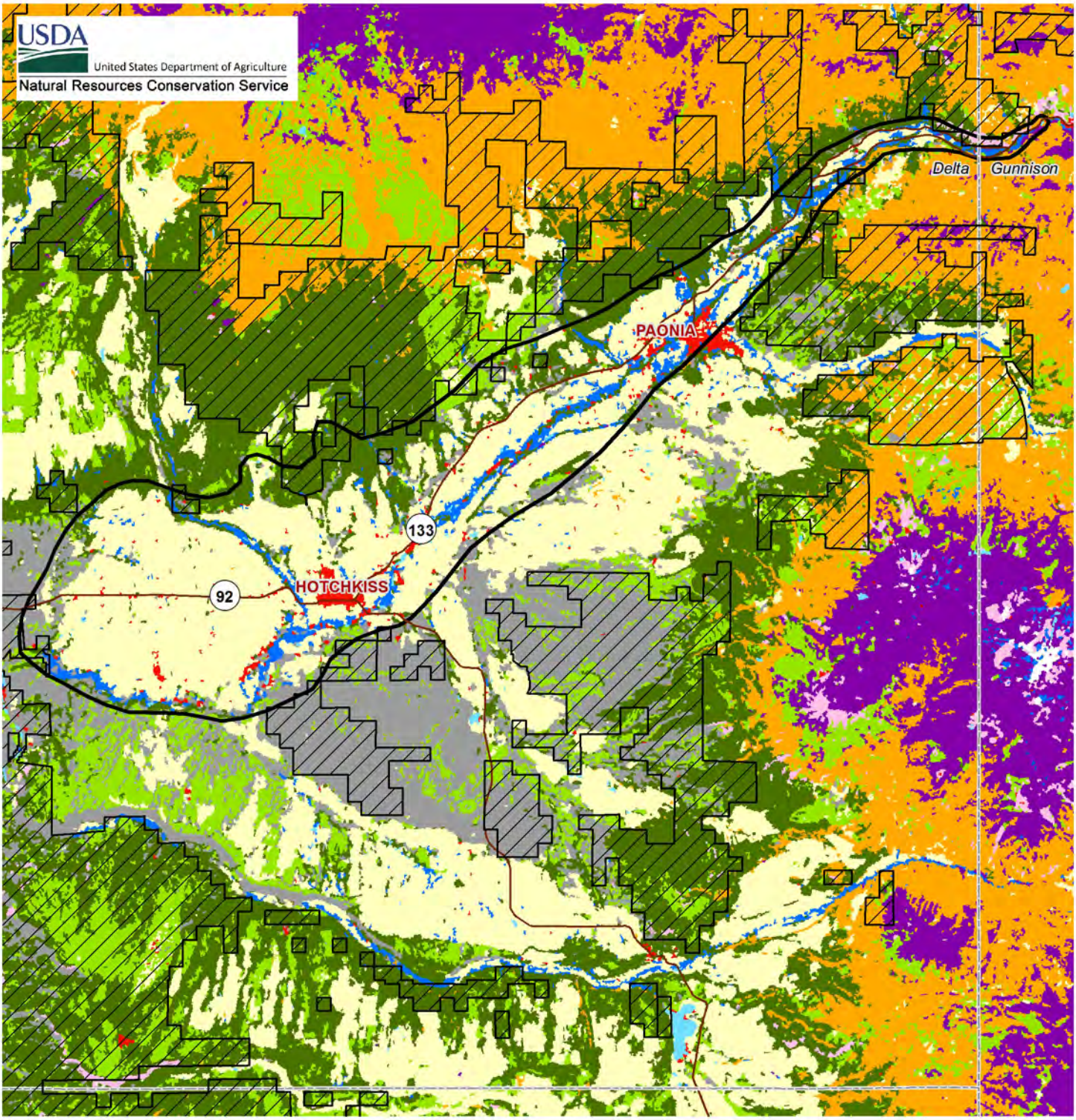
(Ecoregion, Ecoregion Subdivision)

- Colorado Plateaus, Semiarid Benchlands and Canyonlands
- Colorado Plateaus, Shale Deserts and Sedimentary Basins
- Southern Rockies, Alpine Zone
- Southern Rockies, Sagebrush Parks
- Southern Rockies, Sedimentary Mid-Elevation Forests
- Southern Rockies, Sedimentary Subalpine Forests
- Southern Rockies, Volcanic Mid-Elevation Forests
- Southern Rockies, Volcanic Subalpine Forests
- Subwatershed / Focus Area

0 5 10 20
Miles

Figure 3.4-1

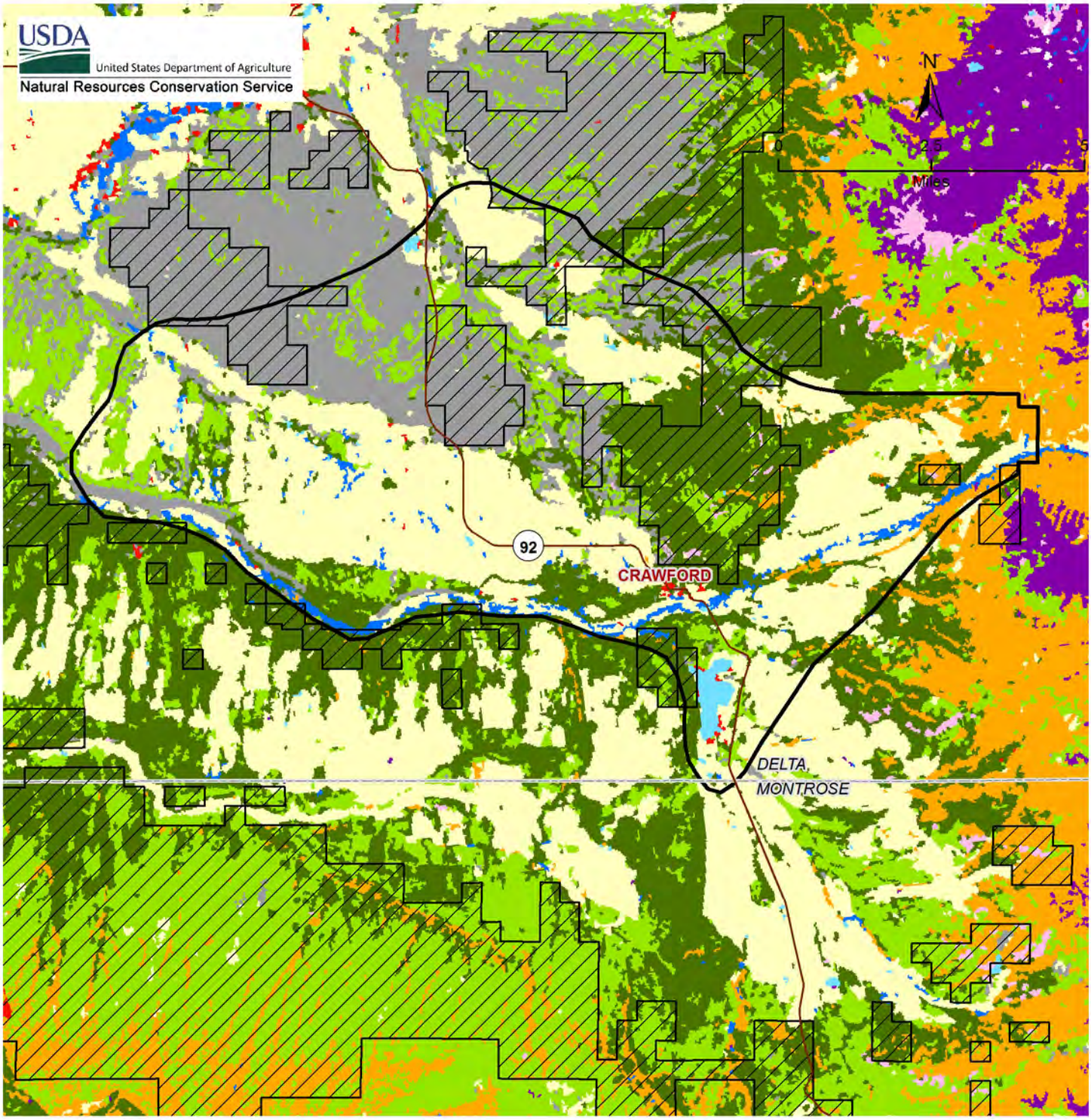
Ecoregions of the Project Area



*Adapted from USGS 2011.

Figure 3.4-2

Vegetation Communities of the North Fork Subwatershed / Focus Area



Vegetation Communities*

- Bedrock and Cliff
- Developed and Disturbed Land
- Irrigated Agricultural Land
- Mixed Mountain Shrublands
- Montane or Subalpine Woodlands or Forests
- Open Water and Emergent Wetland
- Pinyon-Juniper Woodland
- Riparian Woodland or Forest
- Sagebrush Shrublands
- Semi-desert Shrublands

- BLM lands
- County line
- Highway
- Crawford Subwatershed / Focus Area Boundary

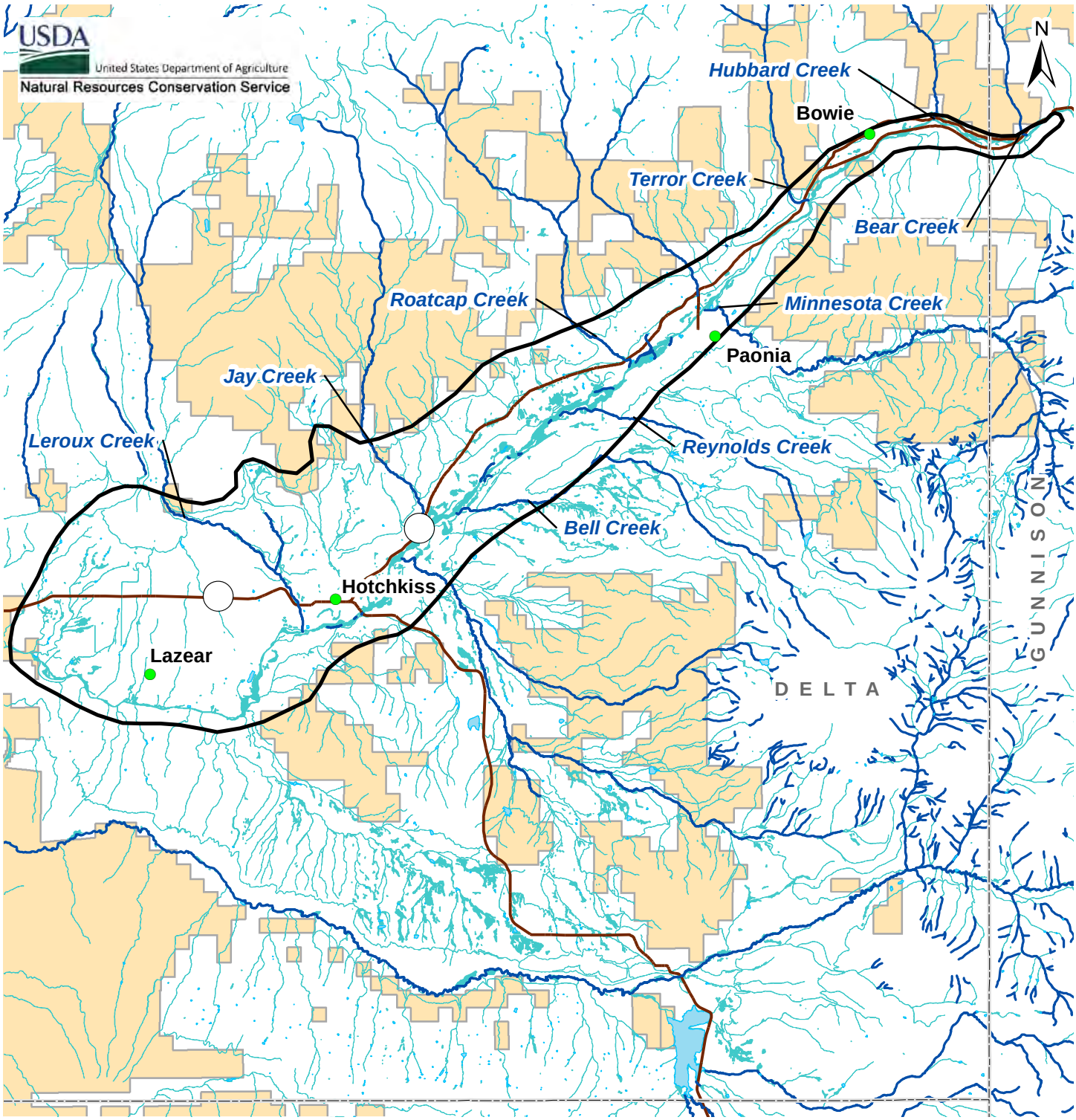
N

0 2.5 5
Miles

*Adapted from USGS 2011.

