USDA
United States Department of Agriculture
Natural Resources Conservation Service

WATERSHED PLAN AND ENVIRONMENTAL ASSESSMENT FOR THE SILT WATER CONSERVANCY DISTRICT PROJECT UPPER COLORADO RIVER WATERSHED

United States Department of Agriculture, Natural Resources Conservation Service (Lead Federal Agency)

In Cooperation With

Silt Water Conservancy District (Sponsoring Local Organization)
Bureau of Reclamation
Bureau of Land Management
U.S. Army Corps of Engineers
Colorado Parks and Wildlife
U.S. Fish and Wildlife Service

June 2025

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Watershed Plan and Environmental Assessment for the Silt Water Conservancy District Project, Garfield County, Colorado

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

Cooperating Agencies: U.S. Department of the Interior, Bureau of Reclamation; U.S. Army Corps of Engineers.

Sponsoring Local Organization (SLO): Silt Water Conservancy District (SWCD).

Authority: This Watershed Plan and Environmental Assessment (Plan-EA) has been prepared under the authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law [P.L.] 83-566) (as amended) and in accordance with the National Environmental Policy Act (NEPA) of 1969, P.L. 91-190, as amended (42 United States Code [U.S.C.] 43221 et seq.).

Abstract: This Plan-EA for the SWCD Project will improve agricultural water management within the administrative boundaries of the SWCD (SWCD Area) in the Upper Colorado River Watershed. Lands in the SWCD Area are irrigated with water from East Rifle Creek and water released to the Colorado River from Green Mountain Reservoir. The location of portions of the Grass Valley Canal along steep slopes has led to issues with bank erosion, seepage, and degraded infrastructure, increasing the risk of system failure. The amount of irrigation water sourced from the Colorado River is currently limited by the existing pump system, which does not allow the SWCD to supply the full amount of water decreed for the SWCD Project out of Green Mountain Reservoir. This Plan-EA analyzes specific watershed protection measures to address these problems to reduce the potential for system failure and to allow SWCD to use the full amount of water decreed. The SWCD project measures installation cost is estimated to be $4,920,516, of which $1,074,205 would be paid by the SLO and other funding sources. The estimated amount to be paid through NRCS P.L. 83-566 funds is $3,846,311. This Plan-EA is intended to fulfill NEPA requirements and to be considered for authorization of P.L. 83-566 funding.

Comments: Comments and inquiries must be received by January 10, 2025. Submit comments and inquiries to: Blongshia Lindsay, NRCS Colorado State Office, Denver Federal Center Building 56, Room 2604, P.O. Box 25486 DFC, Denver, Colorado 80225; or e-mail to Blongshia.Lindsay@usda.gov.

Discrimination Clause: 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.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at How to File a Program Discrimination Complaint and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

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Silt Water Conservancy District Project
Watershed Agreement

between the
Silt Water Conservancy District (SWCD)
(Referred to herein as Sponsor)

and the

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
(Referred to herein as NRCS)

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsor for assistance in preparing a plan for works of improvement for the Silt Water Conservancy District/Upper Colorado River Watershed, State of Colorado, under the authority of the Watershed Protection and Flood Prevention Act, as amended (16 U.S.C. Sections 1001 to 1008, 1010, and 1012); 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, there has been developed through the cooperative efforts of the Sponsor and NRCS a watershed project plan and environmental assessment for works of improvement for the Silt Water Conservancy District/Upper Colorado River Watershed, State of Colorado, hereinafter referred to as the watershed project plan or plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through NRCS, and the Sponsor hereby agree on this watershed project plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this plan and including the following:

1. **Term.** The term of this agreement is for the installation period and evaluated life of the project (60 years) and does not commit NRCS to assistance of any kind beyond the end of the evaluated life.

2. **Costs.** The costs shown in this plan are preliminary estimates. Final costs to be borne by the parties hereto will be the actual costs incurred in the installation of works of improvement.

3. **Real Property.** The Sponsors will acquire such real property as will be needed in connection with the works of improvement. The amounts and percentages of the real property acquisition costs to be borne by the Sponsor and NRCS 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.

4. **Uniform Relocation Assistance and Real Property Acquisition Policies Act.** The Sponsor hereby agrees to comply with all of 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 Code of Federal Regulations [CFR] Part 24 and 7 CFR Part 21) when acquiring real property interests for this federally assisted project. If the Sponsor is legally unable to comply with the real property acquisition requirements, it agrees that, before any federal financial assistance is furnished, it will provide a statement to that effect, 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.

5. **Cost-Share for Watershed Work Plan.** The following table shows cost-share percentages and amounts for Watershed Work Plan implementation.

Cost-Share Table for Watershed Operation or Rehabilitation Measures					
Works of Improvement	**NRCS**		**Sponsor**		**Total**
Cost-Shareable Items	Cost	Percentage	Cost	Percentage	Cost
Construction					
Grass Valley Canal Piping and Reconstruction	$1,364,686	75	$454,895	25	$2,255,912
East Bypass and Pump Station	$1,457,296	75	$580,597	25	$2,322,387
Total Construction	$2,821,982	75	$940,661	25	$3,762,642
Relocation[1]	0	0	0	100	
Subtotal: Cost-Sharable Costs	**$2,821,982**		**$940,661**		**$3,762,642**
Non-Cost-Sharable Items[2,3]	Cost	Percentage	Cost	Percentage	Cost
Engineering Cost					
Grass Valley Canal Piping and Reconstruction	$369,916	100			
East Bypass and Pump Station	$278,148	100			
Total Engineering Costs	$648,065	100	$0	0	$648,065
NRCS Technical Assistance/Engineering		100	0	0	
Project Administration[4]					
Grass Valley Canal Piping and Reconstruction	$181,958	0	$36,392	100	
East Bypass and Pump Station	$194,306	0	$38,861	100	
Total Project Administration	$376,264	N/A	$75,253	N/A	$451,517
Permits	0		$0	100	
Water, Mineral and Other Resource Rights				100	
Real Property Rights[5]	0		$58,292	100	$58,292
Relocation, Beyond Required Decent, Safe, Sanitary[6]	0	0	0	100	
Non-Project Costs	0	0	0	100	
Subtotal: Non-Cost-Share Costs	**$1,024,329**		**$133,545**		**$1,157,874**
Total:	**$3,846,311**		**$1,074,205**		**$4,920,516**

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. The Sponsors and NRCS will each bear the costs of project administration that each incurs. Sponsor costs for project administration include relocation assistance advisory service.
3. If actual non-cost-sharable item expenditures vary from these figures, the responsible party (SWCD) will bear the change.
4. The Sponsors will acquire with other than Watershed Protection and Flood Prevention Act funds, such real property as will be needed in connection with the works of improvement. The value of real property is eligible as in-kind contributions toward the Sponsors' share of the works of improvement costs. In no case will the amount of an in-kind contribution exceed the Sponsors' share of the cost for the works of improvement. The maximum cost eligible for in-kind credit is the same as that for cost sharing.
5. Relocation payments for the cost of improvements beyond decent, safe and sanitary requirements is a nonproject cost ineligible for assistance under the act.

6. **Land Treatment Agreements.** The Sponsor will obtain agreements from owners of not less than 50 percent of the land above each multiple-purpose and floodwater-retarding structure. These agreements must provide that the owners will carry out farm or ranch conservation plans on their land. The Sponsors will ensure that 50 percent of the land upstream of any retention reservoir site is adequately protected before construction of the dam. The Sponsors will provide assistance to landowners and operators to ensure the installation of the land treatment measures shown in the watershed project plan. The Sponsors 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.

7. **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.

8. **Water and Mineral Rights.** The Sponsor will acquire or provide assurance that landowners or resource users have acquired such water, mineral, and other natural resources rights pursuant to state law as may be needed in the installation and operation of the works of improvement.

9. **Permits.** The Sponsor will obtain and bear the cost for all necessary federal, state, and local permits required by law, ordinance, or regulation for installation of the works of improvement.

10. **NRCS Assistance.** This agreement is not a fund-obligating document. Financial and other assistance to be furnished by NRCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.

11. **Additional Agreements.** Separate agreements will be entered into between NRCS and the Sponsor before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

12. **Amendments.** This Plan-EA may be amended or revised only by mutual agreement of the parties hereto, except that NRCS may deauthorize or terminate funding at any time it determines that the Sponsor has failed to comply with the conditions of this agreement or when the program funding or authority expires. In such case, NRCS must promptly notify the Sponsor in writing of the determination and the reasons for the deauthorization of project funding, together with the effective date. Payments made to the Sponsor or recoveries by NRCS must be in accordance with the legal rights and liabilities of the parties when project funding has been deauthorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between NRCS and the Sponsor, having specific responsibilities for the measure involved.

13. **Prohibitions.** No member of or delegate to Congress, or resident commissioner, may be admitted to any share or part of this Plan-EA, or to any benefit that may arise therefrom; but this provision may not be construed to extend to this agreement if made with a corporation for its general benefit.

14. **Operation and Maintenance (O&M).** The Sponsor will be responsible for the operation, maintenance, and any needed replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with an O&M agreement. An O&M agreement will be entered into before federal funds are obligated and will continue for the project life (50 years). Although the Sponsor's responsibility to the federal government for O&M ends when the O&M agreement expires, which is upon completion of the evaluated life of measures covered by the agreement, the Sponsor acknowledges that continued liabilities and responsibilities associated with works of improvement may exist beyond the evaluated life..

15. **Emergency Action Plan.** Prior to construction, the Sponsor must prepare an Emergency Action Plan (EAP) for each dam or similar structure where failure may cause loss of life or as required by state and local regulations. The EAP must meet the minimum content specified in the NRCS Title 180, National Operation and Maintenance Manual, Part 500, Subpart F, Section 500.52, and meet applicable state agency dam safety requirements. The NRCS will determine that an EAP is prepared prior to the execution of fund-obligating documents for construction of the structure. EAPs must be reviewed and updated by the Sponsors annually.

16. **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, employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, 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.

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    By signing this agreement, the recipient assures the USDA 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.

17. **Certification Regarding Drug-Free Workplace Requirements** (7 CFR Part 3021). By signing this Plan-EA, the Sponsor is providing the certification set out below. If it is later determined that the Sponsor knowingly rendered a false certification, or otherwise violated the requirements of the Drug-Free Workplace Act, the NRCS, in addition to any other remedies available to the federal government, may take action authorized under the Drug-Free Workplace Act.

Controlled substance means a controlled substance in Schedules I through V of the Controlled Substances Act (21 U.S.C. Section 812) and as further defined by regulation (21 CFR Sections 1308.11 through 1308.15);

Conviction means a finding of guilt (including a plea of *nolo contendere)* or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the federal or state criminal drug statutes;

Criminal drug statute means a federal or nonfederal criminal statute involving the manufacturing, distribution, dispensing, use, or possession of any controlled substance;

Employee means the employee of a grantee directly engaged in the performance of work under a grant, including: (i) all direct charge employees; (ii) all indirect charge employees unless their impact or involvement is insignificant to the performance of the grant; and, (iii) temporary personnel and consultants who are directly engaged in the performance of work under the grant and who are on the grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g., volunteers, even if used to meet a matching requirement; consultants or independent contractors not on the grantees' payroll; or employees of subrecipients or subcontractors in covered workplaces).

Certification:

A. The Sponsor certifies that they will or will continue to provide a drug-free workplace by-

(1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition.

(2) Establishing an ongoing drug-free awareness program to inform employees about-

(a) The danger of drug abuse in the workplace;
(b) The grantee's policy of maintaining a drug-free workplace;
(c) Any available drug counseling, rehabilitation, and employee assistance programs; and
(d) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.

(3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (1).

(4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee must-

(a) Abide by the terms of the statement; and
(b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction.

(5) Notifying the NRCS in writing, within 10 calendar days after receiving notice under paragraph (4)(b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the federal agency has designated a central point for the receipt of such notices. Notice must include the identification numbers of each affected grant.

(6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4)(b), with respect to any employee who is so convicted-

(a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or

(b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a federal, state, or local health, law enforcement, or other appropriate agency.

(7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6).

B. The Sponsor may provide a list of the sites for the performance of work done in connection with a specific project or other agreement.

C. Agencies will keep the original of all disclosure reports in the official files of the agency.

18. **Certification Regarding Lobbying** (7 CFR Part 3018) (for projects greater than $100,000)

A. The Sponsor certifies to the best of their knowledge and belief that:

(1) No federal appropriated funds have been paid or will be paid, by or on behalf of the Sponsors, to any person for influencing or attempting to influence an officer or employee of an agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, the undersigned must complete and submit Standard Form LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The Sponsor must require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients must certify and disclose accordingly.

B. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by United States Code, Title 31, Section 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

19. **Certification Regarding Debarment, Suspension, and Other Responsibility Matters-Primary Covered Transactions (7 CFR Part 3017).**

A. The Sponsor certifies to the best of their knowledge and belief that they and their principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any federal department or agency;

(2) Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state, or local) transaction or contract under a public transaction; violation of federal or state antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity {federal, state, or local) with commission of any of the offenses enumerated in paragraph A(2) of this certification; and

(4) Have not within a 3-year period preceding this application/proposal had one or more public transactions (federal, state, or local) terminated for cause or default.

B. Where the primary Sponsor is unable to certify to any of the statements in this certification, such prospective participant must attach an explanation to this agreement.

20. **Clean Air and Water Certification.**

A. The project sponsoring organizations signatory to this agreement certify as follows:

(1) Any facility to be used in the performance of this proposed agreement is (_), is not (X) listed on the Environmental Protection Agency (EPA) List of Violating Facilities.

(2) To promptly notify the NRCS-State administrative officer prior to the signing of this agreement by NRCS, of the receipt of any communication from the Director, Office of Federal Activities, U.S. Environmental Protection Agency, indicating that any facility that is proposed for use under this agreement is under consideration to be listed on the EPA List of Violating Facilities.

(3) To include substantially this certification, including this subparagraph, in every nonexempt subagreement.

B. The project sponsoring organizations signatory to this agreement agree as follows:

(1) To comply with all the requirements of Section 114 of the Clean Air Act as amended (42 U.S.C. Section 7414) and Section 308 of the Federal Water Pollution Control Act (33 U.S.C. Section 1318) relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in Section 114 and Section 308 of the Air Act and the Water Act, issued thereunder before the signing of this agreement by NRCS.

(2) That no portion of the work required by this agreement will be performed in facilities listed on the EPA List of Violating Facilities on the date when this agreement was signed by NRCS unless and until the EPA eliminates the name of such facility or facilities from such listing.

(3) To use their best efforts to comply with clean air standards and clean water standards at the facilities in which the agreement is being performed.

(4) To insert the substance of the provisions of this clause in any nonexempt subagreement.

C. The terms used in this clause have the following meanings:

(1) The term "Air Act" means the Clean Air Act, as amended (42 U.S.C. Section 7401 et seq.).

(2) The term "Water Act" means the Federal Water Pollution Control Act, as amended (33 U.S.C. Section 1251 et seq.).

(3) The term "clean air standards" means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements that are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in Section 110 of the Air Act (42 U.S.C. Section 7414), or an approved implementation procedure under Section 112 of the Air Act (42 U.S.C. Section 7412).

(4) The term "clean water standards" means any enforceable limitation, control, condition, prohibition, standards, or other requirement that is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the EPA or by a state under an approved program, as authorized by Section 402 of the Water Act (33 U.S.C. Section 1342), or by a local government to assure compliance with pretreatment regulations as required by Section 307 of the Water Act (33 U.S.C. Section 1317).

(5) The term "facility" means any building, plant, installation, structure, mine, vessel or other floating craft, or location or site of operations owned, leased, or supervised by the Sponsor, to be used in the performance of an agreement or subagreement. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location will be deemed to be a facility except where the Director, Office of Federal Activities, EPA, determines that independent facilities are collocated in one geographical area.

21. **Assurances and Compliance.** As a condition of the grant or cooperative agreement, the Sponsor assures and certifies that it is in compliance with and will comply in the course of the agreement with all applicable laws, regulations, executive orders, and other generally applicable requirements, including those set out below, which are hereby incorporated in this agreement by reference, and such other statutory provisions as a specifically set forth herein.

    State, Local, and Indian Tribal Governments: Office of Management and Budget (0MB) Circular Nos. A-87, A-102, A-129, and A-133; and 7 CFR Parts 3015, 3016, 3017, 3018, 3021, and 3052.

    Nonprofit Organizations, Hospitals, Institutions of Higher Learning: 0MB Circular Nos. A-110, A-122, A-129, and A-133; and 7 CFR Parts 3015, 3017, 3018, 3019, 3021, and 3052.

22. **Examination of Records.** The Sponsor must give the NRCS or the Comptroller General, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to this agreement, and retain all records related to this agreement for a period of 3 years after completion of the terms of this agreement in accordance with the applicable 0MB Circular.

23. **Signatures.**

Silt Water Conservancy District

The signing of this Plan-EA was authorized by a resolution by the **Silt Water Conservancy District** governing body and adopted at an official meeting held on

APRIL 16TH, 2025 at Silt, Colorado.

By: _____ Date: 04/16/2025

CHARLES R. TERRELL, President, Silt Water Conservancy District

USDA-NATURAL RESOURCES CONSERVATION SERVICE

Approved by: Date:

CLINTON EVANS

Digitally signed by CLINTON EVANS
Date: 2025.06.16 15:27:40 -06'00'

Clinton Evans, State Conservationist
Natural Resources Conservation Service

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Summary (OMB Fact Sheet)

Watershed Plan and Environmental Assessment
for
The Silt Water Conservancy District Project
Garfield County, Colorado
Third Congressional District
Authorization: Public Law 83-566 Stat. 666, as amended (16 U.S.C. Section 1001 et seq.) 1954.
Sponsor: Silt Water Conservancy District (SWCD); eligible as outlined in the National Watershed Program Manual (NWPM), Part 500, Section 500.11.
Proposed Action: The Preferred Alternative consists of irrigation water improvement measures to prevent system failure, improve water supply and management, address degraded infrastructure, and decrease the infrastructure damage costs in the SWCD. The Grass Valley Canal (GVC) brings water into the system from East Rifle Creek and is critical to maintaining water levels in Harvey Gap Reservoir and to serving irrigators along the canal itself, along the Dry Elk Lateral, and throughout the SWCD downstream of Harvey Gap Reservoir. Several key components of the system, including the return flow gate and canal shut-off near the intake, tunnels constructed more than 100 years ago, and sections of open canal along steep side slopes, are marginally functional and at risk of failing. Under the Preferred Alternative, priority measures have been selected, addressing the need to improve irrigation water control and mitigate potential system failure and disruptions to water supplies serving irrigation and recreation in the SWCD. Along the GVC, the project would replace a flow control gate near the headgate along East Rifle Creek, shore up high-risk rock tunnel inlet/outlet areas downstream of the headgate, target four high-risk areas downstream of the tunnels for piping, and reconstruct an abandoned section of the GVC near Harvey Gap Reservoir. A new connecting bypass pressurized pipeline between the Silt Pump Canal and the Farmers Irrigation Company East Lateral would allow the SWCD to add an average of 1,300 more acre-feet (AF) of water into the system annually that is currently being stored 70 miles away in Green Mountain Reservoir.
Purpose and Need for Action: The purpose of the SWCD Watershed Plan is to reduce system failure risk, increase climate change and drought resilience, improve system efficiency, and reduce infrastructure damage costs. The project would further the conservation and proper use of the land, as defined in Title 390, NWPM, Part 500, Section 500.3, Subpart A, and address the Agricultural Water Management Purpose (Purpose 5) of the eight purposes listed in Title 390, NWPM, Part 500, Section 500.3, Subpart B. The need for the project is the high risk of system failure, degraded infrastructure, underutilized water supply in the SWCD, and water loss in the conveyance system.
Preferred Alternative/Plan: Alternative 2 is the Preferred Alternative and consists of modifications to the GVC and construction of a new pump station and bypass pipeline between the Silt Pump Canal and the Farmers Irrigation Company East Lateral.
Project Measures: The Preferred Alternative (Alternative 2) would: • Reconstruct an existing flow control gate near East Rifle Creek to control flows into the GVC to improve functionality and water delivery. • Reconstruct the tunnel inlets and outlets at three locations south of the headgate along the GVC where tunnel ends are subject to caving or rockfalls, creating a blockage, flooding, and risk of system failure.

- Pipe a total of 2,605 feet of open canal along four hazardous and steep sections of the canal to prevent system failure.
- Rebuild the GVC around Harvey Gap Reservoir by constructing a 4-foot-wide, 2,827-foot-long ditch along the historic GVC alignment to provide a functional bypass to downstream irrigators as needed for water flows and water management and to allow for future work on the dam and reservoir (GVC Bypass Rebuild).
- Install 8,925 linear feet of plastic pipe to connect the Silt Pump Canal and the East Lateral, creating capacity to bring an additional 1,300 AF of SWCD water into the system annually. The project would benefit water levels at Harvey Gap Reservoir and irrigation water users in the SWCD. Additionally, pumps to pressurize the new pipeline would be installed in a 12-foot by 10-foot building near the Silt Pump Canal inlet (East Bypass Pipeline and Pump Station).

Resource Information:

Latitude and Longitude: Coordinates for the SWCD Area are provided below.

Latitude	Longitude
39.6514	-107.6907

Eight-Digit Hydrologic Unit Code Numbers: 14010005—Colorado Headwaters—Plateau.

Climate and Topography: The Watershed Plan Area lies mostly in the semiarid benchlands and canyonlands, shale deserts and sedimentary basins, and mid-elevation forests of the Colorado Plateaus Ecoregion (Chapman et al. 2006). In the Watershed Plan Area, the elevation of the SWCD Area ranges from approximately 5,250 to 7,900 feet above sea level.

Watershed Size (acres): The project area is 56,465 acres encompassed by the SWCD administrative boundary in the 243,913-acre watershed comprising Hydrologic Unit Codes 140100050-203, 501, 502, 503, 504, 505, 603, 604, and 701.

Land Uses (acres): The entire 56,465-acre SWCD Area is in Garfield County, and land uses in this area are subject to county zoning ordinances. With the exceptions of Rifle and Silt, the SWCD Area is primarily zoned as rural or public lands. In the SWCD Area, 33,552 acres are privately held, 1,354 acres are state-local, and 21,559 acres are federal. Primary land uses in the SWCD Area include private agricultural development and associated rural residences, managed Bureau of Land Management (BLM) land (e.g., livestock grazing and wildlife habitat), oil and gas extraction, and public and private recreation areas. The dominant agricultural land uses include grazing and pasture lands and irrigated cropland (primarily for hay and alfalfa). One BLM Area of Critical Environmental Concern (Grand Hogback) is located in the SWCD Area but does not overlap project area components.

Landownership: Landownership across the watershed is 59.4 percent (33,552 acres) private, 2.4 percent (1,354 acres) state-local, and 38.2 percent (21,559 acres) federal.

Population and Demographics: Project components are proposed to occur in Garfield County, Colorado, where the two most notable towns are Rifle and Silt. The populations of Rifle, Silt, and Garfield County are predominantly white; all other races account for 32 to 34.5 percent of the population. Rifle, Silt, and Garfield County contain a greater percentage of persons identifying as Hispanic or Latino than the state average. The state of Colorado exceeds the national level in the number of persons identifying as Hispanic or Latino.

Due to the spike in unemployment from the COVID-19 pandemic and labor changes due to the outbreak, 2019 and 2020 labor force characteristic data were evaluated. In 2019, unemployment in Garfield County was similar to the state average. In 2020, the unemployment rate in Garfield County was 6.8 percent, which was 0.5 percent lower than that in the state of Colorado at 7.3 percent. Median household income in Garfield County is above the median for the state of Colorado. The percentage of persons living below the poverty level in Garfield County is comparable to, but below, the state average.

Resource Concerns Identified Through Scoping: Based on the input received during the scoping phase for this Plan-EA, several resource concerns were identified relevant to the purpose and need: potential impacts on soil, geology, water, air, vegetation, wetlands and riparian areas, wildlife, cultural and historic resources, paleontology, land use, recreation, scenic beauty and visual resources, and socioeconomics. 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.

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

Components of Each Alternative: Under the No Action Alternative, the SWCD would continue to operate and maintain the irrigation system in its current condition. Alternative 1 consists only of the GVC components. The Preferred Alternative (Alternative 2) consists of the GVC components and the East Bypass Pipeline and Pump Station water improvement measures to prevent system failure, improve water supply and management, and address degrading infrastructure in the SWCD.

Mitigation Measures: Cultural resource mitigation will be completed as required by the Memorandum of Agreement (MOA) among the NRCS, the SWCD, and Colorado State Historic Preservation Office. No compensatory mitigation is anticipated to be required for the Preferred Alternative.

Project Costs	**P.L. 83-566 Funds**		**Other Funds**		**Total**	
Construction	$2,821,982	75%	$940,661	25%	$3,762,642	100%
Engineering	$648,065	100%	0	N/A	$648,065	100%
Land Treatment	0		0		0	
Mitigation	0		0		0	
Real Property Rights	0	N/A	0	100%	0	
Permits	0	N/A	0	100%	0	
Relocation	0	N/A	0	100%	0	
Water Rights	0	N/A	0	100%	0	
Project Administration (NRCS-Administered)	$376,264	100%		N/A	$376,264	100%
Project Administration (Sponsor-Administered)		N/A	$75,253		$75,253	100%
TOTAL COSTS	$3,846,311	75%	$1,074,205	25%	$4,920,516	100%

TOTAL COSTS: $4,920,516

Project Benefits: For the SWCD, the Preferred Alternative (Alternative 2) would benefit the Watershed Plan Area and SWCD Area by increasing water supply to guard against drought, improve agricultural water use and water management efficiency, and reduce and mitigate erosional damage and system failure. It would address the project's general purpose to further the conservation, development, use, and disposal of water; and further the conservation and proper use of the land, as defined in Title 390.

Number of Direct Beneficiaries (Onsite – Offsite): In the SWCD, it is estimated by the project Sponsor that up to approximately 500 individual agricultural producers would benefit from this project, as well as 49,501 average annual recreation visitors to Harvey Gap Reservoir.

Other Beneficial Effects in Physical Terms: Long-term, minor to major, beneficial impacts on farmland health and productivity, water quality, soil quality, and fish and wildlife habitat would result from implementation of the Preferred Alternative.

Benefit to Cost Ratio (authorized rate): 1.8

Benefit to Cost Ratio (current rate): 1.8

National Economic Evaluation: The benefit categories calculated for the Preferred Alternative are:

Agricultural:

Reduced Infrastructure Damage: $111,800

Reduced Crop Yield Damages: $92,500

Avoided Maintenance Costs: not quantified

Additional Crop Yields: $95,400

Non-Agricultural:

Additional Recreation Use: not quantified

Avoided Recreation Damages: not quantified

Total Benefit, Average Annual: $299,700

Net Benefit: $133,900

Funding Schedule (budget year + 10):

2025 to 2035 for federal funds and nonfederal funds

Period of Analysis: 52 years

Project Life: 50 years

Environmental Effects, Impacts:

Soils: Short-term minor adverse impacts on soil during construction activities and permanent impacts on 0.36 acre. Long-term moderate beneficial impacts on soil resources from increased water supply for irrigation; reduction of erosion and sedimentation issues associated with the current irrigation systems.

Farmlands: No impacts on the acreage of farmlands classified as prime; however, the project would ensure reliable irrigation of farmlands, and more water supply in the system would extend the irrigation season and improve farmland productivity.

Geology: Geological hazards addressed along the GVC. No adverse impact on other geologic features, minerals, or oil and gas resources in the project area.

Water: Minor beneficial impacts on water flows in East Rifle Creek, and moderate beneficial impacts on reservoir levels for Rifle Gap Reservoir and Harvey Gap Reservoir. No impacts on water rights. Minor to negligible impacts on other water resources including groundwater, waters of the U.S., and floodplain management. Benefit to stream and river flows during periods of prolonged drought. Increased disaster resiliency.

Air Quality: Project construction activities would result in a negligible contribution to carbon emissions.

Vegetation: Short-term minor adverse impacts on vegetation during construction. Long-term moderate beneficial impacts on wetlands and riparian habitat along East Rifle Creek from improvements in water flows and along the vegetated perimeter around Rifle Gap and Harvey Gap Reservoirs from greater water storage.

Wildlife: Short-term minor adverse impacts on wildlife habitat during construction. Long-term moderate beneficial impacts on fish and aquatic species habitat from improvements in water flows in East Rifle Creek and from higher water levels in Harvey Gap Reservoir. Temporary adverse effects on fish and amphibians from reservoir drawdown during sediment removal may occur, including sediment mobilization in the water column near work areas.

Cultural and Historical Resources: Long-term adverse impacts on the GVC. Acceptable treatment for the adverse effects has been determined and agreed upon by all consulting parties through a MOA.

Resources of Scientific Value Other Than Cultural Resources: Potential long-term impacts on paleontological resources. Potential impacts would be mitigated during ground-disturbing activities in areas with a high potential fossil yield.

Land Use: Short-term negligible impacts on private, state-managed, and BLM-managed lands during construction. Long-term moderate beneficial impacts on agricultural land uses due to increased water storage and delivery capacity. An easement on private land would be required for the East Bypass Pipeline and Pump Station. Negligible or minor impacts on rangeland. **Recreation:** Short-term negligible impacts during construction, including traffic and access disruption. Beneficial impacts due to higher water levels for longer periods in reservoirs leading to additional recreation user days. **Scenic Beauty and Visual Resources:** Short-term minor adverse impacts would be expected during construction and for a few months after due to vegetation removal/disturbance. **Socioeconomics:** Short-term beneficial impacts on the local economy from expenditures on local labor and farm income that would primarily be paid for by taxes levied on regional and national taxpayers. No increase in tax burden expected as a direct result of the proposed project. Long-term beneficial impacts on agriculture economy from reliable irrigation water supply. Additional crop yields and avoidance of agricultural crop loss would result.
Major Conclusions: Major beneficial impacts on the local economy and environment due to avoided infrastructure damages, avoided crop yield damages from drought or water delivery shortfall, and additional crop yields.
Areas of Controversy/Controversial Issues: There are no areas of controversy or controversial issues.
Issues to Be Resolved: Constraints and challenges of infrastructure management and improvement by local ditch companies, and aging infrastructure and safety and efficiency issues.
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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Chapter 1. Introduction

1.1 Background and Decision Framework

The Silt Water Conservancy District (SWCD) has engaged with the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service, Colorado (NRCS) to obtain technical and financial assistance for improving irrigation infrastructure within SWCD boundaries. This Watershed Plan and Environmental Assessment (Plan-EA) has been prepared to assess and disclose the costs, benefits, and environmental impacts of alternatives for project measures in the SWCD. This Plan-EA is required for the SWCD to request federal funding through the Watershed Protection and Flood Prevention Program, Public Law (P.L.) 83-566, authorized by Congress in 1954. The NRCS manages this program to provide technical and financial assistance to various types of project sponsors including states, local governments, water districts, and tribes. Project types include flood prevention and damage reduction; development of rural, municipal, and industrial water supply sources; irrigation and water management; erosion and sediment control; fish and wildlife enhancement; wetland creation and restoration; and increased recreational opportunities.

The NRCS is the Lead Federal Agency for this Plan-EA and is responsible for issuance of a decision in accordance with the National Environmental Policy Act (NEPA). The U.S. Bureau of Reclamation (Reclamation) action would be to issue a temporary access permit for the construction on Reclamation lands. Reclamation plans to cover NEPA requirements in a Categorical Exclusion that references the Plan-EA once SWCD submits the SF-299 requesting the permit. This Plan-EA has been prepared in accordance with applicable Council on Environmental Quality (CEQ) regulations implementing NEPA at 40 Code of Federal Regulations (CFR) 1500–1508, the 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 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 2014).

The purpose of this Plan-EA is to adequately disclose baseline conditions; affected environment; and the magnitude, type, and location of potential effects of proposed incremental project features that are collectively considered the Preferred Alternative. This Plan-EA serves to fulfill the NEPA, National Historic Preservation Act (NHPA), and NRCS environmental review requirements of the Preferred Alternative, as described in **Section 5.3.3**. Should any project component of the Preferred Alternative deviate from its description in **Section 5.3.3**, a project-component-specific Environmental Evaluation will need to be completed and documented on a NRCS CPA-52 worksheet. Based on the results of the Environmental Evaluation, the Plan-EA changes shall follow the policy set forth in NWPM Part 503 Watershed Project Plan Modifications.

The SWCD is considered the Sponsoring Local Organization (SLO) on this Plan-EA as defined in NWPM, Part 500, Section 500.11. The NRCS is able to deliver assistance to the SWCD Plan-EA Project through the authorities and rules of the Watershed Protection and Flood Prevention Act (P.L. 83-566) program.

The Bureau of Reclamation (Reclamation), Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (USFWS), U.S. Army Corps of Engineers (USACE), and Colorado Parks and Wildlife (CPW) are cooperating or consulting agencies on this Plan-EA. Because portions of the project overlap BLM-managed lands, this Plan-EA also conforms with BLM planning considerations. Primary partners specific to this Plan-EA include the SWCD and the Farmers Irrigation Company (FICo).

1.2 Project Overview

1.2.1 Watershed Plan Area, SWCD Area, and Current Infrastructure

For the purposes of this Plan-EA, the project area is 56,465 acres encompassed by the SWCD administrative 56,465-acre boundary within the 243,913-acre watershed comprising Hydrologic Unit Codes 14010005-203, 501, 502, 504, 503, 505, 603, 604, and 701. The "SWCD Area" is the subarea including all of the SWCD's administrative boundaries within the SWCD Area. The SWCD Area includes (in order of dominance) privately owned lands, BLM-managed lands, state and state-managed lands, U.S. Forest Service (USFS) lands, and Reclamation lands, totaling 56,465.31 acres (**Table 1-1**). The USFS Rifle Ranger District Office is located on the small area of USFS lands in the SWCD Area (4.84 acres); none of the SWCD active infrastructure crosses USFS lands, and the USFS is not a cooperating or consulting agency on the project.

Table 1-1. Landownership.

Owner	Acres	Percentage (%)
Private	33,552.4	59.4
BLM	19,952.28	35.4
Local, State-Managed	1,332.69	2.4
State-Owned	21.32	<0.05
USFS	4.84	<0.05
Reclamation	1601.79	2.8
TOTAL	56,465.32	100

The SWCD operates and maintains an integrated system of diversion, collection, pumping, storage, and distribution facilities, including serving as a contracted agent of Reclamation for the Silt Project (Rifle Gap Dam and Reservoir, a pumping plant and lateral system, and Davie Ditch) and operating the Grass Valley Canal (GVC) and Harvey Gap Reservoir under legal agreement to the FICo. Water from the Harvey Gap Reservoir is distributed to the East and West Laterals of the FICo Ditches and the Silt Pump Canal via Harvey Gap. The integrated system operated by the SWCD supports approximately 500 producers that irrigate more than 6,000 acres across the service area with significant local and regional economic benefits (see **Figure 1-1** for a schematic of the current infrastructure; the numbers represent headgates and are in order of direction of flow). The system is tributary to a significant portion of USFWS-designated critical habitat for four endangered fishes.

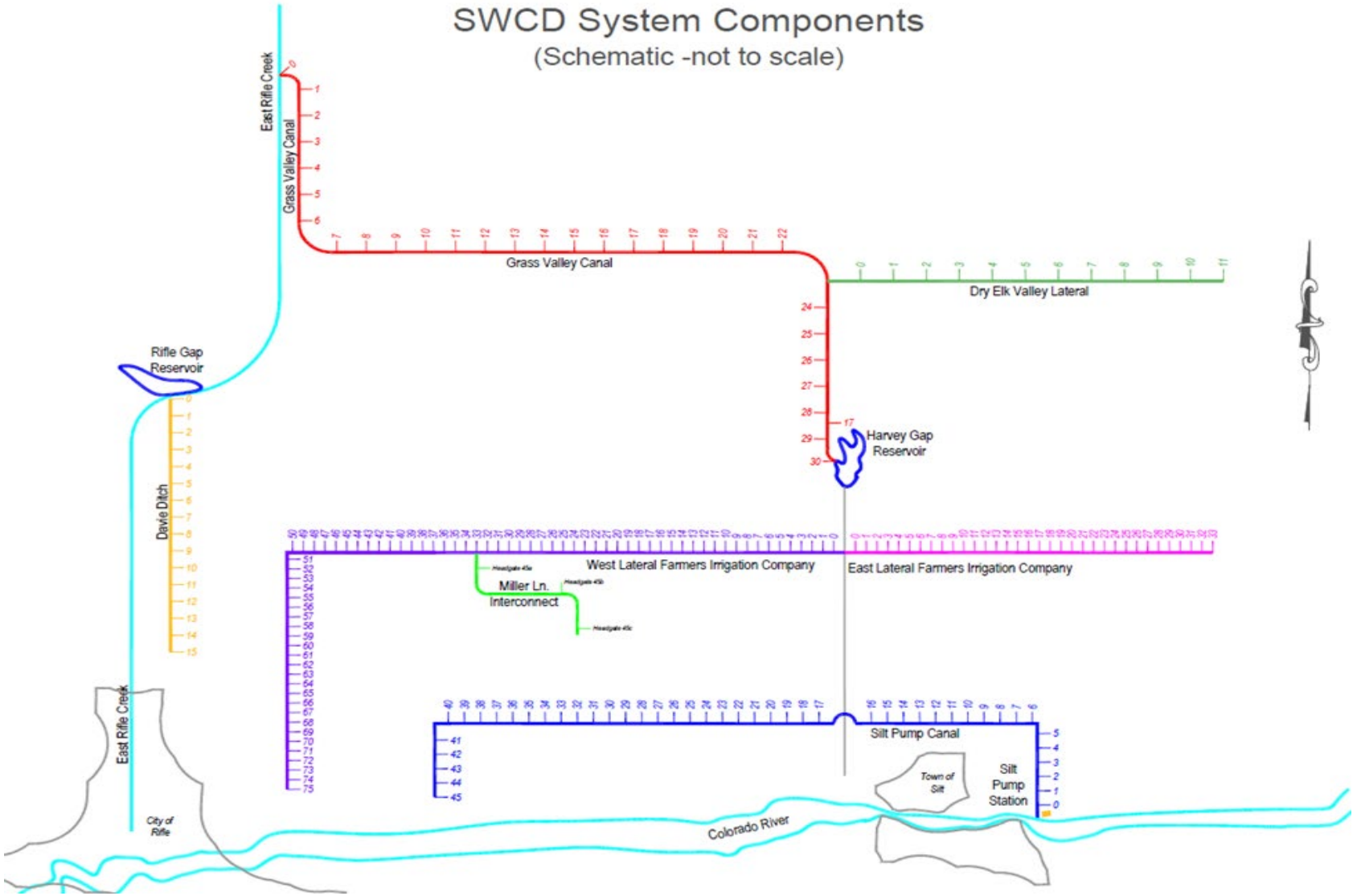
The SWCD falls within the Colorado Headwaters—Plateau watershed, which is part of the Upper Colorado River Basin, which supplies water directly to the Colorado River. The Colorado River provides water to more than 40 million people, delivers water to Mexico pursuant to a 1944 treaty, and irrigates more than 5.5 million acres of land (Reclamation 2012). The waters of the Colorado River are also used for hydropower production, for recreation, and as habitat for fish and wildlife. **Table 1-2** shows the percentage of the Colorado Headwaters—Plateau watershed that falls in the SWCD Area**.**

Table 1-2. Relationship of the SWCD Area to the Colorado River Basin.

Watershed	Acres of Garfield County in Watershed[1]	Total Size of Watershed (acres)	Acres of SWCD Area in Watershed	Percentage of Watershed in SWCD Area (%)
Colorado Headwaters—Plateau	870,115	2,448,671	56,465	2.3

[1]Source: NRCS 2008.

Figure 1-1. SWCD system components schematic.



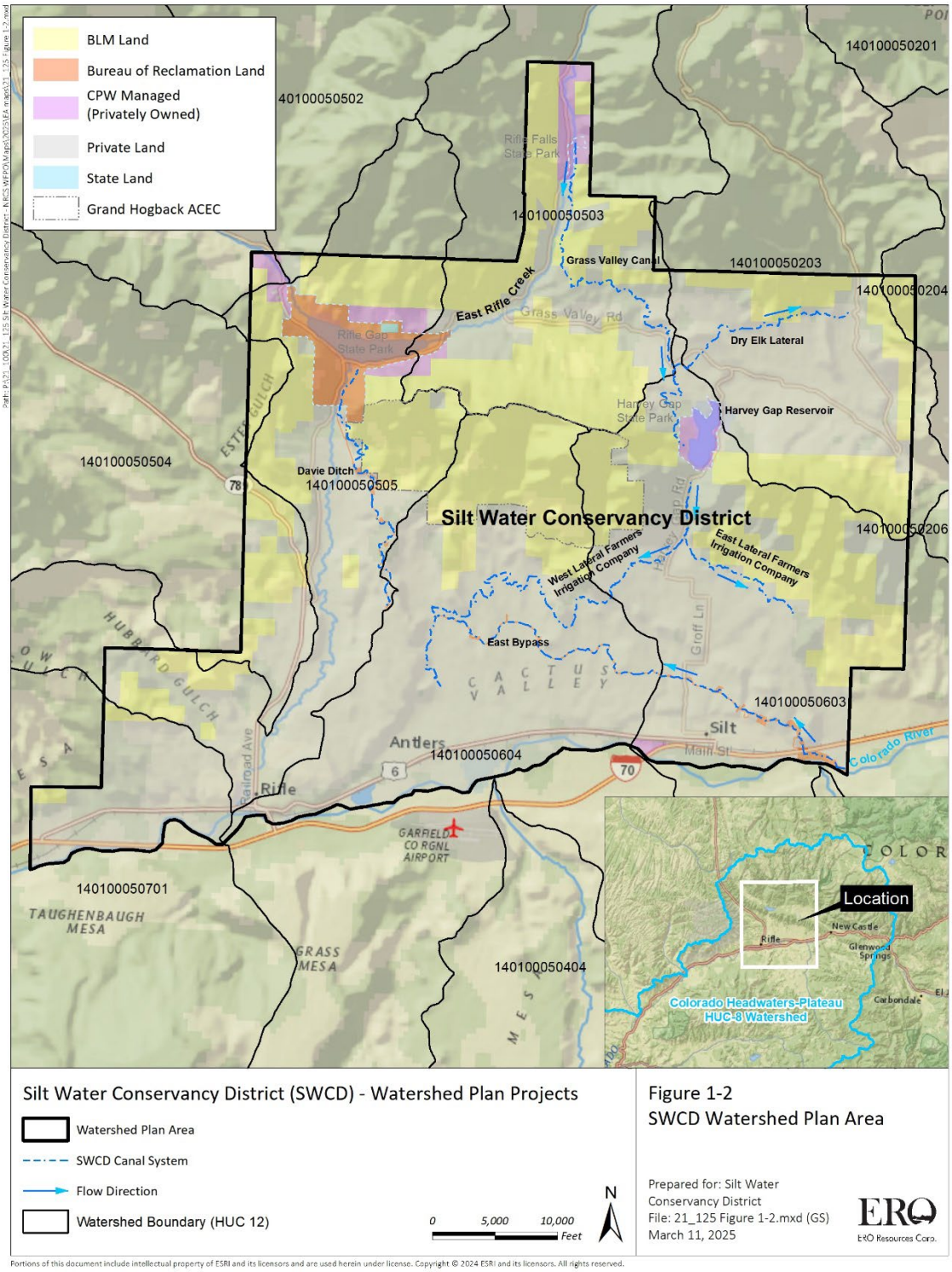
1.2.2 Project Area

The "project area" is defined as the limits of the six proposed project measures and associated use areas (particularly access and staging) that are analyzed in this Plan-EA. In summary, this Plan-EA includes the following activities, conducted in phases over the next 15 years (Preferred Alternative; **Figure 1-2**):

- Constructing a new gate and return flow at the intake of the GVC from East Rifle Creek, above the headgate, to improve water flow control for waters flowing into the GVC and return flows to the creek.
- Installing concrete shoring to prevent failure and modernize the ends of GVC tunnels at three locations.
- Converting a total of approximately 2,605 feet of GVC along four sections from open, earthen ditches to enclosed pipe to minimize the risk of failure and off-farm delivery system losses.
- Rebuilding a 2,827-foot-long abandoned section of the GVC around Harvey Gap Reservoir to provide a functional bypass to downstream irrigators as needed for water flows and water management and to allow for future work on the dam and reservoir.
- Installing a pump station and 8,925 feet of piping (East Bypass Pipeline) to connect the FICo East Lateral to the Silt Pump Canal to improve water supply to irrigated pasture, protect water storage rights, and improve water storage in Harvey Gap and Rifle Gap Reservoirs during low-flow years. The majority of users are located in the portion of the lateral downstream of the confluence of the lateral and the proposed East Bypass Pipeline.

Funding sources for the above activities would be drawn from NRCS programs and the Colorado Department of Agriculture (CDA), as well as other sources to be determined.

Figure 1-2. SWCD Watershed Plan Area.



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Chapter 2. Purpose and Need for Action

To be authorized by the NRCS, the Preferred Alternative must meet the Federal Objectives set forth in the federal Principles, Requirements, and Guidelines (PR&G) (CEQ 2013, 2014) and guidance provided in the NRCS Natural Resources Economics Handbook (NRCS 1998) and the NWPM (NRCS 2015).

Per the Federal Objectives, water resource investments should "reflect national priorities, encourage economic development, and protect the environment by: (1) seeking to maximize sustainable economic development; (2) seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and (3) protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems" (CEQ 2013).

Additionally, the project should seek to achieve the following Guiding Principles as identified by the federal government: Healthy and Resilient Ecosystems, Sustainable Economic Development, Floodplains, Public Safety, Environmental Justice, and Watershed Approach. The measures that make up the Preferred Alternative would be eligible for funding under P.L. 83-566 requirements as an "Authorized Project Purpose (v), Agricultural Water Management," through irrigation water conservation, water quality improvement, and more reliable agricultural water supply (NRCS 2015).

2.1 Purpose of the Project

The purpose of the SWCD Watershed Plan and Preferred Alternative is to:

- Reduce failure risk.
- Increase drought and climate change resilience.
- Improve system efficiency in delivery of water to current irrigation and livestock water users.
- Reduce infrastructure damage costs.

The purposes of the Preferred Alternative would further the conservation and proper use of the land, as defined in Title 390, NWPM, Part 500, Section 500.3, Subpart A.

The project would address one of the eight purposes listed in Title 390, NWPM, Part 500, Section 500.3, Subpart B. Consistent with the Agricultural Water Management Purpose (Purpose 5), analyzed project measures would support and maintain existing agricultural land use by increasing the irrigation system and water delivery reliability. The measures comprising the action alternatives would all contribute to increased system reliability and reduce risk from damage due to naturally occurring hazards and increasing age of the system. The Agricultural Water Management Purpose would also be aided by increasing the SWCD's ability to draw water shares out of the Colorado River and deliver water to shareholders along the farms closest to the river for longer periods. With modernization, repair, and improved system reliability, the Preferred Alternative would decrease operations, maintenance, and repair (OMR) costs, providing greater financial security for the SWCD. Agricultural benefits, including rural communities, are more than 20 percent of the total benefits for the project.

2.2 Need for the Project

The need for the project is due to the following conditions:

- **Environmental conditions that increase the risk of system failure:** The SWCD is characterized by highly variable hydrological conditions that can cause both water supply shortages and surpluses. The arid landscape in the SWCD drains the high mountain regions and plateaus of western Colorado, sloping generally to the south and toward the Colorado River. Soils are geologically unstable along the main feeder to the system, the GVC; this instability has led to damage to the canal in areas with steep slopes from rockfall and landslides (Bell Consulting 2023; Colorado River Engineering 2019, 2021a, 2021b; SWCD 2019). Significant events have occurred every 3 to 5 years since 2007, with shorter periods between more recent events (Bell Consulting 2023; **Appendix E**). Climate variability has increased in recent years, exacerbating this issue by making extreme rain events more likely, while drought conditions further decrease the soil's low natural capacity to handle water.
- **Degraded infrastructure:** The infrastructure of the SWCD is 60 to 120 years old and needs improvement, repair, or replacement to secure the future of irrigation in the SWCD and improve water management.
- **Underutilized water supply in the SWCD:** In total, at least 1,300 acre-feet (AF) of water is currently unusable for irrigation in the SWCD annually due to the lack of delivery infrastructure to make full use of water available from the Silt Pump Canal system.
- **Water loss in the conveyance system:** Open earthen canals, such as the GVC, are prone to water loss through seepage.

2.3 Watershed Problems

The following sections discuss problems in two system components, recognizing that many problems and opportunities are interrelated due to the configuration of the irrigation components in the SWCD (refer to **Figure 1-1**).

2.3.1 Grass Valley Canal Problems

The GVC is critical to supplying water to the SWCD. Near the north boundary of the SWCD Area, water is diverted into the GVC from the headgate along East Rifle Creek; the GVC then flows downstream for nearly 5 miles to Harvey Gap Reservoir (reservoir). Between the headgate and the reservoir, the GVC supplies water to 30 gates along the canal itself and feeds another 11 gates along the Dry Elk Lateral. During the winter months, irrigation ceases, and the GVC is used to fill the reservoir.

Project area soils along the GVC are particularly prone to cracking and slides. In addition, geological hazards at tunnel ends in three locations create a substantial risk for the entire system. The remote location and extreme topography would make access difficult in an emergency situation. A total of 10 weak points in the GVC have been identified.

At the GVC diversion, the bypass and return flows near the headgate are difficult to control and do not work properly; water is constantly pressurized against the gates, making it difficult to completely shut down the GVC or control the amount of returned water. The risk posed by the faulty flow control gate (**Figure 2-1**) is exacerbated due to the soil and geological hazards discussed earlier.

The GVC conveys water along approximately 5 miles of undeveloped, rugged steep side slopes. Several components of the GVC require extensive monitoring and maintenance or clearing due to rockfalls and side sloughing, and are at risk of sliding down the slope and complete failure. Significant damage events have occurred every 3 to 5 years since 2007; events have increased in frequency in the last 4 years (Bell Consulting 2023; memo provided in **Appendix E**). Four high-risk sections of the GVC have been identified.

Likewise, tunnels constructed more than 100 years ago are at risk of blockage/flooding and failure at their end sections in steep side slopes in four key locations. Four high-risk rock tunnel ends (inlet or outlet areas) have been identified as problematic (**Figure 2-2**). Potential flooding, should the surrounding soils or rocks slip and cause a blockage, could lead to a more catastrophic failure of the system where longer sections of the canal could slide or collapse, creating a situation where the GVC is offline for a portion of the year. In turn, this situation would prevent the annual winter filling of Harvey Gap Reservoir, creating more widespread economic losses for downstream agriculture, wildlife, and recreation.

There is also a lack of a control feature for SWCD to provide water to irrigators below the Harvey Gap Reservoir should bypassing the reservoir be required for water management, repairs, or other reservoir management purposes.

Mitigating the problem areas along the GVC would reduce risks of losses to catastrophic failures, thus increasing the operational certainty for delivery of the full allocation of water.

Figure 2-1. Sluice gate for flow control (Credit: SWCD).

Figure 2-2. Tunnel End #1 (Credit: SWCD).

2.3.2 Pump System Problems

The amount of irrigation water sourced from the Colorado River is currently limited by the existing pump system. This system does not allow the SWCD to supply the full amount of water decreed for the SWCD Project out of Green Mountain Reservoir (5,000 AF annually). As a result, on average, 3,700 AF of water is used each season, and 1,300 AF of water is generally left in Green Mountain Reservoir and not used.

Chapter 3. Scope of the Plan-EA

The scoping process followed the general procedures contained in the NRCS National Watershed Program Handbook (NRCS 2014), the NRCS NWPM (NRCS 2015), and the PR&G for Water and Land Related Resources Implementation Studies and Federal Water Resource Investments DM 9500-13 (NRCS 2015). NRCS and PR&G procedures and NEPA regulations (40 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.

3.1 Agency, Tribal, and Public Outreach

3.1.1 Scoping Phase

The SWCD invited all shareholders and the larger community to participate in the pre-planning process that prioritized areas of the system where improvement is needed. After 2 years of planning meetings, a participation survey was distributed via the SWCD website (in April 2021) asking for input regarding priority areas in the system that are problematic and need to be addressed. Federal, state, and local agencies and representatives, as well as area nongovernmental organizations, received an invitation to the scoping phase of this Plan-EA. Advertisements announcing the scoping period and associated scoping meeting were also placed in the *Glenwood Post Independent*, posted on the SWCD website, and distributed via social media (Facebook). The 30-day scoping period for this project began on August 19, 2021, and closed on September 20, 2021. All input was incorporated into the action alternatives.

Per the NHPA, consultation with the Colorado State Historic Preservation Office (SHPO) occurred in February, March, and April 2022 concerning the results of the cultural resource survey of the proposed project measures. A Memorandum of Agreement (MOA) outlining the agreed-upon mitigation measures for adverse effects on historic properties was finalized and signed by all consulting parties in June 2025.

Tribal consultation was conducted in accordance with the NHPA of 1966 and Executive Order (EO) 13175, *Consultation and Coordination with Indian Tribal Governments*, to maintain the NRCS's government-to-government relationship with native villages and tribes via a letter detailing the proposed project to the Ute Indian Tribe-Uintah & Ouray Reservation, the Ute Mountain Ute Tribe, and the Southern Ute Indian Tribes.

3.1.1.1 Scoping Meeting

A scoping meeting was held on August 19, 2021, at the SWCD building at 120 South 7th Street in Silt, Colorado, from 4:00 to 6:30 p.m. The initial hour of the meeting (from 4:00 to 5:00 p.m.) was broadcast via Zoom; the link to Zoom and conference call information were provided in the scoping materials and the newspaper publication. An in-person presentation was given from 5:30 to 6:30 p.m. During the scoping meeting, ERO Resources Corporation (ERO) and SWCD staff presented a PowerPoint slide show that described the need for the project, the purpose and components of the project, the NRCS Plan-EA process, how to get involved, and potential environmental concerns. A question-and-answer session was held at the end of each presentation (Zoom and in-person). Five people attended the presentations, not including the contractor (ERO) and project representative staff. The presentation was emailed to attendees

on August 20, 2021. No responses to the email were received. Discussions and questions following the presentation at the scoping meeting were related to the following topics:

- Constraints and challenges of infrastructure management and improvement by local ditch companies.
- Aging infrastructure and safety and efficiency issues.

3.1.1.2 Scoping Comments

During the scoping phase, one comment letter regarding the Plan-EA was received from CPW, with questions related to the drawdown timing of Harvey Gap Reservoir, handling existing CPW fish structures and aquatic stocking and inventory operations, weed infestation, potential dredging, timing and water quality impacts associated with the GVC bypass, and increased connectivity with the Colorado River. CPW requested to inspect dredging equipment for disinfection. A written response to CPW was issued by the SWCD via email on September 28, 2021 (see the administrative record in **Appendix A**). These concerns are also addressed in **Chapter 6, Environmental Consequences** and would be mitigated through Avoidance, Minimization, and Mitigation Measures (AMM Measures) presented in **Section 8.4**.

3.2 Identification of Resource Concerns

Based on the input received during the scoping phase for this Plan-EA, several resource concerns were identified. **Table 3-1** provides a summary of resource concerns and their relevance to the Preferred Alternative. Resource items determined to not be relevant have been eliminated from detailed study, and resources determined to be relevant have been carried forward for analysis.

Table 3-1. Summary of resource concerns.

Resource	Relevant and Analyzed in the Plan-EA?	Rationale
National Economic Efficiency (NEE) and PR&G	Yes	A NEE Cost Benefit Analysis is required as part of the Plan-EA (**Appendix D**). Guidance is provided by the NRCS Economics Handbook (NRCS 1998), the NRCS NWPM (NRCS 2015), and the Natural Resources and Environment PR&G for Water and Related Land Resources Implementation Studies (CEQ 2013, 2014; USDA 2017c). The analysis includes evaluation of provisioning, regulating, cultural, and supporting services in the ecosystem services Framework.
Ecosystem Services Framework: Provisioning and Cultural Services	Yes	The project measures analyzed will increase the water supply in the SWCD, in turn impacting both provisioning and cultural services.
Soil and Geologic Characteristics	Yes	Temporary and permanent impacts on soils could occur due to construction and installation of project measures. Geologic formations and soils support agricultural practices in the SWCD Area; these soils would be protected/enhanced by irrigation system improvements. Tunnel end shoring can address geologic hazards.
Upland Erosion	Yes	Piping targeted sections of the GVC could reduce upland erosion of soils high in salt and selenium, which benefits water quality in the watershed.
Stream Bank Erosion and Sedimentation	Yes	Stream bank erosion and sedimentation along the GVC has a limited potential to contribute salt and selenium to stream water and reservoir water. Sedimentation could increase temporarily during construction activities and is discussed in the soils section (**Section 4.1**). Piping of the GVC could benefit water quality in the watershed.
Prime and Unique Farmland	Yes	Soils classified as prime farmlands are present in the project area. Increased water use efficiency could have beneficial effects by allowing these lands to continue in production.

Resource	Relevant and Analyzed in the Plan-EA?	Rationale
Surface Water Quality	Yes	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 increasing water supplies for irrigation and increasing water levels at Harvey Gap Reservoir for longer periods during the recreation season.
Hydrology	Yes	Reduced seepage from piping open canals could affect hydrology.
Groundwater	Yes	Reduced seepage could affect groundwater quality and quantity.
Floodplain Management	Yes	Localized short-term adverse effects on floodplains could occur during construction activities. There would be no long-term effects on floodplain management.
Water Rights	Yes	The public may have concerns regarding water rights and how they may be impacted by potential increases in water use in the SWCD by bringing in water shares held at Green Mountain Reservoir.
Wild and Scenic Rivers	No	No wild or scenic rivers exist in or directly adjacent to the project area. The nearest listed segments are on the White and Crystal Rivers and are neither hydrologically connected to nor visible from the project area and thus not considered in this Plan-EA.
Coastal Zone Management Areas	No	No coastal zones occur in or near the project area.
Regional Water Resource Plans (including coastal zone plans)	Yes	The SWCD falls in the middle section of the Middle Colorado River as outlined by the Middle Colorado River Integrated Water Management Plan. Areas on the north side of the Colorado River in the Rifle Creek drainage have benefited from the Silt Project. Salinity in the mainstem of the river has increased as a result of the use of irrigation water on soils (Middle Colorado Watershed Council 2021).
Sole Source Aquifer	No	The project area is not in a service area for a sole source aquifer.
Air Quality	Yes	Implementation of the SWCD Project would include some emissions from the proposed construction and maintenance activities.
Vegetation Communities and Habitat (includes Forest Resources, Natural Areas, and Parklands)	Yes	Construction and operation of project measures could impact vegetation communities and habitat.
Special Status Species	Yes	Potential impacts on special status species could occur from the project, including threatened and endangered species and BLM sensitive species.
Invasive Species	Yes	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.
Wetlands and Riparian Areas (Waters of the United States, including special aquatic sites)	Yes	Construction and operation of project measures could impact wetlands and riparian areas.
Fish and Wildlife (including coordination requirements)	Yes	Construction and operation of project measures could impact fish and wildlife.
Coral Reefs	No	No coral reefs are present in or near the project area.
Essential Fish Habitat	No	No essential fish habitat is present in the project area.
Special Status Species	Yes	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.
Cultural and Historic Resources	Yes	Proposed project activities would result in an adverse effect on archaeological and historic resources.
Environmental Justice (Social Issues)	Yes	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.
Land Use	Yes	Land use impacts would be short-term (during construction) and minor or negligible. No landownership would change, and no subdivision of public lands would occur under the Preferred Alternative.
Recreation	Yes	Recreation resources are expected to be impacted due to the proximity to one state park (Harvey Gap Reservoir State Park).

Resource	Relevant and Analyzed in the Plan-EA?	Rationale
Scenic Beauty and Visual Resources	Yes	Impacts on visual resources could occur from the construction and operation of project measures, particularly for construction around Harvey Gap Reservoir, which is a state park. Other project measures are generally distant from public view or screened by vegetation.
Public Health and Safety (Social Issues)	No	Construction workers would follow all applicable federal and state safety regulations during construction. No negative effects on public health and safety are anticipated from any of the proposed construction activities. Although public health and safety is relevant to the Preferred Alternative, this resource is not analyzed in this Plan-EA.
Socioeconomics (Social Issues)	Yes	The project involves an expenditure of public funds, which could impact the local and regional economy, and an evaluation of the effects of providing NRCS funding is included.
Geologic Risks/ Minerals (Scientific Resources)	Yes	Due to the steep side slopes along the GVC, some risks from geologic hazards are present, such as slope instability, that would affect the project. The project would have no appreciable impact on unique geologic features, minerals, or oil and gas resources in the project area.
Paleontology (Scientific Resources)	Yes	The project area includes areas with a high potential for fossil yield, as indicated by BLM data. The Wasatch Formation is a Potential Fossil Yield Classification (PFYC) 5, and the East Bypass Pipeline would cross portions of this formation. Tunnel end reconstruction also occurs in PFYC 4 and PFYC 5 formations.
Wilderness Areas and Characteristics	Yes	The Flat Tops Wilderness is 11 miles north of the SWCD Area and would not be affected by project activities. The Grand Hogback Area of Critical Environmental Concern on BLM-managed land is located in the SWCD Area and outside the project area limits for the Proposed Action; this area is incorporated in the land use resource analysis but is not relevant to the Preferred Alternative.
Lands and Realty	Yes	An easement on private land would be required for the East Bypass Pipeline construction, access, and pump station and would be acquired prior to construction. No other changes in landownership or rights-of-way (ROWs) are associated with the project. Coordination and agreements with the BLM and CPW for project measures occurring on agency-managed lands would be necessary and acquired prior to construction. Construction access for all measures would use existing roads, with a total of 5,472 linear feet requiring grading in three areas.
Range Management	Yes	Multiple grazing allotments are in the SWCD Area, and project access or construction transects these allotments in two places; however, due to project timing and the confined/controlled nature of activities, impacts on rangeland would be negligible. This issue is incorporated into the land use resource analysis.
Noise	No	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. Although noise is relevant to the Preferred Alternative, noise impacts would be negligible, and the resource is not analyzed further in this Plan-EA.
Transportation/Access	Yes	The project alternatives would not have lasting impacts on transportation or access in the project area and would not impact any transportation/access ROWs. Potential impacts on recreation access are incorporated in **Section 6.11** (Recreation).
Wastes (Hazardous or Solid)	No	Construction activities associated with the Preferred Alternative 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, although wastes are relevant to the Preferred Alternative, the impact of waste generated from the project would be negligible and is not analyzed further in this Plan-EA.
Climate Change	Yes	Anticipated increases in temperature and changes in stream and river flow and other resources are evaluated with respect to the project and the No Action Alternative under the respective water and biological resources sections.

Chapter 4. Affected Environment

4.1 Soils and Geology

The SWCD Area lies mostly within the semiarid benchlands and canyonlands, shale deserts and sedimentary basins, and mid-elevation forests of the Colorado Plateaus Ecoregion. The Grand Hogback monocline, a distinctive landform in the region, bisects the SWCD Area from north to south. The Grand Hogback is a 90-mile-long S-shaped spine of uneven, narrow ridges and steeply sloping sides running from Meeker to Marble, Colorado (USFS 2002). The Grand Hogback is an extensive monocline characterized by steeply dipping rocks that range from Cretaceous to Pennsylvanian in age. In many areas, these formations have been exposed by erosional and fluvial processes that have resulted in steeply dipping fins, flatirons, and ridges (BLM 2007). The surface geology in the SWCD Area is primarily Wasatch Formation and Ohio Formation, Mancos Shale, modern alluvium, and Williams Fork Formation. Other secondary geological formations found in the SWCD Area are shown in **Table 4-1** and **Appendix C**, **Figure C-1** (Green 1992). **Table 4-1** also shows the surface geology in each of the project measure areas. According to the Rifle Falls Geologic Map, the GVC crosses landslide deposits and basal detachment of gravity-driven slide blocks (Scott, Schroba, and Egger 2001).

Table 4-1. Surface geology in the SWCD Area and by project measure.

Geological Formation[1]	Percentage of the SWCD Area (%)[2]	GVC (%)	East Bypass Pipeline (%)
Wasatch Formation (including Fort Union equivalent at base) and Ohio Creek Formation	40.5	--	94.0
Mancos Shale	17.8	24.1	--
Modern alluvium	16.4	--	6.0
Williams Fork Formation	10.3	--	--
Iles Formation	3.8	11.0	--
Frontier Sandstone and Mowry Shale Members and intervening shale zone	3.3	29.4	--
Weber Sandstone and Maroon Formation	1.8	10.5	--
Dakota Sandstone	1.8	--	--
Frontier Sandstone and Mowry Shale Members of Mancos Shale and Dakota Sandstone	1.4	--	--
Water	1.0	--	--
Morrison, Curtis, Entrada, and Glen Canyon Formations	1.0	21.1	--
Chinle and State Bridge Formations	0.5	3.9	--
Evaporitic Facies	0.3	--	--
Gravels and alluviums (Pinedale and Bull Lake age)	0.2	--	--
Minturn Formation in west-central and south-central and other units of middle Pennsylvanian age	<0.1	--	--

[1]Green 1992.
[2]The percentages of the geological formations in the SWCD Area total more than 100 percent due to rounding.

4.1.1 Soils

The NRCS web soil survey shows 47 soil map units occurring in the SWCD Area and 23 soil map units occurring within the project area boundaries. A soil map is in **Appendix C** (**Figure C-2**), and the percentages of each soil map unit in the SWCD Area and project area are provided in **Table E-1** of **Appendix E** (NRCS 2022a). In the SWCD Area, primary soil units include Cushman-Lazear stony loams, 15 to 65 percent slopes (13.8 percent), and Torriorthents-Camborthids-Rock outcrop complex, steep (15.8

percent). Primary soil units mapped in the project area include Vale silt loam, 6 to 12 percent slopes (18.4 percent); these soils make up 2.2 percent of the SWCD Area.

4.1.2 Farmland Designations

Farms in the SWCD are well known for their contributions to state agriculture, particularly for livestock production. The climate of the Colorado River Valley includes cold winters, which are favorable for growing hay crops including grass hay and alfalfa.

NRCS policy and procedures on prime and unique farmlands are published in the *Federal Register*, Vol. 43, No. 21, January 31, 1978. The soils in the project area are a mixture of non-prime farmland, prime farmland, prime farmland if irrigated, and farmland of statewide importance (NRCS 2022a, 2022b). The majority of the SWCD project area is not prime farmland. Specific percentages and locations for each designation are included in **Appendix E**.

Prime Farmland. The USDA defines prime farmland as having the "best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops" (NRCS 2022a). To be productive, prime farmland must have an adequate and dependable supply of moisture from either irrigation or precipitation, a favorable temperature and growing season, acceptable soil chemistry, and few or no rocks. Within the prime farmland designation, soils in the SWCD Area are further classified as:

- prime farmland if irrigated (8,075 acres); and
- prime farmland if irrigated and reclaimed of excess salts and sodium (673 acres).

Kim loam, Olney loam, and Potts loam make up the majority of soils that are prime farmland if irrigated. Wann sandy loam, 1 to 3 percent slopes, is considered prime farmland if irrigated and reclaimed of excess salts and sodium. Fifteen percent of the SWCD project area is prime farmland.

Farmland of Statewide Importance. Productive farmland that produces high crop yields yet does not meet the criteria for prime farmland is considered "farmland of statewide importance" (NRCS 2022a). Within the SWCD Area, Vale silt loam, 6 to 12 percent slopes, is considered farmland of statewide importance and makes up 7,348 acres or 18.4 percent of the project area.

4.1.3 Salinity and Selenium

The Mancos Shale Formation, one of the predominant formations in the project area (**Table 4-1**), naturally contains high levels of salts and selenium and contributes to salt and selenium loading of the Colorado River watershed (Whittig et al. 1983; Selenium Management Program 2011). Salinity is the saltiness of water due to dissolved salts or solids in water. Salinity is problematic for vegetation and wildlife, as well as agriculture, at higher concentrations. Selenium is a trace nonmetal element, common in marine sedimentary rocks, that bioaccumulates and can be toxic to aquatic food chains, particularly birds and fish (Adriano 2001; Kulp and Pratt 2004; Lemly 2002). Both salts and selenium are mobilized because they are soluble in water in certain chemical states and transported in groundwater and surface water (including irrigation water; U.S. Geological Survey [USGS] 2014; Selenium Management Program 2011). Both can be concentrated by evaporation, particularly due to storage in lakes or reservoirs (Batzer and Baldwin 2012; Leib et al. 2012).

Flood irrigation practices in the Colorado River Basin, including unlined irrigation canals and laterals, have contributed to selenium and salt loading to the downstream reaches of the Colorado River (Reclamation 2017). However, water quality data show that the project area is not as significant a source of these minerals as other parts of the Colorado River Basin (see **Section 4.2, Water**; **Hydrology and Water Quality** subsection). Some irrigated areas south of the Grand Hogback are in the Wasatch Formation and modern alluvium, which generally produce runoff water with high concentrations of selenium and salts. However, channels draining the southern face of the Grand Hogback (COLCLCO4a_A) are impaired for aquatic life (see **Table 4-2**).