Figure 3.4-3

Vegetation Communities of the Crawford Subwatershed / Focus Area

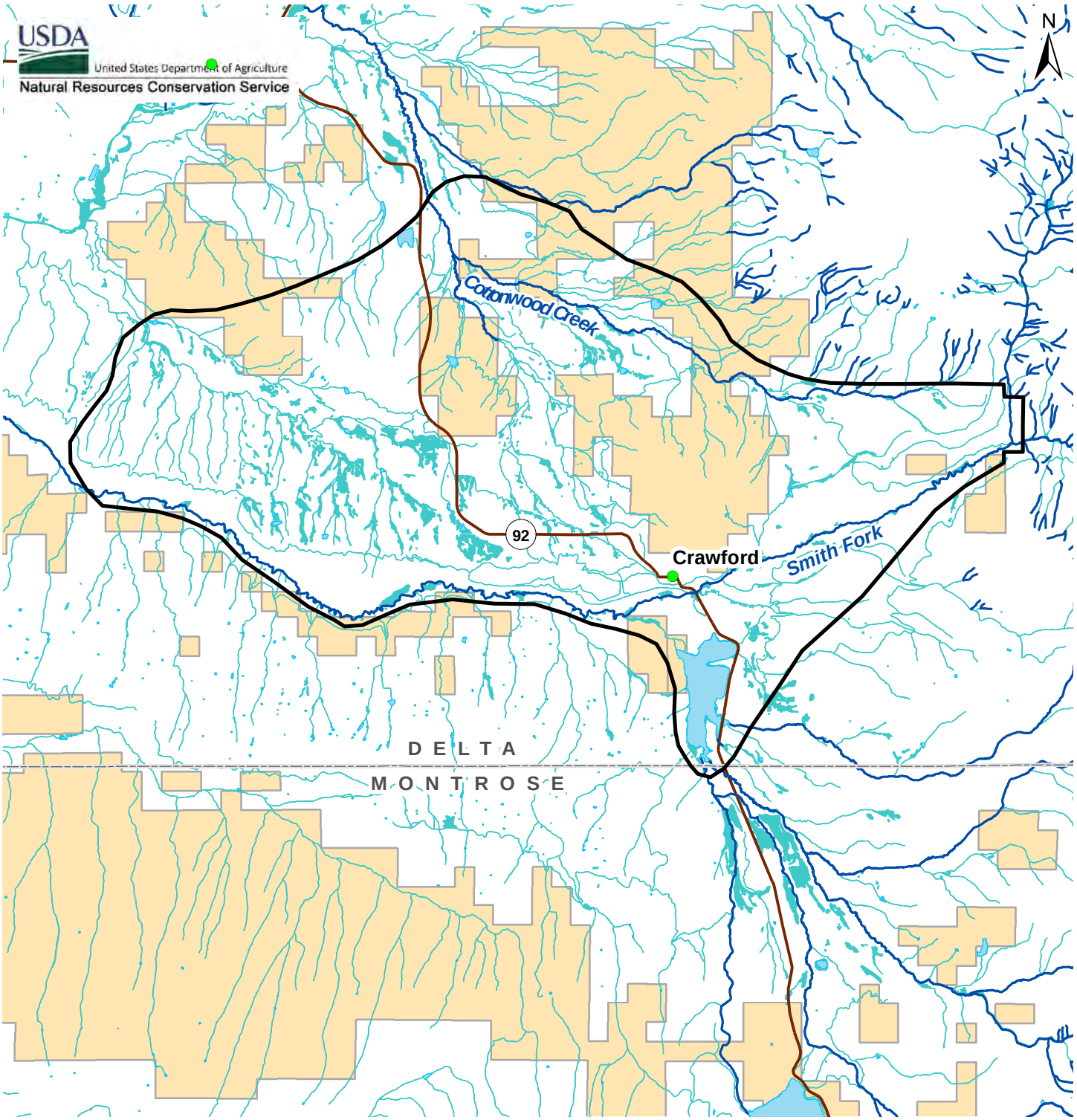


*Adapted from USGS 2011.

Figure 3.4-4

Wetlands / Riparian Resources

of the North Fork Subwatershed / Focus Area

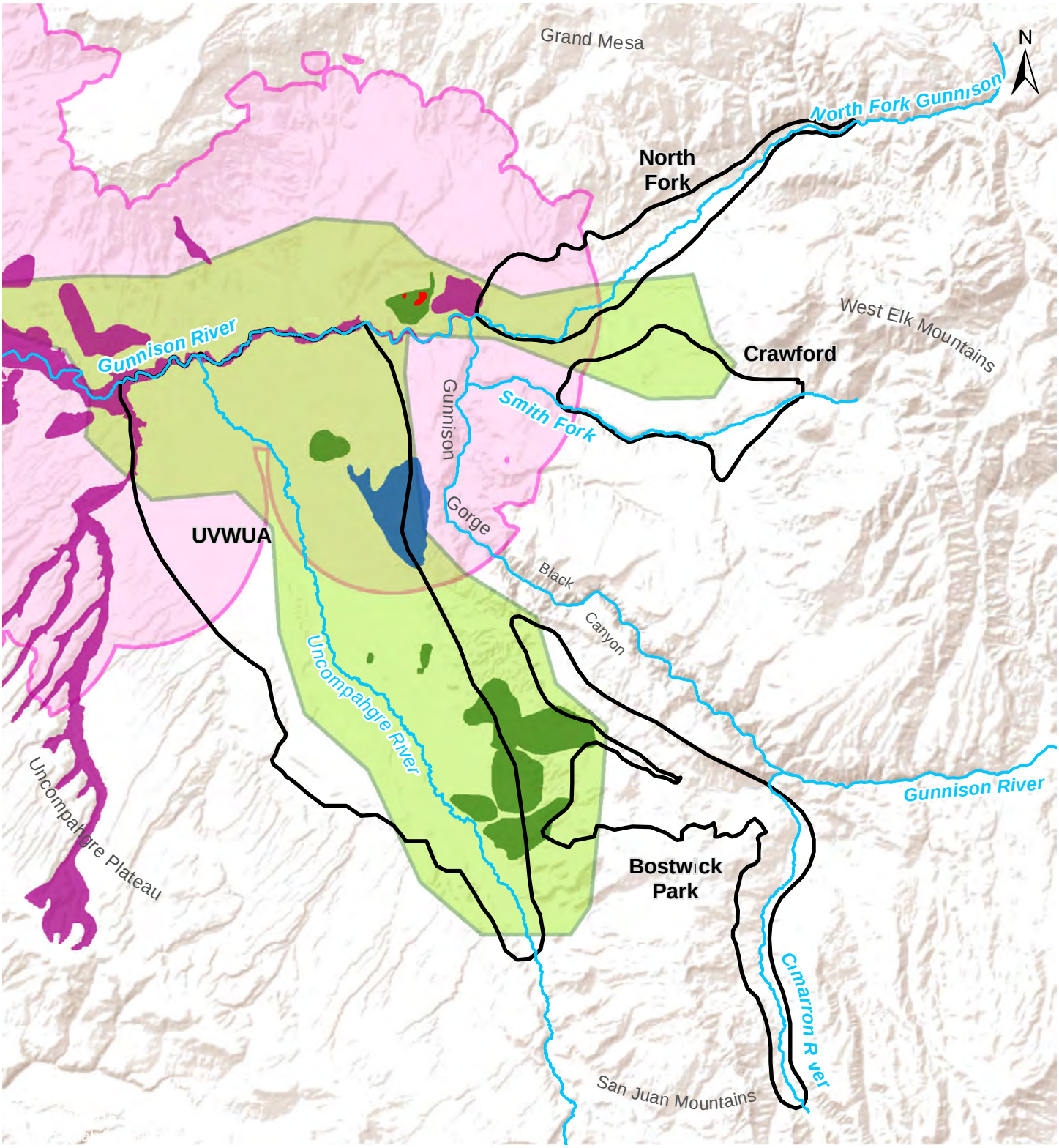


*Adapted from USGS 2011.

Figure 3.4-5

Wetlands / Riparian Resources

of the Crawford Subwatershed / Focus Area



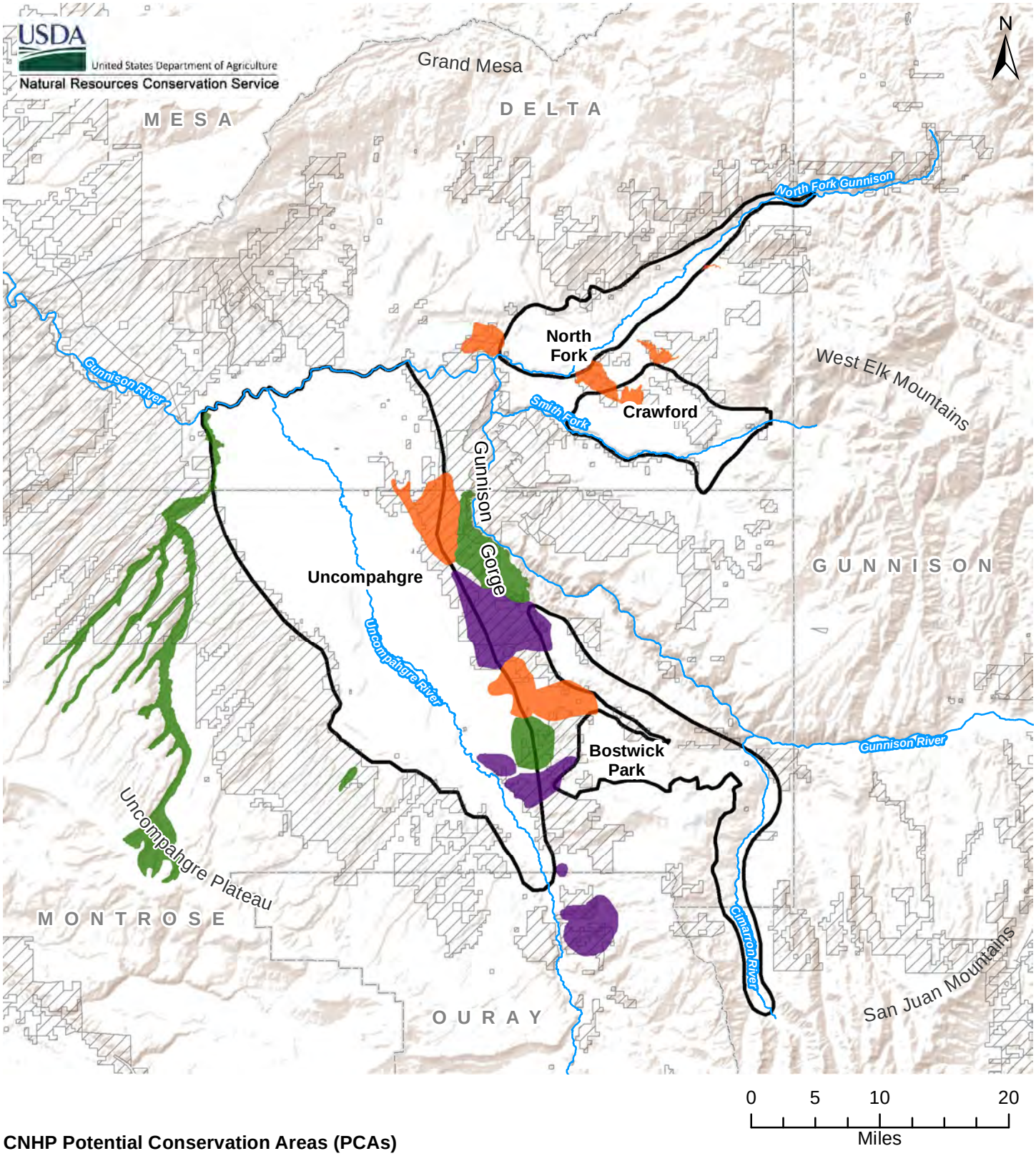
- Subwatershed boundary
- Colorado hookless cactus modeled range
- Clay-loving wild buckwheat modeled range
- PCA with Colorado hookless cactus
- PCA with clay-loving wild buckwheat and Colorado hookless cactus
- PCA with clay-loving wild buckwheat
- Clay-loving wild buckwheat designated critical habitat

0 5 10
Miles

USDA United States Department of Agriculture
Natural Resources Conservation Service

Figure 3.4-6

FWS Section 7 Modeled Ranges & CNHP Potential Conservation Areas for Federally Protected Plants

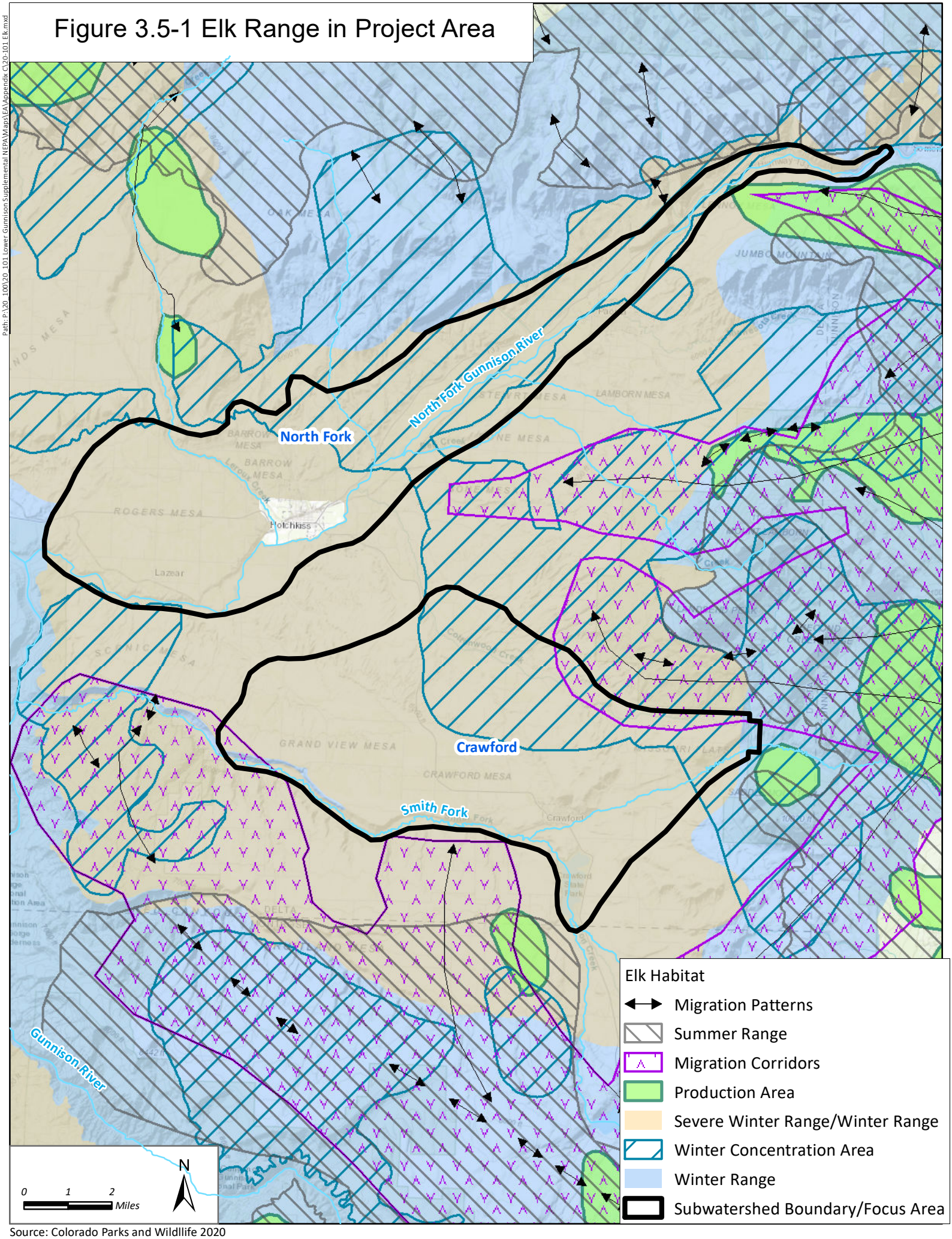


CNHP Potential Conservation Areas (PCAs) with BLM Sensitive Plants

- PCA with Uncompahgre bladderpod
- PCA with Colorado desert parsley
- PCA with Colorado desert parsley and Uncompahgre bladderpod
- BLM lands
- Subwatershed Boundary / Focus Area