4.1.4 Erosion and Sedimentation

Soil erosion is the breakdown and movement of soil particles resulting from the natural forces of wind, water, and gravity (NRCS 2022c). Some soils are naturally more prone to erosion due to particle size, chemical variables, and other soil characteristics. In addition, human activities can influence erosion, which generally increases due to soil compaction, overgrazing, and poor irrigation practices (NRCS 2010). Sedimentation caused by soil erosion degrades water quality from suspended solids (turbidity) as well as pollutants that are mobilized in the water (pesticides, herbicides, and heavy metals; Da Cunha 1991). Water-induced soil erosion in irrigation ditches and canals can increase sediment discharge into downstream waterways, creating water quality and quantity issues (NRCS 1995). Rates of erosion have not been calculated for the SWCD. Sediments build up in the GVC and require the ditch to be cleaned every 3 years. Larger significant erosion events have been documented every 3 to 5 years since 2007 (Bell Consulting 2023). Harvey Gap Reservoir is more than 100 years old and has infilled with silt and fines over the years as a result of sedimentation and erosion.

4.2 Water

All perennial waters in the SWCD are tributaries to the Colorado River, which flows west through the project area and onward through Utah, Arizona, Nevada, California, and Mexico, eventually discharging to the Gulf of California. Portions of perennial flowing waterways occur in the SWCD Area: West Rifle Creek, Rifle Creek, East Rifle Creek, West Elk Creek, and the Colorado River (**Appendix C**, **Figure C-3**). Government Creek is an intermittent waterway that occupies a large portion of the watershed (45 square miles, or 22 percent; **Appendix C**, **Figure C-3**). Two reservoirs—Rifle Gap Reservoir and Harvey Gap Reservoir—are also located in the SWCD Area. The perennial waterways supply water to the irrigation systems in the SWCD Area through SWCD infrastructure. The GVC supplies water to the Harvey Gap Reservoir; very little water flows into the reservoir independent of this structured inflow.

SWCD delivers water to approximately 8,120 acres of land (SWCD 2019; Linenberger 1997), with the majority (90 percent) of irrigated acreage used for growing alfalfa and 10 percent used for growing grass hay; the acreage is irrigated using both flood and sprinkler irrigation methods (USDA 2017a). In the past 10 years of water delivery, only 2 years (2015 and 2016) had adequate water in the system to deliver full allocation to all users (SWCD, 2022 data). Irrigation systems under SWCD management include the GVC, Dry Elk Lateral, Rifle Creek Canyon Ditch, Grand Tunnel Ditch, Davie Ditch, FICo East and West Laterals, and Silt Pump Canal. Additional irrigation systems that are not managed by the SWCD also occur in the SWCD Area including the Grand Tunnel Ditch, Rifle Creek Canyon Ditch, Cactus Valley Ditch, and Rosemond Ditch, among others. Irrigation water applied to farmlands in the SWCD that is not consumed by vegetation returns to waterways via groundwater flow; no tailwater return flow ditches are

in the SWCD. Irrigation ditches and canals alter natural hydrologic processes by incorporating conveyance losses from evaporation and seepage. Water accounting activities are used to estimate conveyance losses and determine the amount of water that must be delivered to a ditch or canal to supply the required shares along the laterals. The SWCD estimates that approximately 0.334 AF per foot of water is lost from seepage over the course of the irrigation system in the proposed piping measures of the GVC. The GVC loses an estimated 870 AF of water in the 2,605 feet of proposed piping.

SWCD irrigation water is supplied from East Rifle Creek at the north end of the project area and from water shares that were allocated to SWCD by Reclamation during construction of the Silt Pump Canal system at the south end of the SWCD Area. SWCD manages operations of Rifle Gap Reservoir and Harvey Gap Reservoir to achieve favorable water levels during the reservoir "fill time" (winter and early spring) and throughout the irrigation season (late spring through fall). East Rifle Creek water diverted at the GVC headgate is used to fill Harvey Gap Reservoir. East Rifle Creek water that is not diverted into the GVC, as well as water from West and Middle Rifle Creeks, is used to fill Rifle Gap Reservoir (**Figure 1-1**). According to the SWCD, Harvey Gap Reservoir is generally prioritized to fill in the late winter or early spring, followed by Rifle Gap Reservoir.

Rifle Gap Reservoir has a water surface area of approximately 359 acres and includes 13,601 AF of decreed storage rights. Seventy-six percent (10,384 AF) of the water rights are allocated to irrigating lands owned by shareholders (CPW 2015a). Rifle Gap Reservoir discharges into the mainstem of Rifle Creek, which flows to the Colorado River. Reservoir releases supply water to Davie Ditch (**Figure 1-1**) during the irrigation season at a rate up to its water right of 18 cubic feet per second (cfs); several other ditch companies receive water released from Rifle Gap Reservoir by exchange. As described earlier, the reservoir is filled by water from West, Middle, and East Rifle Creeks. When less water is diverted into the GVC, more water is available for filling Rifle Gap Reservoir.

Harvey Gap Reservoir has a water surface area of approximately 287 acres and a total capacity of 5,858 AF (SWCD 2019). All available capacity is allocated to shareholders for irrigation; 494 AF is left in the reservoir as "dead pool," which cannot be released from the outlet. Harvey Gap Reservoir discharges to downstream irrigators associated with the FICo East and West Laterals (**Figure 1-1**) throughout the irrigation season at a rate up to 50 cfs (with 30 cfs maximum going to the East Lateral and 20 cfs maximum going to the West Lateral). The actual flow released from the reservoir is based on requests (orders) for water by individual users.

The GVC supplies water to shareholders along the canal based on water orders along the main canal as well as to the Dry Elk Lateral, which requires an average flow rate of approximately 13.5 cfs to provide water for irrigation (12 cfs) and to accommodate seepage and evaporative losses.

The SWCD holds 5,000 AF of water shares in Green Mountain Reservoir, located more than 70 miles east of the project area on the Blue River. These shares were allocated to the SWCD as part of the Silt Water Project, completed in 1967. Water shares are released from Green Mountain Reservoir to the Blue River by Reclamation operators, which flow to the Colorado River, and are eventually pumped from the Colorado River at the SWCD Area through the Silt Pump Canal system and to the FICo West Lateral via a connecting pipeline (Miller Line interconnect; **Figure 1-1**). Although 5,000 AF of shares are allocated to the SWCD, on average only a portion is used due to the limitations of the distribution system; this amount

is up to 3,700 AF depending on the year. On average, another 1,300 AF is left in Green Mountain Reservoir and not used.

4.2.1 Water Rights and Irrigation

Irrigation water rights managed by the SWCD include rights held by FICo with appropriation dates to 1887. The Grass Valley Land & Water Corporation was formed in 1887 and is responsible for the earliest ditches and the original Harvey Gap Dam, which was completed in 1894 and washed out in 1895. The corporation failed soon after, and FICo was incorporated in 1903. The reservoir was rebuilt by FICo in 1903 and enlarged by the Antlers Orchard and Development Company in 1907. FICo constructed most of the original infrastructure in the late 1800s/early 1900s, including the GVC, the Dry Elk Lateral, and Harvey Gap Reservoir (also referred to as Grass Valley Reservoir). The GVC includes two water rights (held by FICo) sourced from East Rifle Creek with different priority dates: 100 cfs (appropriated in 1887 and adjudicated in 1892) and 24 cfs (appropriated in 1891 and adjudicated in 1966) for domestic and stock water use (Colorado Decision Support System [CDSS] 2022). The Davie Ditch, operated by the SWCD and diverted at the Rifle Creek Reservoir outlet, includes two water rights with different priorities: 8.66 cfs (appropriated in 1909 and adjudicated in 1911 for irrigation) and 9.34 cfs (appropriated in 1949 and adjudicated in 1966 for irrigation) (CDSS 2022).

The Silt Project was authorized in 1953 by Reclamation after almost 20 years of investigations and planning as part of the Colorado River Storage Project (Linenberger 1997). Reclamation began construction in 1964, and the project included construction of Rifle Gap Dam and Reservoir, the Silt Pumping Plant, the Silt Pump Canal, and the Dry Elk Lateral, as well as rehabilitation of the Davie Ditch and the GVC. The SWCD was formed in 1957 and assumed operation and maintenance (O&M) responsibility in 1968 (Linenberger 1997).

FICo agreed to pool (co-mingle) their water shares with Silt Project water (project water) in 1951 in exchange for the newly formed SWCD's assistance in distributing and managing the water. Water rights associated with the FICo and project water have therefore been managed since that time as one pool, where available water is allocated to each shareholder at the start of the irrigation season and adjusted throughout the irrigation season based on hydrology. To accommodate seniority, a greater number of share days are allocated for FICo water shareholders than for project water shareholders. Within the larger administrated irrigation system, the co-mingled water is considered to have the junior rights (FICo has relinquished their seniority). This means that downstream water users with water rights senior to project water may "call" for water, resulting in the SWCD being required to forego diversions of co-mingled (FICo and project) water. Although this has not yet occurred, this situation presents an added risk area to the SWCD's water supply, given the ongoing drought in the Colorado River Basin.

GVC diversions, which vary annually depending on hydrologic conditions and senior water demands, fluctuated historically from a low of 5,033 AF (2018) to a high of 24,256 AF (1957) (Colorado River Engineering 2019). Davie Ditch diversions, also variable based on hydrology and irrigation demands, fluctuated historically from a low of 589 AF (1983) to a high of 3,338 AF (1971) (Colorado River Engineering 2018). Pre-irrigation season projections of stream flows in East Rifle Creek and of stored, pooled water in the SWCD system have declined steadily, particularly in recent years, due to regional drought conditions (Bell Consulting 2023).

Colorado's Instream Flow Program was created in 1973, with the intention of correlating "activities of mankind with some reasonable preservation of the natural environment" (Colorado Water Conservation Board [CWCB] 2022). Under this program, the CWCB was granted exclusive authority to create and enforce minimum flow rates for the purposes of protecting the environment, protecting streamflow through a reach of stream rather than at just a single point, and protecting water levels in natural lakes (CWCB 2022). Multiple in-stream flow rights are present in the SWCD Area (**Appendix E**, **Table E-2**; CWCB 2022), including East Rifle Creek with a 1980 appropriation for 6 cfs (year-round) and Rifle Creek with a 1980 appropriation for 9 cfs (May 1 through September 30) and 5 cfs (October 1 through April 30).

4.2.2 Hydrology and Water Quality

Hydrographs for the Colorado River upstream (below Glenwood Springs) and downstream (near Cameo) of the project area, and for East Rifle Creek above Rifle Gap Reservoir, are included in **Appendix E** (**Figures E-2**, **E-3**, and **E-5**). Historically, Colorado River flows near the project area average between 2,000 and 3,000 cfs. Average flows in East Rifle Creek are affected by winter and early spring diversion into the GVC; average streamflow from 1999 to 2022 ranged from a high of 31.5 cfs in late October to a low of 13.5 cfs in mid-August (**Appendix E**; Colorado Division of Water Resources [DWR] 2022). Spring flows are captured for storage in reservoirs; the hydrograph for the 2020-2021 water year shows a low of 2 to 3 cfs during April 2021 and 1 cfs in mid-September (**Appendix E**; DWR 2022). **Appendix E** also includes reservoir storage in AF for Rifle Gap Reservoir (USGS data for Harvey Gap Reservoir were not available). Stored water in Rifle Gap Reservoir in 2021 fluctuated from a high of nearly 9,000 AF in early May 2021 to a low of 1,900 AF in late September 2021; these levels are well below 9-year median reservoir levels, which fluctuate between 5,000 AF and "full" at 13,602 AF (**Appendix E**; USGS 2022).

The region's natural geology, hydrology, and geochemistry, as well as historic mining practices and irrigation practices, influence groundwater and surface water quality in the SWCD Area. The distribution of geochemical elements such as salinity, arsenic, and selenium are affected by both the natural geochemical environment and mining/irrigation practices. Irrigation practices present a perturbation to the natural hydrologic system that has been shown to exacerbate contamination issues in the Colorado River Basin in particular (Reclamation 2017).

Mancos Shale underlays 17.8 percent of the SWCD Area (the SWCD boundaries) and portions of the project area (**Table 4-1**). Irrigation practices may increase the rate of salinity and selenium dissolution, which in turn can affect salinity and selenium concentrations in Rifle Gap Reservoir, Harvey Gap Reservoir, and downstream water bodies including Rifle Creek and the Colorado River. Contributions of selenium from irrigation practices in the SWCD Area to the Colorado River system appear to be minor or negligible, based on USGS data obtained for selenium concentrations upstream and downstream of the SWCD Area (USGS 2022). Upstream at Glenwood Springs, selenium concentrations were generally below the detection limit of 1 microgram per liter (µg/L; 1992-1993 data; 1 sample out of 12 was measured at the detection limit of 1 µg/L). Downstream at Cameo, selenium averaged 0.601 µg/L (2012-2015 data; 9 samples; USGS 2022). Near the Colorado-Utah border downstream of Grand Junction near the confluence with the Gunnison River, recorded selenium levels in the Colorado River were noticeably higher at 2.64 µg/L (2013-2015 data; 9 samples; USGS 2022).

Saline soils develop on agricultural fields over time and are often associated with poor drainage. Agriculture is negatively impacted by saline soils, and managing salinity levels is important for agricultural production and the local economy. Salinity concentrations often increase as water travels downstream and salts accumulate in the water; therefore, maintaining low salinity for water in the Colorado River headwaters is important to prevent excessive downstream salinity. Water can be classified for irrigation based on salinity levels on a scale of 1 to 5, where 1 is "excellent" (250 microSiemens per centimeter [µS/cm]) and 5 is "unsuitable" (3,000 µS/cm; Fipps 2021). Agriculture has been reported as a source of one-third of the salts in the Colorado River (Gardner 1988), and the Colorado River Basin Salinity Control Program implemented in 1995 underscores the importance of considering salinity in Colorado River watershed planning.

The Colorado River Basin Salinity Control Forum, convened as part of the Colorado River Basin Salinity Control Program, has mapped salinity control areas and developed water quality standards and management strategies. The southern portion of the SWCD Area south of the Grand Hogback and south of Harvey Gap Reservoir is mapped as a salinity control area. Measures undertaken to control salinity in this area reduce salinity loading into the Colorado River by approximately 2,600 tons per year, primarily through improved water delivery and irrigation systems (Colorado River Basin Salinity Control Forum 2020). Areas in the Grand Hogback and north of the Grand Hogback are not mapped as salinity control areas (Colorado River Basin Salinity Control Forum 2020).

The overall water quality conditions and watershed health of the Rifle Creek Watershed are considered to be improving (Middle Colorado Watershed Council 2019). Although the watershed has experienced extensive historic mining, none of the mines have been identified as a source of mine drainage by the Colorado Department of Public Health and Environment (CDPHE 2024; Middle Colorado Watershed Council 2019). Two mine tailings reclamation sites, historically containing mills for vanadium and uranium, are located along the Colorado River in the western portion of the SWCD. Both sites have been identified as containing groundwater contaminated with arsenic, molybdenum, nitrate, selenium, uranium, and vanadium (Middle Colorado Watershed Council 2019).

A Rifle Creek Watershed study conducted from 2015 to 2017 analyzed approximately 80 water quality samples for contaminants of concern including selenium, arsenic, iron, sulfate, and salinity. Selenium concentrations had a median of 1 µg/L to a maximum concentration of 2.5 µg/L (Middle Colorado Watershed Council 2019). Other median concentrations included arsenic (0.6 µg/L), iron (299 µg/L), and sulfate (192.5 milligrams [mg]/L; Middle Colorado Watershed Council 2019). Salinity in the Rifle Creek Watershed measured via specific conductance ranged from 815 to 2,441 µS/cm (Middle Colorado Watershed Council 2019). Concentrations of 750 to 2,000 µS/cm are considered "Class 3, Permissible" (Fipps 2021), and concentrations between 2,000 and 3,000 µS/cm are considered Class 4, "Doubtful" (where good drainage is needed and sensitive plants will have difficulty obtaining stands; Fipps 2021). The study concluded that Government Creek (an intermittent waterway and tributary to the mainstem of Rifle Creek) is possibly a major source of nonpoint-source pollution in the Rifle Creek Watershed during precipitation events. The creek drains a 45-square-mile area (approximately 22 percent of the Rifle Creek Watershed) and is a potential large contributor to water quality constituents during rain events.

Colorado water quality standards have been established by the CDPHE Water Quality Control Commission (CDPHE 2022). Impairments due to selenium, arsenic, mercury, temperature, total iron, *E.*

coli, and sediment are listed for relevant reaches in the project area (**Table 4-2**); a map of these segments is included in **Appendix C**, **Figure C-5**. Arsenic and temperature in Rifle Gap Reservoir and Harvey Gap Reservoir are considered high priority for total maximum daily load regulation.

Table 4-2. 303(d) pollutants in the SWCD.

Year	Water Body Identification Number (WBID)	Stream or Lake Segment Description	303(d) (unless noted; some Monitoring and Evaluation) Parameter(s) of Impairment	Total Maximum Daily Load Priority
2024	COLCLC10_A	East Rifle Creek from White River National Forest boundary to Rifle Gap Reservoir and Rifle Creek from Rifle Gap Reservoir to Colorado River	Total arsenic (water supply use), macroinvertebrates (aquatic life), *E. coli* (recreation use)	Low (arsenic), N/A (*E. coli*), High (macroinvertebrates)
	COLCLC10_B	West Rifle Creek and tributaries	Total arsenic (water supply use), iron (aquatic life), *E. coli* (recreation use)	Low (arsenic), N/A (*E. coli*), High (iron)
2024	COLCLC02a	Mainstem of the Colorado River from immediately below the confluence with Rifle Creek to immediately above the confluence of Rapid Creek	Arsenic (water supply use)	Low
2024	COLCLC02a	Mainstem of the Colorado River from immediately below the confluence with Rifle Creek to immediately above the confluence of Rapid Creek	Sediment (aquatic life) (Monitoring and Evaluation List)	N/A
2024	COLCL04a_A	Tributaries to Colorado River, Roaring Fork to Parachute Creek, except for Mamm Creek and Alkali Creek	Total phosphorus (aquatic life), sulfate (water supply use), selenium (aquatic life)	Medium (selenium), N/A (other analytes)

Source: CDPHE 2024.

4.2.3 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 2020). FEMA-mapped floodplains include an area along the Colorado River in the town of Silt, Colorado, and its immediate vicinity; outside of this area, FEMA does not have floodplain data in the SWCD Area (FEMA 2020) **(Appendix C, Figure C-15)**.

4.3 Air Quality

Federal actions must comply with the Clean Air Act of 1970 (42 United States Code [U.S.C.] 7401) and its amendments. Established under the Clean Air Act, the General Conformity Rule (Section 176(c)(4)) and requirements are meant to prevent air quality impacts as a result of federal actions or federally funded actions from causing or contributing to violations of the National Ambient Air Quality Standards (NAAQS). The NAAQS are intended to protect public health and regulate the emissions of hazardous air pollutants. The U.S. Environmental Protection Agency (EPA) has set NAAQS for six pollutants,

commonly referred to as criteria pollutants, which are carbon monoxide, nitrogen dioxide, ozone, particulate matter, lead, and sulfur dioxide. The CDPHE has adopted the national standards and in 2016 established a state standard for sulfur dioxide.

The Clean Air Act amendments of 1977 designated Class 1 airsheds, including national parks and wilderness areas. These require the most stringent air quality protection, with emissions of particulate matter and other constituents of concern restricted.

Areas that meet the NAAQS and state standard are classified as attainment, while areas that exceed the NAAQS or state standard are classified as nonattainment. Areas designated as nonattainment are required to prepare implementation plans for attaining the standard for each pollutant. The CDPHE Air Pollution Control Division oversees air quality policies and develops the statewide implementation plans for all areas that currently violate or have violated federal or state standards.

The project area is in an attainment area for all criteria pollutants and is not located in a CDPHE-defined monitoring region (EPA 2022). Air quality monitoring sites in Rifle collect ozone and particulate matter 2.5 levels and provide air quality index reports.

The Flat Tops Wilderness, designated by Congress in 1975, is approximately 11 miles northeast of the northeast edge of the SWCD boundaries in the White River National Forest. The Flat Tops have an average elevation of 10,000 feet, and the wilderness supports many opportunities for outdoor recreation (USFS 2022). As noted previously, wilderness areas are Class 1 airsheds.

The Grand Hogback Area of Critical Environmental Concern, while not a Class 1 airshed, was designated by the BLM in part for its scenic qualities.

4.4 Vegetation

4.4.1 Vegetation Communities and Habitat

The project area lies 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.

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 Colorado River. 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 Grand Hogback monocline, a distinctive landform in the region, bisects the project area from north to south. The Grand Hogback supports uneven, narrow ridges and steeply sloping sides (USFS 2002). The riparian corridors of perennial streams and creeks typically feature cottonwood woodlands and forests with seminative understories containing significant components of invasive herbaceous and shrub species.

The Southern Rockies Ecoregion in the far northern portion of the SWCD Area is characterized by a temperate semiarid climate of moderately warm summers and cold winters with persistent snowpack. Precipitation at the lower elevations is approximately 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, whereas streams with headwaters in the Southern Rockies are diverted for 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 mixed with meadows and parks. In some areas, rock outcrops and steep canyons interface with the high desert country of the Colorado Plateaus Ecoregion 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 in the project area.

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 (**Section 4.6**). In the local context, the climate and soil properties of the shale lowlands of the SWCD Area provide conditions that support several rare and endemic plant species (see **Special Status Plant Species**, **Section 4.4.2**). 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 Gap Analysis Project (GAP)/LANDFIRE National Terrestrial Ecosystems dataset was used to characterize the spatial distribution of vegetation communities at the macro group level across the project area. At the macro group level, vegetation types are distinguished by diagnostic plant species and growth forms, and regional differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes (USGS 2014). The GAP/LANDFIRE dataset identifies a total of 17 land cover classes across the SWCD Area. **Table 4-3** lists the vegetation communities in order of prevalence in the SWCD Area. **Figure C-6** in **Appendix C** depicts the spatial distribution of vegetation communities in the SWCD Area and project measure areas (project areas). A buffer of 20 to 30 feet was analyzed around the linear project measures (i.e., pipelines) to determine vegetation communities.

Note that the resolution of the GAP/LANDFIRE dataset limits its capability for mapping small, patchy, or discontinuous narrow linear vegetation features such as rocky outcrops or certain wetlands and riparian areas. **Section 4.5** describes the project area's wetlands and riparian areas using other higher-resolution datasets.

Table 4-3. Vegetation communities expressed by total SWCD Area and by project areas for specific measures.

Vegetation Community	Percentage of the SWCD Area (%)	Acres and Percentages of Project Areas for Specific Components[1]	
		GVC	East Bypass Pipeline
Rocky Mountain Two-Needle Pinyon-Juniper Woodland	36.7	9.33 acres (71.7%)	0.9 acre (11.9%)
Herbaceous Agricultural Vegetation	26.5	0.82 acre (6.3%)	6.71 acres (88.6%)
Great Basin and Intermountain Tall Sagebrush Shrubland and Steppe	14.8	0.9 acre (6.9%)	
Intermountain Basin Cliff, Scree, and Rock Vegetation	4.0	0.09 acre (0.7%)	--
Great Basin Saltbrush Scrub	3.3	--	--
Developed and Urban	3.3	--	--
Southern Rocky Mountain Montane Grassland and Shrubland	3.2	0.49 acre (3.8%)	--
Cool Semi-Desert Alkali-Saline Wetland	2.0	--	--
Rocky Mountain and Great Basin Flooded and Swamp Forest (forested riparian, wetlands, and woodlands)	1.8	1.37 acres (10.5%)	--
Introduced and Semi Natural Vegetation	1.6	--	--
Open Water	1.5	--	--
Southern Rocky Mountain Lower Montane Forest	1.2	0.32 acre (2.5%)	--
Great Basin and Intermountain Dry Shrubland and Grassland	0.1	--	--
Warm Desert Freshwater Shrubland, Meadow and Marsh	<0.1	--	--
Recently Disturbed or Modified	<0.1	--	--
Quarries, Mines, Gravel Pits, and Oil Wells	<0.1	--	--
Rocky Mountain Cliff, Scree and Rock Vegetation	<0.1	--	--
Totals	56,465 acres (100%)	13.32 acres (100%)	7.57 acres (100%)

[1]Totals may differ due to rounding.

The following narratives briefly describe the three most common vegetation communities in the SWCD Area (Rocky Mountain two-needle pinyon-juniper woodland, herbaceous agricultural vegetation, and Great Basin and intermountain tall sagebrush shrubland and steppe, in order of prevalence of the vegetation community in the SWCD Area). The scientific names of plants mentioned in the text are provided in **Table E-5** of **Appendix E**. Unless other citations are provided, the following narratives are based on the Colorado Natural Heritage Program (CNHP) assessment for Garfield County (Lyon et al. 2001). Vegetation communities were verified during July 2021 field surveys. **Sections 4.4.1.1** and **4.4.1.2** present descriptions of vegetation and habitat in each project area.

Rocky Mountain Two-Needle Pinyon-Juniper Woodland (36.7 Percent of the SWCD Area)

Pinyon-juniper woodlands are the most extensive vegetation type in Garfield County. They are found primarily in the foothills areas between the valley bottoms and the mesa tops. The dominant species are pinyon pine and juniper. Juniper is more drought tolerant and usually dominant on lower-elevation drier sites, and pinyon tends to be more cold tolerant and dominant at higher elevations. The understory of

pinyon-juniper woodlands varies widely depending on the age and structure of the tree canopy. Open woodlands might include species such as sagebrush, oak, serviceberry, snowberry, and mountain mahogany mixed with grasses and forbs. Often there is considerable bare ground. The trees in this community are short and often widely spaced. The pinyon-juniper woodland community is the most prevalent native vegetation community in the GVC project area (**Table 4-3**; also **Figures C-6** and **C-7** in **Appendix C**).

Herbaceous Agricultural Vegetation (26.5 Percent of the SWCD Area)

This vegetation community is characterized by agricultural vegetation that is typically concentrated along major river valleys in Garfield County. Major crops are grass, hay, and alfalfa. The agricultural vegetation community is the primary vegetation community at the East Bypass Pipeline project area (**Table 4-3**; **Figures C-6** and **C-7** in **Appendix C**).

Great Basin and Intermountain Tall Sagebrush Shrubland and Steppe (14.8 Percent of the SWCD Area)

Great Basin and intermountain tall sagebrush shrubland and steppe, referred to as sagebrush shrublands in this analysis, are widespread throughout Garfield County at elevations both below and above pinyon-juniper woodlands. They are often on mesa tops where sagebrush forms nearly pure stands. Sagebrush shrublands have an open to dense (10 to 80 percent cover) short-shrub canopy dominated by big sagebrush (NatureServe 2021). Big sagebrush, greasewood, fourwing saltbush, and rabbitbrush are common in the bottom lands and stream terraces. Wyoming sagebrush and mountain big sagebrush are found at higher elevations in open upland areas, commonly mixed with shrubs such as snowberry and Utah serviceberry as well as various grasses and forbs. Black sagebrush is less common and found in drier pinyon-juniper communities.

4.4.1.1 GVC

The GVC project area includes project measures that are located in the East Rifle Creek drainage, rolling foothills, and benches and are at the southwest edge of Harvey Gap Reservoir. The vegetation communities in the GVC project area primarily consist of mature pinyon-juniper woodlands (approximately 72 percent of the project area) in the foothills and forested riparian areas, wetlands, and woodlands (Rocky Mountain and Great Basin Flooded and Swamp Forest; 10.5 percent of the project area) along East Rifle Creek (**Table 4-3**). A small portion of the project area consists of agricultural vegetation and sagebrush shrublands on the drier hillsides and terraces, and lower montane coniferous forests above the creek. The northernmost component of the GVC Project, the GVC Flow Control Gate Reconstruction, is located in Rifle Falls State Park, an area noted for waterfalls, limestone caves, lush riparian forests, and wetlands surrounded by steep canyon terrain and pinyon-juniper woodlands. The majority of the GVC Project occurs on existing disturbance. Small areas of the existing access road to be improved, accessing Piping Measure #3 (**Appendix B**, **Figure B-3**), would occur in a mature pinyon-juniper woodland. The GVC Bypass Rebuild project area around the Harvey Gap Reservoir occurs in open sagebrush shrublands and pinyon-juniper woodlands (**Appendix C**, **Figure C-6**).

4.4.1.2 East Bypass Pipeline

The East Bypass Pipeline project area component travels from north to south through irrigated fields, residential development, and foothills in the southeastern portion of the SWCD Area. Herbaceous

agricultural vegetation is the primary vegetation community, along with small amounts of pinyon-juniper woodland and sagebrush shrubland (**Table 4-3**). The majority of the project area runs parallel to existing roads. The southern part of this project component would be located on the edge of a fallow agricultural field (**Appendix C**, **Figure C-6**).

4.4.2 Special Status Plant Species

Special status plants in the SWCD Area include plants protected under the Endangered Species Act (ESA) and plants recognized as sensitive species by the BLM. 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 2015a). ERO biologists reviewed the distribution for each Tier 1 PSGCN in relation to the SWCD Area (CNHP 1997+). Except for federally listed species that occur on the Tier 1 PSGCN list, no additional Tier 1 PSGCN have potential to occur in the SWCD Area based on known distributions and habitat. Therefore, Tier 1 PSGCN are not discussed further in this Plan-EA.

For each future specific project proposed under this 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 area.

Federally Protected Plants

Table 4-4 presents plants protected under the ESA that occur or potentially occur in the SWCD Area. The list was generated using the USFWS Environmental Conservation Online System Information for Planning and Conservation (IPaC) tool in May 2025 (USFWS 2025) and a follow-up informal technical consultation with a BLM Colorado River Valley Field Office (CRVFO) Biologist (Boyd, pers. comm. 2021) to confirm the presence and absence of each species in the SWCD Area. The CRVFO actively maintains a spatial dataset of special status species and provided data and local knowledge informing the following discussion. No designated critical habitats for plant species with ESA protection are present in the SWCD Area.

Table 4-4. ESA-protected plant species occurring or potentially occurring in the SWCD Area.

Species	Legal Status	SWCD Area	Habitat
DeBeque phacelia *Phacelia submutica*	Threatened	Potentially occurring	Suitable habitat (exposures of chocolate to purplish brown and dark charcoal-gray alkaline clay soils derived from the Wasatch Formation) does not occur near project measures but has potential to occur in the SWCD Area. Critical habitat has been designated, but does not occur in, the SWCD Area.
Ute ladies'-tresses orchid *Spiranthes diluvialis*	Threatened	Potentially occurring	Suitable habitat (moist meadows associated with perennial stream terraces, floodplains, and oxbows) does not occur near project measures but has potential to occur in the SWCD Area.

Two ESA-protected plant species have potential to occur in the SWCD Area: DeBeque phacelia and Ute ladies'-tresses orchid (ULTO; **Table 4-4**). There are no documented occurrences of either species in the SWCD Area (Clayton, pers. comm. 2021). Potential Conservation Areas that occur in the SWCD Area were reviewed for the presence of federally listed and BLM-listed special status plant species. None of

the five Potential Conservation Area that occur in the SWCD Area are reported to contain populations of special status plants (CNHP 2019; Lyon et al. 2001).

According to C. Clayton (supervisory fish and wildlife biologist, USFWS), DeBeque phacelia is not likely to occur east of its designated critical habitat near DeBeque, Colorado (approximately 20 miles southwest of the SWCD Area), and will likely be removed from the Section 7 modeled range near and in the SWCD Area in the future (Clayton, pers. comm. 2021). Currently, the USFWS Section 7 modeled range for DeBeque phacelia extends to the southeast along the Grand Hogback and encompasses the southwestern portion of the SWCD Area (**Appendix C**, **Figure C-7**; USFWS 2021c). The nearest area of documented occurrences of DeBeque phacelia lies approximately 18 miles southwest of the SWCD Area (BLM 2014). Although potentially suitable habitat (Wasatch Formation on badland hillsides with sparse vegetation) exists in the SWCD Area, and although some of the USFWS Section 7 modeled range encompasses the southwestern portion of the SWCD Area, the SWCD Area lies outside the occurrence-based current known range of the species (Clayton, pers. comm. 2021). ERO biologists reviewed project-specific locations with USFWS biologists during field surveys (July 27 and 28, 2021) for suitable DeBeque phacelia habitat. Because habitat suitability evaluation surveys were conducted outside of the blooming season (late April to late June), no individuals were identified or surveyed for. Field reviews focused on habitat identification in the Section 7 modeled range in the project area and did not identify any potentially suitable habitat, including distinctive clay soils and associated species.

The USFWS's Section 7 modeled range for ULTO is scattered throughout the southern and western portions of the SWCD Area (USFWS 2021c; **Appendix C**, **Figure C-7**). There are no documented occurrences of ULTO in the SWCD Area (Clayton, pers. comm. 2021). The closest known occurrence of ULTO to the SWCD Area is in the Carbondale, Colorado, area, approximately 25 miles to the southeast (BLM 2014). The project measure areas consist of highly developed areas, agricultural developments, and modified stream and riparian habitat. ERO biologists reviewed project-specific locations with USFWS biologists and during field surveys (July 27 and 28, 2021) for suitable ULTO habitat. Habitat suitability evaluation surveys were conducted during the blooming season (July through September), and no individuals were identified during the surveys. No ULTO suitable habitat was documented at any of the project measure areas or within a 100-foot buffer. Detailed descriptions of these species are provided in the *SWCD Watershed Plan Biological Assessment* (ERO 2021; provided in **Appendix A**) and in **Appendix E**.

BLM Sensitive Plants

A listing (**Table 4-5**) of BLM sensitive plants potentially occurring in the SWCD Area and project measure areas was compiled from the current list of BLM sensitive species of the CRVFO (BLM 2023). Several plants on the BLM sensitive species lists were dismissed from further analysis based on a lack of habitat or range in the project area (**Table 4-6**). Species assignments for these two tables were confirmed with a CRVFO BLM biologist (Boyd, pers. comm. 2021), who maintains a spatial dataset of special status species for the CRVFO and provided data and local knowledge informing the following discussion.

Table 4-5. BLM sensitive plant species potentially occurring in the SWCD Area and project measure areas.

Species	SWCD Area	Project-Specific Measures[1]		Habitat
		GVC	East Bypass Pipeline	
DeBeque milkvetch *Astragalus debequaeus*	X	--	--	Only found in soils of the Atwell Gulch Member of the Wasatch Formation, in areas surrounded by pinyon-juniper woodlands and desert shrub. Elevation 4,944-6,680 feet.
Harrington's beardtongue *Penstemon harringtonii*	X	X	--	Open sagebrush or pinyon-juniper habitats on gentle slopes. Soils are typically rocky loams and rocky clay. Elevation 6,100-10,000 feet.

[1]X = potential occurrence; -- = no potential occurrence.

Two BLM sensitive plant species, DeBeque milkvetch and Harrington's beardtongue, have potential to occur on BLM lands in the SWCD Area. None of the project-specific measures provide suitable habitat for DeBeque milkvetch due to the lack of the appropriate geological formation. Potential habitat for Harrington's beardtongue occurs on BLM lands in the GVC Bypass Rebuild project area. Neither of the BLM sensitive plant species has potential to occur on BLM lands in the East Bypass Pipeline project area due to extensive previous disturbance in and around the area (see **Appendix E** for complete descriptions of these species).

Several BLM sensitive plant species on the CRVFO list were eliminated from further analysis (**Table 4-6**) because their documented ranges lie outside the SWCD Area, or no suitable habitat is present in the SWCD Area.

Table 4-6. BLM sensitive plant species dismissed from further analysis.

Species Dismissed from Further Analysis	Rationale for Dismissal from Further Analysis
Naturita milkvetch *Astragalus naturitensis*	Documented in Garfield, Mesa, Montezuma, Montrose, and San Miguel Counties. Occurs in the south-central portion of Garfield County on sandstone ledges along canyon rims (CNHP 2019). Not documented in or near the SWCD Area.
Roan Cliffs blazing star *Mentzelia rhizomata* (*Mentzelia argillosa*)	Endemic to steep talus slopes of the Green River Formation in Garfield County (BLM 2014; CNHP 2019). The geological substrate in the SWCD Area is not suitable habitat for this species.
Piceance bladderpod *Lesquerella parviflora*	Documented in Garfield, Mesa, and Rio Blanco Counties. Occurs on shale outcrops of the Green River Formation, and on ledges and slopes of canyons in open areas. The geological substrate in the SWCD Area is not suitable habitat for this species, and there are no documented occurrences in the CRVFO planning area (BLM 2014).
Cathedral Bluff meadow-rue *Thalictrum heliophilum*	Documented in Garfield, Mesa, and Rio Blanco Counties. Occurs on shale outcrops consisting of the Green River Formation (CNHP 2019). The geological substrate in the SWCD Area is not suitable habitat for this species.

4.4.2.1 GVC

No habitat occurs in the GVC project area for either of the ESA-listed plant species. The southern portion (approximately 0.25 acre) of the GVC Bypass Rebuild project area around Harvey Gap Reservoir is located in the USFWS Section 7 modeled range for DeBeque phacelia. However, this project area is not located on the appropriate geological formation for DeBeque phacelia (Wasatch Formation), and appropriate soils were not observed (exposures of chocolate to purplish brown and dark charcoal-gray

alkaline clay soils) during the July 2021 field surveys. Likewise, the rest of the GVC project area does not contain soils derived from the Wasatch Formation, precluding the presence of DeBeque phacelia. The GVC project area consists of modified stream and riparian habitat; no suitable habitat for ULTO was observed in the project area during the July 2021 field surveys.

Potential habitat for the BLM sensitive species Harrington's beardtongue occurs on BLM land in the GVC Bypass Rebuild project area around Harvey Gap Reservoir. A portion of the GVC Bypass Rebuild project area occurs on BLM land. The open stands of sagebrush on the edges of pinyon-juniper woodlands, as well as the historic disturbance of the existing ditch, provide suitable habitat for this species. No individuals were observed during the July 2021 field surveys; however, the habitat suitability surveys were conducted outside of the blooming season (May through June).

The southern portion of the GVC Bypass Rebuild project area around Harvey Gap Reservoir is located in the USFWS Section 7 modeled range for DeBeque phacelia. However, this project area is not located on the appropriate geological formation for DeBeque phacelia (Wasatch Formation), and appropriate soils were not observed (exposures of chocolate to purplish brown and dark charcoal-gray alkaline clay soils) during the July 2021 field surveys.

4.4.2.2 East Bypass Pipeline

No habitat occurs in the East Bypass Pipeline project area for any of the ESA-listed plant species or BLM sensitive plant species due to previous disturbance and/or lack of appropriate habitat. The East Bypass Pipeline project area is located in the USFWS Section 7 modeled range for DeBeque phacelia and the appropriate geological formation for DeBeque phacelia and DeBeque milkvetch (Wasatch Formation), but appropriate soils were not observed (exposures of chocolate to purplish brown and dark charcoal-gray alkaline clay soils) during the July 2021 field surveys. A small portion of the East Bypass Pipeline project area occurs on previously disturbed terrain on BLM land. This relatively small corner of BLM land is bordered by County Road (CR) 250 (Bendetti Road) to the north and east, and residential development to the south and west, limiting the availability of suitable habitat for BLM sensitive plant species. No habitat for BLM sensitive species occurs in the East Bypass Pipeline project area.

4.4.3 Invasive Species

The CDA developed the Noxious Weed Program to assist in the control of noxious weeds, which are nonnative aggressive invasive plants that replace native vegetation, reduce agricultural productivity, cause wind and water erosion, and pose an increased threat to communities from wildfires. The Colorado Noxious Weed Act (8 Colorado Court Rule 1206-2) directs the CDA to develop and implement management plans for all List A and List B noxious weed species. The CDA Noxious Weed Program designates four weed categories. List A weeds are of the highest priority for control, 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 species for which state noxious weed management plans are designed to stop the continued spread of these species through eradication, containment, or suppression in identified areas. List C species are species that are widespread and well-established, for which the CDA recommends but does not require control. Watch list species have been determined to pose a threat to the agricultural productivity and environmental values of the lands of the state. The Watch list is nonregulatory and advisory only (CDA 2020; Garfield County 2016).

Garfield County has developed an Integrated Weed Management Plan designed to stop the spread of noxious weeds as mandated by the Colorado Noxious Weed Act. The Garfield County Noxious Weed List includes the CDA designations as well as some not listed by the state (CDA 2017; Garfield County 2016). The BLM CRVFO, as surface owner of approximately 35 percent of the SWCD Area, has adopted the Colorado Noxious Weed Act and categories as well as the BLM's *Final Programmatic Environmental Impact Statement for Vegetation Treatment on Bureau of Land Management Lands in 17 Western States* (BLM 2007) to guide management priorities (BLM 2014).

Table E-3 in **Appendix E** presents the state-listed noxious weeds currently known from and potentially occurring in Garfield County and the SWCD Area (Garfield County 2016), along with the current management priority for each weed assigned by Garfield County and the BLM CRVFO (BLM 2014; Garfield County 2016).

4.5 Wetlands and Riparian Areas

The Clean Water Act (CWA) protects the chemical, physical, and biological quality of waters of the U.S. The USACE Regulatory Program administers and enforces Section 404 of the CWA. Under Section 404, a USACE permit is required for the discharge of dredged or fill material into wetlands and other waters of the U.S. (streams, ponds, and other water bodies).

On August 29, 2023, the EPA and USACE announced a final rule amending the 2023 definition of "waters of the U.S." to conform with the Supreme Court ruling under *Sackett v. Environmental Protection Agency*, No. 21-454. The amended rule reduces the jurisdiction of the CWA over wetlands adjacent to bodies of water that do not have a continuous surface connection to other known waters of the U.S., as well as streams that do not have continuous flowing or relatively permanent water. The amended rule removes the "significant nexus" standard that was created under *Rapanos v. United States*, removes interstate wetlands from the definition of waters of the U.S., and revises the definition of "adjacent" to mean "having a continuous surface connection." Wetlands that do not have a continuous surface connection to a jurisdictional traditionally navigable water or tributary are no longer jurisdictional, and neither are ephemeral streams that do not have relatively permanent water.

Section 404 of the CWA and the BLM define 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" (BLM 1992; EPA 2015).

The 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 supports a prevalence of such vegetation under normal circumstances" (16 U.S.C. § 3801(a)(27)).

Riparian areas occur as narrow bands along the banks of rivers, streams, waterways, or other typically flowing bodies of water. They can also form along open canals or ditches. Many federal agencies have a unique definition of a riparian area; those applicable to the project area are shown in **Table 4-7**.

Table 4-7. Agency riparian definitions.

Agency	Riparian Definition
EPA	Riparian areas are defined as transition areas between terrestrial and aquatic ecosystems (EPA 2020).
NRCS	Riparian areas are ecotones that occur along watercourses 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 include perennial and intermittent stream banks, floodplains, and lake shores (NRCS 2010).
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).

Wetlands and riparian areas are important aspects in the watershed, performing functions such as water storage, water filtration, and biological productivity (EPA 2016). Many species depend on wetland and riparian habitats.

The SWCD Area contains numerous wetlands and riparian areas. ERO biologists reviewed the distribution of wetlands and riparian areas throughout the SWCD Area via the USFWS National Wetlands Inventory wetlands mapper (USFWS 2021a). The project measures were field verified, but wetland delineations were not performed during the development of this Plan-EA. The USACE has a clear path for permitting the project, based on field reviews of wetland areas and conversations with the USACE. Regional General Permit (RGP) 5 provides for ditch-to-pipe conversions, which is the remaining project measure that would result in potential impacts on jurisdictional waters. However, because regular maintenance is an exempted activity under 404 and can affect the wetlands present along ditches and canals, ERO recommends revisiting the mapping of canals and ditches 3 months prior to submittal of the preconstruction notification required for USACE permitting purposes.

Freshwater emergent wetlands commonly occur in shallow, mostly still water. Emergent wetlands in the SWCD Area are commonly dominated by cattails, giant reeds, spike rushes, bulrushes, sedges, and rushes. Some freshwater emergent wetlands develop downslope of unlined irrigation canals. Riverine wetlands occur along rivers and streams. Irrigation canals are included in this category. Overbank stream flow is the main source of water maintaining the riverine wetland vegetation (Carsey et al. 2003). Freshwater forested/shrub wetlands are commonly dominated by narrowleaf cottonwood, skunkbush sumac, thinleaf alder, and coyote willow (Lyon et al. 2001). The scientific names of plants mentioned in the text are provided in **Table E-5** of **Appendix E**.

Extensive industrial development and gravel mining operations in the Colorado River floodplain upstream and downstream of Rifle have included the removal of cottonwood gallery forests and associated riparian areas. Along the immediate banks of the Colorado River in the SWCD Area and around wetlands in the floodplain, dominant plant species include coyote willow, cocklebur, barnyard grass, reed canarygrass, common reed, and cattail (CNHP 2021).

4.5.1 SWCD Area

Table 4-8 shows the wetland and other aquatic resource types in the SWCD Area as well as project measures by landownership (**Appendix C**, **Figure C-8**). Approximately 2,576.1 acres of wetland and other aquatic resource types occur in the approximately 56,465-acre SWCD Area. Aquatic resources make

up approximately 4.6 percent of the total acreage of the SWCD Area. Wetlands (freshwater emergent and freshwater forest/shrub types) account for approximately 1.5 percent, and other aquatic resources (freshwater ponds, lakes, and rivers) account for approximately 3.1 percent of the SWCD Area.

4.5.2 GVC

Table 4-8 shows a total of 4.14 acres in the wetland and other aquatic resource types in the 13.32-acre GVC project area. Riverine wetlands account for approximately 25 percent, and freshwater emergent wetlands account for approximately 7 percent of the GVC project area. The riverine classification is primarily due to the open canal and a small portion of East Rifle Creek; the GVC Flow Control Gate Reconstruction Project crosses the creek.

4.5.3 East Bypass Pipeline

Table 4-8 shows a total of 0.2 acre in the wetland and other aquatic resource types in the 7.57-acre East Bypass Pipeline project area. Freshwater emergent wetlands account for less than 1 percent of the East Bypass Pipeline project area. No perennial rivers or streams are in the project area.

Table 4-8. Wetland and aquatic resource types in the SWCD and project measure areas by landownership.

Wetland/Aquatic Resource Type[1]	BLM (Acres)	Private (Acres)	Local (State/County/City Recreation Lands) (Acres)	USFS (Acres)	Total (Acres)[2]
SWCD Area					
Freshwater Emergent Wetland	11.2	682.9	15.6	0.1	**709.8**
Freshwater Forested/Shrub Wetland	0.3	107.2	19.8	0.0	**127.3**
Freshwater Pond	10.1	105.7	32.0	0.0	**147.8**
Lake	0	72.7	453.7	0.0	**526.4**
Riverine	213.9	793.4	57.4	0.1	**1064.8**
SWCD Area Total[2]	**235.5**	**1761.9**	**578.5**	**0.2**	**2576.1**
GVC					
Freshwater Emergent Wetland	0.07	0.13	0.65	0	**0.85**
Freshwater Forested/Shrub Wetland	0	0.03	0	0	**0.03**
Freshwater Pond	0	0	0	0	**0**
Lake	0	0	0	0	**0**
Riverine	1.38	1.61	0.27	0	**3.25**
GVC Total[2]	**1.45**	**1.77**	**0.92**	**0**	**4.13**
East Bypass Pipeline					
Freshwater Emergent Wetland	0	0.2	0	0	**0.2**
Freshwater Forested/ Shrub Wetland	0	0	0	0	**0**
Freshwater Pond	0	0	0	0	**0**
Lake	0	0	0	0	**0**
Riverine	0	0	0	0	**0**
East Bypass Pipeline Total[2]		**0.2**	**0**	**0**	**0.2**

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

4.6 Wildlife

A variety of wildlife species occur in the SWCD Area. **Section 4.4** provides an overview of vegetation communities that comprise wildlife habitat. Terrestrial wildlife are discussed in **Sections 4.6.1** and **4.6.2**.

Fish and amphibians are discussed in **Section 4.6.3**. **Table E-6** of **Appendix E** provides the scientific names of wildlife species mentioned in the text.

4.6.1 Terrestrial Wildlife

Generally, wildlife present in the SWCD Area consist of habitat generalists or "edge" species. Edge species use edge habitat, or the boundary between two different vegetation communities (e.g., pinyon-juniper woodlands adjacent to agricultural land). Generalist species can eat a wide variety of food and thrive in various environments. These species are tolerant of disturbance and include species such as mule deer, coyote, striped skunk, raccoon, and red-tailed hawk. Some environments in the SWCD Area are suitable for habitat specialist species. Specialist species, such as the black swift, are found in specific habitats and are not as adaptable to change in their environment. Wildlife in the project measure areas may use the canals as water sources and dispersal corridors. Additionally, where not cleared, vegetation along canals provides food, cover, and breeding areas for many wildlife species throughout the year.

4.6.1.1 Big Game

Big game species in the SWCD Area include elk, mule deer, black bear, and mountain lion. Elk and mule deer are an economic resource for the region through hunting and wildlife viewing revenue and are the most abundant big game in the SWCD Area. Elk and deer are migratory species. Typically, they travel from higher to lower elevations in the winter and move back to higher altitudes during warmer weather. Snow and weather events typically trigger seasonal movements. Resident populations of mule deer are found in the southern portion of the SWCD Area.

Figures C-9 and **C-10** in **Appendix C** depict the CPW-mapped seasonal distribution of elk and mule deer across the SWCD Area. For both elk and mule deer, the SWCD Area provides overall winter range, winter concentration areas, and severe winter range (CPW 2020a).[1] Most of the project measure areas are located entirely or partially in mapped mule deer winter concentration area. Portions of the GVC and East Bypass Pipeline project areas are located in mapped mule deer and elk severe winter range. Except for the GVC Bypass Rebuild, all of the project measures are located entirely or partially in mapped elk winter concentration area (CPW 2020a; **Table 4-9**). Habitat quantity and quality on winter range are limiting factors for mule deer and elk populations in the region. Elk and mule deer are more vulnerable to starvation and predation during the winter months, especially during severe winters (Cooley et al. 2020). No mapped migration patterns occur in the SWCD Area (CPW 2020a), although elk and mule deer move from surrounding summer range in the mountains to the foothills and agricultural lands in the SWCD Area during winter months. No summer range or production areas occur in the SWCD Area.

A portion of the proposed GVC Bypass Rebuild project area around Harvey Gap Reservoir would be located in the BLM-designated Dry Rifle Creek Winter Closure Area (**Figures C-9** and **C-10** in **Appendix C**). The Dry Rifle Creek area is considered priority wildlife habitat (BLM 2024). Deer and elk likely pass through the project area to reach water in Harvey Gap Reservoir.

[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 and/or winter temperatures are at a minimum in the 2 worst winters out of 10 (CPW 2021a).

Table 4-9. Elk and mule deer ranges in the SWCD Area and project measure areas (expressed as percentages).

Range Type by Species	SWCD Area	Project-Specific Measures	
		GVC	East Bypass Pipeline
Elk[1]			
Winter Range	87.5	100.0	100.0
Winter Concentration Area	38.5	89.0	40.8
Severe Winter Range	45.4	26.2	91.5
[1]The following mapped elk ranges do not occur in the SWCD Area or project measure areas: migration corridor, resident population area, summer range, summer concentration area, and production area (calving) (CPW 2020a).			
Mule Deer[2]			
Winter Range	100.0	100.0	100.0
Winter Concentration Area	72.0	100.0	28.0
Severe Winter Range	51.7	40.2	71.1
Concentration Area	4.8	44.0	--
Resident Population Area	46.5	--	100.0
[2]The following mapped mule deer ranges do not occur in the SWCD Area or project measure areas: migration corridor, summer range, and concentration area (CPW 2020a).			

4.6.1.2 Other Mammals

A variety of mammal species occur in the SWCD Area. These include but are not limited to black bear, mountain lion, bobcat, coyote, red fox, porcupine, badger, weasels, mountain and desert cottontail rabbits, white-tailed jackrabbit, raccoon, striped and spotted skunks, ringtail, and several species of small mammals (e.g., mice, ground squirrels, chipmunks, and squirrels) and bats. Mammals associated with wetlands or riparian areas found in the SWCD Area are beaver, muskrat, and river otter (iNaturalist 2022).

4.6.1.3 Reptiles

Many types of reptiles occur in the SWCD Area, including but not limited to bull snake, western terrestrial garter snake, smooth green snake, sagebrush lizard, fence lizard, plateau striped whiptail, short-horned lizard, and collared lizard (Hammerson 1999; iNaturalist 2022). Reptiles are more common in the lower elevations of the project area and are most often associated with semidesert shrublands, sagebrush shrublands, and pinyon-juniper woodlands. The western terrestrial garter snake and smooth green snake are often found near water, while the other reptiles prefer rocky, dry areas.

4.6.1.4 Birds

Up to 280 species of birds occur or potentially occur in the SWCD Area as residents or migratory species (Colorado Field Ornithologists 2021), including raptors, game birds, waterbirds, and songbirds. The highest number of species occur in riparian and wetland vegetation communities. In upland vegetation communities, more bird species occur in mid-elevation forests and woodlands during spring, summer, and fall due to migratory species, whereas pinyon-juniper woodlands and lower-elevation shrublands support more bird species during the winter (BLM 2014).

Red-tailed hawk, American kestrel, northern harrier, great horned owl, golden eagle, Cooper's hawk, peregrine falcon, and prairie falcon, as well as other raptor species, occur in the SWCD Area. Turkey vultures are common during the summer. Bald eagles occur near the Colorado River and reservoirs during the winter (**Appendix C**, **Figure C-11**). CPW (2020a) maps numerous bald eagle roosts and some active nest sites in the SWCD Area, particularly near the Colorado River (**Appendix C**, **Figure C-11**). Some

raptors in the region begin nesting as early as December (golden eagles), but most start nesting in March. Most raptors typically fledge their young by mid-July, but some individual clutches could fledge as late as mid-August (CPW 2020b).

Common waterbirds (waterfowl and shorebirds) that breed near the streams, rivers, reservoirs, and associated wetlands and riparian areas in the SWCD Area include Canada goose, mallard, gadwall, American wigeon, blue-winged teal, cinnamon teal, and green-winged teal. A variety of other waterfowl occur during migrations, including lesser scaup, Barrow's goldeneye, American white pelican, American coot, great blue heron, killdeer, spotted sandpiper, American avocet, sora, and belted kingfisher (BLM 2014; iNaturalist 2022). Several Canada goose production, foraging, and wintering areas are mapped throughout the SWCD Area; Harvey Gap Reservoir is mapped as goose production area and brood concentration area (CPW 2020a). The majority of waterbirds in the area nest in May through August, although some can begin nesting in March. Others 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 the SWCD Area include wild turkey, chukar, and dusky grouse.

A variety of migratory songbirds commonly associated with shrublands, riparian woodlands and shrublands, or pinyon-juniper woodlands have potential to occur in the SWCD Area. A list of these species is included in **Table E-6** in **Appendix E**. Birds common throughout the SWCD Area include black-billed magpie, common raven, horned lark, mountain chickadee, and American robin (BLM 2014). The majority of migratory songbirds in the region nest between April and mid-July. Several of these species overwinter in the lower elevations of the SWCD Area. Common spring and fall migrants include western wood peewee, chipping sparrow, vesper sparrow, white-crowned sparrow, and yellow-rumped warbler.

All migratory birds in the SWCD 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. Furthermore, EO 13186 (66 *Federal Register* 3853–3856, January 10, 2001), 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 of 1940.

Although migratory birds are likely to travel through the project measure areas, limited habitat is provided in the GVC and East Bypass Pipeline project areas due to maintenance activities that remove vegetation annually. Harvey Gap Reservoir provides habitat for ducks and shorebirds.

Table 4-10 presents migratory bird species of concern occurring or with the potential to occur in the SWCD Area. The table was compiled using the USFWS's Environmental Conservation Online System IPaC in May 2025 (USFWS 2025), the USFWS's Birds of Conservation Concern for Bird Conservation Region Southern Rockies/Colorado Plateau (USFWS 2021d), and the BLM's Proposed Resource Management Plan and Final Environmental Impact Statement for the CRVFO (BLM 2014). Species that have no habitat or no potential to occur in the SWCD Area were excluded from the list in **Table 4-10**. Several species of concern listed in **Table 4-10** are protected under the ESA or considered sensitive by the

BLM and are further discussed in **Section 4.6.2, Terrestrial Special Status Wildlife Species**. Habitat notes, including nesting periods, were synthesized from Kingery (1998), Colorado Bird Atlas Partnership (2016), and USFWS (2021b, 2021d).

Table 4-10. Migratory bird species of concern occurring or potentially occurring in the SWCD Area.

Species of Concern	Season Present	Habitat Notes and Nesting Periods
Bald eagle *Haliaeetus leucocephalus*	Year-round	Winters in upland areas, especially low shrublands with nearby rivers or lakes; nests in snaggy cottonwoods along forested rivers and lakes; nests December through August
Black rosy-finch *Leucosticte atrata*	Winter	Open country, mountain meadows, high deserts, valleys, and plains; nests in the alpine zone near rocks and cliffs (no breeding records in the SWCD Area)
Black swift *Cypseloides niger*	Summer	Water, high relief over surroundings, inaccessibility to predators, unobstructed aerial access, and darkness; nests June through mid-September
Brewer's sparrow *Spizella breweri*	Summer	Large patches of sagebrush shrublands and shrub-steppe; nests May through mid-August
Broad-tailed hummingbird *Selasphorus platycercus*	Spring/summer/fall	Meadows and open woodlands, especially pinyon-juniper, pine-oak, evergreen, and montane scrub; nests May through mid-August
Brown-capped rosy-finch *Leucosticte australis*	Winter	Alpine meadows, cliffs, talus, and high-elevation parks; nests June 15 through August 25; winters at lower elevations in shrubby and forested habitats
California gull *Larus californicus*	Spring/fall migrant	Forages in pastures, scrublands, and garbage dumps
Cassin's finch *Carpodacus cassinii*	Year-round	Open montane coniferous forests; breeds/nests in coniferous forests; migrates through other habitat types; nests mid-April through mid-August
Clark's grebe *Aechmophorus clarkia*	Summer	Nests on large freshwater lakes and marshes with edges containing emergent vegetation (no breeding records in the SWCD Area)
Clark's nutcracker *Nucifraga columbiana*	Fall/winter	Open coniferous forests; migrates downslope in the fall to pinyon-juniper, ponderosa pine, or other lower-elevation forests
Evening grosbeak *Coccothraustes vespertinus*	Year-round	Mature and second-growth coniferous forests, including pine-oak and pinyon-juniper; nests mid-April through mid-August
Flammulated owl *Otus flammeolus*	Summer	Montane and subalpine forests, including ponderosa pine, Douglas-fir, aspen, and aspen-conifer mix; nests May through mid-August
Golden eagle *Aquila chrysaetos*	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
Gray vireo *Vireo vicinior*	Summer	Pinyon-juniper woodlands and open juniper-grasslands; nests mid-May through mid-August
Lesser yellowlegs *Tringa flavipes*	Spring/fall migrant	Wetlands, marshes, lake and pond edges, wet meadows, and flood agricultural fields
Lewis's woodpecker *Melanerpes lewis*	Year-round	Coniferous, aspen, riparian woodland and forests, orchards, and sometimes pinyon-juniper woodlands; nests mid-April through July
Long-eared owl *Asio otus*	Year-round	Roosts in dense vegetation and forages in open grasslands or shrublands; also roosts in open coniferous or deciduous woodlands; nests March through July
Mountain plover *Charadrius montanus*	Rare spring/fall migrant	High plains, cultivated fields, and desert scrublands, often in association with heavy grazing (no breeding records in the SWCD Area)
Olive-sided flycatcher *Contopus cooperi*	Summer	Coniferous forests and woodlands, near openings; early successional forests with standing snags; nests June through July
Pinyon jay *Gymnorhinus cyanocephalus*	Year-round	Pinyon-juniper woodlands; nests mid-March through mid-July
Rufous hummingbird *Selasphorus rufus*	Spring/fall migrant	During migration, occurs in mountain meadows up to 12,600 feet in elevation
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 SWCD Area)

Species of Concern	Season Present	Habitat Notes and Nesting Periods
Veery *Catharus fuscescens*	Possible summer resident	Moist, dense willow carrs or thickets of alders or cottonwood saplings along montane rivers or streams; nests mid-May through mid-July
Virginia's warbler *Vermivora virginiae*	Summer	Gambel oak shrublands, mixed montane shrublands, and pinyon-juniper woodlands; brushy cover for ground nests; nests mid-May through July
Western grebe *Aechmophorus occidentalis*	Possible summer resident	Open water with marshy shoreline; occasional breeder in the SWCD Area; nests mid-May through August
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	Summer	Wetlands in prairies and mountain meadows, and shallow areas of marshes, ponds, and rivers; nests in cattails, bulrushes, or reeds; forages in surrounding grasslands or croplands; nests mid-May through August

4.6.2 Terrestrial Special Status Wildlife Species

Special status wildlife species with the potential to be affected by the Preferred Alternative are animals protected or proposed for protection under the ESA and their designated or proposed critical habitats; animals recognized as sensitive species by the BLM; and animals listed as threatened, endangered, and Species of Greatest Conservation Need (SGCN) Tier 1 category by CPW. Only Tier 1 SGCN were evaluated, as this list represents the species that have the highest conservation priority in the state (CPW 2015b). 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 and candidate species are not federally protected; however, potential impacts on these elements are being considered by this Plan-EA so that these elements have been adequately analyzed should USFWS finalize the proposed rulings. Special status fish and amphibians are discussed in **Section 4.6.3**.

For each future specific project proposed under this Plan-EA, the following lists of special status species and critical habitats designated or proposed under the ESA must be confirmed and updated as necessary to reflect the current legal status, BLM status, or CPW status of wildlife in the vicinity of the specific project.

4.6.2.1 Federally Protected Terrestrial Wildlife

Table 4-11 presents the two federally protected mammal species, two federally protected bird species, one proposed threatened insect species, one threatened insect species, and one proposed endangered insect species potentially occurring in the SWCD Area. This list was developed using the USFWS's IPaC in May 2025 (USFWS 2025). To confirm the presence or absence of each ESA-protected species, a follow-up informal technical consultation was held with a USFWS biologist (Clayton, pers. comm. 2021) and a BLM CRVFO biologist (Boyd, pers. comm. 2021). The CRVFO actively maintains a spatial dataset of special status species and provided data and local knowledge informing the following discussion. Spatial range mapping datasets maintained by CPW (2020a) and other resources were also consulted, as cited. No ESA-protected wildlife species are expected to occur in the SWCD Area (**Table 4-11**). The rationale of this determination is provided in more detail in the *SWCD Watershed Plan Biological Assessment* (ERO 2021; provided in **Appendix A**).

The monarch butterfly was designated as a proposed threatened species in December 2024 (89 *Federal Register* 100662-100716), December 12, 2024) due to widespread drought, habitat loss, fragmentation, and low population abundance (USFWS 2024a). Potential habitat for the monarch butterfly occurs in the SWCD Area as well as the project measure areas, specifically along the GVC. Due to regular maintenance

of vegetation along the canal, potential monarch butterfly is marginal. A description of the monarch butterfly and its habitat is provided in **Appendix E**.

The silverspot butterfly was listed as threatened on March 18, 2024 (89 *Federal Register* 11750-11772, March 18, 2024) due to habitat loss and fragmentation, hydrologic alteration, livestock grazing, genetic isolation, and climate change (USFWS 2024b). In Colorado, it is possible that Rifle Gap Reservoir and Dam was previously suitable habitat as one butterfly was observed at a small wetland downstream of the dam (USFWS 2022). However, most of the project area is located in upland habitat, and suitable habitat for the silverspot butterfly is unlikely to occur in the SWCD project measure areas.

Suckley's cuckoo bumble bee was proposed for listing as endangered on December 17, 2024 (89 *Federal Register* 102074-102091) (USFWS 2024c). Suckley's cuckoo bumble bee is an obligate social parasite of social bumble bees in the genus *Bombus*. Suckley's cuckoo bumble bee cannot successfully reproduce without the availability of suitable host colonies. It is a semi-specialist parasite and confirmed to usurp nests of western bumble bees and Nevada bumble bees (USFWS 2024d). Based on the best available information, there have been no observations of Suckley's cuckoo bumble bee since 2014 despite ongoing surveys. The Species Status Assessment shows recent observations (since 2018) occur only in northern latitudes, primarily in Canada (USFWS 2024d). Based on this information, the Suckley's cuckoo bumble bee is considered extirpated from Colorado. Because of this, Suckley's cuckoo bumble bee is unlikely to occur in the SWCD project measure areas.

Table 4-11. Federally protected wildlife species potentially occurring in the SWCD Area.

Element	Occurrence in SWCD Area[1]
Canada lynx (Threatened)	--
Gray wolf (Endangered)	--
Mexican spotted owl (Threatened)	--
Western yellow-billed cuckoo (Threatened)	--
Monarch butterfly (Proposed Threatened)	P
Silverspot butterfly (Threatened)	--
Suckley's cuckoo bumble bee (Proposed Endangered)	--

[1] -- = no known occurrences and/or no potential habitat present; P = potential habitat present.

4.6.2.2 BLM Sensitive Wildlife Species

BLM sensitive wildlife includes those species found on BLM lands for which the 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 2014, 2023). The BLM administers approximately 35 percent of the lands in the SWCD Area.

Table 4-12 presents BLM sensitive wildlife with potential to occur in the SWCD Area and project measure areas. The list was compiled using the current list of BLM sensitive species of the CRVFO (BLM 2023). Species appearing in **Table 4-12** either have documented occurrences in or have the potential to occur in the SWCD Area and project measure areas.

4.6.2.3 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 2015b). In Colorado, 51 state threatened, endangered, and special concern wildlife species and 28 Tier 1 SGCN wildlife species (CPW 2015b, 2023) are listed. Of this total, 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. Fourteen of those species have potential to occur in the SWCD Area.

Table 4-12 presents CPW sensitive wildlife with potential to occur in the SWCD Area and project measure areas. The list was compiled using the current lists of CPW threatened and endangered species (CPW 2023) and Tier 1 SGCN (CPW 2015b). Species appearing in **Table 4-12** either have documented occurrences in or the potential to occur in the SWCD Area and project measure areas. Species' potential for occurrence was reviewed using the CPW species activity mapping data, which are updated regularly (CPW 2020a). Descriptions of these species with potential to occur in the SWCD Area and their respective habitats are provided in **Appendix E**.

Table 4-12. BLM CRVFO and CPW Tier 1 sensitive wildlife species potentially occurring in the SWCD Area and project measure areas.

Species	BLM/CPW Status[1]	SWCD Area[2,3]	Project-Specific Measures[3]	
			GVC	East Bypass Pipeline
Mammals				
Fringed myotis *Myotis thysanodes*	BLM S, Tier 1	X	X	X
Gray wolf *Canis lupus*	SE	X	--	--
Hoary bat *Lasiurus cinereus*	BLM S	X		
Little brown myotis *Myotis lucifigus*	BLM S, Tier 1	X	X	X
River otter *Lontra canadensis*	BLM S, ST	X	--	--
Spotted bat *Euderma maculatum*	BLM S, Tier 1	X	X	X
Townsend's big-eared bat *Corynorhinus townsendii*	BLM S, SC, Tier 1	X	X	X
Birds				
Bald eagle *Haliaeetus leucocephalus*	BLM S, SC	X	X	X
Black swift *Cypseloides niger*	BLM S	X	X	--
Brewer's sparrow *Spizella breweri*	BLM S	X	X	--
Burrowing owl *Athene cunicularia*	BLM S, ST, Tier 1	X	--	--
Ferruginous hawk *Buteo regalis*	BLM S, SC	X	X	X
Golden eagle *Aquila chrysaetos*	BLM S, Tier 1	X	X	X
Greater sage-grouse *Centrocercus urophasianus*	BLM S, SC, Tier 1	X	--	--
Greater sandhill crane *Grus canadensis tabida*	Tier 1	X	--	X
Peregrine falcon *Falco peregrines*	BLM S, SC	X	X	X
Invertebrates				
Monarch butterfly *Danaus plexippus*	BLM S	X	X	X

Species	BLM/CPW Status[1]	SWCD Area[2,3]	Project-Specific Measures[3]	
			GVC	East Bypass Pipeline
Reptiles				
Midget faded rattlesnake *Crotalus viridis concolor*	BLM S, SC	X	X	X

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

4.6.2.4 BLM Sensitive Wildlife Species Dismissed from Further Analysis

Several BLM sensitive wildlife species have been dismissed from further analysis in this Plan-EA based on a lack of suitable habitat or range in the SWCD Area. A list of species dismissed from further analysis is provided in **Table E-4** in **Appendix E**. Species assignments for BLM sensitive species were confirmed with a BLM CRVFO biologist (Boyd, pers. comm. 2021), who maintains a spatial dataset of special status species for the CRVFO and provided data and local knowledge.

4.6.2.5 CPW Sensitive Wildlife Species Dismissed from Further Analysis

Several CPW sensitive species have been dismissed from further analysis in this Plan-EA based on a lack of suitable habitat or range in the SWCD Area. A list of species dismissed from further analysis is provided in **Table E-4** in **Appendix E**. Species' potential for occurrence was reviewed using the CPW species activity mapping data, which are updated regularly (CPW 2020a). Given the extensive list of species from the state threatened and endangered and Tier 1 SGCN lists (38) dismissed from further analysis, these species are not discussed further in this Plan-EA.

4.6.2.6 Project-Specific Measures

No ESA-protected wildlife species are expected to occur in any of the project measure areas.

GVC

Townsend's big-eared bat, a BLM sensitive species, is known to occur in an unnamed mine approximately 0.25 mile southwest of the GVC staging area (Lyon et al. 2001) but also has potential to occur at the other project measure areas. Cliffs and wooded habitat on BLM land near Tunnel Ends #1, #2, and #4; Piping Measures #1 and #2; and access roads provide suitable habitat for the species. However, only a small portion of the suitable habitat would be impacted by piping on BLM land, and individuals would be able to use adjacent habitats.