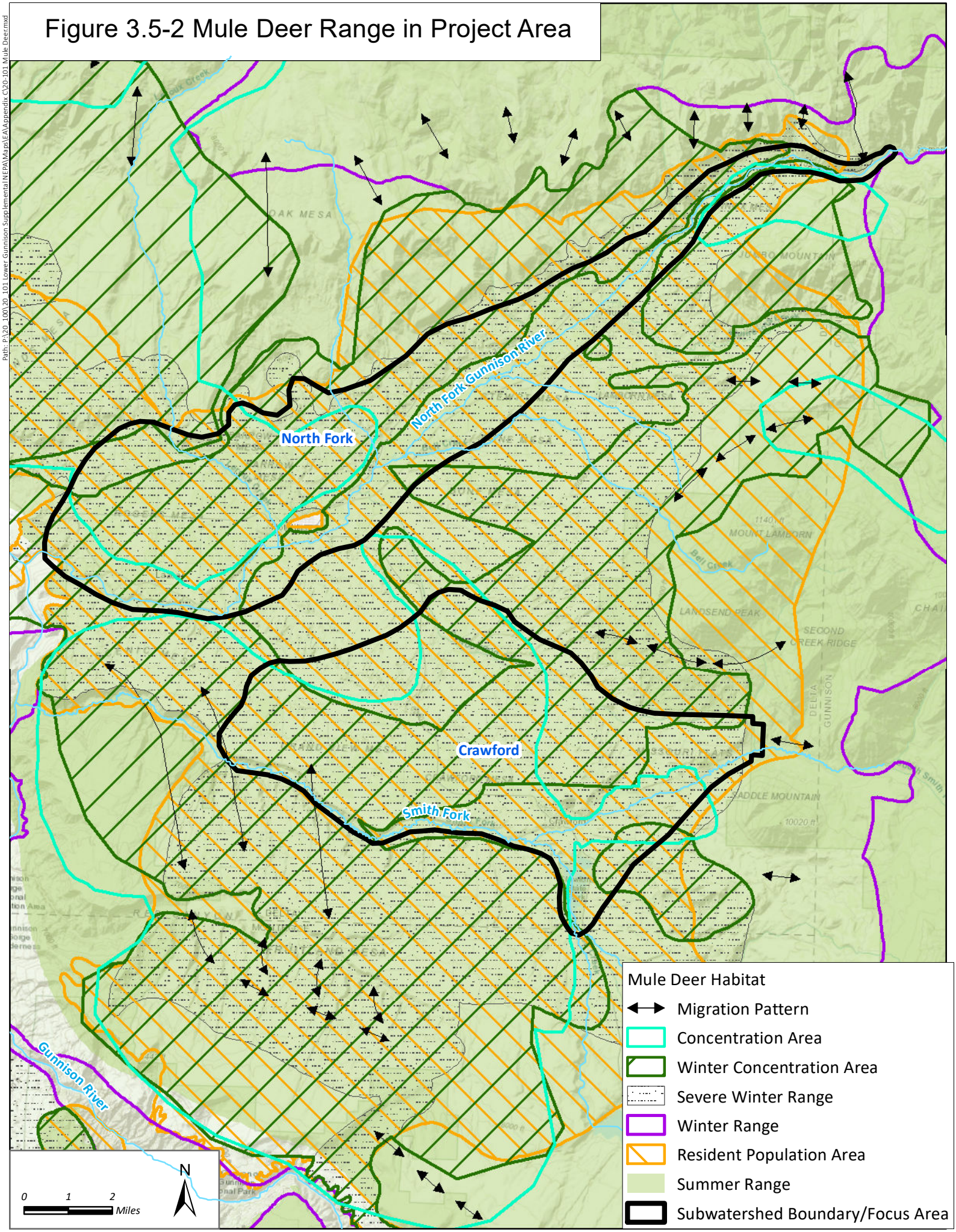
Figure 3.4-7

Figure 3.5-1 Elk Range in Project Area



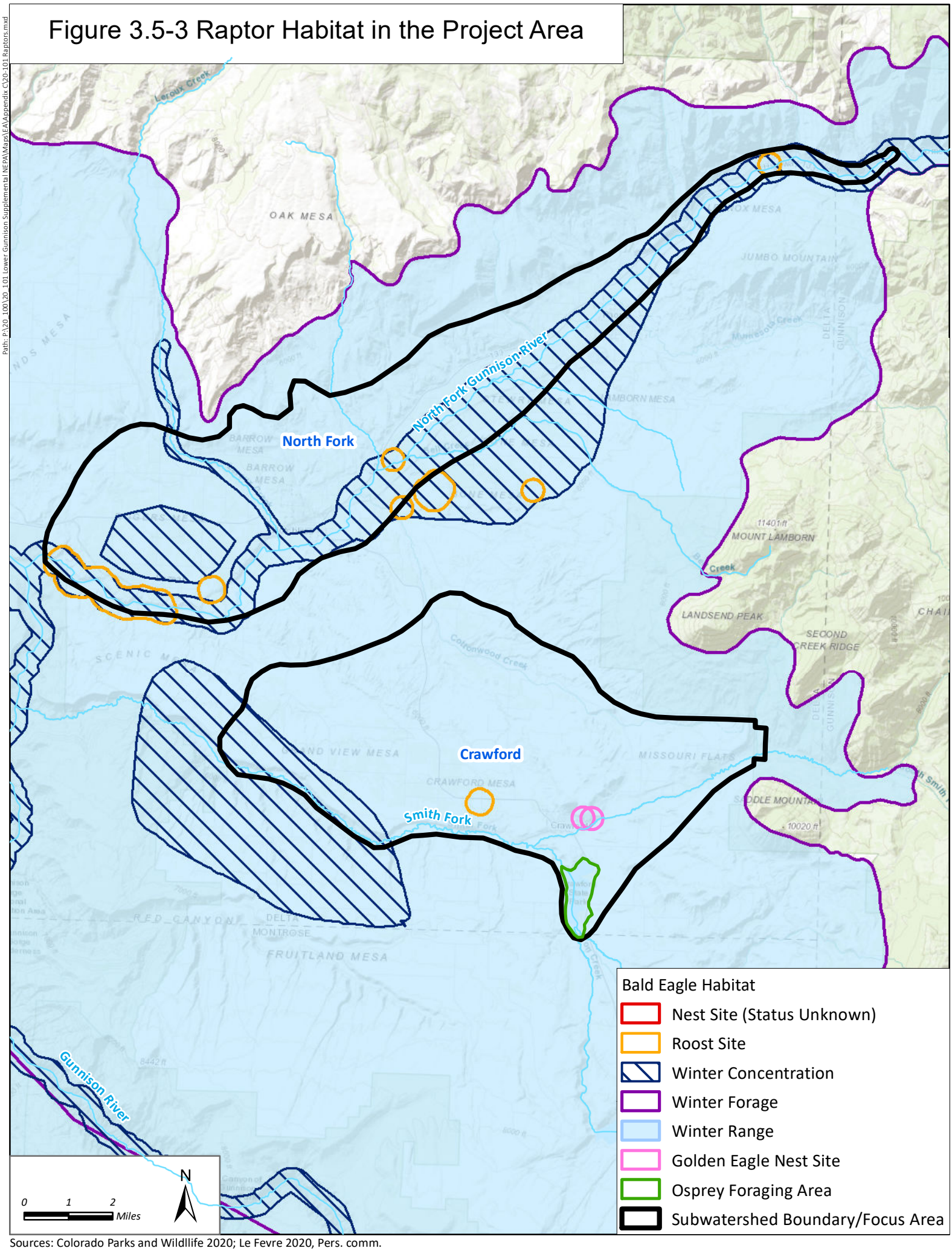
Source: Colorado Parks and Wildlife 2020

Figure 3.5-2 Mule Deer Range in Project Area



Source: Colorado Parks and Wildlife 2020

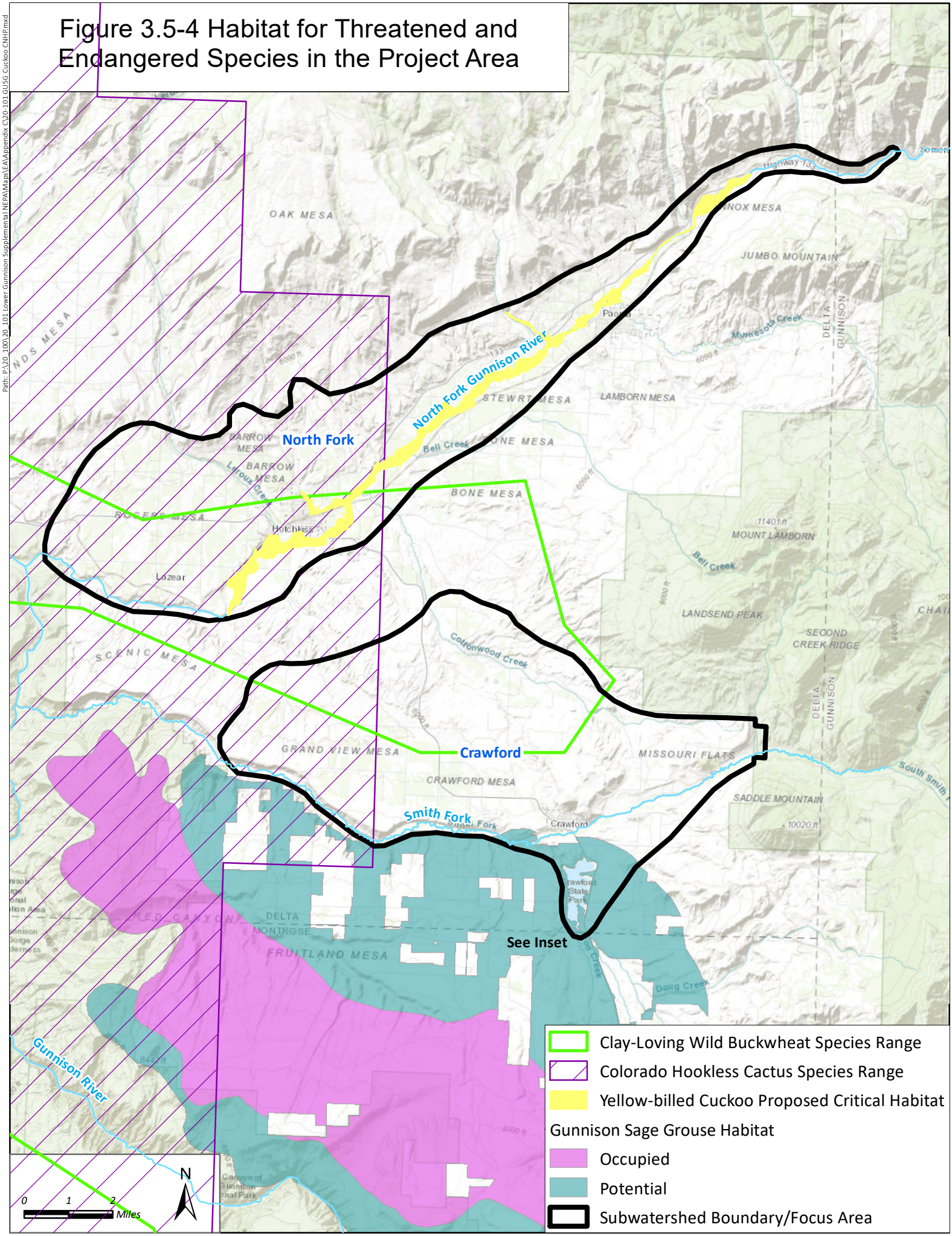
Figure 3.5-3 Raptor Habitat in the Project Area



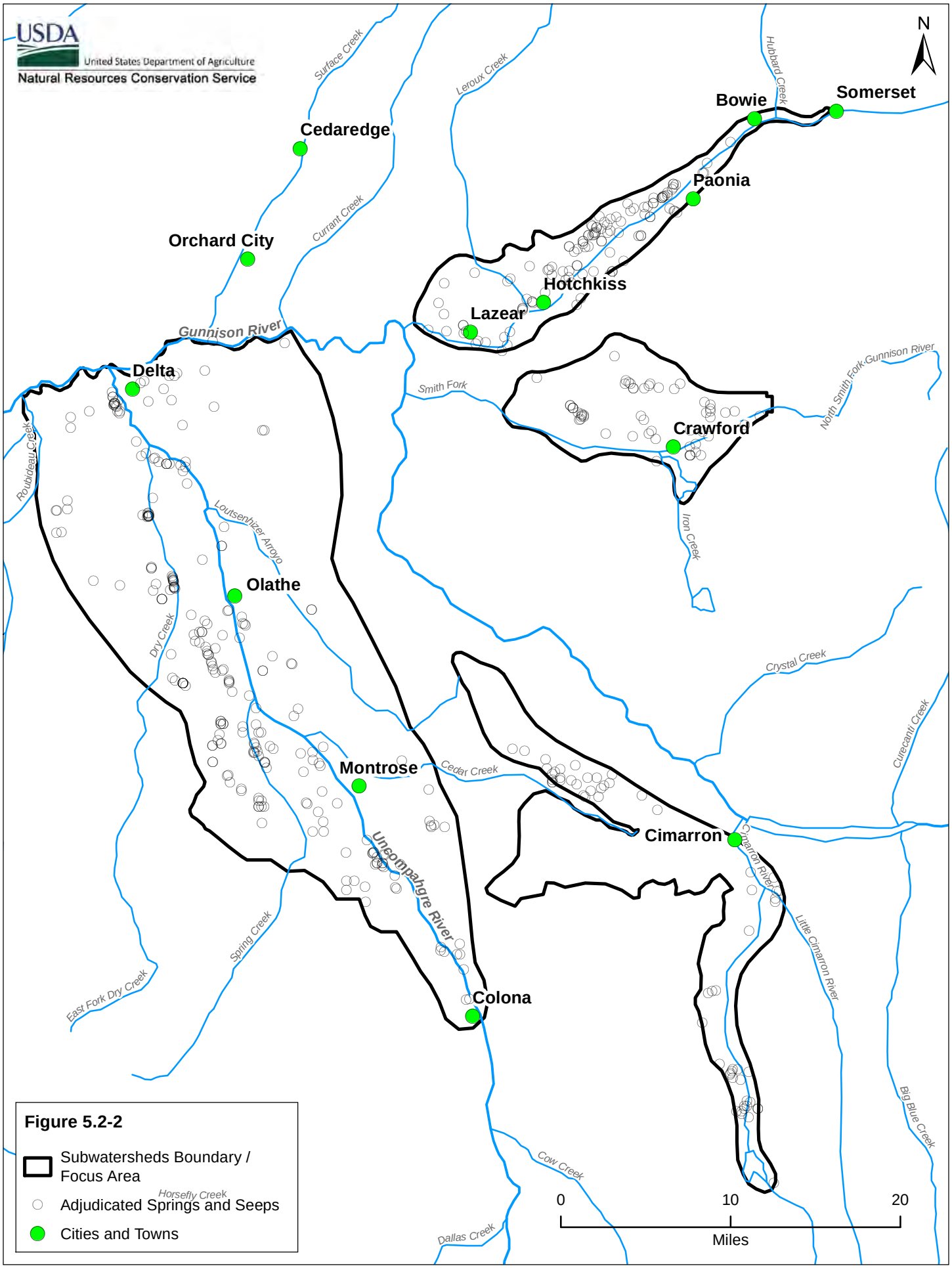
Sources: Colorado Parks and Wildlife 2020; Le Fevre 2020, Pers. comm.

Path: P:\20_100\20_101 Lower Gunnison Supplemental NEPA\Maps\EA\Appendix C\20-101 Raptors.mxd

Figure 3.5-4 Habitat for Threatened and Endangered Species in the Project Area



Source: USFWS, 2014; 2020a, 2020b.



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Appendix D

Investigation and Analysis

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Appendix D
Investigation and Analysis

D.1 Introduction

This report estimates the benefits and costs of the proposed Lower Gunnison Project Supplemental Watershed Plan Environmental Assessment (Supplemental Plan-EA). The Supplemental Plan-EA is needed to improve agricultural water management by increasing irrigation conveyance efficiency, reducing operations and maintenance (O&M) costs, and reducing salinity and selenium concentrations in the Colorado River Basin. The Supplemental Plan-EA would make improvements and install new irrigation infrastructure in the North Fork and Crawford subwatersheds of the Lower Gunnison River Basin.

The Supplemental Plan-EA's action alternatives would achieve the purpose and need by installing several works of improvement in the North Fork and Crawford subwatersheds. In the North Fork subwatershed, works of improvement include a 60-acre-foot (AF) regulating reservoir, approximately 2 miles of piping to replace an unlined earthen canal, and Supervisory Control and Data Acquisition (SCADA) systems. A SCADA system would also be installed in the Crawford subwatershed.

These works of improvement would create multiple economic benefits that would increase National Economic Development (NED) by reducing damages from salinity loading, lost farm income, and heightened O&M costs.

The objective of this report is to estimate the benefits and costs of the two action alternative considered as part of the Supplemental Plan-EA. The proposed measures are evaluated in conformance with the Principles and Guidelines (P&G) for federal investments in water resource projects. Specifically, this report uses a benefit-cost framework to consider the benefits and costs of the action alternatives. All applicable benefits and costs are compared against a baseline of the No Action Alternative, in which existing conditions in the subwatersheds are likely to persist into the future.

This report is structured into the following sections:

- Federal Guidelines of National Economic Development Analysis of Watershed Improvement Measures
- Engineering Analysis
- Alternatives and Ecosystem Services Evaluated
- Types of Benefits and Costs Evaluated
- National Economic Development Analysis: Data and Methodology
- Current NED Costs
- Economic and Structural Tables

D.2 Federal Guidelines of National Economic Development Analysis of Watershed Improvement Measures

The analysis uses federal water resource project and U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) guidelines for the evaluation of NED benefits such as the NRCS

Natural Resources Economics Handbook (NRCS 1998) and the National Watershed Program Manual (NWPM; NRCS 2015).

The basic objective of the economic analysis is to determine if benefits from proposed actions exceed project costs for federally funded projects. The P&G also require the NED Alternative, which maximizes monetary net benefits, be selected for implementation unless there is an overriding reason for selecting another alternative based on federal, state, local, or international concerns related to the social and environmental accounts (P&G 1.10.2).

D.3 Engineering Analysis

Engineering analyses conducted by J-U-B Engineers (J-U-B), the Irrigation and Training Research Center (ITRC), and Applegate Group (Applegate) provided data for the current Supplemental Plan-EA for the North Fork subwatershed and the economic analysis (Applegate 2019, 2020; J-U-B 2016, 2017; ITRC 2017) (Table D-1). These analyses (provided in Appendix E of the Supplemental Plan-EA) considered the overall goals of the Fire Mountain Canal (FMC) (improve water quantity and quality, improve canal safety, and improve system and on-farm efficiency) to generate a list of improvement projects. Further analysis provided design characteristics and cost projections for piping and lining projects as well as flow rates, water loss estimates per mile along the entire FMC, and potential salinity reduction by project. Seepage loss is estimated at 0.95 cubic feet per second per mile of canal (J-U-B 2016) and salinity reduction is estimated to be up to 1,007 tons per year. The need and feasibility of a regulating reservoir was also evaluated (J-U-B 2016; ITRC 2017; Applegate 2020). With the completion of the FMC pipeline across Rogers Mesa in 2020 to the east of the currently proposed piping section, the demands of the pipeline do not match the supply of the canal at times during the irrigation season. A regulating reservoir would allow the system to conserve rainfall runoff and readjust the canal flows with more ease than at present to buffer the variable flows of the canal (ITRC 2017). The regulating reservoir and associated SCADA would result in a water savings of 1,400 AF per year (Applegate 2020). The Coal Road Regulating Reservoir location on primarily U.S. Bureau of Reclamation (Reclamation) lands was evaluated by J-U-B in 2016 and further evaluated in the ITRC 2017 study; the location is in a narrow drainage that would create storage with a short dam crest length. The dam would be classified as a high hazard dam (Applegate 2020), and the design would adequately address public health and safety requirements. The current estimated costs for this reservoir considered these requirements. The location of the 3300 Road Regulating Reservoir was evaluated by Applegate in 2020. It is on private land and the topography of the site would allow for a longer, but lower, height dam that would qualify as a low hazard dam (Applegate 2020). The cost estimate is consistent with those requirements.

Table D-1. Engineering Analyses Document Summary.

Document Title	Document Citation	Prepared For	Summary
Phase II Salinity Improvements Feasibility Study	Applegate 2019	Fire Mountain Canal and Reservoir Company	This study was funded through the Delta Conservation District, with funds provided by the Colorado Water Conservation Board to provide technical assistance to ditch companies for planning and applying for federal funds. FMC was awarded funding from the Colorado River Basin-wide Salinity Control Program for piping the lower end of the canal identified as Segment 47 following application to the 2015 Funding Opportunity Announcement. The purpose of this study is to investigate the feasibility of several additional proposed improvements to the FMC: Wolf Park Siphon, Coal Road to 3300 Road pipeline, 3300 Road to Leroux Creek pipeline, and Garvin Mesa pipeline.
Fire Mountain Canal Regulating Reservoir Feasibility Study	Applegate 2020	Fire Mountain Canal and Reservoir Company	The Board of the Fire Mountain Canal and Reservoir Company has been actively working to modernize this irrigation system to enhance the efficiency of the limited water resources available. Prior studies of the FMC system have highlighted the potential benefits of creating a regulating reservoir somewhere along the lower section of the canal. Two sites for a potential regulating reservoir (Coal Road and 3300 Road) were evaluated in this report.
North Fork Water Conservancy District Master Plan and Funding Plan	J-U-B 2016	North Fork Water Conservancy District	The purpose of this Master Plan is to supplement the Water Management Plan and to provide guidance for future improvement projects on the canal. The goals of selected improvement projects will include one or more of the following outcomes: improve water quantity (seepage loss and inefficient delivery), improve canal safety through canal enclosures in geologically sensitive areas, improve water quality (salinity and selenium reduction), improve system efficiency through remote monitoring and data acquisition and remote control (SCADA system), and improve on-farm efficiency (provide pressurized irrigation alternatives). The Master Plan focuses on two areas: the FMC, which is 33.275 miles long and delivers water to approximately 90 turnouts and approximately 480 water users, and the Paonia Reservoir, which was constructed with an initial capacity of 18,150 AF.
North Fork of the Gunnison River Irrigation Management Plan	J-U-B 2017	North Fork Water Conservancy District	The purpose of the Irrigation Management Plan is to identify the near river infrastructure needs of agricultural users who divert water directly from the North Fork and provide recommendations for moving forward with improvements in the river corridor that have multiple benefits. The plan also seeks to educate the agricultural water users on the process of stream management planning and emphasize the following ideas: nonconsumptive beneficial uses may also be realized without damage to existing agricultural water rights, beneficial and meaningful infrastructure improvements may be achieved by working with nonconsumptive water use interests on the river, and infrastructure improvements may be used as

Document Title	Document Citation	Prepared For	Summary
			a means of protecting agricultural water rights. An existing conditions assessment of the FMC, including system efficiency, is included in this report.
Integrated Assessment, Comprehensive Implementation Planning and Engineering Review: Fire Mountain Canal Reconfiguration Project and Optimization of Water Delivery System: A Rapid Assessment	Irrigation Training & Research Center 2017	Colorado River Water Conservation District and Fire Mountain Canal and Reservoir Company	The primary focus of the Rapid Assessment was to review assumptions and criteria for the planned Rogers Mesa pipeline. The Rogers Mesa canal is scheduled to be pipelined to reduce salinity loading. A variety of options were examined and are summarized in this document. Key points, safety issues, and SCADA (telemetry) benefits are included in this assessment.

According to previous engineering analysis (ITRC 2017), SCADA will automate alarm notifications, improve diversion flow measurement, streamline daily water operations via more remote monitoring and control sites, improve the emergency notification system in canal failure and blockage scenarios, improve the level of service to growers and other downstream users, prepare for future regulatory reporting requirements, and implement an independent, in-house communications system. SCADA systems are proposed to be installed in each subwatershed to improve system efficiency through remote monitoring and data acquisition and remote control. SCADA systems are computer-controlled irrigation systems that gather and analyze real time data on operational parameters of the irrigation distribution system to remotely control the system to ensure it operates as efficiently as possible. SCADA systems improve the operational efficiency of irrigation systems by relaying real-time data to a central location where system operators can monitor conditions and use remote control of system infrastructure to regulate water distributions. In the absence of SCADA systems, the canal operators must physically travel the length of the canal systems to monitor conditions and regulate flows. Installation of the SCADA systems in the North Fork and Crawford subwatersheds would provide operational savings to canal operators by reducing daily trips to monitoring sites.

The SCADA infrastructure in the North Fork and Crawford systems are integrated infrastructure and, therefore, are analyzed as a single work of improvement. For example, without the radio repeater antennas, the SCADA systems would not be able to operate because they could not send or receive data from the monitoring station. As another example, SCADA systems at the inlet of the control reservoir would not serve any purpose without a SCADA system at the outlet that could monitor and regulate outflows in harmony with the inlet SCADA systems' ability to regulate inflows. As a result of this integration, the benefits of the SCADA systems are evaluated as a single unit.

D.4 Alternatives and Ecosystem Services Evaluated

To improve agricultural water management in the subwatersheds, the project sponsor developed two action alternatives (Alternatives 2 and 3) and a no action alternative. The No Action Alternative describes the most likely future if no federal investment is made in the watersheds.

Under the No Action Alternative (Alternative 1), irrigation supplies in the subwatersheds would continue to be underutilized due to poor flow control that results from the not having a control reservoir or SCADA infrastructure to monitor flows and seepage losses from the unlined and unpiped canal. Canal seepage and

poor control of irrigation flows would maintain existing levels of salinity and selenium loading, perpetuating damages for downstream water users and necessitating future investment in selenium and salinity control projects to conform with federal, state, and local water quality regulations. Without the SCADA infrastructure, ditch riders and other personnel would also have to spend time and resources monitoring flows and managing headgates to ensure adequate flows are maintained to serve irrigation customer's demands.

Under the action alternatives (Alternatives 2 and 3), three works of improvement would be installed in the North Fork subwatershed and one work of improvement would be installed in the Crawford subwatershed. Alternative 2 would install several works of improvement in the North Fork subwatershed, including a regulating reservoir, a piped canal, and SCADA system to support the regulating reservoir and pipeline (Table D-2). These improvements would create an integrated irrigation system that would improve the efficiency of agricultural water use. SCADA infrastructure would be installed in the Crawford subwatershed at the Crawford Clipper Headgate, the Aspen Canal to Zanni Turnout, the Aspen Canal, the Clipper/Aspen Splitter, and the Grandview Diversion. The benefits in this system would be additive by eliminating the need for site visits; this would not be the case if all sites were not included in the project measures.

Alternative 3 is the same as Alternative 2, except that the Fire Mountain Regulating Reservoir would be installed on private, rather than public, land and the piped section of the FMC would be marginally shorter (Table D-3). Under Alternative 3, all Crawford subwatershed SCADA measures would be the same as Alternative 2.

Table D-2. Alternative 2 Works of Improvement.