The majority of the GVC project area lies within bald eagle winter range (CPW 2020a; **Appendix C**, **Figure C-11**). The open stands of sagebrush on the edges of pinyon-juniper woodlands and agricultural fields provide suitable foraging habitat for other special status raptor species including golden eagle (BLM sensitive and CPW Tier 1 species), peregrine falcon (BLM sensitive species and CPW Tier 1 species), and ferruginous hawk (BLM sensitive species and CPW Tier 1 species). ERO biologists observed a golden eagle flying near the GVC Piping Measure #1 project area during the July 2021 field surveys. No raptor nests were documented; however, several cliffs provide potential nesting habitat nearby. No known bald eagle, golden eagle, or other raptor nests or roosts are located within 1 mile of the project measure areas (CPW 2020a). Foraging raptors and eagles have the flexibility to move to other

areas of appropriate habitat in response to disturbance. The black swift, a BLM sensitive species, is known to occur at Rifle Falls State Park near the GVC Flow Control Gate Reconstruction Project near East Rifle Creek. The species may occur near associated access roads to the project component on BLM land. Black swifts were observed at Rifle Falls State Park during habitat evaluation surveys in July 2021. This species does not have the potential to occur in any other project measure areas due to its specific habitat requirements.

The open sagebrush shrublands in the GVC Bypass Rebuild project area around Harvey Gap Reservoir may provide suitable nesting habitat for Brewer's sparrow, a BLM sensitive species. Migrants may occur in most habitats in the project area and would have the flexibility to move to adjacent areas of suitable habitat in response to disturbance.

The midget faded rattlesnake, a BLM sensitive species and state species of concern, has the potential to occur throughout the GVC project area as well as the other project measure areas in the rocky, shrubby areas and open woodlands.

Milkweed, an essential feature of quality monarch butterfly habitat, is common throughout the region. Whorled milkweed was observed near the GVC project area during the July 2021 field surveys. It is likely that milkweed occurs throughout the Watershed Plan Area and near additional project-specific measures, particularly near riparian corridors, ditches, stream edges, and roadsides.

East Bypass Pipeline

Approximately 0.01 acre of the East Bypass Pipeline project area occurs on previously disturbed terrain on BLM CRVFO land. This relatively small corner of BLM land is bordered by CR 250 to the north and east, and residential development to the south and west, limiting the availability of suitable habitat to special status wildlife species. Only foraging species, including bats and raptors, would likely pass through the East Bypass Pipeline project area on BLM land. The entire East Bypass Pipeline project area lies within mapped bald eagle winter range (CPW 2020a; **Appendix C**, **Figure C-11**). The irrigated agricultural fields near the East Bypass Pipeline project area may provide potential habitat for migrating greater sandhill cranes. The midget faded rattlesnake has potential to occur throughout the East Bypass Pipeline project area in the rocky, shrubby areas and open woodlands.

4.6.3 Fish and Amphibians

Fish and amphibians are found throughout the SWCD Area. The streams, creeks, reservoirs, ponds, and wetlands in the SWCD Area provide habitat for fish and amphibians. Fish species primarily occur in the larger streams, rivers, and reservoirs including West Rifle Creek, Rifle Creek, East Rifle Creek, West Elk Creek, the Colorado River, Rifle Gap Reservoir, and Harvey Gap Reservoir. Native fish species that occur in the SWCD Area include bluehead sucker, flannelmouth sucker, roundtail chub, speckled dace, and mottled sculpin (Thompson and Hooley-Underwood 2019). Nonnative warmwater fishes such as yellow perch, walleye, smallmouth and largemouth bass, black crappie, bluegill, golden shiner, green sunfish, northern pike, red shiner, black bullhead, common carp, white sucker, walleye, and channel catfish occur in the reservoirs and Colorado River. Rainbow trout, brook trout, and brown trout, as well as warmwater fish that are valued recreation and economic resources, occur in Rifle Gap Reservoir. An in-stream fish screen was constructed in 2013 to preclude nonnative sport fish from escaping from the reservoir and negatively impacting native or federally listed fish species and their designated critical habitat

downstream in Rifle Creek and the Colorado River (CPW 2015a). Harvey Gap Reservoir is also managed as a warmwater and rainbow trout fishery, and CPW regularly stocks black crappie, bluegill, largemouth bass, channel catfish, rainbow trout, and tiger muskie in the reservoir (CPW 2021b).

Amphibian species occur in habitat provided by the perennial water resources in the SWCD Area. 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, are common amphibians in the SWCD Area. The Great Basin spadefoot, bullfrog, and northern leopard frog are known to occur or have historically occurred in the SWCD Area (Lyon et al. 2001).

4.6.3.1 Federally Protected Species

According to the USFWS IPaC list (USFWS 2025), four federally listed fish species should be considered in the analysis of the SWCD Area, as shown in **Table 4-13**. No federally listed fish species are expected to occur in the project measure areas due to barriers, lack of habitat, competition, and predation. Descriptions of these species are provided in the *SWCD Watershed Plan Biological Assessment* (ERO 2021; provided in **Appendix A**) and **Appendix E**.

Table 4-13. Federally protected fish species in the SWCD Area and designated critical habitat.

Species[1]	Legal Status[2]	Documented Range in SWCD Area[3]	Designated Critical Habitat	Critical Habitat Location Description[4]
Bonytail chub *Gila elegans*	E	N	Y	Upper Colorado River Basin: portions of the Colorado, Green, and Yampa Rivers Lower Colorado River Basin: Colorado River
Colorado pikeminnow *Ptychocheilus lucius*	E	Y	Y	Upper Colorado River Basin: portions of the Colorado, Green, Yampa, White, Gunnison, and San Juan Rivers Lower Colorado River Basin: none designated
Humpback chub *Gila cypha*	T[5]	N	Y	Upper Colorado River Basin: portions of the Colorado, Green, and Yampa Rivers Lower Colorado River Basin: Colorado and Little Colorado Rivers
Razorback sucker *Xyrauchen texanus*	E	Y	Y	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]This species list was compiled using USFWS IPaC (USFWS 2025).
[2]E = federally listed as endangered; T = federally listed as threatened.
[3]Y = yes; N = no (BLM 2014; Lyon et al. 2001; USFWS 2021c). Species without documented range in the SWCD Area have been eliminated from further analysis.
[4]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).
[5]The humpback chub was downlisted from E to T on October 18, 2021 (USFWS 2021e). The designation for the humpback chub in the *SWCD Watershed Plan Biological Assessment* (ERO 2021) is listed as E, as the Biological Assessment (BA) was finalized prior to the change in designation.

The four Colorado River listed fishes (bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker) use aquatic habitats that are downstream of the SWCD Area. All occupied habitats and critical habitat designated for bonytail chub and humpback chub are found downstream of the SWCD Area. Rare occurrences of Colorado pikeminnow and razorback sucker are reported as far upstream as Rifle, Colorado, and near the SWCD Area (USFWS 1994).

Critical habitat for the bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker was designated in 1994 under one rule, as shown in **Table 4-13** (USFWS 1994). According to the IPaC tool, there is designated critical habitat for the Colorado pikeminnow and razorback sucker along the Colorado River at the southwestern corner of the SWCD Area. The designated critical habitat includes the confluence of Rifle Creek and the Colorado River in the SWCD Area. Project-specific measures (i.e., East Bypass Pump Station) are located approximately 0.35 mile north of the Colorado River and approximately 7.7 miles from designated critical habitat.

4.6.3.2 BLM Sensitive Species

The BLM CRVFO maintains a list of fish and amphibian species that have been identified as sensitive species (BLM 2014, 2023). **Table 4-14** lists these species and their potential to occur in the SWCD Area and project measure areas. Descriptions of these species with potential to occur in the SWCD Area and their respective habitats are provided in **Appendix E**.

4.6.3.3 CPW Sensitive Species

In the state of Colorado, 30 state threatened, endangered, and special concern fish and amphibian species and 27 Tier 1 SGCN fish and amphibian species (CPW 2015b, 2024) are listed. Of those, 23 fish and amphibian species 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. Six species have the potential to occur in the SWCD Area.

Table 4-14 presents CPW sensitive fish and amphibian species with potential to occur in the SWCD Area and project measure areas. The list was compiled using the current list of CPW threatened and endangered species (CPW 2024) and Tier 1 SGCN (CPW 2015b). Species appearing in **Table 4-14** have either documented occurrences in or the potential to occur in the SWCD Area and project measure areas. Species' potential for occurrence was reviewed using the CPW species activity mapping data, which are updated regularly (CPW 2020a).

Three BLM and CPW sensitive fish species—bluehead sucker, flannelmouth sucker, and roundtail chub—may use suitable aquatic habitats in the SWCD Area. The Colorado River cutthroat trout historically occurred in the SWCD Area but has not been documented in the area for more than 10 years (Hirsch et al. 2013). The mountain sucker has not been collected near the SWCD Area (Belica and Nibbelink 2006). Thus, these two species are eliminated from further discussion. Based on habitat preferences, the bluehead sucker, flannelmouth sucker, and roundtail chub are not expected to commonly occur in irrigation canals or ditches in the SWCD Area, although occasional use may occur—especially by fry or juvenile fish. Descriptions of these species with potential to occur in the SWCD Area and their respective habitats are provided in **Appendix E**. A list of BLM and CPW sensitive fish and amphibian species dismissed from further analysis is provided in **Table E-4** in **Appendix E**.

Table 4-14. BLM and CPW sensitive fish and amphibian species with potential range in the SWCD Area and project measure areas.

Species	BLM/CPW Status[1]	Potential Range in SWCD Area[2]	Potential Range in GVC	Potential Range in East Bypass Pipeline
Bluehead sucker *Catostomus discobolus*	BLM S, Tier 1	Y	N	N
Colorado River cutthroat trout *Oncorhynchus clarkii pleuriticus*	BLM S, SC, Tier 1	H	N	N
Flannelmouth sucker *Catostomus latipinnis*	BLM S, Tier 1	Y	N	N
Mountain sucker *Catostomus platyrhunchus*	BLM S, SC, Tier 1	P	N	N
Roundtail chub *Gila robusta*	BLM S, SC, Tier 1	Y	N	N
Northern leopard frog *Rana pipiens*	BLM S, SC, Tier 1	Y	P	P

[1]BLM S = BLM Sensitive; SC = Special Concern; Tier 1 = CPW designated Tier 1 SGCN.
[2]Y = yes; N = no; H = historic; P = potential (Albeke 2020; BLM 2023; Lyon et al. 2001). Species without documented range in the SWCD Area have been eliminated from further analysis.

4.6.3.4 SWCD Area Fisheries

None of the SWCD Area canals or the project measure areas support resident fish or threatened and endangered, BLM sensitive, or CPW sensitive fish species. Colorado pikeminnow and razorback suckers have been stocked in the Colorado River from Rifle, Colorado, to the Utah border (CNHP 2021). This section of the Colorado River crosses the southernmost portion of the SWCD Area (**Appendix E**).

Harvey Gap Reservoir is annually stocked with a variety of warmwater species and rainbow trout and contains populations of bluegill, channel catfish, largemouth and smallmouth bass, yellow perch, black crappie, rainbow trout, tiger muskie, and northern pike (CPW 2021b). No populations of native BLM or CPW sensitive fish species are documented or have potential to occur in any of the project-specific project areas.

There is potential for the northern leopard frog, a BLM sensitive amphibian species, to occur in the project area canals.

4.7 Cultural and Historic Resources

Section 106 of the NHPA of 1966, as amended, and its implementing regulations under 36 CFR 800 require all federal agencies to consider effects of federal actions on historic properties. During the Section 106 review, the Lead Federal Agency considers effects on historic properties in the area of potential effects (APE). The Lead Federal Agency for this project is the NRCS; the NRCS is responsible for all aspects of the NHPA. Historic properties are those historic or cultural resources that are either listed in or eligible for listing in the National Register of Historic Places (NRHP). Cultural and historic resources include sites, buildings, structures, objects, districts, or areas of traditional religious and cultural importance. The National Park Service has established an age criteria guideline of 50 years for a cultural resource to be evaluated as a potential historic property (Little et al. 2000).

The APE is defined as “the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist” (36 CFR 800.16). The cultural resource assessment considers the effects of the proposed undertaking on

historic properties in the APE. During the project consultation process, the "historic properties" require an assessment of project effects by the federal agencies with review and concurrence provided by the SHPO. The technical report for the project (Engleman 2021) evaluates cultural resources for NRHP significance and assesses overall project effects on historic properties; the MOA is the legal document for resolving adverse effects on historic properties prior to project construction. During the assessment of effects, agencies must consider whether "an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association" (36 CFR 800.5(a)(1)).

4.7.1 History of Irrigation in the SWCD Area

By the late 1800s, the development of irrigation ditches in Colorado was viewed as an investment opportunity. Large sums of money were spent constructing irrigation systems to reach more remote areas of land in the hope of creating a profit by selling water rights. Colorado's water laws, which protect the water rights of earlier uses, made many of these ditches less successful than originally planned by limiting the quantity of water available to them (Holleran 2005). The construction of large irrigation systems on the Western Slope, such as the Grand Valley Project, proliferated during the late 1800s.

The Grass Valley Dam and Ditch are representative of this irrigation development in the Colorado River Valley. Construction began on the GVC on July 20, 1887; this canal is considered a pioneer ditch due to its early construction date. The GVC was quickly improved as an investor canal, owned and operated by the Grass Valley Land, Loan, and Irrigation Company, with the purpose of irrigating 5,000 acres in the Cactus and Grass Valleys, sourcing water from East Rifle Creek. The Grass Valley Land, Loan, and Irrigation Company was the first organized irrigation effort in the area and was largely funded by English investors Lord Ogilvie and Abner S. Baker (Holleran 2005; Purcell and Spurr 2006).

The Grass Valley Dam (also called the Harvey Gap Dam) is one of 1,738 earthen dams in Colorado. Earthen dams are by far the most typical, making up 95 percent of all dams statewide (National Inventory of Dams 2009). Of these earthen dams, 237 were constructed from 1900 to 1909. Constructed in 1909, the Grass Valley Dam is the ubiquitous earthen dam of Colorado irrigation projects of the time and is not a unique structure, nor is it in its original state. Archival data show that the first earthen dam spanning Harvey Gap began in 1893 and was completed in 1894, but it soon collapsed in 1895 (Linenberger 1997). The *Biennial Report of the State Engineer of the State of Colorado for the Years 1909-1910* suggests two dams were constructed prior to the 1909 incarnation, stating that "twice in the past ten years has a dam been constructed on this site; each time the dam has failed" (Comstock 1911). The combined evidence of these records may suggest three previous dams: the dam completed in 1894 and then two more completed "in the past ten years" from 1900 to 1910. There is, however, "no record of the plans or specifications of either of the dams previously constructed" (Comstock 1911), so it is unclear if the 1894 incarnation could be one of the two dams referenced by the state engineer's report.

In 1936, Reclamation began investigating a project designed to improve and streamline the irrigation systems of the agricultural lands near Silt. Finally, in 1956, the Silt Project was authorized as a unit of the Colorado River Storage Project (Linenberger 1997). Through the Reclamation project, the Rifle Gap Dam and Reservoir and the Silt Pumping Plant were built, the Davie Ditch was constructed/rehabilitated, the GVC was improved in 1966, and the Dry Elk Lateral was constructed from 1965 to 1967. Although the

"Harvey Gap Dam prompted the development of the Silt Project" (Linenberger 1997), no archival documentation was found referencing improvements or modifications to the Grass Valley Dam during the Silt Project. As of January 1, 1968, the SWCD became responsible for the O&M of the project as well as the administration of the exchange of waters between the SWCD and FICo.

Established in 1915, the town of Silt began as a small ranch owned by George Ferguson. Mr. Ferguson operated a ferry across the Colorado River, prior to the first bridge construction in 1908. The area was named Silt after the Denver and Rio Grande Junction Railway named the depot in this location after the fine local sediments. Agriculture is the dominant industry in Silt, supported by the Grass Valley Reservoir (Harvey Gap Reservoir) and surrounding irrigation systems (Silt Historical Park 2021).

4.7.2 Cultural Resource Analysis of the Project

The cultural resource analysis for this Plan-EA included a review of the existing files and literature of the entire SWCD Area as well as a Class III cultural resource inventory of all proposed project measures. All proposed project measures, access roads, and staging areas were surveyed at the Class III level in July 2021. Copies of the cultural resource inventory report were submitted to the Colorado SHPO for consultation on February 10, 2022, and additional information was provided on April 21, 2022. The Colorado SHPO concurred with the determinations of eligibility and project effects in letters dated March 10, 2022, and April 29, 2022 (Appendix A).

All project measures, access roads, and staging areas were surveyed in July 2021. Twenty-one cultural resources were documented in or intersecting the APE: 18 previously documented or newly recorded sites or linear resources and 3 isolated finds (IFs) (**Table 4-15**). Of the 18 documented sites and linear resources, 4 have been determined eligible for listing in the NRHP (5GF4638, 5GF5811.1, 5GF5818, and 5GF5820), 2 are determined not eligible (5GF5815.1 and 5GF5819), 7 are determined supporting of an eligible linear resource (5GF3405.2, 5GF3946.3, 5GF3946.6, 5GF3946.7, 5GF3946.9, 5GF5812.1, and 5GF5814.1), 2 are determined nonsupporting of an eligible linear resource (5GF3946.8 and 5GF5813.1), and 3 are determined needs data (5GF5816.1, 5GF5817, and 5GF5821). The three IFs are determined not eligible for listing in the NRHP.

Table 4-15. Revisited and newly documented sites.

Smithsonian Site No.	Resource Type/Name	NRHP Eligibility Determination	Landownership	Project Component
5GF3405.2	East Lateral FICo Ditch segment	Eligible, supporting	Private	East Bypass Pipeline
5GF3946.3	GVC segment	Eligible, supporting	State, private, BLM	GVC
5GF3946.6	GVC segment	Eligible, supporting	Private, BLM	GVC
5GF3946.7	GVC segment	Eligible, supporting	Private	GVC
5GF3946.8	GVC segment	Eligible, nonsupporting	Private	GVC
5GF3946.9	GVC segment	Eligible, supporting	State, BLM	GVC
5GF4638	Grass Valley Dam and Grass Valley Reservoir (Harvey Gap Reservoir)	Eligible	State, private	Harvey Gap Reservoir
5GF5811.1	Dry Elk Lateral Ditch segment	Eligible	Private, BLM	Dry Elk Lateral
5GF5812.1	Grass Valley Road (CR 226) segment	Eligible, supporting	Private	Dry Elk Lateral
5GF5813.1	Distribution line segment	Eligible, nonsupporting	State	GVC
5GF5814.1	Harvey Gap Road (CR 237) segment	Needs data, supporting	Private, BLM	Harvey Gap Reservoir
5GF5815.1	CR 250 (Bendetti Road) segment	Not eligible	Private	East Bypass Pipeline
5GF5816.1	CR 214 (Peach Valley Road) segment	Needs data	Private	East Bypass Pipeline
5GF5817	Mine	Needs data	Private	GVC
5GF5818	Dugout and can dump	Eligible	Private	GVC
5GF5819	Historic trash scatter	Not eligible	BLM	Eliminated portion of the Dry Elk Lateral
5GF5820	Dugout	Eligible	Private	GVC
5GF5821	Rifle Falls State Park Cultural Landscape	Needs data	State	GVC
5GF5822	Historical IF	Not eligible	Private	Dry Elk Lateral
5GF5824	Historical IF	Not eligible	State	Harvey Gap Reservoir
5GF5825	Precontact IF	Not eligible	State	Harvey Gap Reservoir

4.8 Resources of Scientific Value Other Than Cultural Resources

The NRCS may consider resources that do not contain cultural material but are still of value for other reasons. These include geological, paleontological, and other scientific resources of interest. According to the NRCS Title 190 National Cultural Resources Procedures Handbook Part 601, Subpart G, Section 601.70, these resources include the following:

(1) Geological resources include structural features that are of local or regional significance, such as faults, folds, discontinuities (due to erosion or interruptions in deposition), or caves. Other geological resources that may be of significance include specific mineral deposits or the occurrence of specific rock types that may be scientifically important because of composition, crystallinity, structure, or mode of occurrence, and rareness or uniqueness of the occurrence.

(2) Paleontological deposits include plant and animal fossils that may be the original preserved organism, molds, and casts, casts that have been completely replaced by minerals, and secondary fossils such as animal footprints and preserved burrows. The rocks surrounding important paleontological sites are also

significant resources because the rocks provide information about the environment in which the ancient plants and animals lived.

No unique geological resources have been identified (see **Section 4.1** for a description of the geology of the SWCD Area). A paleontological file and literature review was completed on March 7, 2022, for the individual project measures within a 1-mile buffer (Western Slope Paleontological Services 2022). No known fossil localities have been identified in the project-specific measure areas; however, 10 vertebrate fossil localities are known from the Wasatch Formation in the same township as the southernmost portion of the project area (T5S, R92W), and 1 fossil locality is known from the same township and section as a portion of the northern portion of the project area (T4S, R92W, Section 4).

There is fossil potential in the project area. Individual project measures overlay eight unconsolidated Quaternary surficial deposits with low to moderate fossil potential, four bedrock geologic units with moderate potential (three members of the Mancos Shale and the Maroon Formation), and six bedrock geologic units with very high potential (two members of the Wasatch Formation, two members of the Iles Formation, the Morrison Formation, and the State Bridge Formation).

Specifically, there is moderate fossil potential in the Mancos Shale units located along portions of the GVC, Dry Elk Lateral, and Harvey Gap Reservoir and in the Maroon Formation unit in Rifle Falls State Park. Very high fossil potential exists along the northern part of the GVC where it crosses the Morrison and State Bridge Formations, in Harvey Gap State Park where the Iles Formation is extant, and along the East Bypass Pipeline where it crosses the Wasatch Formation.

4.9 Land Use

The entire 56,465.31-acre SWCD Area is in Garfield County, and land uses in this area are subject to county zoning ordinances. With the exceptions of Rifle and Silt, the SWCD Area is primarily zoned as rural or public lands. Generally, the SWCD Area is sparsely populated (see **Section 4.12.1**, **Population Demographics**), except for Silt and Rifle and the margins of those municipalities.

Most of the SWCD Area is private land (59.4 percent), followed by BLM CRVFO lands (35.4 percent); the remainder is other federal lands (Reclamation has 2.8 percent and USFS has less than 0.5 percent), state lands, and state-managed Reclamation lands around Rifle Gap Reservoir as well as state-managed private lands around Harvey Gap Reservoir (see **Table 1-1** in **Section 1.2.2** and **Figure 1-2**). One BLM Area of Critical Environmental Concern (Grand Hogback) is located in the SWCD Area but does not overlap project measures. The Flattop Wilderness Area is 11 miles north of the SWCD Area. Project Rulison, an underground nuclear test project, was located more than 15 miles southwest of the project area.

Primary land uses in the SWCD Area include private agricultural development and associated rural residences, BLM-managed land (e.g., livestock grazing and wildlife habitat), oil and gas extraction, and public and private recreation areas (see **Section 4.10, Recreation**). The dominant agricultural land uses include grazing and pasture lands. On publicly owned or managed lands, ranchers can lease federal land (primarily from the BLM) for livestock grazing; 13 federal grazing allotments (https://gis.blm.gov/arcgis/rest/services/range/BLM_Natl_Grazing_Allotment/MapServer) overlap the SWCD Area. Another primary agricultural land use is irrigated cropland, primarily for hay and alfalfa.

Rural residences typically include parcels of associated farmable land approximately 10 acres or larger to accommodate agriculture (forage for cattle feed and animal husbandry). Recreational use of the SWCD Area is described in **Section 4.10, Recreation**. Residential and developed lands in the municipalities of Rifle and Silt include urban (incorporated areas) and rural residences; associated infrastructure, such as water and utility lines and roads; schools; and commercial uses, including restaurants, shops, automotive repair facilities, places of worship, municipal offices, and fitness facilities.

4.9.1 GVC

The GVC includes project-specific measures that are located in the East Rifle Creek drainage, which consists of rolling foothills and benches, primarily vegetated in mature pinyon-juniper woodlands, and the southwest edge of Harvey Gap Reservoir. Measures are outlined in **Section 5.3.2** and are shown on **Figures B-1** through **B-4** in **Appendix B**. The project area is primarily privately owned (approximately 54 percent) and BLM CRVFO lands (approximately 30 percent); the remainder (16 percent) is under other ownership, including private land managed by CPW. The primary land uses in this area are grazing and wildlife habitat but also include some rural residences. There also may be some small-scale timber harvest and firewood cutting on both public and private lands. A small portion of the project area (reconstruction of the southern canal segment) overlaps the northeast corner of the federal grazing lease Elk Park Com CO 18032. Other project measures, including the GVC piping and tunnel sections and associated access roads, run through the western edge of federal grazing lease Weaver CO 18009.

4.9.2 East Bypass Pipeline

The East Bypass Pipeline component travels from north to south through irrigated fields, residential development, and foothills in the southeastern portion of the SWCD Area (see **Figures B-8** and **B-9** in **Appendix B**). The project area will overlap Reclamation-owned lands; less than 1 percent is BLM land. The primary land use in this area is agriculture, including grazing and irrigated croplands, but residential areas with both rural and suburban densities are also proximate to project measures.

4.10 Recreation

Recreation resources in the SWCD Area consist of public parklands such as Harvey Gap, Rifle Falls, and Rifle Gap State Parks where water- and land-based recreation take place and BLM lands that are used for activities such as hiking, mountain biking, rock climbing, and hunting.

Harvey Gap State Park

Water-based recreation at Harvey Gap State Park primarily consists of low-speed boating and fishing during the summer recreation season. Canoeing, swimming, kayaking, sailboarding, and paddleboarding are popular water sports for visitors and are supported by one boat ramp and the swim beach on the south side of the lake. The boat ramp is closed November 1 through March 31 unless it is a low-water year, which causes it to close earlier. Shoreline and boat fishing are both popular activities at Harvey Gap Reservoir, which supports northern pike, largemouth and smallmouth bass, rainbow trout, catfish, perch, crappie, and muskie all seasons of the year. Ice fishing is popular in the winter season. Harvey Gap State Park saw an annual average of 49,501 visitors from 2015 to 2021 (Palcer, pers. comm. 2021). In 2020, visitation increased to more than 196,000 visitors before declining to 66,284 visitors in 2021. Most visitation occurs from mid-May through mid-August. The increase in visitation created parking issues and

competition for space on the reservoir. The reservoir is also challenged by low water levels in August, which have resulted in early closure of the boat ramp (Palcer, pers. comm. 2021).

Land-based recreation at Harvey Gap State Park primarily consists of picnicking and wildlife viewing. There are 30 picnic sites with grills in the park. Hunting is also a popular attraction. Other activities that take place during the winter months include snowshoeing and cross-country skiing. A visitor center at Harvey Gap houses public restrooms, a pay phone, and a gift shop.

Rifle Falls State Park

Water-based recreation at Rifle Falls State Park consists primarily of fishing. Shoreline fishing for brown and cutthroat trout along East Rifle Creek is a popular activity at the park. Land-based recreation at Rifle Falls State Park primarily consists of camping and picnicking. There are 13 drive-in and 7 walk-up campsites along with 10 picnicking spots. Hiking is also a popular attraction at the park, with three trails for visitors to use, which include destinations at the waterfalls and caves along the Coyote Trail. Hunting basecamps are usually set up in the park campground to accommodate hunters using adjacent public lands. The dirt road following the canal south of Rifle Falls is often used by visitors for walking and running.

Rifle Gap State Park

Water-based recreation at Rifle Gap State Park primarily consists of boating and fishing, supported by one boat ramp on the north side of the reservoir. The boat ramp is closed November 1 through March 31 unless it is a low-water year, which causes it to close earlier. High-speed boating allows for activities such as jet skiing and water skiing. Swimming and sailing are also common water activities. Boat fishing is a popular activity at Rifle Gap Reservoir, which supports rainbow and German brown trout, walleye, pike, largemouth and smallmouth bass, and yellow perch all seasons of the year. Ice fishing is popular in the winter season. Land-based recreation at Rifle Gap State Park primarily consists of camping. There are five campgrounds with a total of 89 campsites in the park. These sites can accommodate tents to large RVs and are available year-round. Picnicking sites are also offered throughout the park for day users. Hiking on the one designated trail is a popular activity. Visitors can also walk the perimeter of the reservoir. Hunting basecamps are usually set up in the park campground to accommodate hunters using adjacent public lands. A visitor center at Rifle Gap houses public restrooms, a pay phone, and a gift shop.

4.10.1 GVC

The GVC includes project-specific measures that are located in the East Rifle Creek drainage, which consists of rolling foothills and benches, primarily vegetated with mature pinyon-juniper woodlands, and the southwest edge of Harvey Gap Reservoir. Measures are outlined in **Section 5.3** and **Table 5-2** and are shown on **Figures B-1** through **B-4** in **Appendix B**. BLM lands and private lands managed by CPW adjacent to Harvey Gap Reservoir provide land and water recreation potential. Access roads to this area also are used for accessing Rifle Falls State Park and BLM land adjacent to the GVC.

4.10.2 East Bypass Pipeline

The East Bypass Pipeline component travels from north to south through irrigated fields, residential development, and foothills in the southeastern portion of the SWCD Area (see **Figures B-8** and **B-9** in **Appendix B**). Due to the prevalence of private land, very little recreation potential exists in the project

area. The access road to the north part of this area is also used for accessing Harvey Gap Reservoir and BLM land near the project area that provides recreational opportunities.

4.11 Scenic Beauty and Visual Resources

Visual resources consist of topography, geologic features, water features, vegetative patterns, man-made features, and land uses that typify an area and influence the visual appeal of an area to viewers. Although the scenic quality of a given landscape is subjective, that quality is derived from several objective characteristics. These characteristics include the diversity of elements constituting 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 landforms, vegetation, water, and structures, 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 1986).

The SWCD Area is both private and BLM lands; the majority of lands are private. Regardless of ownership, the BLM Visual Resource Management (VRM) method of visual analysis was used to evaluate scenery impacts as a consistent method of assessing impacts for all lands in the project area. The BLM manages visual resources in accordance with its VRM system, which provides a framework to categorize landscapes into four classes, determine management objectives for each class, and evaluate the degree of contrast between existing landscapes and proposed management plans or projects.

The four VRM classes and management objectives are in **Table 4-16**.

Table 4-16. BLM VRM class management objectives.

VRM Class	Class Management Objective
Class I	Preserve the landscape character. This class provides for natural ecological changes but does not preclude very limited activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II	Retain the existing landscape character. The level of change to the characteristic landscape should be low. Activities may be seen but should not attract a casual observer's attention. Any changes must repeat the basic elements of line, form, color, and texture found in the predominant natural features of the characteristic landscape.
Class III	Partially retain existing landscape character. The level of change to the characteristic landscape should be moderate. Activities may attract attention but should not dominate a casual observer's view. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV	Provide for activities that require major modification of the landscape character. The level of change to the characteristic landscape can be high. Activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic landscape elements.

Figure C-14 in **Appendix C** displays VRM classes in the SWCD Area. The majority of the SWCD Area is Class III, allowing for moderate changes to the landscape. Areas of Class II include the Grand Hogback Area of Critical Environmental Concern, the narrow East Rifle Creek Valley, and the Colorado River Valley corridors.

4.11.1 SWCD Area

The landscape in the SWCD Area is diverse and consists of foothills, mountains, plateaus, mesas, and canyons as well as broad (Colorado River) and narrow (East Rifle Creek) river valleys. Vegetation types include sagebrush shrublands, grasslands, agricultural lands, Gambel oak, pinyon pine/juniper woodlands, and cottonwood gallery forests. The southern boundary of the SWCD Area follows the large, wide Colorado River corridor, while the narrow Rifle Creek and East Rifle Creek are the major rivers flowing north to south through the SWCD Area. The two reservoirs, Rifle Gap and Harvey Gap, are unique landscape features used for recreation in the otherwise arid landscape (**Figure 4-1**). Interstate 70, one of Colorado's busiest highway corridors, borders the SWCD Area on the south. A portion of the 90-mile-long prominent landscape feature, the Grand Hogback, diagonally crosses the SWCD Area. Another scenic attraction, Rifle Falls, is located in Rifle Falls State Park at the north end of the GVC project area (**Figure 4-2**). The Grand Hogback is designated as an Area of Critical Environmental Concern by the BLM for its scenic beauty.

Figure 4-1. Harvey Gap Reservoir; view is from the dam looking north.

The towns of Silt and Rifle occur in the SWCD Area. Agriculture, ranching, oil and gas extraction, and recreation at the reservoirs and creeks occur in the area. On the outskirts of both towns, the landscape has scattered residences, barns, fences, dirt roads, and open fields dotted among open, rugged BLM lands. Uneven topography limits visibility in many areas. Agricultural ditches are generally narrow and visible only where they parallel or are perpendicular to roads.

Figure 4-2. Rifle Falls scenic attraction.

In the lands north and south of the Grand Hogback, views are broader, and the agricultural landscape takes on an ordered appearance with gridded roads and utilities, shelterbelts, evenly distributed homes, and sharp contrasts between adjacent fields. Terrain becomes steeper and more rugged in the northern SWCD Area, and visibility is lower due to the topography.

4.11.2 GVC

The GVC flow control gate is located in Rifle Falls State Park. The area is a narrow canyon with canopied, mature cottonwood and box elder trees along East Rifle Creek and the GVC. Steep tan, rust, and black rock outcrops occur on the east side of the canyon in the forested pinyon-juniper hillside. On the west side of the canyon, the hills are also forested with pinyon pine and juniper trees, and the hillsides are rounded. The viewing platform for Rifle Falls is approximately 300 feet northwest of the GVC flow control gate. Visitors would pass the project area as they walked on the path from the parking area to the falls or if they hiked on the two-track road next to the GVC, which dead-ends at Tunnel End #1.

The GVC piping measures (#1, #2, #3, and #4) are located in pinyon-juniper woodlands. The canal is generally not visible to the public, and even though portions of it are on BLM land, the access roads cross private land and are gated and locked (GVC Piping Measure #1) or are in areas not visited frequently by the public (GVC Piping Measures #2, #3, and #4). When it is visible from CR 325 and CR 226, the canal appears as a horizontal strip of lighter-green vegetation on a steep pinyon-juniper hillside. The mature cottonwoods and box elder trees and the deciduous shrubs that line the ditch are a noticeably lighter green in the summer or yellow in the fall compared to the surrounding gray and olive-green pinyon pine and juniper trees (**Figure 4-3**). The tunnel end shoring measures appear as a steel gate painted white over the tunnel opening (Tunnel End #1; **Figure 4-4**), a concrete and rock rectangular structure (Tunnel End #2), or an opening in the rock overhang (Tunnel Ends #3 and #4). None of the tunnel end measures would be visible from county roads or adjacent landowner residences. Tunnel End #1 would be visible to pedestrians hiking on the ditch road adjacent to the GVC in Rifle Falls State Park. The GVC Bypass Rebuild project area occurs on a bench above Harvey Gap Reservoir. It is a linear cut in the hillside with some exposed soils and cleared vegetation from when it was built, as well as cottonwood trees along the ditch. Rounded and triangular pinyon-juniper-covered hills associated with the Grand Hogback occur in the middle ground of the bypass rebuild, as viewed from Harvey Gap Road. The teal-blue water in the reservoir is visible in the foreground.