Component	Location	Description
Fire Mountain Piping Project	The east end of the Segment 47 Piping Project to the Regulating Reservoir Site	13,800 feet of 72-inch Spirolite pipe would be installed in a 60-foot-wide ROW. Staging areas required for storing equipment and pipe would be established within the footprint of the Coal Road Regulating Reservoir.
Fire Mountain Regulating Reservoir	Coal Road Regulating Reservoir on Reclamation Land 0.5 mile east of 3300 Road	The project would consist of a 44- to 60-AF reservoir and associated inlet and outlet works. The maximum stored water footprint/construction disturbance is 4.7 to 6.7 acres. Construction access would be along Canal Road. The water depth would be about 28 feet.
FMC SCADA Network	SCADA Coal Road Repeater Tower and FM New Access to SCADA	A SCADA network, consisting of a tower site and four SCADA sites would be installed to support the regulating reservoir and pipeline. A single SCADA site generally includes water level sensors, buried conduit, relay antenna (telemetry equipment), solar power, and panels; and would occupy about 20 square feet or less after construction.
	Inlet	
	Outlet	
	Coal Road Drop Site	
	SCADA Site 10	
Crawford SCADA Network	Crawford Clipper Headgate	Each SCADA system generally includes gate control equipment, a stilling well, water level sensors, 1-inch buried conduit, a relay antenna (telemetry equipment), solar power, and panels. Increased water use efficiency would occur based on the modernization and conversion of the existing direct delivery irrigation systems (using an "always-on" supply-driven system) to a more well-timed irrigation and producer "demand-driven" system. Each SCADA system would occupy a maximum footprint of about 20 square feet after construction.
	Aspen Canal to Zanni Turnout	
	Aspen Canal	
	Clipper/Aspen Splitter	
	Grandview Diversion	
	Alkali Creek Inlet	The SCADA components are as described above but without the gate control equipment, and including a stilling well, a water level sensor, 1-inch buried conduit, a relay antenna (telemetry equipment), solar power, and panels.
	Muddy/Iron Creek Inlet	
	Feeder Canal/Daisy Ditch	
	Clear Fork Inlet	
	SCADA Gates 1 through 7 on the Aspen Canal (seven total)	The SCADA components are as described above but without a stilling well or water level sensor, and with a turbine or differential flow transmitter.
	KREX on Existing Tower	This component is installation of a radio repeater antenna.

Source for FMC: Applegate 2019, 2020, pers. comm. 2020.
Source for Crawford: Harward, pers. comm. 2020; Ligrani, pers. comm. 2020.

Table D-3. Alternative 3 Works of Improvement.

Component	Location	Description
Fire Mountain Piping Project	The east end of the Segment 47 Piping Project to the Regulating Reservoir Site	13,000 feet of 72-inch Spirolite pipe would be installed in a 60-foot-wide ROW. Staging areas required for storing equipment and pipe would be established within the footprint of the 3300 Road Regulating Reservoir.
Fire Mountain Regulating Reservoir	3300l Road Regulating Reservoir on Private Land	The project would consist of a 44- to 60-AF reservoir and associated inlet and outlet works. The maximum stored water footprint/construction disturbance is 6.3 to 9.1 acres. Construction access would be along Canal Road. The water depth would be about 28 feet.
FMC SCADA Network	SCADA Coal Road Repeater Tower and FM New Access to SCADA	A SCADA network, consisting of a tower site and four SCADA sites would be installed to support the regulating reservoir and pipeline. A single SCADA site generally includes water level sensors, buried conduit, relay antenna (telemetry equipment), solar power, and panels; and would occupy about 20 square feet or less after construction.
	Inlet	
	Outlet	
	Coal Road Drop Site	
	SCADA Site 10	
Crawford SCADA Network	Crawford Clipper Headgate	Each SCADA system generally includes gate control equipment, a stilling well, water level sensors, 1-inch buried conduit, a relay antenna (telemetry equipment), solar power, and panels. Increased water use efficiency would occur based on the modernization and conversion of the existing direct delivery irrigation systems (using an "always-on" supply-driven system) to a more well-timed irrigation and producer "demand-driven" system. Each SCADA system would occupy a maximum footprint of about 20 square feet after construction.
	Aspen Canal to Zanni Turnout	
	Aspen Canal	
	Clipper/Aspen Splitter	
	Grandview Diversion	
	Alkali Creek Inlet	The SCADA components are as described above but without the gate control equipment, and including a stilling well, a water level sensor, 1-inch buried conduit, a relay antenna (telemetry equipment), solar power, and panels.
	Muddy/Iron Creek Inlet	
	Feeder Canal/Daisy Ditch	
	Clear Fork Inlet	
	SCADA Gates 1 through 7 on the Aspen Canal (seven total)	The SCADA components are as described above but without a stilling well or water level sensor, and with a turbine or differential flow transmitter.
	KREX on Existing Tower	This component is installation of a radio repeater antenna.

Source for FMC: Applegate 2019, 2020, pers. comm. 2020.
Source for Crawford: Harward, pers. comm. 2020; Ligrani, pers. comm. 2020.

The action alternatives were formulated to improve the cost-effectiveness of operating the North Fork and Crawford systems and increase farm incomes. For example, the regulating reservoir would capture snowmelt before it flows into the FMC, thereby improving agricultural water supplies by aligning water availability with water demand. The piped sections of the FMC would also reduce seepage and deep percolation, thereby enhancing agricultural water supplies. The SCADA systems would reduce O&M costs of operating the canals because ditch riders, farmers, and ranchers would not have to monitor the canal and laterals as frequently.

D.5 Types of Benefits and Costs Evaluated

Based on the anticipated effects of the works of improvement described in the *Reduced Salinity Control Costs* section below, this analysis evaluated the following benefits for each work of improvement:

- Reduced salinity and selenium control costs;
- Reduced damages to agricultural income; and
- Reduced O&M costs.

The analysis also analyzed the costs of each work of improvement, including:

- Installation costs, including construction, engineering, permitting, land acquisition, and contingencies; and

- O&M costs.

Because the 52-year analysis period corresponds to the 2-year construction period of the works of improvement and their 50-year design life, the replacement cost of most works were not included in the analysis. However, SCADA systems are partly composed of electronic equipment with a 10- to 20-year lifespan, meaning that the electronic components will likely need to be replaced twice during the 50-year analysis period. The replacement cost of the SCADA electronics was accounted for in the analysis.

Ability to Characterize, Quantify, and Monetize Benefits and Costs. The benefits and costs described above can be characterized, quantified, and monetized to varying degrees. Based on discussions with the project sponsor, the frequency and costs of O&M can be quantified using estimates of the time required to perform annual O&M tasks. Reductions in agricultural income damages can be quantified and valued using irrigation efficiency data from the Colorado Water Plan Technical Update, data from the USDA, crop budgets from Colorado State University, and water savings estimates from the third-party Supplemental Plan-EA team. Reduced salinity control costs can be quantified and valued using salinity reduction estimates for each work of improvement and watershed-specific costs of salinity control projects recently implemented in the Lower Gunnison River Basin by Reclamation.

D.6 National Economic Development Analysis: Data and Methodology

Benefits and costs for Alternatives 2 and 3 were calculated based on the expected effects of the action alternatives on the benefits and costs described above as compared against Alternative 1–No Action Alternative. The NED analysis evaluated the costs of the action alternatives based on the preliminary engineering information (Applegate 2019, 2020), which included costs for permitting, engineering, construction, administration, and O&M of proposed improvements to the irrigation storage and delivery system. These costs were compared against benefits received by reducing agricultural income damages, reducing O&M costs, and reducing salinity and selenium control costs.

Effects of the action alternatives were evaluated over a 52-year time horizon including the 2 years required to complete installation and the 50-year useful life of the improvements. This analysis period is equal to the length of time over which the works of improvement are expected to have significant beneficial effects. Benefits are expected to begin accruing the year after the works of improvement are installed and continue to accrue until the end of the 52-year time horizon. Since most of the project elements have design lives of 50 years, replacement costs were not included for most elements as the project time horizon does not exceed the life of the measures (PR&G Section 9, NWPM 501.37.B and the Economics Handbook, Part 611, 1.12.). However, SCADA components have a lifespan of 10 to 20 years, meaning that certain pieces of the SCADA systems in the North Fork and Crawford subwatersheds would have to be replaced twice during the 50-year analysis period. These replacements costs were accounted for in the analysis.

Projected benefits and costs are based on a full employment economy and assume no change in relative prices during the period of analysis. Benefits and costs are discounted using the discount rate for federal projects of 2.5 percent for 2023. Results are reported in both net present values and average annual values in 2023 dollars. The unit of analysis in this study is the action alternative. For this study, costs and benefits are estimated jointly for all works of improvement for the action alternative. The following analysis considers the impact of each work of improvement separately, beginning with the most beneficial improvement and ending with the least beneficial improvement, as part of the incremental analysis.

Preliminary engineering work was completed as necessary to provide cost estimates, benefits, and environmental analysis (e.g., size/footprint and construction process). In the North Fork subwatershed, design assumptions for elevation data and flow rates, assumption sources, and methods are contained in feasibility studies completed for the Fire Mountain Regulating Reservoir and Fire Mountain Piping Project in the North Fork Subwatershed (Applegate 2019, 2020). Elevation data were obtained from published LiDAR data, with on-site level survey to confirm water surface slope.

Reduced Salinity Control Costs

An overall goal of the Lower Gunnison Project is to improve water quality downstream of the watershed by complying with Colorado Water Quality Standards, the Colorado River Basin Salinity Control Act[1], and the Gunnison Basin Selenium Management Program[2] to reduce salt and selenium loading by piping irrigation laterals or canals and installing high-efficiency irrigation systems to eliminate seepage and deep percolation into saline shale-derived soils that dominate in the study area (River District 2015).

Salinity and selenium are naturally occurring and prevalent in the Lower Gunnison River Basin and are known to cause water quality impairments to streams and rivers downstream (Whittig et al. 1983; Selenium Management Program 2011). Salinity is generally defined as the concentration of dissolved mineral salts or dissolved solids in water. Selenium is an essential micronutrient for organisms, but at high concentrations it can be toxic. It bioaccumulates in aquatic food chains and can cause deformities and reproductive issues in birds and fish (Lemly 2002). Complexes of selenium, including selenium in an oxidized state as selenite or selenate, can be soluble when complexed as a salt, and thus readily transported as dissolved ions by groundwater and surface water in the aquatic environment (U.S. Geological Survey [USGS] 2014). Due to this mobility, selenium transport is accelerated by irrigation practices (Selenium Management Program 2011; Batzer and Baldwin 2012; Leib et al. 2012).

The damages caused by salinity in the Colorado River system are a major concern in both the United States and Mexico. As of 2014, annual salinity damages were estimated to be about $382 million per year (Reclamation 2017). The Gunnison River Basin annually contributes approximately 1.1 million tons of salinity to the Colorado River (Leib 2008). Irrigation practices and irrigation infrastructure in the North Fork and Crawford subwatersheds contribute to the salt export from the Gunnison River watershed. Estimates suggest that the North Fork subwatershed contributes up to 8 percent of the Gunnison River Basin's annual salt exports (Reclamation 2006) and the Crawford subwatershed has been noted for its Mancos Shale mud fans, which also contribute to high salinity loading downstream (West Slope Environmental and Western Slope Conservation Center 2016; Richards et al. 2014).

To reduce the downstream damages of nutrient and mineral transport, several federal programs have been created. The NRCS began implementing salinity control projects in the Lower Gunnison River Basin in 1988, including piping or lining irrigation ditches and small laterals and improving the on-farm irrigation systems, to reduce downstream damages (NRCS 2020). Later, the Selenium Management Program (USGS 2014) was designed to reduce selenium concentrations throughout the Lower Gunnison River Basin and to address three primary objectives: (1) achieve compliance with the state of Colorado aquatic-life standard for dissolved selenium of 4.6 micrograms per liter (µg/L) in the Gunnison River at

[1] https://www.nrcs.usda.gov/programs-initiatives/colorado-river-basin-salinity-project
[2] https://www.usbr.gov/uc/progact/Selenium/index.html

Whitewater, Colorado; (2) reduce selenium concentrations to improve water quality conditions to assist in the recovery of listed fish species in the Gunnison and Colorado Rivers (primarily Colorado pikeminnow and razorback sucker in critical habitat from Delta to Whitewater, Colorado); and (3) support continued water uses in the basin (USGS 2014).

Much of the selenium reduction accomplished in the Lower Gunnison River Basin is a result of salinity control projects completed by programs such as the Colorado River Basin Salinity Control Program. A study conducted by the USGS in Montrose Arroyo (in the neighboring Uncompahgre subwatershed) determined that piping and replacement of earthen-lined canals can have direct and immediate water quality benefits in terms of selenium and salinity reductions (Butler 2001).

The action alternatives of the Supplemental Plan-EA would help reduce salinity and selenium loading in the Colorado River Basin. There are two potential approaches to estimating the annual benefits from the salinity reductions. Benefits could be estimated based on the reduction in salinity-related damages to water users downstream throughout the Colorado River system. Alternatively, benefits can be estimated based on the avoided cost of installing additional salinity control projects in the Gunnison Basin. The latter approach produces more "conservative" benefit estimates (e.g., lower values per ton) and was used in this analysis.

Each year, the USDA NRCS publishes a Colorado River Salinity Control Program report documenting investments in salinity control projects throughout the Colorado River Basin designed to reduce downstream salinity damages from salinity-exporting watersheds. The most recent report, for Fiscal Year (FY) 2020, showed that in the Lower Gunnison River Basin, salinity reduction treatments were applied to 1,656 acres and reduced salinity loads by 1,814 tons per year at a total cost of $327,700 or approximately $180.65 per ton in 2020 dollars. This estimate was updated to a value of $211 per ton in 2023 dollars using the Consumer Price Index.

Table D-4 shows the annual salinity reductions that would be achieved by Alternatives 2 and 3 and the avoided cost of salinity control projects required to mitigate these loadings in the absence of the action alternatives.

Table D-4. Avoided Salinity Control Costs, Supplemental Plan-EA, Colorado (FY 2023 $).

Subwatershed	Work of Improvement	Median Selenium Reduction, pounds/year[1]	Median Salinity Reduction, tons/year[1]	Cost of Salinity Control Treatments ($/ton)	Reduced Annual Salinity Control Costs
North Fork	Fire Mountain Piping Project (Alternative 2)	15	1,007	$211	$212,477
North Fork	Fire Mountain Piping Project (Alternative 3)	14.2	948	$211	$200,028

[1]Source: Applegate 2019; ITRC 2017; NRCS 2018; Bureau of Labor Statistics Consumer Price Index Calculator, April 2023.

The action alternatives would replace open earthen canals with piped canals, reducing seepage and thereby reducing salinity loading by 1,007 tons per year under Alternative 2 and 948 tons per year under Alternative 3. The avoided cost of control is estimated at $211 per ton, which suggests the action alternatives would reduce salinity loading damages by $212,477 per year under Alternative 2 and $200,028 under Alternative 3.

Reduced Operations and Maintenance Costs

The improvements proposed as part of the action alternatives would reduce O&M expenditures in the North Fork and Crawford subwatersheds. The canal operators in both subwatersheds have regular O&M costs associated with maintaining the operability of the canals during the irrigation season. Maintenance items include cleaning and trash removal (by both operators and shareholders); spring burning, mowing, and spraying of vegetation; rodent controls; and miscellaneous repairs. These costs include materials, labor, and equipment costs; as well as travel time to the canals and project management. These costs would be reduced with the conversion of open canals to pressurized pipelines, and the installation of water control facilities and SCADA networks.

Canal operators in both subwatersheds estimated the annual reduction in O&M costs associated with each work of improvement included in the action alternatives. In the North Fork System, the canal operator estimated the annual reduction in O&M costs that would be expected as a result of the installation of the Fire Mountain Regulating Reservoir and the Fire Mountain Canal Piping Project (Fletcher, pers. comm. 2020). The expected cost reductions are shown in Table D-5.

Table D-5. Annual O&M Cost Reductions of Fire Mountain Regulating Reservoir and Piping Project, Lower Gunnison Watershed, Colorado (FY 2023 $).

North Fork	Water Control Facility-Fire Mountain Regulating Reservoir	$4,864
	Canal Piping Installation-Fire Mountain Piping Project	$14,298
Total		$19,162

Source: Fletcher, pers. comm. 2020.

The Fire Mountain Regulating Reservoir and the Fire Mountain Piping Project would reduce expenditures of time and materials associated with maintaining the operability of the FMC during the irrigation season. Maintenance activities include cleaning and trash removal (by both operators and shareholders); spring burning, mowing, and spraying of vegetation; rodent controls; and miscellaneous repairs. These costs would all be reduced or eliminated. The costs of the above activities include materials, labor, and equipment costs; as well as travel time to the canals and project management. In total, the cost reductions from the two works of improvement amount to an annual total of $19,162 in 2023 dollars.

In addition to the reduced costs shown in Table D-4 above, the Fire Mountain Piping Project would reduce O&M costs for stakeholders as well as the canal operator. While stakeholder cost reductions are not quantified in this analysis, they would represent real savings to the stakeholders who currently must spend time checking and cleaning diversion gates each day during the irrigation season. With the Fire Mountain Piping Project, stakeholders would no longer have to exert the time, energy, and materials for this task because the pipes would replace the diversion gates, resulting in substantial travel time savings.

Additional reductions in O&M costs would be realized through the installation of the SCADA systems in both subwatersheds. SCADA systems are computer-controlled irrigation systems that gather and analyze real time data on operational parameters of the irrigation distribution system to remotely control the system to ensure it operates as efficiently as possible. Their use improves the operational efficiency of irrigation systems by relaying real-time data to a central location where system operators can monitor conditions and use remote control of system infrastructure to regulate water distributions. In the absence

of SCADA systems, the canal operators must physically travel the length of the canal systems to monitor conditions and regulate flows. Installation of the SCADA systems in the North Fork and Crawford subwatersheds would provide an operational savings to canal operators by reducing daily trips to monitoring sites.

The Crawford Water Conservancy District president provided a detailed estimate of travel time savings for the SCADA system proposed to be installed in the subwatershed (Krai, pers. comm. 2020), shown in Table D-6. The estimates are based on cost of labor and vehicle mileage multiplied by the number of visits required under existing and proposed conditions. The manager and dam tender for the Fire Mountain Canal and Reservoir Company provided a general estimate of anticipated savings for the North Fork subwatershed, also shown in Table D-6 (Fletcher, pers. comm. 2020). In total, the SCADA systems in both subwatersheds are projected to reduce O&M costs by $37,594 per year in 2023 dollars.

Table D-6. Annual Savings from Reduced O&M Costs of SCADA Components of Alternatives 2 and 3, Supplemental Plan-EA, Colorado (FY 2023 $).

SCADA Locations or Task	Labor Cost/ Visit[1]	Mileage Cost/Visit[2]	Current Number of Visits per Irrigation Season	Number of Visits with SCADA	Reduced Time and Mileage Expenses
Crawford Cost Savings					
Crawford Clipper Headgate	$28.40	$11.04	92	2	$3,550
Reservoir Inlet(s) (four locations)	$4.74	$0.69	42	2	$218
Clipper/Aspen Splitter	$28.40	$5.52	66	2	$2,170
Aspen Canal	$28.40	$6.90	66	2	$2,259
Grandview Diversion Structure	$4.74	$0.69	66	2	$347
Aspen Canal to Zanni Turnout	$4.74	$0.69	34	2	$173
Clearing Blockages	$56.79	unknown	10	0	$567
Total Crawford					$9,286
Total North Fork[3]					$28,308
Grand Total					$37,594

[1]Labor costs are based on $18.93/hour.
[2]Mileage costs are based on $0.69/mile (Krai, pers. comm. 2020).
[3]Based on data from Fletcher, pers comm 2020; Krai, pers. comm. 2020.

Water Conservation

The works of improvement in the North Fork and Crawford subwatersheds are expected to save substantial amounts of water that are currently lost to leakage, seepage, and structural losses, thereby reducing agricultural damages in the watershed. In total, approximately 3,117 AF per year are projected to be saved and become available to provide additional irrigation for farmers and ranchers under Alternative 2, while 3,070 AF would be available under Alternative 3. Table D-7 shows the anticipated conservation savings from each work of improvement under each action alternative.

Table D-7. Agricultural Water Conservation by Work of Improvement.

Work of Improvement	Alternative 2 Water Conservation (AF/year^{-1})	Alternative 3 Water Conservation (AF/year^{-1})
Fire Mountain Piping Project	826	779
Fire Mountain Regulating Reservoir	1,050	1,050
Fire Mountain SCADA Network	350	350
Crawford SCADA Network	891	891
Total Annual Savings	3,117	3,070

Source: ITRC 2017.

The 33-mile length of the FMC and the installation of an on-demand piping system near the canal's terminus make it difficult for irrigation managers to control flows on the canal's lower end. The proposed regulating reservoir would allow water used to push supplies through the canal and the piping system to be captured, rather than spilled into the river under the existing system and used during periods of peak demand. The annual water savings associated with the regulating reservoir were estimated at 1,050 AF per year. An additional benefit of this work of improvement, while not quantified, is that the installation of the regulating reservoir would allow large water users on Roger's Mesa to transition to a more efficient pressurized irrigation system in the future, should they choose to do so.

The Fire Mountain Piping Project would also conserve water by reducing seepage and leakage from the unlined FMC. Based on studies of the canal (ITRC 2017), the proposed piping component of the action alternatives would conserve an estimated 826 AF of water per year under Alternative 2 and 779 AF under Alternative 3.

SCADA systems are computer-controlled irrigation systems that gather and analyze real time data on operational parameters of the irrigation distribution system to remotely control the system to ensure it operates as efficiently as possible. SCADA systems improve operational efficiency by conserving water that would otherwise be lost to overdelivery or spillage by controlling the amount of water put into the system to meet real-time demand. The conserved water can be stored for use at other times, extending the growing season or to respond to other resource needs (River District 2015).

Conservation savings for each SCADA system were estimated by the ITRC for the FMC. In total, the SCADA systems proposed under the action alternatives are projected to conserve approximately 1,241 AF per year, of which 350 AF would be conserved by the Fire Mountain SCADA network and 891 AF for the Crawford system. Studies suggest that water savings from the use of SCADA systems generally range from about 7 to 10 percent of delivered water (Temido et al. 2014). The current analysis used 3 percent of delivered water (891 AF) as a conservative estimate to determine the potential water savings benefit by the Crawford SCADA network.

The water conserved by the works of improvement of the action alternatives would be used to irrigate existing land since, in most years, additional water is needed to supplement supplies on existing irrigated acreage. A study conducted by the Wilson Water Group and funded by the Colorado Water Conservation Board found that, based on crop water requirements and the extent of irrigated acreage, the North Fork of the Gunnison River Basin has an average annual water shortage of approximately 54,000 AF per year (Wilson Water Group 2015). The action alternatives would meet approximately 5 percent of the shortage. The primary crops grown in the area served by the works of improvement are grass hay, peaches, and grapes, although a variety of other crops are grown in the Lower Gunnison River Basin (NRCS 2018).

Reduced Agricultural Damages from Use of Conserved Water

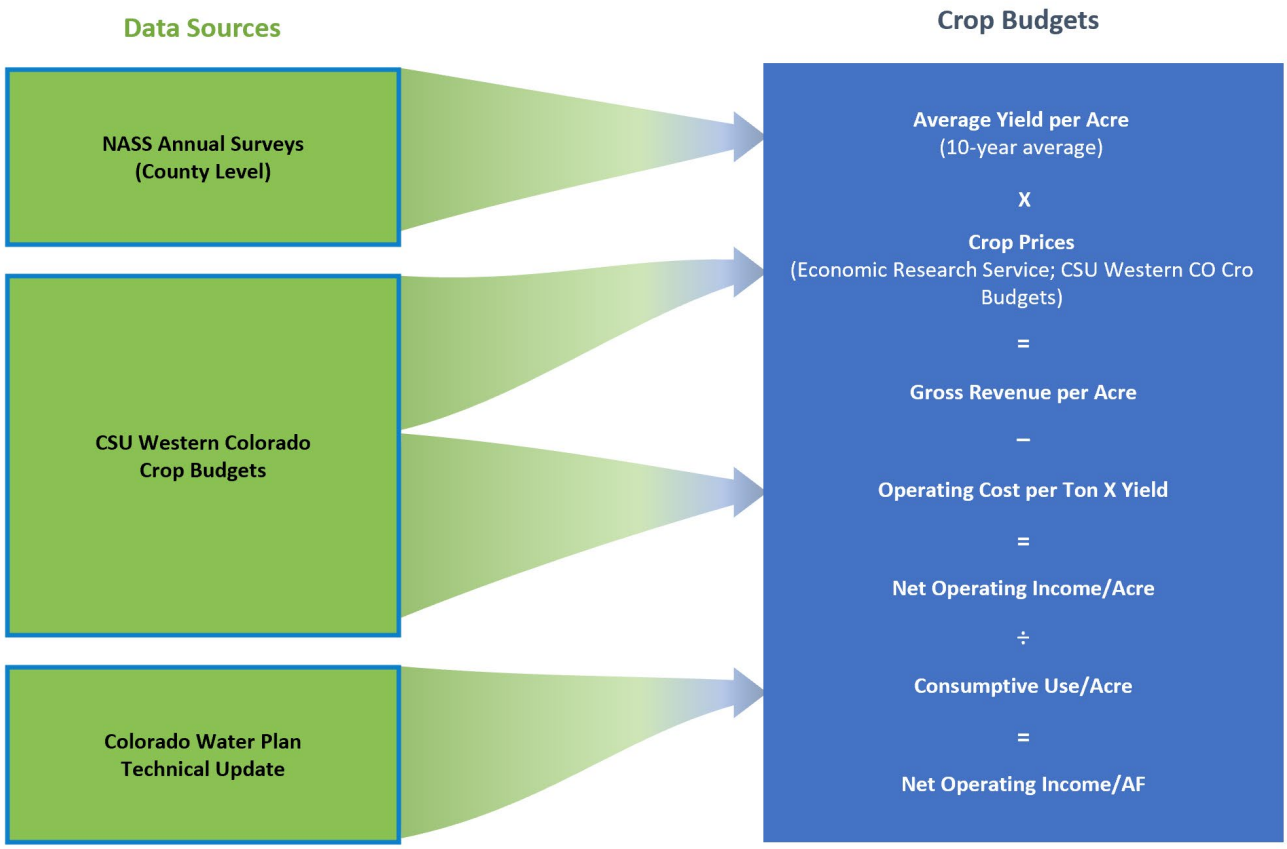
Agricultural Income Estimates

The economic benefit of making additional irrigation supplies available for agricultural production depends on the total yield of crops grown with the water and the financial characteristics of crop production in the study area. The number of acres that can be irrigated with water conserved by the action alternatives depends on both crop consumptive irrigation requirements in the area and the efficiency of irrigation in the North Fork and Crawford areas. Prior studies have determined that average crop irrigation consumptive use in the Gunnison River Basin is about 1.9 AF per year per acre irrigated. Average annual irrigation diversions from the Gunnison River average about 7.3 AF per year, meaning that the average irrigation efficiency from the river to the crop (system efficiency) is about 26 percent (Wilson Water Group 2015).

The water conserved by the action alternatives would be gained after the water is diverted from the river and stored in reservoirs, but before the water is delivered to farm headgates. Assuming that on-farm efficiency using flood irrigation in the area is about 50 percent and that conveyance efficiency under the action alternatives is 76 percent, the average efficiency between the locations of the conserved water savings and the consumptive use of the crops would be about 38 percent. This efficiency factor was used to conservatively estimate the number of acres that could be irrigated with those savings. In other words, about 5 AF of conserved water from the middle of the Fire Mountain and Crawford systems would be required to fully irrigate 1 acre of crops.

Most of the water conserved by the improvements is likely to be used to irrigate the primary crops grown with water delivered by the FMC: orchards, grapes, and grass hay. Orchards and grass hay each account for approximately 37.5 percent of the canal's irrigated acreage while vineyards account for approximately 25 percent (Fletcher, pers. comm. 2020). The analysis modeled the benefits of the water conserved by the action alternatives assuming it would be used to produce peaches (representative of fruit orchards in the study area), grass hay, and grapes according to the existing distribution of land dedicated to each use. Gross income per acre and net income per acre for each crop were estimated following the process illustrated in Figure D-1 and described in further detail below.

Figure D-1. Development Process of Gunnison Basin Crop Budgets.