Figure 4-3. GVC near Piping Measure #2, looking south; deciduous shrubs occur along the GVC.

Figure 4-4. Tunnel End #1.

The flow control gate and GVC Piping Measure #1 are designated VRM Class II, while the remainder of the GVC projects are Class III.

4.11.3 East Bypass Pipeline

In the area where the East Bypass Pipeline occurs, the landscape is characterized by agricultural vegetative patterns integrated with features of the built environment, such as homes, agricultural buildings, roads, and utility lines. Although individual agricultural fields may be homogenous in color and texture, adjacent fields typically vary in crop type and stage of growth, creating geometric patterns of varying colors, textures, and heights. Roads, fences, ditches, and utility lines follow grid patterns that accentuate the geometric character of the agricultural fields. The built environment is rural-residential, located north of the population center of Silt. The topography appears rolling with pinyon-juniper wooded hills occurring between brown and green agricultural and grass fields. The Grand Hogback north of this area is a prominent landscape feature (**Figure 4-5**). The VRM Class for this area is Class III.

Figure 4-5. The Grand Hogback; view is from the Pump Canal project (East Bypass Pipeline) looking north.

4.12 Socioeconomics and Environmental Justice

This section describes the socioeconomic and environmental justice conditions for the areas associated with the Preferred Alternative, which are Garfield County and the communities of Rifle and Silt. The following sections and tables present the current status of key social and economic indicators for the project area including population demographics, employment, income, and poverty, as well as a section on the economic value of the SWCD irrigation infrastructure. These data are compared against state data for reference. The EPA defines a community with potential environmental justice populations as one that has a greater percentage of minority or low-income populations than an identified reference community. Minority populations are those populations having (1) a 50 percent minority population in the affected area or (2) a significantly greater minority population than the reference area (EPA 2016). The EPA has not specified any percentage of the population that can be characterized as "significant" to define environmental justice populations. The current analysis defines a population of concern in the analysis area as a minority or low-income population more than 5 percentage points larger than those of the reference area.

4.12.1 Population Demographics

Table 4-17 presents the total population with breakdowns for gender and age for each town, the county, and the state of Colorado for comparison from the 2020 U.S. Census (Census 2020).

Table 4-17. Population characteristics by town, county, and state (2020 Census).

Population Criteria		Rifle (Town)	%	Silt (Town)	%	Garfield County	%	Colorado (State)	%
Total Population		10,325		3,485		61,221		5,839,926	
Gender	Female	4,943	48%	1,845	53%	29,830	49%	2,879,030	49%
	Male	5,382	52%	1,640	47%	31,391	51%	2,960,896	51%
Age	Under 18	2,962	29%	1,090	31%	15,427	25%	1,211,095	21%
	65 and older	939	9%	244	7%	8,137	13%	915,661	16%

Source: Census 2020.

Ethnicity is shown for the project area in **Table 4-18**. Rifle, Silt, and Garfield County contain a greater percentage of persons identifying as Hispanic or Latino than the state average.

Table 4-18. Ethnicity by town, county, and state (2020 Census).

Population Criteria		Rifle (Town)	Silt (Town)	Garfield County	Colorado (State)
Total Population		10,325	3,485	61,221	5,839,926
White	Number	6096	2,136	40,561	3,793,270
	Percentage	59%	61.3%	66.3%	65%
Hispanic or Latino	Number	3,713	1,304	17,860	1,314,962
	Percentage	36%	37.4%	29.2%	22.5%
Non-white, Not Hispanic or Latino	Number	516	45	2,800	731,694
	Percentage	8%	2%	6%	16%

Source: Census 2020.

The populations of Rifle, Silt, and Garfield County are predominantly white; Rifle has a higher percentage of minority populations (Hispanic or Latino and non-white, not Hispanic or Latino), at 44 percent, than the state of Colorado (38.5 percent), Garfield County (35.2 percent), and Silt (39.4 percent).

The Hispanic or Latino population is more than 5 percentage points higher than the state's for Rifle, Silt, and Garfield County.

Table 4-19 demonstrates labor force characteristics for Garfield County and for Colorado. Unemployment in Garfield County was the same as in the state in 2022 and lower in 2023.

Table 4-19. Labor force characteristics (2022 and 2023).

Indicator	Garfield County 2022	Garfield County 2023	Colorado (State) 2022	Colorado (State) 2023
Civilian Labor Force	30,093	32,052	3,200,625	3,243,536
Employed	29,975	31,144	3,103,531	3,143,4
Unemployed	788	908	97,094	100,171
Unemployment Rate	3.0%	2.8%	3.0%	3.1%

Source: U.S. Bureau of Labor Statistics 2023.

Household income and persons living below the poverty level are summarized in **Table 4-20** (Census 2020). Information is presented for two income indicators: median household income and per capita income. Median household income and per capita income in Rifle, Silt, and Garfield County are below those in the state of Colorado. The percentage of persons living below the poverty level in Rifle, Silt, and Garfield County is below the state number.

Table 4-20. Income and poverty rates (2020).

Indicator	Silt	Rifle	Garfield County	Colorado (State)
Median Household Income	$66,250	$72,935	$88,125	$89,302
Per Capita Income	$27,694	$29,209	$35,608	$49,071
Percentage of Persons in Poverty	6.2%	7.0%	7.9%	9.4%

Source: Census 2020.

Based on the data in **Table 4-19** and **Table 4-20**, there are no low-income or unemployed populations more than 5 percentage points larger than those of the reference area of the county and state.

Table 4-21 summarizes employment by industry classification. The primary sectors of employment in Garfield County, which make up approximately 62 percent of the jobs, include (in order of dominance) "government and government enterprises," "construction," "retail trade," "health care and social assistance," "accommodation and food services," and "real estate and rental and leasing." Most of these percentages are in line with the job market in Colorado as a whole, except for construction. Construction jobs make up 13.7 percent of the jobs in Garfield County and 7.0 percent in the state (a difference of more than 5 percentage points).

Table 4-21. Employment by industry (2020).

Employment Sector	Garfield County	% of Jobs (County)	Colorado (State)	% of Jobs (State)
Total employment (number of jobs)	37,736		3,737,075	
Government and government enterprises	5,300	14	504,547	13.5
Construction	5,168	**13.7**	262,377	**7.0**
Retail trade	3,734	9.9	325,773	8.7
Health care and social assistance	3,360	8.9	349,948	9.4
Accommodation and food services	3,026	8.0	248,074	6.6
Real estate and rental and leasing	2,794	7.4	215,423	5.8
Professional, scientific, and technical services	2,520	6.7	366,492	9.8
Other services (except government and government enterprises)	2,059	5.5	192,284	5.1
Administrative and support and waste management and remediation services	1,972	5.2	303,373	8.1
Finance and insurance	1,306	3.5	220,814	5.9
Arts, entertainment, and recreation	1,041	2.8	87,737	2.3
Mining, quarrying, and oil and gas extraction	1,010	2.7	39,162	1.0
Farm employment	869	2.3	49,011	1.3
Transportation and warehousing	854	2.3	154,192	4.1
Wholesale trade	680	1.8	118,527	3.2
Educational services	655	1.7	75,897	2.0
Manufacturing	541	1.4	163,097	4.4
Information	249	0.7	87,925	2.4
Utilities	224	0.6	9,186	0.2
Management of companies and enterprises	223	0.6	49,715	1.3
Forestry, fishing, and related activities	151	0.4	13,521	0.4

Source: U.S. Department of Commerce, Bureau of Economic Analysis 2021.

4.12.2 Agricultural Statistics

Table 4-22 presents summarized agricultural information for Garfield County from the 2012 and 2017 USDA Census of Agriculture (USDA 2012, 2017b). The top crop items produced in Garfield County by acreage are alfalfa and grass hay.

Table 4-22. Agricultural statistics for Garfield County.

Parameter	2012	2017	Percent Change from 2012 to 2017
Number of Farms	625	661	5%
Land in Farm (acres)	310,854	475,166	35%
Average Size of Farm (acres)	497	719	31%
Market Value of Products Sold	$22,670,000	$35,863,000	37%
Crop Sales (percent)	25%	24%	-1%
Livestock Sales (percent)	75%	76%	1%
Average Market Value per Farm	$36,271	$54,255	33%

Source: USDA 2017b.

The SWCD irrigation infrastructure serves an important role in both the agriculture and recreation economies of the surrounding communities, particularly in light of the increase in farms and farmland. System components convey, store, and distribute water for irrigated pasture (primarily grass hay and alfalfa) supporting small- and large-scale livestock production, export crop income, and hobby farming in Garfield County (USDA 2017b). Two large reservoirs operate in the system and provide visitors and residents opportunities for fishing, swimming, and boating. These reservoirs, along with the system of canals, provide open water and fringe vegetation habitat for wildlife. The infrastructure operated by the

SWCD and constructed water resources, particularly the Harvey Gap and Rifle Gap Reservoirs, contribute to the overall visual and recreation aesthetic that supports a quality of life for residents in the SWCD. The cultural services offered by the SWCD infrastructure enhance aesthetics, recreation, and tourism in the region by providing recreational water opportunities in a beautiful mountainous environment. This infrastructure both directly and indirectly supports household income levels, community health and well-being, and the environment.

4.13 Ecosystem Services

The PR&G requires benefits and costs of the action alternatives to be evaluated in an ecosystem service framework. The framework classifies ecosystem services into four broad categories of provisioning, regulating, cultural, and supporting services and gives economic, social, and environmental costs and benefits equal standing in decision-making processes. The primary services impacted by flood mitigation and recreation enhancement projects are regulating and cultural services. Projects designed to provide additional irrigation water may primarily impact provisioning services. Supporting services, which underlie most regulating and provisioning services, are generally regarded as redundant from the perspective of benefit-cost analysis. Currently, the existing system provides cultural and provisioning services. The open GVC provides water to the irrigators and Harvey Gap Reservoir, resulting in both provisioning services (irrigation water) and cultural services (recreation opportunities). Proposed project measures would enhance these services.

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Chapter 5. Alternatives

5.1 Project Formulation

An initial alternative was considered (improvements to the GVC; Alternative 1); see **Section 5.3.2**. Following consideration of Alternative 1, the Preferred Alternative (Alternative 2) was cooperatively developed over a 2-year period using a project prioritization and selection process that included input meetings with the SWCD board and stakeholders, the Colorado River District, Reclamation, and the NRCS. The process identified components of the SWCD system where water supply could be improved, water management could be improved, and infrastructure could be replaced or augmented to reduce failure and flooding risk and to reduce infrastructure damage costs. **Figure 5-1** indicates infrastructure areas of concern identified by the SWCD, overlaid on a graphical representation of the SWCD system.

Once the list was compiled, benefits of each project to the SWCD were considered; measures were prioritized according to whether they would (1) reduce failure risk, (2) mitigate drought, (3) improve system efficiency in delivery of water to current irrigation and livestock water users, and (4) reduce infrastructure damage costs. Possible alternatives were considered in the context of the ecosystem services framework as well. Provisioning services (improving system efficiency and increasing the water supply) were the primary consideration under the ecosystem services framework, followed by cultural services (recreation). For the final project list, consideration was given to funding needs for the project (some measures may be funded by other federal agencies or by the district funds) and whether the project would be achievable within a 10-year time frame. **Table 5-1** presents a summary of the measures identified and either retained as part of the Preferred Alternative or eliminated. Areas of concern are consistent with the Federal Objectives of maximizing sustainable economic development and minimizing adverse impacts and vulnerabilities in the SWCD system.

Figure 5-1. SWCD Project evaluation schematic.

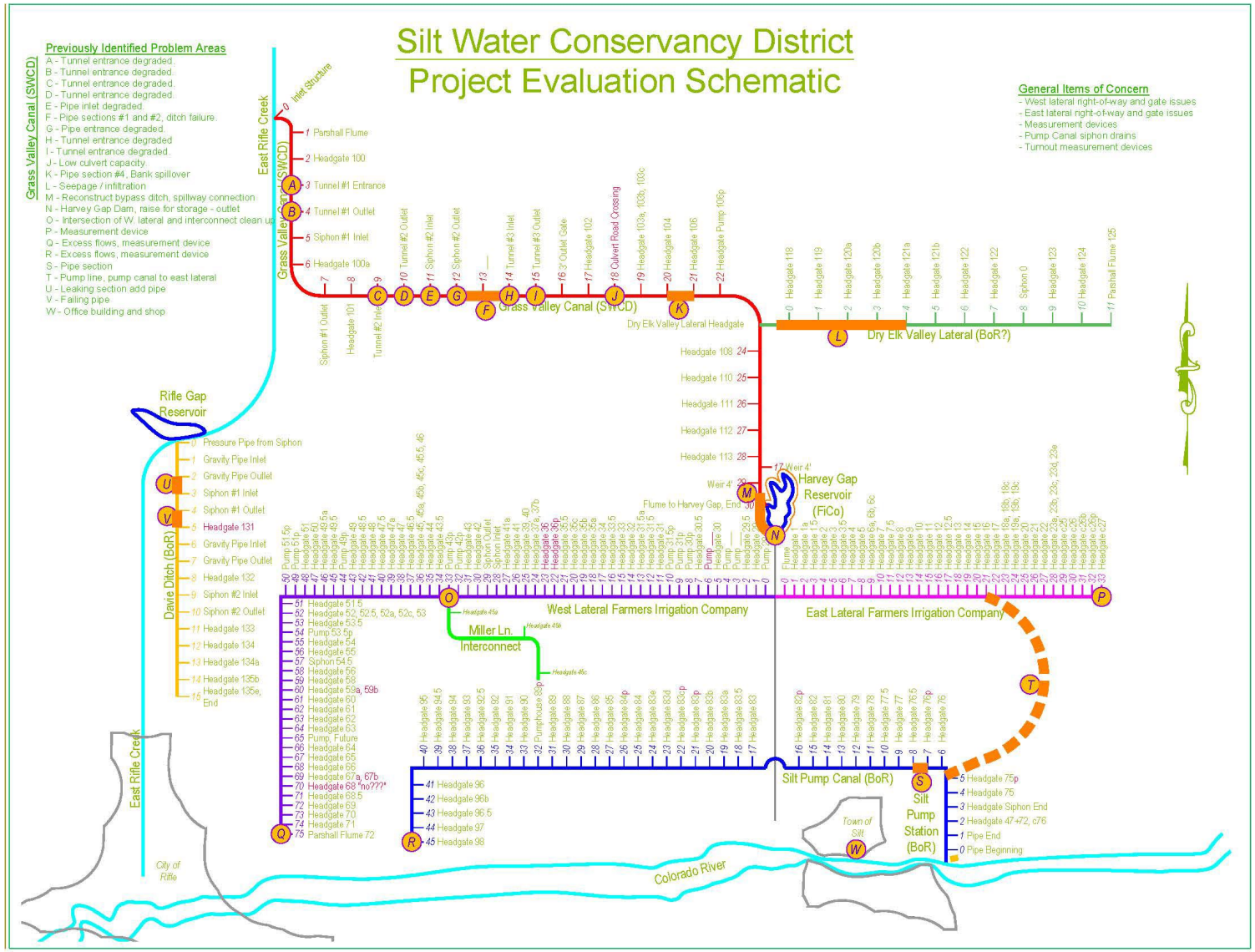


Table 5-1. Project selection process.

Project	Which Purpose and Need Criteria Does the Project Achieve?				Selected as Part of Which Alternatives
	Reduce Failure Risk	Increase Water Storage Capacity or Water Supply	Improve Water Management/ Reduce Infrastructure Damage Costs	Fundable, Feasible within 10-Year Time Frame	
GVC—flow control gate reconstruction	X	X	X	X	Alternatives 1 and 2
GVC—tunnel end reconstruction at three locations where there is 30% to 40% probability of failure	X		X	X	Alternatives 1 and 2
Pipe four portions of the GVC that have 40% to 60% probability of failure	X	X	X	X	Alternatives 1 and 2
GVC Bypass Rebuild around Harvey Gap Reservoir	X	X	X	X	Alternatives 1 and 2
Line or pipe the entire length of the Dry Elk Lateral	X	X	X		Eliminated
Spillway reconstruction at Harvey Gap Dam	X	X	X		Eliminated
Dredge silt deposited in Harvey Gap Reservoir		X			Eliminated
Address a leaky intersection of the West Lateral and interconnect	X	X	X		Eliminated
Install a measurement device on the FICo East Lateral and West Lateral and the Silt Pump Canal			X		Eliminated
Pipe a section of the Silt Pump Canal	X	X	X	X	Eliminated
Install a bypass from the Silt Pump Canal to the FICo East Lateral		X	X	X	Alternative 2
Address the Davie Ditch's leak and failing pipe	X	X	X	X	Eliminated
Update the office building and shop			X		Eliminated

At the conclusion of the development process, a set of five proposed measures in two main SWCD components—the GVC and the Silt Pump Canal system—were determined to best meet the purpose and need. These measures would be completed in phases over the next 10 years. The measures that comprise the action alternatives were further evaluated against the PR&G and against the criteria of completeness, effectiveness, efficiency, and acceptability, as defined by the PR&G.

5.2 Alternatives Considered but Eliminated from Detailed Study

After assessing all components and infrastructure within the SWCD administrative boundaries (as described in **Section 5.1**), some measures were eliminated. Measures were eliminated if they did not address the purpose and need for action; did not achieve the PR&G; became unreasonable because of time frame to install, cost, logistics, existing technology, or environmental reasons; or are currently under design/construction by other agencies (NWPM 501.37; PR&G 6.5b). See **Appendix E** for further discussion. In total, 10 measures throughout the SWCD were evaluated and eliminated from the Preferred

Alternative (see the attachment to **Appendix D** for more information) because they did not meet the purpose and need. The following measures were eliminated:

- Shoring up/reinforcing three tunnel ends and one pipe inlet of the GVC where there is 20 percent probability of failure was considered. Based on additional field inspection by SWCD contract engineers, the time frame estimated for repairs at these tunnel entrances exceeded the 15-year horizon established as part of the current EA.
- Lining or piping the Dry Elk Lateral to minimize water seepage loss would have provided provisioning services, but it was determined to be inefficient from a cost perspective; the cost was exorbitant with insufficient added benefit.
- Reconstructing the spillway around Harvey Gap Reservoir to improve water storage and mitigate seepage and erosion hazards would have provided provisioning and cultural services under the ecosystem services framework. However, to qualify for P.L. 566 funds, this measure would have also required reconstruction/rehabilitation of the Harvey Gap Dam to bring it up to NRCS standards. This requirement was deemed too costly relative to the benefits.
- Dredging Harvey Gap Reservoir to improve water storage capacity would have resulted in provisioning and cultural services. This measure was determined to be inefficient from a cost perspective relative to the benefits.
- Addressing the leaky intersection of the FICo West Lateral and interconnect was considered, but the leaking area required repair in a short time frame, which necessitated making repairs before the completion time frame for the current EA.
- Installing a measurement device on the FICo East Lateral and West Lateral and the Silt Pump Canal was considered, but measuring devices are not a requirement at this time and may not serve much purpose for water administration. This is a potentially small project that would be better suited to in-house funding.
- Piping a section of the Silt Pump Canal is a lower-priority project that would not occur within the 15-year time frame.
- Addressing the Davie Ditch's leak and failing pipe is a project that already has funding and is under design by Reclamation under MOA 1.
- Updating the office building and shop is deemed a lower-priority project that would not occur within the 15-year window.
- Piping the entire GVC was also considered but eliminated due to the benefit-cost ratio. The remaining sections of the GVC are stable with significantly less risk of failure. The cost for piping all of the GVC would be exorbitant, with insufficient added benefit.
- Piping of 600 feet of Piping Measure #1 was originally included but removed as a result of SWCD privately funding piping this portion of the GVC.
- On-farm measures were not included because early scoping found that more than half of farms in the project area had conservation plans addressing irrigation water management and water use efficiency improvements, and USDA Farm Bill programs were better suited to addressing the needs of any remaining willing participants.

5.3 Alternatives Considered for Detailed Study

Three alternatives were considered for the project and carried forward for further study in this Plan-EA: the No Action Alternative and two action alternatives. The SWCD initially considered improvements to the GVC only (Alternative 1). Restricting the project to improvements to the GVC only partially meets the purposes of the project. It reduces system failure risk, mitigates failure risk to increase climate change resilience, improves system efficiency in water delivery, and reduces the system O&M burden. A second

alternative was analyzed to further meet the stated purposes of the project. Both of these alternatives provide provisioning and cultural services within the ecosystem services framework.

These action alternatives are additive: Alternative 1 includes all GVC proposed measures, and Alternative 2 includes the GVC measures and the East Bypass Pipeline and Pump Station. Both action alternatives consist of irrigation water improvement measures to reduce system failure risk, improve water supply and management, address degrading infrastructure in the SWCD, and reduce infrastructure damage costs (see **Figure 1-2**). A description of these alternatives is presented below. The action alternatives project measures are shown on **Figure 5-2** and **Figures B-1** through **B-9** in **Appendix B**.

5.3.1 No Action Alternative (Future without Federal Investment)

Under the No Action Alternative, the SWCD would continue to operate and maintain the irrigation system in its current condition. This alternative assumes that modernization of the SWCD system to meet the purpose and need of the project would not be reasonably certain to occur. For the purposes of this Plan-EA, the No Action Alternative is a near-term continuation of the standard operation procedures.

The No Action Alternative would not meet the purpose and need of the project. There would be continuation of inefficient water use, high risk of system failure, lack of adequate supply from Green Mountain Reservoir and associated conditions of insufficient water availability, degraded water quality, poor soil conditions, and potentially high infrastructure damage costs.

5.3.2 Alternative 1: Grass Valley Canal Improvements

Alternative 1 consists of three measures: reconstruction of the existing GVC flow control gate near its diversion on East Rifle Creek, reconstruction of four high-risk rock tunnel inlet/outlet areas downstream of the GVC flow control gate, and piping four sections of the GVC totaling 2,605 feet in length (**Table 5-2**). The measures under Alternative 1 would improve irrigation water control, reduce system failure risk, and reduce potential flood damage and disruptions to water supplies serving recreation and irrigation in the SWCD. Also included in the GVC project area is 3.82 miles of access roads and 0.86 acre of temporary disturbance across four staging areas. Approximately 1.04 miles of access road will require grading; the remainder will be used as is with no modifications.

5.3.2.1 GVC Flow Control Gate Reconstruction

An existing gate used to control flows into the GVC would be rebuilt to improve functionality and reduce flooding risk. Disturbance includes a 20-foot by 50-foot construction area around the gate on the ditch bank, with access being provided via the existing ditch service road.

5.3.2.2 Tunnel End Reconstruction

Concrete and anchors would be used to shore tunnel inlets or outlets at three locations along the GVC where the tunnel ends are subject to caving or rockfalls, creating blockages, flooding, and risk of system failure. Temporary disturbance includes a 20-foot by 50-foot area at three locations.

5.3.2.3 Piping Four Sections of the GVC

A total of 2,605 feet of open canal would be piped along four hazardous and steep sections of the canal to prevent system failure (the total GVC length is 25,564 feet). The pipe would be made of high-density

polyethylene (HDPE) and would be 48 inches in diameter. The pipe would be bedded in the existing canal and backfilled to grade; disturbed ground would be revegetated. Concrete aprons and a trash rack would be installed at the inlet where necessary; a maximum of three aprons would be needed, and each footprint would be approximately 30 feet by 60 feet.

5.3.2.4 Bypass Rebuild Around Harvey Gap Reservoir

A 4-foot-wide, 2,827-foot-long ditch would be constructed along the historic GVC alignment around Harvey Gap Reservoir to provide a functional bypass to downstream irrigators if needed for water flows and water management. A 20-foot-wide construction buffer is assumed. Spoils would be used for downstream reinforcement and embankment.

5.3.3 Alternative 2 (Preferred Alternative)

Alternative 2 includes the GVC components described above as well as the East Bypass Pipeline and Pump Station (**Table 5-2**). In addition to the benefits described above for the GVC measures, the East Bypass Pipeline and Pump Station would increase water supply by adding an average of 1,300 AF of water into the system annually that is currently being stored 70 miles away in Green Mountain Reservoir. Currently, SWCD does not have an effective system to get access to this water. In addition to the access and staging described above in **Section 5.3.2**, 0.15 mile of new access road would be constructed, and a 0.24-acre staging area would be used.

5.3.3.1 GVC Measures

See **Section 5.3.2** for a description of the three GVC measures.

5.3.3.2 East Bypass Pipeline and Pump Station

A total of 8,925 linear feet of plastic pipe would be installed to connect the Silt Pump Canal and FICo East Lateral, creating capacity to bring approximately 1,300 AF of SWCD water into the system annually. The water is currently stored at Green Mountain Reservoir approximately 70 miles east of Silt and is not being used. The project would benefit water levels at Harvey Gap Reservoir and irrigation water users in the SWCD. Pumps to pressurize the new pipeline would be installed in a 12-foot by 10-foot building near the Silt Pump Canal inlet. The Silt Pump Canal is owned by Reclamation.

Table 5-2. Project Measures for Alternatives 1 and 2.

System	Project and Location	Description
GVC (Alternative 1, Alternative 2)	**Flow Control Gate Reconstruction** near East Rifle Creek	An existing gate used to control flows into the GVC would be rebuilt to improve functionality and reduce localized flooding risk. Temporary disturbance includes a 50-foot by 20-foot construction area around the gate.
	Tunnel End Reconstruction at three locations along three tunnels south of the headgate	Concrete and anchors would be used to shore tunnel inlets or outlets at three locations along the GVC where the tunnel ends are subject to caving or rockfalls, creating blockages, flooding, and risk of system failure. Temporary disturbance includes a 20-foot by 50-foot area at three locations.
	Piping Projects at four locations (#1, #2, #3, and #4) south of the shoring area, in the northern part of the system	A total of 2,605 feet of open canal (25,564.1-foot total length) would be piped along four hazardous and steep sections of the canal to prevent system failure. The pipe would be made of HDPE and would be 48 inches in diameter. The pipe would be bedded in the existing canal and backfilled to grade; disturbed ground would be revegetated. Concrete aprons and a trash rack would be installed at the inlet where necessary; a maximum of three aprons would be needed, and each footprint would be approximately 30 feet by 60 feet.
	Bypass Rebuild around Harvey Gap Reservoir	A 4-foot-wide, 2,827-foot-long ditch would be constructed along the historic GVC alignment to serve as a bypass around the Harvey Gap Reservoir to provide a functional bypass to downstream irrigators if needed for water flows and water management. A 20-foot-wide construction buffer is assumed. Spoils would be used for downstream reinforcement and embankment.
East Bypass Pipeline (Alternative 2)	**East Bypass Pipeline** between the Silt Pump Canal and FICo East Lateral, and East Bypass Pump Station at the inlet	8,925 linear feet of plastic pipe would be installed to connect the Silt Pump Canal and FICo East Lateral, creating capacity to bring approximately 1,300 additional AF of SWCD water into the system annually. The water is currently stored at Green Mountain Reservoir approximately 70 miles east of Silt and is not being used. The project would benefit water levels at Harvey Gap Reservoir and irrigation water users in the SWCD. Pumps to pressurize the new pipeline would be installed in a 12-foot by 10-foot building near the Silt Pump Canal inlet.

5.3.4 Construction Timetable, Staging, and Access

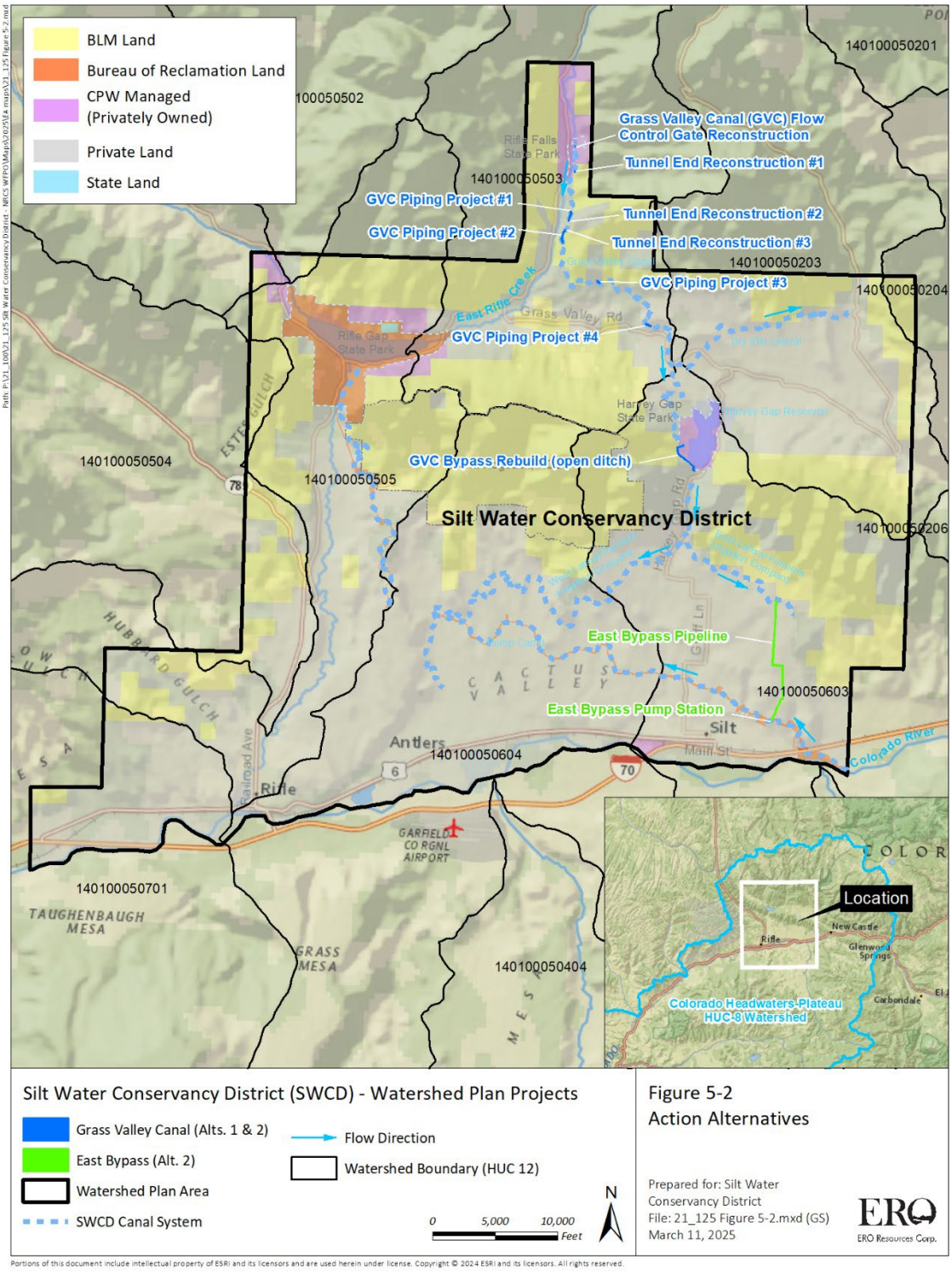
Construction would be phased by project component and would generally occur between October 15 and April 15, when irrigation water is not being used, beginning in winter 2025 and with an anticipated end date of 2035. The GVC Project is the highest-priority project. The GVC flows year-round, filling the reservoir during the winter; therefore, construction timing for the GVC would be as condensed as possible to minimize impacts on reservoir filling. Construction for each project would take 2 weeks to 3 months to complete, as shown in **Table 5-3**. Each project measure would be constructed over a 2-year period; GVC components would be built between Years 1 and 5, and the East Bypass Pipeline components would be built between Years 6 and 10.

Table 5-3. Construction timetable, staging, and access.

Alternative	Project Measure	Construction Time Frame	Construction Staging and Access
Alternatives 1 and 2	GVC Flow Control Gate Reconstruction	15 days	Existing access would be used. A 20-foot by 50-foot construction area for staging would be used, adjacent to the gate.
Alternatives 1 and 2	GVC Tunnel End Reconstruction	10 days per tunnel	Access along existing routes; no additional staging would be needed. Temporary disturbance includes a 20-foot by 50-foot area at four locations.
Alternatives 1 and 2	GVC Piping Measures #1, #2, #3, and #4	2 months per piping segment	Access along existing routes with some grading needed and three staging areas (0.14, 0.21, and 0.43 acre) have been selected. Fill for bedding and cover would be obtained on-site or excess from SWCD stockpiles. Some access road improvements would be needed. 4,484.5 feet of access (most of which is across BLM lands) would require grading to access Piping Measure #2 and Tunnel End #4; 10 feet of new disturbance width is assumed. 606.6 feet would require grading between the Grass Valley Road and the canal to access Piping Measure #2.
Alternatives 1 and 2	GVC Bypass Rebuild around Harvey Gap Reservoir	15 days	Access along existing access that would require some grading (380 feet) and one staging area (0.08 acre) below Harvey Gap Dam; 20-foot-wide temporary disturbance.
Alternative 2	Silt Pump Canal East Bypass Pipeline and Pump Station	3 months, phased	Temporary disturbance includes a 30-foot-wide construction disturbance area and a staging area co-located with the pump station (0.24 acre). Approximately 777 feet of new access would be needed directly north of the pump station; the access road would be constructed in the disturbed 30-foot piped corridor and would create a permanent 20-foot-wide disturbance (10 feet of surface and 5 feet on either side for the shoulder).

Staging areas would be located on private land in the SWCD and would not be placed on federal land. Access to construction and storage areas would use existing disturbed access routes with some minimal upgrades and grading, except as listed in **Table 5-3**. If new disturbance is required for borrowing fill materials, for material storage, or for new access ways, the areas would be surveyed prior to construction to comply with requirements for protection of biological and cultural resources.

Figure 5-2. Map showing proposed project measures from action alternatives.



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5.3.5 Comparison of Alternatives

A summary comparison of Alternative 1, Alternative 2, and the No Action Alternative is presented in **Table 5-4**.

Table 5-4. Summary and comparison of alternatives (see also Appendix D, Table D-2).

	Item or Concern	Alternative 1[2]	Alternative 2[2] (Recommended)	No Action Alternative (Future without Project)[1]
Installation Costs	**Total Cost** (Refer to **Table D-10**, Economic Table 1 for breakdown)	$2,404,850	$4,920,520	$0
	NRCS Contribution	$1,916,560	$3,846,311	$0
	SLO Contribution	$491,290	$1,074,205	$0
National Economic Evaluation	**Annual Benefits**	$204,300	$299,700	$0
	Annual Costs	$73,300	$165,800	$0
	Annual Net Benefits	$131,000	$133,900	$0
	OMR	$5,400	$20,500	$13,700
Key Problems, Needs, and Opportunities	**System Failure Risk**	Risk of system failure is reduced along nine weak points, leading to avoidance of repair costs, agricultural crop loss, and damages to recreation values.	Risk of system failure is mitigated along nine weak points, leading to avoidance of OMR costs, agricultural crop loss, and damages to recreation values.	Continued and worsening risk of failure.
	Degraded Infrastructure/ OMR Cost Reduction	Avoidance of repair costs due to damage to irrigation system and recreation values.	Avoidance of OMR costs due to damage to irrigation system and recreation values.	Continued OMR cost and risk.
	Underutilized Water Supply	Restricting the project to the GVC measures would not bring additional water into the system but would prevent some water loss.	The East Bypass Pipeline would provide the SWCD with the ability to bring additional water into the system, resulting in additional crop yields, instream flows, and recreation user days.	Continued underutilized water rights.
	Water Loss	Piping portions of the GVC would reduce water loss from seepage and evaporation, resulting in additional crop yields, avoidance of agricultural crop loss, and avoidance of OMR costs.	Piping portions of the GVC would reduce water loss from seepage and evaporation, resulting in additional crop yields, avoidance of agricultural crop loss, and avoidance of OMR costs.	Continued water loss.

	Item or Concern	Alternative 1[2]	Alternative 2[2] (Recommended)	No Action Alternative (Future without Project)[1]
Environmental Considerations	**Soils** Soil and Geologic Characteristics Upland Erosion Stream Bank Erosion Sedimentation	Short-term minor adverse impacts on soil during construction activities and permanent impacts on a much smaller area. Long-term moderate beneficial impacts on soil resources from increased water supply for irrigation; reduction of erosion and sedimentation issues associated with the current irrigation system.	Short-term minor adverse impacts on soil during construction activities and permanent impacts on a much smaller area. Long-term moderate beneficial impacts on soil resources from increased water supply for irrigation; reduction of erosion and sedimentation issues associated with the current irrigation system.	Continuation of the status quo for the reasonably foreseeable future.
	Prime Farmland	No impacts on the acreage of farmlands classified as prime; however, the project would ensure reliable irrigation of farmlands, and more water supply in the system would extend the irrigation season and improve farmland productivity.	No impacts on the acreage of farmlands classified as prime; however, the project would ensure reliable irrigation of farmlands, and more water supply in the system would extend the irrigation season and improve farmland productivity.	No action may impact the extent of land designated as prime farmland if irrigated due to potential failure of irrigation water delivery, climate change and drought, and the constrained water supply in the SWCD.
	Geology Resources	Geological hazards addressed along the GVC. No adverse impact on other geologic features, minerals, or oil and gas resources in the project area.	Geological hazards addressed along the GVC. No adverse impact on other geologic features, minerals, or oil and gas resources in the project area.	No impacts for the reasonably foreseeable future.
	Paleontological Resources	Earthwork could reveal buried paleontological resources, and proposed project activities could have long-term effects on these resources.	Earthwork could reveal buried paleontological resources, and proposed project activities could have long-term effects on these resources.	Tunnel or ditch failure in areas of high potential fossil yield could cause damage to unidentified resources.
	Water Water Rights Surface—Quality Surface—Quantity Groundwater—Quantity Waters of the U.S. Floodplain Management	Minor beneficial impacts on water flows in East Rifle Creek, and moderate beneficial impacts on reservoir levels for Harvey Gap Reservoir. No impacts on water rights. Minor to negligible impacts on other water resources including groundwater, waters of the U.S., and floodplain management.	Minor beneficial impacts on water flows in East Rifle Creek, and moderate beneficial impacts on reservoir levels for Harvey Gap Reservoir. No impacts on water rights. Minor to negligible impacts on other water resources including groundwater, waters of the U.S., and floodplain management.	Continuation of the status quo for the reasonably foreseeable future.
	Air	Short-term negligible impacts during construction. No long-term impacts.	Short-term negligible impacts during construction. No long-term impacts.	No impacts for the reasonably foreseeable future.

	Item or Concern	Alternative 1[2]	Alternative 2[2] (Recommended)	No Action Alternative (Future without Project)[1]
	Plants Wetlands / Riparian Areas Special Status Plants Invasive Species	Short-term minor adverse impacts on vegetation during construction. Long-term moderate beneficial impacts on wetlands and riparian habitat along East Rifle Creek from improvements in water flows and along the vegetated perimeter around Harvey Gap Reservoir.	Short-term minor adverse impacts on vegetation during construction. Long-term moderate beneficial impacts on wetlands and riparian habitat along East Rifle Creek from improvements in water flows and along the vegetated perimeter around Harvey Gap Reservoir.	No impacts for the reasonably foreseeable future.
	Wildlife Fish Habitat Wildlife Habitat Special Status Species / Threatened and Endangered Species	Short-term minor adverse impacts on wildlife habitat during construction. Long-term moderate beneficial impacts on fish and aquatic species habitat from improvements in water flows in East Rifle Creek and from higher water levels in Harvey Gap Reservoir.	Short-term minor adverse impacts on wildlife habitat during construction. Long-term moderate beneficial impacts on fish and aquatic species habitat from improvements in water flows in East Rifle Creek and from higher water levels in Harvey Gap Reservoir.	No impacts for the reasonably foreseeable future.
	Flood Damages	Reduced risk of localized flooding at high-probability failure areas on the GVC.	Reduced risk of localized flooding at high-probability failure areas on the GVC.	Persistent risk of system failure, which could lead to localized flooding at the failure site.
	Tribal, Religious, Sacred, Historic, and Cultural Resources	Long-term minor adverse impacts on one historic canal (ERO 2021). Acceptable treatment for the adverse effects has been determined and agreed upon by all consulting parties, and mitigation would occur prior to construction. Tribal consultation did not result in any additional tribal, religious, or sacred resource effects.	Long-term minor adverse impacts on one historic canal (ERO 2021). Acceptable treatment for the adverse effects has been determined and agreed upon by all consulting parties, and mitigation would occur prior to construction. Tribal consultation did not result in any additional tribal, religious, or sacred resource effects.	No impacts for the reasonably foreseeable future.

	Item or Concern	Alternative 1[2]	Alternative 2[2] (Recommended)	No Action Alternative (Future without Project)[1]
	Land Use Lands and Realty Wilderness Areas and Characteristics Range Management	Short-term negligible impacts on private, state-managed, and BLM-managed lands during construction. Long-term moderate beneficial impacts on agricultural land uses due to decreased risk of failure. Negligible or minor impacts on rangeland.	Additional crop production due to increased water supply; improvement in farmland health due to increased water supply. Short-term negligible impacts on private, state-managed, and BLM-managed lands during construction. Long-term moderate beneficial impacts on agricultural land uses due to decreased risk of failure and increased water storage and delivery capacity. An easement on private land would be required for the East Bypass Pipeline and Pump Station. Negligible or minor impacts on rangeland.	Continuation of the status quo for the reasonably foreseeable future.
	Recreation	Short-term negligible impacts during construction, including traffic and access disruption.	Short-term negligible impacts during construction, including traffic and access disruption. Beneficial impacts on recreation for Harvey Gap Reservoir. Increases in water supply would impact recreation use at Harvey Gap Reservoir, resulting in additional user days.	No change to surface water recreation use. Low water in reservoirs would continue to impact recreation use.
	Scenic Beauty and Visual Resources	Short-term negligible to minor impacts during construction, and long-term minor impacts. Beneficial impacts due to higher water levels for longer periods in reservoirs, leading to additional recreation user days.	Short-term negligible to minor impacts during construction, and long-term minor impacts. Beneficial impacts due to higher water levels for longer periods in reservoirs, leading to additional recreation user days.	No impacts for the reasonably foreseeable future.
	Socioeconomics	Short-term minor beneficial impacts from expenditure of public funds for construction. Long-term beneficial impacts on agriculture economy from reliable irrigation water supply. Additional crop yields and avoidance of agricultural crop loss would result. No increase in taxation as a direct result of this project would occur.	Short-term minor beneficial impacts from expenditure of public funds for construction. Long-term beneficial impacts on agriculture economy from reliable irrigation water supply. Additional crop yields and avoidance of agricultural crop loss would result. No increase in taxation as a direct result of this project would occur.	No impacts.

	Item or Concern	Alternative 1[2]	Alternative 2[2] (Recommended)	No Action Alternative (Future without Project)[1]
	Climate Change	Project construction activities would result in a negligible contribution to carbon emissions. Benefit to stream and river flows during periods of prolonged drought. Increased disaster resiliency.	Project construction activities would result in a negligible contribution to carbon emissions. Benefit to stream and river flows during periods of prolonged drought. Increased disaster resiliency.	Increased OMR costs associated with increased chance of system failure.

[1]The No Action Alternative is considered the baseline "Future without Federal Investment"; therefore, the benefits and costs are listed as $0. O&M costs for the No Action Alternative have been tracked as an avoided-cost benefit in the Proposed Action alternative.
[2]Price base: 2024 dollars amortized over 52 years at a discount rate of 2.75 percent.
Period of analysis: 52 years; price level: 2023 price levels.

Chapter 6. Environmental Consequences

The NRCS is required under NEPA to consider effects on the environment that may result from the action alternatives. Direct, indirect, and cumulative effects resulting from the three alternatives (the No Action Alternative, and Alternative 1 and Alternative 2 [collectively referred to as the action alternatives] as defined in Chapter 5) are included in this analysis.

6.1 Effects Analysis Definitions

Effect/impact—The terms "effect" and "impact" are used interchangeably and synonymously. An environmental impact or effect is any change from the present condition of any resource or issue that may result from the decision by the agencies to implement the Preferred Alternative or another alternative.

Impact Type—

- Direct impacts occur at the same time and place as the action that triggers the effect.
- Indirect impacts under NEPA are caused by the action and occur later in time (either short-term or long-term as defined below) or farther away in distance but are still reasonably foreseeable.
- Cumulative impacts under NEPA are the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions.
  - Past actions—Those that have previously taken place and are largely complete, but that have lasting effects on one or more of the resources that also would be affected by the alternatives.
  - Present actions—Those that are currently occurring and result in impacts on the same resources that the alternatives could affect. Present actions generally include ongoing land management and utilization activities (such as recreation and timber harvest), as well as recently completed residential and industrial development.
  - Reasonably foreseeable future [related] actions—Those that are likely to occur and affect the same resources as the alternatives.

Impact Duration—Impacts can be short-term or long-term:

- Short-term—An impact that would no longer be detectable over a limited period, as the resource returns to its predisturbance condition. These impacts would not last longer than the life of the project, including final reclamation (closure) and post-closure monitoring.
- Long-term—An impact that would remain or occur beyond post-closure and joint agency bond release.

Impact Change—Impacts can be beneficial, adverse, or both:

- Beneficial—A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition (e.g., improved water quality).
- Adverse—A negative change in the condition or appearance of the resource or a change that moves the resource away from a desired condition.

Impact Severity—The severity of impacts was evaluated using the following categories:

- No impact—No change to the affected environment from existing conditions.
- Negligible—An adverse or beneficial effect would occur but would be at the lowest levels of detection.
- Minor—The effect would be noticeable but would be relatively small and would not affect the function or integrity of the resource.

- Moderate—The effect would be easily identifiable and would influence the function or integrity of the resource. Mitigation may be required.
- Significant—The effect would be easily identifiable and would significantly impact the resource. Mitigation would be required.

Past, present, and reasonably foreseeable activities in the SWCD include:

- The Silt Project in the 1960s, which resulted in the construction of the Rifle Gap Dam and Reservoir and the Silt Pumping Plant, the construction/rehabilitation of the Davie Ditch, improvements to the GVC, and construction of the Dry Elk Lateral.
- Rehabilitation of the Davie Ditch, which is ongoing with Reclamation funding.
- Repair of the Harvey Gap Spillway, which is still a priority for SWCD but was removed from the current project because of NRCS dam requirements; the dam meets current state standards, and the spillway reconstruction will likely be pursued with other funding.
- Residential development in the area.
- Oil and gas development.
- Timber harvest.
- Weed management programs.
- Livestock grazing.
- Motorized and nonmotorized recreation.

6.2 Soils and Geology

Geology and soil conditions in the SWCD Area and project areas are of concern due to potential for erosion, influence of chemical constituents in certain bedrock formations, and geologic hazards in some areas. Construction activities could impact soil characteristics such as chemical and physical composition, structure (e.g., compaction or disaggregation), or function (including prime farmland and other unique soils). Temporary construction impacts may be mitigated or avoided through Best Management Practices (BMPs).

6.2.1 No Action Alternative

Under the No Action Alternative, the current conditions would continue. Although farmlands in the project area would continue to produce as in the past as long as irrigation water is made available, soils would be at risk if less irrigation water is available, particularly along the GVC and FICo East Lateral. With no repairs and with persistent, unmitigated risk of failure, the extent of prime farmland or farmland of statewide importance may decline over time. The No Action Alternative may impact the extent of land designated as prime farmland if irrigated due to potential failure of irrigation water delivery, climate change and drought, and the constrained water supply in the SWCD.

Under the No Action Alternative, temporary erosion and sedimentation issues associated with construction would not occur. No direct adverse impacts would occur on geologic resources under the No Action Alternative.

6.2.2 Action Alternatives

6.2.2.1 Direct and Indirect Effects

Geology

The action alternatives would have no adverse impact on geologic features, minerals, or oil and gas resources in the project area. No adverse effects on geological resources would occur under the action alternatives, and no new geologic hazards would be expected in the SWCD Area.

Existing geological hazards along the tunnel ends of the GVC would be addressed by shoring with concrete and rebar; this activity would have a negligible effect on geological structures. Geological hazards along four exposed areas of the GVC would be addressed by placing pipe in the existing canal footprint, adding backfill to grade, and restoring the surface to conform to surrounding conditions. Where surrounding conditions are arid, rocky, and sparsely vegetated, surface rock would be placed to minimize visual scarring. A dryland seed mix would be scattered where soil conditions are favorable for reseeding. In steep areas, construction equipment would be confined as much as possible to stable areas. If needed, side slopes would be shored up to prevent erosion and slippage beneath equipment and beneath the bedded pipe; these areas would be determined during final engineering and design.

No impacts on geological resources are expected as a result of the East Bypass Pipeline and Pump Station Project measures.

Soils

The total project area footprint for measures analyzed in this Plan-EA is calculated at 20.89 acres (**Table 6-1**); project-specific components (including staging and access) are located on BLM CRVFO land, Reclamation land, CPW-managed lands, and private lands. Detailed project maps showing the footprint over aerial imagery are in **Appendix B**.

Many project measures would be reconstructed in the existing footprint of the existing system component, and very little soil disturbance is expected. The flow control gate would be reconstructed in its existing footprint of approximately 0.02 acre. GVC tunnel end shoring and piping would occur in the current ditch alignment. Clearing of vegetation and general disturbance from the GVC ditch-to-pipe conversions, followed by restoration, would occur on approximately 1.75 acres of soils; it is assumed that this area has been previously disturbed by construction of the canal. Any erosion-control measures in the GVC piping measures would be rebuilt and maintained as part of the project to prevent damage to the piped sections of the canal. Reconstruction of the GVC bypass around Harvey Gap would be in the abandoned footprint of the canal. Three staging areas for the GVC measures and one staging area for the East Bypass would be used to complete the measures. The GVC Project measures would require a total of 14,721 feet of access roads; 5,471 feet of which would require improvement (blading) in three locations. For the purposes of the impact analysis, it is assumed that bladed roads would disturb an additional 5 feet on either side of the existing road infrastructure.

Permanent impacts on soils would occur in the East Bypass infrastructure, specifically the new pump station, pipeline, and access road (7.33 acres), a portion of which would occur on Reclamation lands. The pipeline would follow an existing road in a previously disturbed corridor. The East Bypass would require a new 777-foot-long access road.

All project components would have some short-term minor adverse impacts on soils during construction. Soils in the GVC area have been previously disturbed. Clearing of vegetation may result in soil erosion and sedimentation; however, these areas would be confined to the construction buffer and restored after construction (backfilled or graded and contoured and revegetated). Soils compacted under the weight of construction equipment would recover over time, but impacts may be longer term. Reseeding would be used where appropriate.

Table 6-1. Acres of temporary and permanent disturbance by project component.

System Component (acres)	Project	No New Disturbance (acres)	New Temporary Disturbance (acres)	Permanent Disturbance (acres)	Total Acreage
GVC (13.32 acres)	Flow Control Gate Reconstruction	0.02	0	0	0.02
	Tunnel End Shoring	0.09	0	0	0.09
	Piping Measures	0	1.75	0	1.75
	Bypass Rebuild	0	1.43	0	1.43
	Access Roads	7.81	0	1.25	10.29
	Staging	0	0.97	0	0.97
East Bypass (7.57 acres)	East Bypass Pipeline and Pump Station	0	0	6.97	6.97
	Access Roads	0	0	0.36	0.36
	Staging	0	0.24	0	0.24
Totals		**7.92**	**4.39**	**8.58**	**20.89**

Farmland Including Prime Farmland and Farmland of Statewide Importance

The action alternatives would provide long-term beneficial impacts on the existing extent of prime farmland and farmland of statewide importance in the SWCD Area by ensuring a reliable irrigation water supply to farm fields and enhancing water supply during times of drought. Farmland would not be converted to nonagricultural use under any of the proposed project measures. Construction of the action alternatives would occur during the nongrowing season to prevent disruption of normal farming operations. Short-term negligible to minor impacts on agriculturally important soils would be expected during construction, but adherence to BMPs would minimize these impacts. No long-term adverse impacts would be expected on any federal- or state-level farmland designations; however, an access road (0.36 acre) would be installed on land not considered prime farmland (NRCS 2022b) in the East Bypass area.

Salinity and Selenium

Under the action alternatives, piping measures of the GVC would minimize water contact with the Mancos Shale–derived soils, which may reduce salinity and selenium loading in the Upper Colorado River Basin by a minor immeasurable amount; these effects are expected to be negligible.

Erosion and Sedimentation

Construction may cause a localized short-term minor increase in the rates of erosion and sedimentation in the project area. 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 Storm Water General Permit for Construction Activities is required for construction activities that disturb more than 1 acre and discharge pollutants to surface waters. During construction, 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.

The project would have long-term moderate beneficial impacts on soil resources due to an increased water supply for irrigation and contributions to agricultural productivity, compared to the No Action Alternative.

6.2.2.2 Cumulative Impacts

The action alternatives, when combined with past, present, and reasonably foreseeable future upgrades and maintenance to the SWCD infrastructure, could result in short-term negligible effects on geological resources and soils. Past impacts on soils exist in all of the GVC components. Some minor ground-disturbing activities and movement of construction vehicles and equipment during the action alternatives would contribute to a short-term minor disturbance and loss of soils. These impacts would be incremental to other regional effects from residential and industrial development and ongoing agricultural land uses. Cumulative long-term soil effects would be negligible.

6.3 Water

6.3.1 No Action Alternative

Under the No Action Alternative, infrastructure used to supply water for irrigation use in the SWCD would continue to be at risk of failure from blockage or sliding, which may result in soil sloughing and sediment loading downhill of the GVC, as well as localized flooding. No additional water supplies would be incorporated into the existing system, and approximately 1,300 AF of water would remain in storage at Green Mountain Reservoir. Fewer productive agriculture days would equate to less productive croplands, particularly at the east end of the FICo East Lateral, and potentially more erosion due to a decline in land health/vegetation condition.

Irrigators at the end of the FICo East Lateral would continue to endure limited water supply conditions during dry periods, resulting in a decline in land health and an increase in erosion. O&M flexibility on key infrastructure components would be limited. The SWCD has been short of water needed for full shares (see **Section 4.2**). Under the No Action Alternative, this circumstance would continue and may worsen due to the ongoing drought and risk of a call from downstream water users with senior water rights.

6.3.2 Action Alternatives

Project-specific components are described in **Chapter 5** and listed in **Table 5-2**; maps are available in **Appendix B**, **Figures B-1** through **B-9**. Most components are situated on private lands, except the GVC Bypass Rebuild project area around Harvey Gap Reservoir, which is located on state-managed lands, and the East Bypass Pump Station and Pipeline on Reclamation lands; some access would be on BLM-managed lands. The action alternatives would result in direct and indirect long-term beneficial impacts on system reliability, O&M flexibility, irrigation season longevity, surface water flow rates, and reservoir storage volumes. The action alternatives would extend the irrigation season and enhance agricultural

productivity in the region, with resulting economic benefits. Minor benefits to reservoir and irrigation water quality in the watershed may occur. There would be no impacts on water rights.

As discussed in **Section 4.2**, the SWCD has been short of water needed to deliver full shares; in the past 10 years of water delivery, only 2 years (2015 and 2016) had adequate water in the system to deliver full allocation to all users, according to administrative data available from the SWCD. The action alternatives would result in more than 2,040 AF of added water supply and storage volume to the SWCD.

6.3.2.1 Direct and Indirect Effects

Increased Water Availability

Alternative 1 is expected to increase water availability by 870 AF annually as a result of piping 2,605 feet of the GVC. Alternative 2 includes this 870 AF, as well as the 1,300 AF of water that would be brought into the system from the East Bypass Pipeline Project. It is assumed that at least 90 percent of the 1,300 AF will be added to the system annually for a total increased water supply of 2,040 for Alternative 2.

Groundwater

No groundwater resources would be extracted or consumptively used as part of the project. Piping sections of the GVC may result in less bank storage and seepage from the ditch, which could result in minor reductions in groundwater flow that may supply downgradient seeps and springs. 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 that may have historically beneficially used canal seepage return flows. Reductions in canal seepage could beneficially affect (increase) the amount of water left in East Rifle Creek downstream of the GVC diversion, since less water would seep from canals and less water would be diverted.

Floodplains

Project components would be generally located in upland areas and would not affect any 100-year or 500-year floodplains. The GVC Flow Control Gate Reconstruction would be located in the floodplain of East Rifle Creek; however, this modification would result in temporary minor changes to the floodplain. The gate reconstruction would occur consistent with the existing infrastructure, and some temporary construction impacts would result.

Water Rights

No changes to and no adverse impacts on water rights are expected with the project. The project would provide more flexibility to the SWCD to respond to a potential call for water from senior water users downstream of the SWCD. In addition, the action alternatives would increase water supply operational flexibility, thereby allowing greater use of established water rights.

In general, adjacent or downstream water rights are junior to the SWCD; therefore, downstream impacts on water rights are not expected for any potential change in hydrology as a result of the action alternatives. Potential effects on hydrology are discussed in the following section.

Hydrology and Water Quality

Surface water flows under the action alternatives would be expected to increase in East Rifle Creek through the reach between the GVC headgate at Rifle Falls State Park and Rifle Gap Reservoir due to seepage savings along the piped sections of the GVC and additional water supplied from Green Mountain Reservoir (1,300 AF). Less water diverted from East Rifle Creek would be required as a result of added water supply to the Harvey Gap system. There would be a minor immeasurable increase in flow in the Colorado River and a decrease in water stored in Green Mountain Reservoir.

Wells and springs within 0.5 mile of the piping measures were mapped (CDSS 2022). Five springs and one well are downgradient of GVC piped sections (CDSS 2022). Wells and springs downgradient of the piping measures may be affected if seepage from the four sections of the GVC to be piped is contributing substantially to the water sourcing the wells and springs. Five springs near the GVC piping measures may be affected; however, the springs are located in low-lying areas that would remain undisturbed, and most of the GVC in the vicinity of these springs would not be piped.

Effects on water quality as a result of the action alternatives are expected to be minor and immeasurable overall. GVC piping may result in a minor improvement in irrigation water quality. Converting 2,605 feet of the 25,564-foot-long GVC (10.2 percent) to enclosed pipe may result in some reduction of salt and selenium loading in the Upper Colorado River Basin, but this effect is expected to be negligible.

An increase in water supply from East Rifle Creek and Green Mountain Reservoir, and greater water storage, would provide an extended irrigation season for farmers along the FICo East and West Laterals and the Silt Pump Canal system, areas considered a Salinity Area (Colorado River Basin Salinity Control Forum 2020). An increase in irrigation days across the southern portion of the SWCD Area may increase salinity loading into the Colorado River; however, projecting the amount of salinity loading increase is beyond the scope of this assessment.

Water supply, management, and quality impacts from the action alternatives are shown in **Table 6-2.**

Table 6-2. Effects on SWCD water supply/Rifle Creek and Colorado River from the action alternatives.

Project Component	Environmental Consequences		
	Additional Distribution (AF/year)	Operation Benefit and Related Benefit to Surface Water	Water Quality Effects
GVC Flow Control Gate Reconstruction	N/A	Temporary negligible benefits to East Rifle Creek water flows during reconstruction of the gate.	Unquantified, negligible.
East Bypass Pipeline and Pump Station	1,300 AF in additional water supplied to irrigators along the Silt Pump Canal system and the FICo East Lateral	Unused water shares released from Green Mountain Reservoir can result in: • Minor increase in Blue River and Colorado River stream flows upstream from Silt. • Increased SWCD diversions at the Silt Pump Station. • Increased project water deliveries to the Silt Pump Canal and FICo East Lateral. • Less FICo water required from East Rifle Creek and from Harvey Gap Reservoir. • Moderate benefits to the amount of water stored at Harvey Gap Reservoir. • An extended irrigation season. • Less storage water diverted from East Rifle Creek. • Minor amounts of increased flow in East Rifle Creek. • Moderate benefits to the amount of water stored in Rifle Gap Reservoir. • Minor benefits to water supply downstream from Rifle Gap Reservoir (e.g., extended irrigation season). • Adverse impacts on Green Mountain Reservoir are not expected; the amount of water relative to the overall volume (153,639 AF) of the reservoir is very small.	Unquantified, negligible. • Extended irrigation season can result in a minor increase in groundwater return flows, which can result in a minor increase in groundwater salinity contributions to the Colorado River.

6.3.2.2 Compliance and Best Management Practices

AMM Measures to reduce negative consequences for water resources are listed in **Section 8.4** in **Table 8-2**. Permits may be required from the agencies listed in **Section 8.4** in **Table 8-2** for canal piping.

6.3.2.3 Cumulative Impacts

The cumulative impacts of piping measures of the GVC would mean less groundwater recharge to local 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 downgradient streams.

Cumulative effects on water quality as a result of the project measures are considered minor or negligible in most cases. An increase in irrigation days across the southern portion of the SWCD Area (south of the Grand Hogback) may increase salinity loading into the Colorado River. Ongoing projects to modernize irrigation systems in the Salinity Area south of the Grand Hogback are currently working to mitigate salinity loading by an estimated 2,600 tons annually (Colorado River Basin Salinity Control Forum 2020). These projects, and associated economic benefits from increased productivity, are expected to offset the negative effects from an increase in salinity loading associated with the action alternatives. Overall, no measurable long-term negative impacts on water quality are expected for the Rifle Creek Watershed or the Colorado River.

The action alternatives do 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 stream flows downstream of the diversion points and in associated riparian habitats. However, speculating on the manner and degree to which irrigators 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.

6.4 Air Quality

6.4.1 No Action Alternative

Under the No Action Alternative, no new air quality impacts would occur, and existing air quality would continue. Maintenance activities would continue to result in temporary impacts, including vehicle and equipment emissions and dust mobilization.

6.4.2 Action Alternatives

Effects on air quality from vehicle emissions and fugitive dust would be short-term and negligible during construction. The measures are anticipated to be phased, and the schedule for the work is as shown in **Table 5-3**. No long-term effects following construction and revegetation activities are anticipated. Short-term localized reductions in air quality may be associated with fugitive dust production resulting from surface disturbance from ditch piping and construction activities. Soils in the project area have moderate to low susceptibility to wind erosion (NRCS 2022a). O&M activities would have minimal effects associated with vehicle traffic on dirt roads.

All proposed project measures in the action alternatives could result in a short-term negligible increase in greenhouse gas emissions associated with construction, operation, and maintenance of the project. These local minor emissions would have a negligible immeasurable effect on climate.

6.4.2.1 Compliance and Best Management Practices

The CDPHE Air Pollution Control Division has air emissions reporting requirements for criteria pollutants. Reporting is required for greater than 2 tons per year for each criteria pollutant. For the action alternatives, the emissions are not anticipated to reach the thresholds that would require reporting or permitting. AMM Measures to reduce negative consequences for air quality are listed in **Section 8.4** in **Table 8-2**.

6.4.2.2 Cumulative Impacts

Cumulative effects may result from future construction associated with increased residential, infrastructure, and oil and gas development and have an impact on regional or local air quality. Emissions and fugitive dust associated with new development could have cumulative effects if they occur coincident with the action alternatives. However, given the short-term nature of the project, relatively minor exposed disturbed soils, and revegetation activities proposed, impacts on local and regional air quality are expected to be temporary and negligible.

6.5 Vegetation

6.5.1 No Action Alternative

Under the No Action Alternative, the artificial wetland and riparian habitat created by the network of open irrigation ditches in the SWCD Area would persist, and adjacent native upland vegetation would remain in its current condition. There would be no temporary or permanent removal of vegetation for the purpose of improving and constructing new access roads. Maintenance activities would continue to result in temporary impacts, including dust accumulation on leaf surfaces from vehicles driving on dirt roads.

Under the No Action Alternative, there would be no effect on special status plants. Additionally, there would be no effect on the status and management of invasive species in the SWCD Area.

6.5.2 Action Alternatives

6.5.2.1 Vegetation Communities and Habitat

Effects on vegetation communities and habitat described in **Section 4.4** resulting from incremental implementation of the proposed project measures under both action alternatives would be localized, direct and indirect, and temporary and permanent. Short-term minor adverse impacts on vegetation would occur during construction. Project components with temporary, permanent, and no new disturbance are included in **Table 6-1**.

No watershed-scale impacts or benefits to vegetation communities are expected from the action alternatives.

Vegetation in the pipeline ROWs for four sections of the GVC (2,605 feet) would transition to entirely upland species. Some increase in extents of native grass and forb vegetation would be gained for these areas where soil conditions are suitable for revegetation. The loss of open canals and associated wetland fringe created by canal leakage in the SWCD Area would be offset to some extent by better overall water supply for irrigation, an extended irrigation season, and enhanced wetland/riparian habitat along irrigated fields.

During construction, existing access roads would provide access to most of the project area. Vegetation in the project area would be temporarily disturbed through activities such as clearing, crushing, and digging. Except for a permanent access road and pump station in the East Bypass Pipeline project area, all disturbed areas would be recontoured as necessary and reseeded with approved appropriate seed mixes of native grasses, forbs, and shrubs. Weed management would be implemented according to county, BLM, and Reclamation standards.

6.5.2.2 Special Status Plant Species

Plant species protected by the ESA with the potential to be affected by future watershed improvements and currently funded projects are DeBeque phacelia and ULTO. DeBeque phacelia designated critical habitat was dismissed from further analysis because it lies outside the SWCD Area. No critical habitat has been designated for ULTO. Background information for these species and their critical habitats is provided in the *SWCD Watershed Plan Biological Assessment* (ERO 2021; provided in **Appendix A**), **Section 4.4.2** of this Plan-EA, and **Appendix E**.

Effects determinations for DeBeque phacelia and ULTO of "may affect, not likely to adversely affect" were provided in the *SWCD Watershed Plan Biological Assessment* (ERO 2021; provided in **Appendix A**). Concurrence was received from the USFWS on December 17, 2021 (USFWS 2021f).

6.5.2.3 Invasive Species

During construction, exposed soils would create susceptible areas where weeds could temporarily establish. The GVC piping measures are anticipated to cause more ground disturbance than the other types of watershed improvements. These watershed improvement measures have the highest potential to introduce or spread invasive plant species, including noxious weeds. Many areas in the SWCD Area have substantial existing infestations of nonnative plants and noxious weeds.

Noxious weeds are spread through flowing water (e.g., open canals), vehicles, people, livestock, and wildlife. Construction AMM Measures (**Section 8.4**) would help minimize the risk of such infestations, and ongoing weed management efforts by the project proponents would be necessary during revegetation of construction projects. After construction, the potential spread of noxious weeds would be reduced by the presence of piped canals and fewer maintenance trips to the project areas.

Effects from each of the project-specific components on vegetation communities and habitat, special status species, and invasive species are described in **Table 6-3**. AMM Measures to reduce negative consequences for vegetation resources are listed in **Section 8.4** in **Table 8-2**.

Table 6-3. Impacts from project-specific components on vegetation resources.

System	Project and Location	Impacts on Vegetation	Impacts on Special Status Species	Impacts on Invasive Species
GVC	**Flow Control Gate Reconstruction** near East Rifle Creek	The flow control gate would be replaced in its current location, and existing access roads would be used. There would be no new disturbance to vegetation communities in the project area, primarily forested riparian areas, wetlands, and woodlands and secondarily agricultural vegetation communities. No new disturbance would occur for this project, and existing access roads would be used.	No effect on DeBeque phacelia. The project area is not located in the Wasatch Formation or USFWS-modeled range for DeBeque phacelia. May affect, not likely to adversely affect, ULTO if construction occurs in suitable habitat (moist meadows, floodplains, subirrigated stream channels and valleys, lakeshores, irrigation canals, and berms) in the USFWS-modeled range. No suitable habitat for DeBeque phacelia or ULTO was identified in the project area during the July 2021 field surveys. No effect on DeBeque milkvetch or Harrington's beardtongue. The project is not located on BLM land.	During construction, exposed soils would create susceptible areas where weeds could temporarily establish.
	Tunnel End Reconstruction at three locations along three tunnels south of the headgate	The tunnel end reconstruction measures would be replaced in their current locations. A short-term disturbance of approximately 0.1 acre in primarily pinyon-juniper woodlands and secondarily forested riparian areas, wetlands, and woodlands as well as mixed conifer forests would occur.	No effect on DeBeque phacelia. The project area is not located in the Wasatch Formation or USFWS-modeled range for DeBeque phacelia. May affect, not likely to adversely affect, ULTO if construction occurs in suitable habitat (moist meadows, floodplains, subirrigated stream channels and valleys, lakeshores, irrigation canals, and berms) in the USFWS-modeled range. No suitable habitat for DeBeque phacelia or ULTO was identified in the project area during the July 2021 field surveys. No effect on DeBeque milkvetch. The project area on BLM land does not occur in the Wasatch Formation necessary for this species. No effect on Harrington's beardtongue. The project area on BLM land does not contain open stands of sagebrush on the edges of pinyon-juniper woodlands.	During construction, exposed soils would create susceptible areas where weeds could temporarily establish.