Grass Hay

The estimates of agricultural income per acre for grass hay are based on data developed for a 2020 regional study of the economics of a potential water demand management program in Western Colorado (BBC et al. 2020). That study included analysis of long-term average yields, prices, and operating expenses for irrigated grass hay in each of the major river basins in Western Colorado – including the Gunnison River Basin in which the proposed project is located. The estimated crop budget for grass hay in the Gunnison Basin is shown in Table D-8. Prices and costs shown in this table were estimated in 2020 dollars and updated to 2023 based on changes in the Consumer Price Index between 2020 and 2023.

Table D-8. Grass Hay Yields, Revenue, and Net Operating Income per Acre for Gunnison River Basin, Supplemental Plan-EA, Colorado (2023 $).

Year	Average Yield (tons/acre)	Average Price ($/ton)	Gross Revenue ($/acre)	Operating Expense ($/acre)	Net Operating Income ($/acre)
2018	2.40	$245	$587	$236	$352
2017	1.82	$206	$374	$112	$262
2016	1.97	$188	$370	$115	$255
2015	2.43	$173	$421	$124	$298
2014	2.44	$172	$420	$166	$254
2013	2.23	$294	$655	$179	$475
2012	1.87	$284	$532	$151	$381
2011	2.11	$260	$548	$170	$378
2010	2.06	$153	$316	$206	$109
2009	2.67	$184	$490	$282	$208
2016-18 Average	**2.06**	**$213**	**$443**	**$154**	**$290**
10-Year Average	**2.20**	**$215**	**$472**	**$174**	**$297**
NRCS Normalized Price[1]		**$225**	**$495**	**$174**	**$321**

Source: Yield data from the USDA National Agricultural Statistics Service Annual Surveys (USDA 2009-2018). Crop price data from Colorado State University (CSU) crop enterprise budgets. Western Colorado-specific prices were not available for 2011-2013 for grass hay, so statewide averages were used for those years. Operating expenses per ton in 2011-2013 are based on average expenses per ton from CSU crop enterprise budgets from 2009 to 2018. https://www.ers.usda.gov/data-products/normalized-prices/.

Orchards

The estimates of agricultural income per acre for orchards are based on information from Colorado State University Extension's Western Colorado Research Center (CSU Extension) and the USDA NASS Database. CSU Extension developed enterprise budgets for peach orchards in Western Colorado that were used as a representative orchard use given the prevalence and popularity of peaches grown in western Colorado. The budgets reflected operating costs for a representative orchard starting with site establishment and continuing until the end of the orchard's productive life, which occurred in year 20. The budgets assumed the orchard was established on open land with no improvements and where winter cold injury and spring frosts are minimal. The budgets also included the cost of site preparation, orchard planting, machinery, pest control, fertilization, operating interest, and marketing costs (Sharp et al. 2011).

This analysis averaged the lifetime costs of establishing and operating an orchard so that the average annual cost of production could be reported in Table D-9. The average annual cost was assumed to be fixed except for harvesting costs, which varied by the average annual yield shown in Table D-9. Crop yield data and crop price data were collected from the USDA NASS Database for the state of Colorado. Crop prices were adjusted for inflation and are all reported in 2023 dollars.

As Table D-9 shows, the average peach orchard yield is approximately 4.6 tons per year when calculated over a 10-year period. The average price per ton over that time was $2,753, which equates to an average annual gross revenue of $12,429 per acre. Average operating expenses were estimated to be approximately $11,102, which results in an average annual net operating income of $1,327 per acre.

Table D-9. Peach Orchard Yields, Revenue, and Net Operating Income per Acre for Gunnison River Basin, Supplemental Plan-EA, Colorado (2023 $).

Year	Average Yield (tons/acre)	Average Price ($/ton)	Gross Revenue ($/acre)	Operating Expense ($/acre)	Net Operating Income ($/acre)
2022	5.6	$2,692	$15,077	$11,156	$3,921
2021	4.6	$2,539	$11,679	$11,104	$575
2020	1.7	$3,328	$5,690	$10,951	-$5,261
2019	5.7	$2,783	$15,891	$11,161	$4,730
2018	6	$2,374	$14,243	$11,177	$3,066
2017	4.3	$2,608	$11,215	$11,088	$127
2016	5.5	$2,632	$14,447	$11,151	$3,296
2015	4.3	$2,948	$12,674	$11,088	$1,586
2014	5.1	$3,159	$16,142	$11,130	$5,012
2013	2.9	$2,468	$7,232	$11,014	-$3,782
2018-22 Average	**4.7**	**$2,743**	**$12,516**	**$11,110**	**$1,406**
10-Year Average	**4.6**	**$2,753**	**$12,429**	**$11,102**	**$1,327**

Source: Yield and price data from the USDA National Agricultural Statistics Service Annual Surveys (USDA 2013-2020). Operating expenses per acre are based on enterprise budgets of a representative peach orchard in Western Colorado developed by CSU Extension and averaged over a 20-year production life with variable costs that depend on yields.

Grapes

The estimates of agricultural income per acre for vineyards are based on information from the CSU Extension's Western Colorado Research Center and CSU's College of Agricultural Science's Wine Growers Survey (Caspari 2013). CSU Extension developed enterprise budgets for vineyards in Western Colorado (Sharp and Caspari 2010). The budgets reflected operating costs for a representative vineyard starting with site establishment and continuing until the end of the vineyard's productive life, which the budgets assume occur in year 20. The budgets assumed the vineyard is established on open land with no improvements and where winter cold injury and spring frosts are minimal. The budgets also included the cost of site preparation, vine planting, machinery, pest control, fertilization, and operating interest.

The analysis conducted in this study averaged the lifetime costs of establishing and operating a vineyard so that the average annual cost of production could be reported in Table D-10. The average annual cost was assumed to be fixed except for harvesting costs, which varied by the average annual yield shown in Table D-10. Yield and price data were also reported by CSU Extension. All price and cost data were updated to 2023 dollars using the Consumer Price Index.

As Table D-10 shows, the average grape yield for a vineyard is approximately 2.9 tons per year when calculated between 2013 and 2019. The average price per ton over that time is $2,100, which equates to an average gross revenue of $6,010 per acre. Average operating expenses were estimated to be approximately $4,193 per acre, which results in an average annual net operating income of $1,817 per acre.

Table D-10. Grape Yields, Revenue, and Net Operating Income per Acre for Gunnison River Basin, Supplemental Plan-EA, Colorado (2023 $).

Year	Average Yield (tons/acre)	Average Price ($/ton)	Gross Revenue ($/acre)	Operating Expense ($/acre)	Net Operating Income ($/acre)
2019	3.8	$1,974	$7,499	$4,386	$3,113
2018	3.9	$2,060	$8,035	$4,407	$3,628
2017	3.3	$2,165	$7,143	$4,282	$2,861
2016	3.2	$2,125	$6,799	$4,261	$2,537
2015	3.3	$2,143	$7,072	$4,282	$2,790
2014	1.1	$2,075	$2,282	$3,825	-$1,542
2013	1.5	$2,160	$3,239	$3,908	-$669
Average	**2.9**	**$2,100**	**$6,010**	**$4,193**	**$1,817**

Source: Yield and price data from CSU's College of Agricultural Science's Wine Growers Survey (2013-2016). Operating expenses per acre are based on enterprise budgets of a representative vineyard in Western Colorado developed by CSU Extension and averaged over a 20-year production life with variable costs that depend on yields.

Estimated Agricultural Income from Conserved Water Use

As shown in Table D-11, crop irrigation with the water that would be conserved by the improvements under Alternatives 2 and 3 is projected to produce more than $3.0 million per year in additional gross income for local farmers and ranchers, and about $517,000 per year in additional net income under Alternative 2 and $508,000 under Alternative 3 based on the agricultural income analyses conducted above.

Table D-11. Estimated Agricultural Income Generated from Use of Conserved Water from Alternatives 2 and 3, Supplemental Plan-EA, Colorado (2023 $).[1]

Alternative	Conserved Water (AF/year)	Irrigation per Acre (AF/year)	Acres Irrigated	Value per Acre		Annual Income Benefit	
				Gross Income	Net Income	Gross Income	Net Income
Fire Mountain Piping Project (Alternative 2)	826	5	165	$6,349	$1,072	$1,047,585	$176,880
Fire Mountain Piping Project (Alternative 3)	779	5	156	$6,349	$1,072	$990,444	$167,232
Fire Mountain Regulating Reservoir	1,050	5	210	$6,349	$1,072	$1,333,290	$225,120
Fire Mountain SCADA Network	350	5	70	$6,349	$1,072	$444,430	$75,040
Crawford SCADA Network	891	5	178	$6,349	$1,072	$1,130,122	$190,816
Total Alternative 2	**3,117**					**$3,995,427**	**$667,856**
Total Alternative 3	**3,088**					**$3,898,286**	**$658,208**

Note: Gross income and net income are based on a crop distribution of 37.5 percent peach orchards, 37.5 percent grass hay, and 25 percent vineyards.

D.7 Current NED Costs

Project costs include all expenses incurred as part of the development, installation, operation, and maintenance of a project. In addition, other direct costs and adverse effects must be accounted for.

Installation Costs. Preliminary engineering work on design, permitting, construction, and O&M requirements for the structures included as part of the action alternatives was completed by Stantec. The

cost estimates were allocated to particular cost categories, which included design and engineering, administration, and construction.

Installation costs were estimated using the bottom-up approach (Table D-12 through Table D-17). This method breaks projects and structures into lower-level components and then costs those components for their direct costs, including labor, materials, and professional services. In addition, installation cost estimates include a cost contingency of 20 percent for construction and indirect costs for design, engineering and project administration.

Table D-12. Estimated Installation Costs of the Fire Mountain Regulating Reservoir (Alternative 2-Coal Road Siphon), Supplemental Plan-EA, Colorado (2023 $).

ESTIMATE OF QUANTITIES					
Item #	**Description**	**Unit**	**Quantity**	**Unit Price**	**Amount**
INDIRECT COSTS					
1.	Engineering Design and Dam Safety Permitting	%		30%	$693,797[1]
2.	Permitting and Planning	LS	1	$61,000	$61,000
3.	Engineering Oversight During Construction	%		10%	$231,266
4.	Survey and Quality Assurance/Quality Control (QA/QC)	%		6%	$138,759
				Indirect Costs - Total	**$1,124,823**
CONSTRUCTION COSTS					
1.	Mobilization	%		6%	$128,481
2.	Bonding and Insurance	%		2%	$42,827
3.	Coal Road Re-route	LS	1	$50,000	$50,000
4.	Homogenous Embankment	CY	25,200	$12	$302,400
5.	Keyway Construction	CY	700	$18	$12,600
6.	Chimney and Blanket Drain	CY	1,300	$125	$162,500
7.	Riprap on Upstream Dam Face	CY	620	$120	$74,400
8.	Grade Beam with Staff Gage, Gate Stem, and Air Vent	LF	57	$350	$19,950
9.	Concrete Spillway, Reservoir	CY	165	$1,800	$297,000
10.	Pipe Spillway for Canal	LS	1	$95,000	$95,000
11.	72" Canal Pipe within Reservoir	LF	1,200	$430	$516,000
12.	36" Outlet Siphon Pipe	LF	900	$200	$180,000
13.	60" Pipe for Drop Structure	LF	100	$375	$37,500
14.	Outlet Control Structure with Gates	LS	1	$196,000	$196,000
15.	12" Low Level Dam Outlet, Concrete Encased	LF	240	$700	$168,000
16.	Reclamation	AC	10	$3,000	$30,000
				Construction Costs - Subtotal	**$2,312,658**
				Contingency (20%)	**$462,532**
				Total Construction Costs	**$2,775,190**
PROFESSIONAL SERVICES COSTS (Real Property)					
1.	Wetland Delineation	LS	1	$5,000	$5,000
2.	Environmental Permitting	LS	1	$5,000	$5,000
3.	Cultural Survey	LS	1	$5,000	$5,000
4.	Bureau of Land Management/Reclamation and Right-of-Way Acquisition	LS	1	$30,000	$30,000
				Total Professional Services Costs	**$45,000**
GRAND TOTAL					**$3,945,012**

[1]Total includes $250,000 in estimated cost for Reclamation review and approval.
Source: Applegate April 2023.

Table D-13. Estimated Installation Costs of the North Fork Pipeline Project (Alternative 2-Coal Road Siphon), Supplemental Plan-EA, Colorado (2023 $).

ESTIMATE OF QUANTITIES					
Item #	**Description**	**Unit**	**Quantity**	**Unit Price**	**Amount**
INDIRECT COSTS					
1.	Engineering Design and Dam Safety Permitting	%		5%	$337,233
2.	Permitting and Planning	LS	1	$15,000	$15,000
3.	Engineering Oversight During Construction	%		6%	$404,679
4.	Survey and QA/QC	%		2%	$134,893
				Indirect Costs - Total	**$891,805**
CONSTRUCTION COSTS					
1.	Mobilization	%		6%	$374,703
2.	Bonding and Insurance	%		2%	$124,901
3.	Regulating Pool Cut/Fill Grading	CY	500	$20	$10,000
4.	72" Pipeline Screen Intake Structure (relocated screen)	CY	50	$1,800	$90,000
5.	Canal Prep Grading	LF	13,800	$5	$69,000
6.	72" Canal Pipe Below Drop	LF	13,800	$430	$5,934,000
7.	User Turnouts	EA	10	$8,500	$85,000
8.	Modifications to Existing Screen Structure	LS	1	$50	$50
9.	Reclamation	AC	19	$3,000	$57,000
				Construction Costs - Subtotal	**$6,744,654**
				Contingency (20%)	**$1,348,931**
				Total Construction Costs	**$8,093,585**
PROFESSIONAL SERVICES COSTS					
1.	Wetland Delineation	LS	1	$10,000	$10,000
2.	Environmental Permitting	LS	1	$5,000	$5,000
				Total Professional Services Costs	**$15,000**
GRAND TOTAL					**$9,000,390**

Source: Applegate April 2023.

Table D-14. Estimated Installation Costs of the Fire Mountain Regulating Reservoir (Alternative 3-3300 Road), Supplemental Plan-EA, Colorado (2023 $).

ESTIMATE OF QUANTITIES					
Item #	**Description**	**Unit**	**Quantity**	**Unit Price**	**Amount**
INDIRECT COSTS					
1.	Engineering Design and Dam Safety Permitting	%		20%	$235,613
2.	Permitting	LS	1	$19,000	$19,000
3.	Land Purchase including Subdivision	Acre	19	$6,000	$114,000
4.	Engineering Oversight	%		12%	$141,368
5.	Survey and QA/QC testing	%		5%	$58,903
				Indirect Costs - Total	**$568,884**
CONSTRUCTION COSTS					
1.	Mobilization	%		6%	$65,448
2.	Bonding and Insurance	%		2%	$21,816
3.	Zoned Embankment	CY	24,000	$12.00	$288,000
4.	Keyway Construction	CY	8,000	$18.00	$144,000
5.	Riprap Lined Spillway	CY	925	$120.00	$111,000
6.	Riprap on Upstream Dam Face	CY	980	$120.00	$117,600
7.	30" Concrete Encased Dam Outlet with Upstream Slide Gate	LS	1	$189,750.00	$189,750
8.	Reservoir Inlet Structure	CY	15	$1,700.00	$25,500
9.	Grade Beam with Staff Gage, Gate Stem, and Air Vent	LF	57	$350.00	$19,950
10.	Outlet Control Structure with Gates	LS	1	$165,000.00	$165,000
11.	Reclamation	AC	10	$3,000.00	$30,000
12.	Mobilization	%		6%	$65,448
				Construction Costs - Subtotal	**$1,178,064**
				Contingency (20%)	**20%**
				Total Construction Costs	**$1,413,677**
PROFESSIONAL SERVICES COSTS					
1.	Wetland Delineation	LS	1	$2,500	$2,500
2.	Environmental Permitting	LS	1	$2,500	$2,500
3.	Cultural Survey	LS	1	$2,500	$2,500
				Total Professional Services Costs	**$7,500**
GRAND TOTAL					**$1,990,060**

Source: Applegate April 2023.

Table D-15. Estimated Installation Costs of the Fire Mountain Pipeline Project (Alternative 3-3300 Road), Supplemental Plan-EA, Colorado (2023 $).

ESTIMATE OF QUANTITIES					
Item #	**Description**	**Unit**	**Quantity**	**Unit Price**	**Amount**
INDIRECT COSTS-Engineering					
1.	Engineering Design and Dam Safety Permitting	%		5%	$316,696
2.	Permitting and Planning	LS	1	$15,000	$15,000
3.	Engineering Oversight During Construction	%		6%	$351,884
4.	Survey and QA/QC	%		2%	$117,295
				Indirect Costs - Total	**$800,875**
CONSTRUCTION COSTS					
1.	Mobilization	%		6%	$351,884
2.	Bonding and Insurance	%		2%	$117,295
3.	Regulating Pool Cut/Fill Grading	CY	500	$20	$10,000
4.	72" Pipeline Screen Intake Structure (relocated screen)	CY	50	$1,800	$90,000
5.	Canal Prep Grading	LF	13,000	$5	$65,000
6.	72" Canal Pipe Below Drop	LF	13,000	$430	$5,590,000
7.	User Turnouts	EA	7	$8,500	$59,500
8.	Modifications to Existing Screen Structure	LS	1	$5,240	$5,240
9.	Reclamation	AC	15	$3,000	$45,000
				Construction Costs - Subtotal	**$6,333,919**
				Contingency (20%)	**$1,172,948**
				Total Construction Costs	**$7,506,867**
PROFESSIONAL SERVICES COSTS					
1.	Wetland Delineation	LS	1	$5,000	$5,000
2.	Environmental Permitting	LS	1	$2,500	$2,500
				Total Professional Services Costs	**$7,500**
GRAND TOTAL					**$8,315,242**

Source: Applegate April 2023.

Table D-16. Estimated Installation Costs of the Fire Mountain SCADA System, Supplemental Plan-EA, Colorado (2023 $).

ESTIMATE OF QUANTITIES					
Item #	**Description**	**Unit**	**Quantity**	**Unit Price**	**Amount**
INDIRECT COSTS					
1.	Planning, Engineering, and Design	LS	1	$24,000	$24,000
				Indirect Costs - Total	**$24,000**
CONSTRUCTION COSTS					
1.	Construction	LS	1	$80,000	$80,000
				Construction Costs - Subtotal	**$80,000**
				Contingency	**$10,000**
				Total Construction Costs	**$90,000**
REPLACEMENT COSTS					
1.	Hardware Replacement (Year 20)	LS	1	$40,000	$40,000
2.	Hardware Replacement (Year 40)	LS	1	$40,000	$40,000
				Replacement Costs - Subtotal	**$80,000**
				Total Replacement Costs	**$80,000**
GRAND TOTAL					**$194,000**

Source: Applegate April 2023.

Table D-17. Estimated Installation Costs of the Crawford SCADA System, Supplemental Plan-EA, Colorado (2023 $).

ESTIMATE OF QUANTITIES					
Item #	**Description**	**Unit**	**Quantity**	**Unit Price**	**Amount**
CONSTRUCTION COSTS					
1.	Construction	LS	1	$708,375	$708,375
2.	Installation	LS	2	$236,125	$236,125
				Construction Costs - Subtotal	**$944,500**
				Total Construction Costs	**$944,500**
REPLACEMENT COSTS					
1.	Hardware Replacement (Year 20)	LS	1	$354,188	$354,188
2.	Hardware Replacement (Year 40)	LS	1	$354,188	$354,188
				Replacement Costs - Subtotal	**$708,376**
				Total Replacement Costs	**$708,376**
GRAND TOTAL					**$1,652,876**

Source: Applegate April 2023.

Other Direct Costs and Adverse Effects. According to the P&G:

> *Other direct costs and adverse effects include uncompensated losses caused by the installation, operation, maintenance, and replacement of a project or group of projects. These other direct costs and adverse impacts can include costs caused by downstream flood damages cause by channel modifications, levies, dikes, and other structures, erosion of land along streambanks created by dams that prevent sediment export downstream, and through lost use value of the land where flood mitigation structures are cited (NRCS 2014).*

The action alternatives would require operations, maintenance, and repair costs to support their functioning following construction and installation. However, these costs would be lower than the operations, maintenance, and repair costs that are required to operate the existing irrigation systems. The difference between the costs under existing and proposed conditions results in a reduction, which is quantified in the *Reduced Operations and Maintenance Costs* section above and included in the analysis as a project benefit.

Two components of the action alternatives would require replacement during the 52-year analysis period. SCADA hardware and electronic equipment generally have a lifespan of 10 to 20 years.[3] The analysis accounts for the replacement costs of the North Fork and Crawford subwatershed SCADA systems assuming that the hardware of both systems will be replaced at years 20 and 40 of the 52-year analysis period. In the North Fork subwatershed, the SCADA replacements costs are assumed to be equal to 50 percent of the construction costs, assuming the other 50 percent of costs are for labor to develop the sites where the SCADA equipment is located (Table D-16). In the Crawford subwatershed, the replacement costs are assumed to be equal to the original installation costs as shown in Table D-17.

D.8 Economic and Structural Tables

The results of the NED analysis for the action alternatives are compared against the No Action Alternative and serve as the best estimate of the additional economic value that would be created under the action alternatives. Results are presented using the Economic and Structural Tables (NWPM Part 506, NRCS 2014) as shown below.

[3] https://eaintegrator.com/how-to-eliminate-scada-obsolescence/

Table D-18 (NWPM 506.18, Economic Table 1) summarizes the installation costs using the cost information reported in Tables D-12 through Table D-17, above.

Table D-18. Economic Table 1—Estimated Installation Costs of Alternatives 2 and 3, Lower Gunnison River Basin, Colorado (2021 $).

Works of Improvement	Unit	Number			Estimated Cost (dollars)						
					Public Law 83-566 Funds			Other Funds			Total
		Federal Land	Non-Federal Land	Total	Federal Land	Non-Federal Land NRCS	Total	Federal Land	Non-Federal Land	Total	
Regulating Reservoir (Coal Road; Alternative 2)	Acres	16.15	0	16.15	$3,414,355	$0	$3,414,355	$808,177	$0	$808,177	$4,222,532
Regulating Reservoir (3300 Road; Alternative 3)	Acres	0	14.33	14.33	$0	$1,621,203	$1,621,203	$0	$510,268	$510,268	$2,131,471
FMC Piping (Coal Road; Alternative 2)	Acres	0.75	35.18	35.93	$157,995	$7,411,018	$7,569,013	$46,773	$2,193,963	$2,240,736	$9,809,749
FMC Piping (3300 Road; Alternative 3)	Acres	0.03	32.04	32.07	$6,550	$6,987,543	$6,994,093	$1,931	$2,069,967	$2,071,898	$9,065,991
FMC SCADA	Acres	5.03	0	5.03	$164,250	$0	$164,250	$46,750	$0	$46,750	$211,000
Crawford SCADA	Acres	5.92	7.01	12.93	$624,344	$739,299	$1,363,643	$208,115	$246,433	$454,548	$1,818,191
Total (Alternative 2)		27.84	42.19	70.33	$4,406,257	$8,165,004	$12,571,261	$1,030,339	$2,425,709	$3,456,048	$16,061,464
Total (Alternative 3)		10.98	53.38	64.36	$795,144	$9,348,045	$10,143,188	$256,796	$2,826,668	$3,083,464	$13,226,652

Notes: Totals may differ due to rounding.
Source: Applegate September 2023.

Table D-19 (NWPM 506.18, Economic Table 4) summarizes the estimated average annual NED costs for the action alternatives.

Table D-19. Economic Table 4—Estimated Average Annual NED Costs of Alternatives 2 and 3, Supplemental Plan-EA, Colorado (2023 $).[1]

Work of Improvement	Total Project Outlays (Amortization of Installation Cost)
Alternative 2	
Fire Mountain Regulating Reservoir (Coal Road)	$140,694
Fire Mountain Piping Project	$326,859
Fire Mountain SCADA Network	$8,132
Crawford SCADA Network	$72,616
Total (Alternative 2)	**$548,301**
Alternative 3	
Fire Mountain Regulating Reservoir (3300 Road)	$71,520
Fire Mountain Piping Project	$326,859
Fire Mountain SCADA Network	$8,132
Crawford SCADA Network	$72,616
Total (Alternative 3)	**$479,127**

Notes: Totals may not sum due to rounding.
[1]Price base: 2023 dollars, amortized over 52 years at a discount rate of 2.5 percent.
[2]Other direct costs include annual O&M associated with installation, operation, or replacement of project structures.
Source: Applegate April 2023.

The impact of the Supplemental Plan-EA on NED values is shown in Table D-20 (NWPM 506.18, Economic Table 5a). Table D-20 displays the discounted values of the annual benefits estimated earlier in Section D.5 of this report. The works of improvement would positively impact NED values. In total, the proposed works of improvement would create average annualized gross benefits equal to $896,618 and $875,676 per year for Alternatives 2 and 3, respectively. As Tables D-19 and D-20 demonstrate, agricultural-related benefits make up 100 percent of the total benefits of the project measures.

Table D-20. Economic Table 5a—Estimated Average Annual Benefits of Alternatives 2 and 3 of the Supplemental Plan-EA, Colorado (2023 $)[1].

Benefit	Agricultural-Related	Non-Agricultural-Related
On-site (Alternative 2)		
Reduced agricultural income damages	$645,328	0
Reduced O&M costs	$52,972	0
Reduced salinity and selenium mitigation costs	$198,318	0
Subtotal	$751,601	0
Total Quantified Benefits (Alternative 2)	$896,618	
On-site (Alternative 3)		
Reduced agricultural income damages	$636,006	0
Reduced O&M costs	$52,972	0
Reduced salinity and selenium mitigation costs	$186,698	0
Total Quantified Benefits (Alternative 3)	$875,676	

Notes: Totals may not sum due to rounding.
[1]Price base: 2023 dollars amortized over 52 years at a discount rate of 2.5 percent.
Source: Applegate March 2023.

Using the resulting benefits and costs from Table D-19 and Table D-20, Table D-21 (NWPM 506.21, Economic Table 6, NRCS 2014) presents a comparison of the NED average annualized benefits and average annualized costs for the Supplemental Plan-EA. In total, the proposed Supplemental Plan-EA will generate average annualized discounted benefits of $896,600 compared to average annualized discounted

costs of $548,300 for Alternative 2, for a benefit-cost ratio of 1.6. Under Alternative 3, annualized discounted benefits would be $875,676 compared to average annualized discounted costs of $479,127, for a benefit cost ratio of 1.8.

Table D-21. Economic Table 6—Comparison of Average Annualized NED Costs and Benefits, Supplemental Plan-EA, Colorado (2023 $).[1]

Works of Improvement	Agriculture-Related				Average Annual Benefit	Average Annual Cost	Benefit Cost Ratio
	Reduced Farm Income Damages	Reduced O&M Costs	Reduced Salinity Control Costs	Reduced Selenium Loading (pounds/year^{-1})			
Alternative 2							
Fire Mountain Regulating Reservoir	$218,293	$4,540	-		$222,833	$140,694	1.6
Fire Mountain Piping Project	$170,209	$13,345	$198,308	15	$381,862	$326,859	1.2
Fire Mountain SCADA Network	$74,539	$26,420	-		$100,961	$8,132	12.4
Crawford SCADA Network	$182,296	$8,667	-		$190,963	$72,616	2.6
Total Alternative 2	**$645,337**	**$52,972**	**$198,308**		**$896,618**	**$548,301**	**1.6**
Alternative 3							
Fire Mountain Regulating Reservoir	$218,293	$4,540	-		$222,833	$71,520	3.1
Fire Mountain Piping Project	$160,886	$13,345	$186,698	14.2	$360,929	$326,859	1.1
Fire Mountain SCADA Network	$74,539	$26,422	-		$100,961	$8,132	12.4
Crawford SCADA Network	$182,296	$8,667	-		$190,963	$72,616	2.6
Total Alternative 3	**$636,006**	**$52,972**	**$186,698**		**$875,676**	**$479,127**	**1.8**

Notes: Totals may not sum due to rounding.
[1]Price base: 2023 dollars amortized over 52 years at a discount rate of 2.5 percent.
Source: Applegate September 2023.

D.9 References

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