System	Project and Location	Impacts on Vegetation	Impacts on Special Status Species	Impacts on Invasive Species
	Piping Measures at four locations (#1, #2, #3, and #4) south of the shoring area, in the northern part of the system	The piping measures would occur entirely in existing disturbance. There would be no new impact on pinyon-juniper woodlands or Southern Rocky Mountain Lower Montane Forest vegetation communities in the area. Access to the construction sites would primarily be via existing roads through sagebrush shrubland, pinyon-juniper woodland, agricultural areas, and riparian forests. The majority of access would be via existing roads, and no new disturbance would occur. Approximately 5,707 feet of access across BLM lands would require grading to access Piping Measures #3 and #4 for a temporary impact on pinyon-juniper woodlands (1.1 acres), agricultural (0.05 acre), scree (0.04 acre), and sagebrush (0.01 acre) communities. Some trees and shrubs may need to be removed for the proposed access road improvements. However, due to the existing two-track, impacts on pinyon-juniper trees would be minimized. Three staging areas would temporarily disturb pinyon-juniper woodlands (0.24 acre), sagebrush (0.19 acre), and disturbed grassland (0.21 acre) vegetation communities.	No effect on DeBeque phacelia. The project area is not located in the Wasatch Formation or USFWS-modeled range for DeBeque phacelia. May affect, not likely to adversely affect, ULTO if construction occurs in suitable habitat (moist meadows, floodplains, subirrigated stream channels and valleys, lakeshores, irrigation canals, and berms) in the USFWS-modeled range. No suitable habitat for DeBeque phacelia or ULTO was identified in the project area during the July 2021 field surveys. No effect on DeBeque milkvetch. The project area on BLM land does not occur in the Wasatch Formation necessary for this species. No effect on Harrington's beardtongue. The project area on BLM land does not contain open stands of sagebrush on the edges of pinyon-juniper woodlands.	During construction, exposed soils would create susceptible areas where weeds could temporarily establish.
	Bypass Rebuild around Harvey Gap Reservoir	Approximately 1.43 acres of disturbance would occur to open sagebrush shrubland (0.44 acre) and pinyon-juniper woodlands (0.99 acre). This project is located in a previously disturbed area due to the historic canal on BLM (approximately 0.19 acre) and local lands. Some shrubs and trees would need to be removed for the construction of the bypass rebuild.	May affect, not likely to adversely affect, DeBeque phacelia if construction occurs in exposures of chocolate to purplish brown and dark charcoal-gray alkaline clay soils derived from the Wasatch Formation and sparse vegetation in the USFWS-modeled range (**Figure C-12** in **Appendix C**). May affect, not likely to adversely affect, ULTO if construction occurs in suitable habitat (moist meadows, floodplains, subirrigated stream channels and valleys, lakeshores, irrigation canals, and berms) in the USFWS-modeled range.	During construction, exposed soils would create susceptible areas where weeds could temporarily establish.

System	Project and Location	Impacts on Vegetation	Impacts on Special Status Species	Impacts on Invasive Species
			No suitable habitat for DeBeque phacelia or ULTO was identified in the project area during the July 2021 field surveys. No effect on DeBeque milkvetch. The project area on BLM land does not occur in the Wasatch Formation necessary for this species. Potential to affect Harrington's beardtongue. The open stands of sagebrush on the edges of pinyon-juniper woodlands, as well as the historic disturbance of the existing ditch, provide suitable habitat for Harrington's beardtongue. Approximately 0.2 acre of the bypass rebuild project area is located on BLM land. No Harrington's beardtongue was identified during the July 2021 field surveys; however, the surveys were done outside of the May through June blooming season.	
East Bypass Pipeline	**East Bypass Pipeline** between the Silt Pump Canal and FICo East Lateral, and **East Bypass Pump Station** at the inlet	8,925 linear feet of plastic pipe would be installed to connect the Silt Pump Canal and the FICo East Lateral. Temporary disturbance includes a 30-foot-wide construction disturbance width and one staging area (0.24 acre) at the southern end co-located with the pump station. Approximately 0.17 acre of the staging area and approximately 110 feet (0.06 acre) of new access (grading and gravel) would be located along an existing Reclamation ditch ROW. The southern portion of the pipeline and pump station would be located on the edge of a fallow agricultural field for a disturbance of 0.99 acre. The remaining 7.2 acres of the project area would be located in primarily agricultural vegetation with scattered sagebrush shrubland and pinyon-juniper woodland communities. Disturbance from the pump station (0.003 acre) and new access road (0.36 acre) in agricultural vegetation would be permanent, while the remaining 7.85 acres would be temporary.	May affect, not likely to adversely affect, DeBeque phacelia if construction occurs in exposures of chocolate to purplish brown and dark charcoal-gray alkaline clay soils derived from the Wasatch Formation and sparse vegetation in the USFWS-modeled range. May affect, not likely to adversely affect, ULTO if construction occurs in suitable habitat (moist meadows, floodplains, subirrigated stream channels and valleys, lakeshores, irrigation canals, and berms) in the USFWS-modeled range. No suitable habitat for DeBeque phacelia or ULTO was identified in the project area during the July 2021 field surveys. No effect on DeBeque milkvetch or Harrington's beardtongue due to a lack of suitable habitat.	During construction, exposed soils would create susceptible areas where weeds could temporarily establish.

6.5.2.4 Compliance and Best Management Practices

AMM Measures to reduce negative consequences for vegetation resources are listed in **Section 8.4** in **Table 8-2**.

6.5.2.5 Cumulative Impacts

Cumulative effects that may impact vegetation resources include future activities associated with increased residential, infrastructure, and oil and gas development; timber harvest; weed management programs; livestock grazing; motorized and nonmotorized recreation; and conversion of native shrublands and woodlands to agricultural or other uses. Impacts from climate change, wildfire, and wildfire suppression would likely also continue to impact vegetation communities in the future. These activities, if they occur concurrently with the action alternatives, could have cumulative effects on vegetation communities. However, given the short-term nature of the project, relatively minor disturbance to vegetation communities, and revegetation activities proposed, impacts on vegetation resources are expected to be temporary and negligible. The action alternatives are not anticipated to cumulatively add to the ongoing impacts that currently threaten vegetation resources. Through the use of AMM Measures, such as reseeding with weed-free seed sources and continued weed management programs, the action alternatives are not expected to contribute significantly to the cumulative spread of invasive species.

6.6 Wetlands and Riparian Areas

6.6.1 No Action Alternative

Under the No Action Alternative, the artificial wetland and riparian habitat created by the network of open irrigation ditches in the SWCD Area would persist. The wetlands and riparian habitat in the SWCD Area's natural riverine systems would not benefit from reductions in sediment loading, localized flooding to aquatic systems, and improved water quality.

6.6.2 Action Alternatives

Impacts on wetland and riparian habitat from construction and operation of the action alternatives would be both temporary and permanent. During construction, temporary impacts include potential erosion from the construction sites, access, and staging areas. There is the potential for spills or leaks of industrial fluids during construction, which could impact wetland and riparian vegetation and soils. Invasive weeds could spread into adjacent wetland and riparian habitats from construction and ground-disturbance activities.

Open irrigation canals create artificial wetland and riparian habitat due to water seepage. Implementation of the GVC piping would result in the permanent loss of artificial wetland and riparian habitat as ditch seepage would no longer provide wetland hydrology downslope, and ditch channels and banks would no longer support riparian habitat. However, the NRCS would not require habitat replacement for the loss of artificial wetland and riparian habitat wetlands created by irrigation infrastructure for the known project components. The permanent loss of artificial local wetland and riparian habitat resulting from piping measures and canal lining would be partially offset by minor gains in water quality and wetland and riparian habitat function in the project area's natural riverine systems.

Effects from each of the project-specific components on wetlands and riparian areas are described in **Table 6-4**. AMM Measures to reduce negative consequences for vegetation resources are listed in **Section 8.4** in **Table 8-2**.

Table 6-4. Estimated impacts from project-specific components on wetlands and riparian areas.

System	Project and Location	Impacts on Wetlands and Riparian Areas[1]
GVC	**Flow Control Gate Reconstruction** near East Rifle Creek	Reconstruction of the flow control gate would not impact riparian vegetation. No construction work would occur in East Rifle Creek, minimizing impacts on aquatic resources. Short-term impacts on wetlands and riparian habitats from erosion and increased potential for introduction of invasive plant species adjacent to construction sites could occur.[1]
	Tunnel End Reconstruction at three locations along three tunnels south of the headgate	Riverine habitat accounts for 0.05 acre of the tunnel end reconstruction project area due to the open canal. No wetlands or riparian habitat occurs near the tunnel end reconstruction measures. Potential to result in short-term temporary impacts on riverine areas from erosion and increased potential for the introduction of invasive plant species adjacent to construction sites.
	Piping Measures at four locations (#1, #2, #3, and #4) south of the shoring area, in the northern part of the system	Riverine habitat accounts for 0.9 acre of the piping measures project area due to the open canal. The action alternatives would result in the permanent fill of the GVC piping measure area. A small 0.03-acre wetland occurs on an access road that requires improvements (**Appendix C**, **Figure C-11**).[1] Short-term temporary impacts on wetlands and riverine habitats from erosion and increased potential for introduction of invasive plant species adjacent to construction sites could occur. Permanent impacts on emergent wetlands dependent on canal seepage for hydrology and riparian habitat on the edges of the open canal would occur from implementation of the action alternatives.
	Bypass Rebuild around Harvey Gap Reservoir	Wetlands account for 0.79 acre of the bypass rebuild. Excavation would potentially result in a short- or long-term loss of these wetlands.[1] There is potential for short-term impacts on wetlands and riparian habitats from erosion and increased potential for introduction of invasive plant species adjacent to construction sites.
East Bypass Pipeline	**East Bypass Pipeline** between the Silt Pump Canal and FICo East Lateral, and **East Bypass Pump Station** at the inlet	Wetlands account for only 0.2 acre (2.4 percent) of the project area (7.57 acres). There is potential for short-term impacts on wetlands and riparian habitats from erosion and increased potential for the spread of invasive plant species adjacent to the construction sites.[1] Gains in natural wetland and riparian areas are expected due to increased water supply in the system (1,300 AF of additional water). Gains in wetland and riparian vegetation would correspond with increased water flows and reservoir water levels around Harvey Gap Reservoir and Rifle Gap Reservoir and along the reach of East Rifle Creek between the GVC headgate and Rifle Gap Reservoir.

[1]Note that these preliminary impact estimates are based on general wetland mapping information found in the National Wetlands Inventory. Due to time restrictions on wetland delineations, a site-specific wetland delineation and permitting analysis would be conducted prior to construction to determine if USACE permitting is required. Wetland delineation and permitting are included in the proposed costs.

6.6.2.1 Cumulative Impacts

Cumulative effects that may impact wetlands and riparian areas include future activities associated with increased residential, infrastructure, and oil and gas development; weed management programs; livestock grazing; motorized and nonmotorized recreation; and irrigation improvements. Climate change and drought would likely also continue to impact wetlands and riparian habitats in the future. These activities, if they occur concurrently with the action alternatives, could have cumulative effects on wetlands and riparian habitats. However, given the short-term nature of the project, avoidance of wetland and riparian habitats as practicable, relatively minor disturbance to wetlands and riparian habitats, revegetation activities proposed, and adherence to AMM Measures (**Table 8-2**), impacts on wetland and riparian habitats are expected to be temporary and negligible.

6.7 Wildlife

6.7.1 No Action Alternative

Under the No Action Alternative, the wildlife communities and special status species in the SWCD Area would continue to use the artificial wetland and riparian habitat created by the open canals in the SWCD Area. Wildlife and special status species dependent on wetland and riparian areas in the SWCD Area would not benefit from reductions in sediment loading and localized flooding to aquatic systems, and thus improved water quality, created by the action alternatives.

6.7.2 Action Alternatives—Terrestrial Wildlife Communities

Effects on terrestrial wildlife communities resulting from implementation of the action alternatives are summarized in **Table 6-5**.

Table 6-5. Terrestrial wildlife impacts resulting from the action alternatives.

Wildlife Community	Time Frame	Impact Type	Impact Description
All	Temporary	Direct	Stress, disturbance, and displacement of wildlife in the SWCD Area could occur due to an increase in noise and human presence during construction activities. Distribution patterns of wildlife may change where open irrigation canals are piped and artificial wetlands transition to upland habitat. Piping open irrigation canals and improving irrigation water systems in relatively undeveloped areas would potentially reduce human presence, and therefore human disturbances to wildlife in the long term, since fewer trips to maintain canals, headgates, and ditches would be necessary.
All	Permanent	Indirect	Wildlife species associated with upland habitats would benefit from an increase in habitat due to the piping measures. Converting open irrigation ditches to enclosed pipe would result in a slight reduction of salt and selenium loading, potential sedimentation, and localized flooding in the Upper Colorado River Basin. Effects on water quality as a result of the action alternatives are expected to be minor and immeasurable overall. Wildlife would generally benefit from the water quality improvements and improved health of aquatic, wetland, and riparian habitats. There could also be a reduction in water availability for wildlife in stretches of piping. However, the areas that would be converted to enclosed piping have steep topography and marginal habitat suitability. Areas of more suitable habitat based on topography would remain open and provide habitat for wildlife.

Wildlife Community	Time Frame	Impact Type	Impact Description
Big game	Temporary	Direct	Stress, disturbance, and displacement of wintering big game in the SWCD Area could occur during construction activities due to increased human presence and noise. There is potential for big game animals to be trapped in pipeline trenches left open overnight during construction periods. Completing construction of individual project components in the shortest practical time frame would minimize direct disturbance impacts on big game.
Big game	Temporary	Indirect	Increased movements away from human disturbances and project activities could result in increased energy demands, potentially reducing fitness or reproductive success of individuals or herds. The majority of the action alternatives occurs in big game winter range (**Figures C-9** and **C-10** in **Appendix C**). For construction of portions of the GVC and East Bypass Pipeline measures planned in big game winter concentration areas or severe winter range on all landownerships between December 1 and April 30, the project proponents would review the scope, timing, and duration of the project with BLM and CPW during the planning phase and would be required to request project-long exceptions to BLM and CPW timing limitations.
Small ground-dwelling mammals and reptiles	Temporary	Direct	Potential to crush, trample, injure, or displace small ground-dwelling mammals and reptiles hibernating or sheltering in the construction area could occur. Individuals may leave the area during construction activities due to an increase in human presence and noise.
Nesting raptors	Temporary	Direct	Potential for "take" under the MBTA (loss of eggs or young from nest abandonment) due to construction activities, increased noise, and human presence during construction could occur. Raptors may abandon their nests if project activities are too disruptive. Nesting raptor surveys would be conducted as necessary to provide clearance for construction during the raptor nesting season (dates vary between species). Construction activities in the vicinity of active raptor nests would follow CPW-recommended buffer distances (CPW 2020b), or buffer distances in another USFWS-approved guidance (if a more current guidance becomes available), or buffer distances specified by coordinating with a USFWS biologist.
Bald and golden eagles	Temporary	Direct	Potential for "take" under the MBTA (loss of eggs or young from nest abandonment) due to construction activities and human presence could occur during construction. There would be no impact on nesting or roosting bald eagles from construction of the project-specific components. No bald eagle nests or roosts were identified within 1 mile of a project measure area (**Appendix C**, **Figure C-11**). There is potential to interfere with an eagle's "substantial lifestyle, including shelter, breeding, feeding," as defined by the Bald and Golden Eagle Protection Act of 1940—this can include disturbance of eagles on hunting roosts and night roosts.
Nesting migratory birds of concern (**Table 4-10**) except raptors	Temporary	Direct	Disturbance and displacement during construction activities could occur due to an increase in human presence and noise. Wintering or migrating birds are not likely to be measurably impacted, as they have the flexibility to move away from disturbances to other suitable habitat. There is potential for "take" under the MBTA (loss of eggs or young from nest abandonment or direct destruction) if construction activities and vegetation disturbances occur during the April 1 through August 31 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.

6.7.2.1 Project-Specific Components

The action alternatives would include approximately 20.89 acres of land (approximately 13.32 acres in the GVC and 7.57 acres in the East Bypass Pipeline project area). Effects from each of the project-specific components on terrestrial wildlife communities are described in **Table 6-6**. AMM Measures to reduce negative consequences for wildlife resources are listed in **Section 8.4** in **Table 8-2**.

Table 6-6. Impacts from the project-specific components on terrestrial wildlife communities.

System	Project, Location	Impacts on Terrestrial Wildlife Communities
GVC	**Flow Control Gate Reconstruction** near East Rifle Creek	No construction activities would occur in-stream. The project would take approximately 15 days to complete. Workers would travel to the site in a light-duty work truck. The project area is located in mapped winter concentration area for elk. Construction of project measures could potentially take place while wintering elk are in the area. Construction activities have the potential to displace wintering elk and change their use patterns on surrounding lands for the duration of the activity (approximately 15 days). Impacts on elk are expected to be temporary and insignificant. Construction activities would temporarily disturb and displace terrestrial wildlife due to an increase in human presence and intermittent noise. See **Table 6-5** for general impacts on terrestrial wildlife from construction activities.
	Tunnel End Reconstruction at three locations along three tunnels south of the headgate	The project area is located in mapped winter concentration area for elk. Construction of project measures could potentially take place while wintering elk are in the area. Construction activities have the potential to displace wintering elk and change their use patterns on surrounding lands for the duration of the activity (10 days per tunnel end shoring project). Impacts on elk are expected to be temporary and insignificant. Tunnel end reconstructions would take approximately 10 days each. Each tunnel would be worked on in stages and prioritized. Existing access routes would be used to access the locations. Construction activities would temporarily disturb and displace terrestrial wildlife due to an increase in human presence and intermittent noise. See **Table 6-5** for general impacts on terrestrial wildlife from construction activities.
	Piping Measures at four locations (#1, #2, #3, and #4) south of the shoring area, in the northern part of the system	The majority of the piping measures would occur on existing disturbance. Construction corridors would be approximately 30 feet on either side of the existing ditch centerlines. Access to the construction sites would be primarily via existing roads through sagebrush shrubland, pinyon-juniper woodland, agricultural land, and riparian forests. The majority of access would be via existing roads, and no new disturbance would occur. Approximately 5,707 feet of access across BLM lands would require grading to access Piping Measures #3 and #4, for a temporary impact on pinyon-juniper woodlands (1.1 acres) and agricultural (0.05 acre), scree (0.04 acre), and sagebrush (0.01 acre) communities. Some trees and shrubs that provide suitable nesting, roosting, and foraging habitat may need to be removed for the proposed access road improvements. There would be no direct effects on breeding migratory birds if construction activities occur outside of the April 1 through August 31 breeding season. If vegetation removal were to occur during the nesting season, surveys for nesting birds would be conducted before vegetation removal activities could begin. The project area is located in mapped winter concentration area for elk. Piping Measures #3 and #4 are located in mapped severe winter range for elk and mule deer (**Figures C-9** and **C-10**). Construction of project measures could take place while wintering deer and elk are in the area. Construction activities have the potential to displace wintering mule deer and elk on severe winter range and change their use patterns on surrounding lands, for the duration of the activity (approximately 2 months per piping project). Pipeline construction would be accomplished in the shortest time frame possible, and trenches would be covered at night. Distribution patterns of big game and other wide-ranging species in the project area may change after the open ditch is piped. The enclosed pipe would require fewer maintenance trips than the traditional irrigation system, providing more seclusion to wildlife. Construction would be accomplished using heavy equipment over a period of several weeks. Construction activities would temporarily disturb and displace terrestrial wildlife due to an increase in human presence and intermittent noise. See **Table 6-5** for general impacts on terrestrial wildlife from construction activities.

System	Project, Location	Impacts on Terrestrial Wildlife Communities
	Bypass Rebuild around Harvey Gap Reservoir	The bypass rebuild on BLM land would cross 0.19 acre of the Dry Rifle Creek Winter Closure Area for big game (**Figures C-9** and **C-10**; **Figure B-7**). To protect wintering big game and other wildlife species, the Dry Rifle Creek Winter Closure Area is closed to motorized and mechanized travel from December 1 to April 15. Under severe winter conditions, the closure may be extended at the request of CPW. To keep big game on BLM lands and reduce big game movement to private lands during the big game hunting season, all motorized use is prohibited in the Dry Rifle Creek area from October 1 to November 30. Surface occupancy and surface-disturbing activities are prohibited in the Dry Rifle Creek Winter Closure Area from October 1 to April 15 (BLM 2024). Construction activities on the GVC Bypass Rebuild project area around Harvey Gap Reservoir would adhere to BLM timing limitations. Total disturbance for this project would be approximately 1.43 acres, primarily impacting pinyon-juniper woodland (0.99 acre) and secondarily sagebrush (0.44 acre) vegetation. Shrubs and trees would need to be removed, removing suitable nesting, roosting, and foraging habitat for a variety of wildlife. There would be no direct effects on breeding migratory birds if construction activities occurred outside of the April 1 through August 31 breeding season. If vegetation removal were to occur during the nesting season, surveys for nesting birds would be conducted before vegetation removal activities could begin. The anticipated construction schedule is 2 weeks. Construction activities would temporarily disturb and displace terrestrial wildlife due to an increase in human presence and intermittent noise. See **Table 6-5** for general impacts on terrestrial wildlife from construction activities.
East Bypass Pipeline	**East Bypass Pipeline** between the Silt Pump Canal and FICo East Lateral, and **East Bypass Pump Station** at the inlet	Total disturbance from the East Bypass Pipeline Project would be approximately 7.57 acres. Approximately 0.24 acre would be temporary, and 0.36 acre would be permanent. Approximately 777 feet of new access (grading and gravel) would be created along an existing Reclamation pipeline ROW. Construction would be phased and take approximately 3 months to complete. The removal of shrubs and trees would remove potential nesting and roosting habitat. There would be no direct effects on breeding migratory birds if construction activities occurred outside of the April 1 through August 31 breeding season. If vegetation removal were to occur during the nesting season, surveys for nesting birds would be conducted before vegetation removal activities could begin. The majority of the project area falls within CPW-mapped severe winter range and winter concentration area for elk and mule deer and a resident population area for mule deer (**Figures C-9** and **C-10**). Construction activities could occur while wintering deer and elk are in the area. Construction activities would have short-term temporary impacts on terrestrial wildlife and displace them due to an increase in human presence and intermittent noise. See **Table 6-5** for general impacts on terrestrial wildlife from construction activities.

6.7.2.2 Cumulative Impacts

Cumulative effects that may impact wildlife include future activities associated with increased residential, infrastructure, and oil and gas development; weed management programs; livestock grazing; motorized and nonmotorized recreation; irrigation improvements and maintenance activities; recreational hunting and tourism; and conversion of habitat to agricultural and other uses. Impacts from climate change, drought, and wildfire suppression and prevention would likely also continue to impact wildlife populations in the future. These activities, if they occur concurrently with the action alternatives, could have cumulative effects on wildlife.

The SWCD Area contains important big game seasonal and year-round ranges and habitat for a variety of other wildlife. Human population growth and development in the SWCD Area in the next 50 years are anticipated to have the most impacts on wildlife habitat and populations. Mule deer populations have significantly declined in portions of western Colorado. CPW estimates that mule deer numbers in Colorado declined by approximately 28 percent between 2006 and 2018 to levels significantly below population objectives (CPW 2014, 2020c). The increase in human population has contributed to the direct loss, fragmentation, and degradation of mule deer habitat due to housing developments, urban and suburban sprawl, and infrastructure (CPW 2020c).

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 habitat function in the SWCD Area's natural riverine systems (see **Section 6.6** for further discussion of impacts on wetlands and riparian areas) 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 AMM Measures (**Table 8-2**), impacts on wildlife are expected to be temporary and negligible, but are not expected to rise to the level of significance.

6.7.3 Terrestrial Special Status Wildlife Species

6.7.3.1 Action Alternatives

Watershed Improvements

No terrestrial wildlife species or critical habitats protected by the ESA are expected to occur in the SWCD Area. Effects determinations for listed species are provided in more detail in the *SWCD Watershed Plan Biological Assessment* (**Table 4-11**) (ERO 2021; provided in **Appendix A**). Therefore, the listed species would not be impacted by project-specific component measures or future watershed improvements. The monarch butterfly, a federal candidate species, has potential to occur in the SWCD Area as well as the project measure areas. Canada lynx, gray wolf, Mexican spotted owl, western yellow-billed cuckoo, silverspot butterfly, and Suckley's cuckoo bumble bee were dismissed from further analysis based on the lack of documented occurrences in the SWCD Area. Thus, a determination of "no effect" is made for each of these species and critical habitat. Note that ESA-protected species presented in this Plan-EA are current as of the preparation date and should be updated as necessary during the planning phase of each watershed improvement project.

Because the monarch butterfly is a candidate species, no impact determination has been made for this species. However, potential habitat for monarch butterfly occurs in the SWCD Area as well as the project

measure areas, and NRCS policy dictates full consideration of federal candidate species. AMM Measures, such as implementing weed-control measures and revegetating construction sites using weed-free seed mixes approved by the NRCS, would be used to minimize impacts on monarch butterfly from the action alternatives. Background information for monarch butterfly is provided in **Appendix E**. AMM Measures to reduce negative consequences for terrestrial special status species are listed in **Section 8.4** in **Table 8-2**.

Table 6-7 summarizes potential impacts from the action alternatives on BLM and CPW sensitive species for the project-specific components. Because both BLM and CPW sensitive species are discussed, all landownership types were analyzed. Species that do not have potential to occur in a project measure area (gray wolf, river otter, burrowing owl, and greater sage-grouse; **Table 4-12**) are not listed in **Table 6-7**.

For watershed 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.

Note that BLM and CPW sensitive species presented in **Table 6-7** are current as of the preparation date of this Plan-EA and should be updated as necessary during the planning phase of each watershed improvement.

Table 6-7. Preliminary effects determinations for special status terrestrial species in the SWCD Area per the project-specific components.[1]

Species	GVC	East Bypass Pipeline
Mammals		
Fringed myotis Hoary bat Little brown myotis Spotted bat Townsend's big-eared bat	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, especially if construction is done during nighttime. Artificial riparian and wetland foraging habitat loss would be offset by water quality and habitat improvements to natural riverine systems in the SWCD Area.	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, especially if construction is done during nighttime.
Birds		
Bald eagle Ferruginous hawk Golden eagle Peregrine falcon	Potential direct effects could occur during construction if the project area footprint is located inside CPW-recommended buffer distances from active nests during the breeding season (CPW 2020b). Potential disruption of foraging patterns during construction could occur. No measurable permanent effects are anticipated. There would be no impact on nesting or roosting bald eagles.	
Black swift	Potential direct effects if construction occurs during the April 1 through August 31 breeding season near an active nest. No effect from construction on birds during spring or fall migration (would avoid the construction site). No measurable long-term effects are anticipated.	No effect. No suitable habitat occurs in the East Bypass Pipeline project area.
Brewer's sparrow	Potential direct effects if construction occurs during the April 1 through August 31 breeding season near an active nest. No effect from construction on birds during spring or fall migration (would avoid the construction site). No long-term effects are anticipated; chance of beneficial effect of creating more upland nesting habitat once the project area footprint is revegetated.	No effect. The relatively small area (0.01 acre) of BLM land does not provide suitable habitat due to development surrounding the project area at this location.
Greater sandhill crane	No effect. No suitable habitat occurs in the project area.	No effect on breeding or nesting individuals; none are known to occur in the CRVFO planning area (BLM 2014). No effect from construction on birds during spring or fall migration (would avoid the construction site).
Reptiles		
Midget faded rattlesnake	Potential direct effects (stress and mortality) during construction on active or hibernating individuals. No measurable long-term effects are anticipated.	

[1]Note that federally listed species are not included in this table; none have the potential to occur in the SWCD Area. The monarch butterfly is discussed above.

Project-Specific Components

The following tables present preliminary effects determinations for BLM and CPW sensitive terrestrial wildlife species for the project-specific components in the SWCD Area. No terrestrial wildlife species and critical habitats protected by the ESA are expected to occur in the SWCD Area; therefore, they would not be impacted by project-specific component measures or future watershed improvements. Species that do not have potential to occur in a project measure area (gray wolf, river otter, burrowing owl, and greater sage-grouse; **Table 4-12**) are not listed in the following tables.

Note that any vegetation- or ground-disturbing activities ancillary to the watershed improvements analyzed in **Table 6-8** and **Table 6-9**, such as creation of or widening of access roads to project measure areas, establishment of staging areas, or habitat conservation or mitigation actions not previously described, could trigger a need for additional Section 7 consultation and/or clearance surveys if these

actions would occur in the range and suitable habitat of a special status wildlife species. The BLM CRVFO would need to concur with BLM sensitive species impacts and the need for clearance surveys on BLM-managed lands. Because the monarch butterfly is listed as a candidate species, no impact determination has been made for this species.

Grass Valley Canal

Table 6-8. Preliminary effects determinations for special status terrestrial wildlife species for the GVC.

BLM or CPW Sensitive Species	Effect Determination	Rationale
Fringed myotis Hoary bat 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; project activities during active months are not expected to interfere with crepuscular feeding, and bats would be hibernating during winter construction. No foraging habitat loss would result from the project.
Bald eagle Golden eagle	May affect, not likely to measurably affect	CPW-mapped bald eagle nests or roosts are outside CPW-recommended buffer distances (CPW 2020b) from the project area. A golden eagle was observed near GVC Piping Measure #1; cliffs near the project area may provide suitable nesting habitat. If construction activities were to occur during the December 15 to July 15 golden eagle nesting season, nest surveys would be conducted to determine golden eagle nesting activity within 0.5 mile of the project area. If an active nest were observed, CPW-recommended buffer zones and seasonal restrictions (CPW 2020b) would be followed. Foraging eagles have the flexibility to move to other areas of appropriate habitat in response to disturbance.
Ferruginous hawk Peregrine falcon	No effect	Migratory or wintering ferruginous hawks and peregrine falcons have the flexibility to move to other areas of appropriate habitat in response to disturbance; the habitat at the project area is not exceptional or unique.
Black swift	No effect	Construction of the flow control gate would take approximately 15 days in the winter months, outside of the April 1 through August 31 breeding season.

BLM or CPW Sensitive Species	Effect Determination	Rationale
Brewer's sparrow	May affect, not likely to measurably affect	The open stands of sagebrush on the edges of pinyon-juniper woodlands provide suitable habitat for this species in the GVC Bypass Rebuild project area. Approximately 0.19 acre occurs on BLM land. Potential direct effects could occur if construction occurs during the April 1 through August 31 breeding season near an active nest. If construction occurs during the primary nesting season, vegetation clearing or grubbing should take place 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 2 weeks prior to commencement of work. If active nests are found during nest surveys, establish nest buffers in coordination with the local BLM CRVFO biologist. If an active nest is discovered during construction, cease work and consult the local BLM CRVFO biologist for next steps. Beneficial effects may occur following revegetation of the project area footprint by the creation of more upland nesting habitat.
Midget faded rattlesnake	May affect, not likely to measurably affect	Construction activities could temporarily disturb active or hibernating individuals. Winter construction could crush hibernating individuals.

East Bypass Pipeline

Approximately 0.01 acre of the East Bypass Pipeline project area occurs on previously disturbed terrain on BLM CRVFO land. This relatively small corner of BLM land is bordered by CR 250 to the north and east, and residential development to the south and west, limiting the availability of suitable habitat to special status wildlife species. Only foraging species, including bats and raptors, would likely pass through the East Bypass Pipeline project area on BLM land.

Table 6-9. Preliminary effects determinations for special status terrestrial wildlife species for the East Bypass Pipeline.

BLM or CPW Sensitive Species	Effect Determination	Rationale
Fringed myotis Hoary bat 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; project activities during active months are not expected to interfere with crepuscular feeding, and bats would be hibernating during winter construction. No foraging habitat loss would result.
Bald eagle Golden eagle	No effect	CPW-mapped bald eagle nests or roosts are outside CPW-recommended buffer distances (CPW 2020b) from the project area. No suitable golden eagle nesting habitat was observed near the project area during the July 2021 field surveys. Foraging eagles have the flexibility to move to other areas of appropriate habitat in response to disturbance.
Ferruginous hawk Peregrine falcon	No effect	Migratory or wintering ferruginous hawks and peregrine falcons have the flexibility to move to other areas of appropriate habitat in response to disturbance; the habitat at the project area is not exceptional or unique.
Greater sandhill crane	No effect	This species is not known to breed in the SWCD Area. Construction activities would occur outside of the breeding season. If activities were to occur during migration, individuals could move away from construction activities.
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.

6.7.3.2 Cumulative Impacts

Cumulative effects that may impact terrestrial special status species are similar to those described for wildlife in general in **Section 6.7.2.2**. Climate change and human population growth will likely put more pressure on special status species and their habitats in the future than any other factors.

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 being converted to enclosed pipe. However, these losses would be offset by gains in wetland and riparian habitat function in the SWCD Area's natural riverine systems (see **Section 6.6** 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 the adherence to AMM Measures.

6.7.4 Fish and Amphibians

6.7.4.1 No Action Alternative

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 SWCD Area waterways and downstream. Soil conditions would not be improved, and irrigation-related surface runoff would continue to infiltrate into aquatic resources, resulting in ongoing sediment loading and localized flooding of aquatic systems in the Upper Colorado River Basin. Selenium exposure and

salinity loading would continue to impact water quality and contribute to habitat degradation for endangered fish species in the Upper Colorado River Basin.

6.7.4.2 Action Alternatives

Direct effects on fishes and amphibians from incremental implementation of the proposed watershed improvements would be localized and temporary, while indirect effects would be long-term. AMM Measures in **Section 8.4** in **Table 8-2** would minimize or avoid impacts on fishes and amphibians due to implementation of the action alternatives. Prior to implementation, the effects of the action alternatives would be fully analyzed in project-specific BAs and evaluations (as appropriate). Potential impacts would be addressed in consultation with the USFWS, as required under Section 7 of the ESA. BLM sensitive species are fully analyzed in the Biological Evaluation in **Appendix E**.

The action alternatives would conserve water, increase water storage capacity, and bring new water supply into the system (see **Section 6.3.2**) and should result in minor improvement in habitat for critical species in the Colorado River as well as in rivers and streams in the SWCD Area.

Fish

Construction of the project-specific measures would be limited to SWCD Area ditches and canals; no construction is proposed along SWCD Area streams or rivers. Fish, especially individual fry or juveniles, may occasionally occur in SWCD Area irrigation canals; however, they are more likely to occur in streams or rivers in the SWCD Area. Construction of the action alternatives 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 could result in a temporary increase in sediment loading into SWCD Area waterways, which may temporarily impact water quality. The action alternatives would result in permanent beneficial impacts on fish habitats, including improved water availability for fish in the Upper Colorado River Basin.

Amphibians

During construction of the action alternatives, an increase in noise, human presence, and equipment use in the SWCD Area may result in displacement of amphibians. Adult or juvenile amphibians occupying the SWCD Area would likely relocate to adjacent suitable habitat during construction; however, individual mortality of eggs, larvae, 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.

Permanent impacts of the action alternatives would include the loss of wetland and riparian habitat along the GVC as described in **Section 6.6**. Amphibians occupying these habitat areas would relocate to adjacent suitable habitat or could be injured or crushed. Construction of the action alternatives would result in permanent beneficial impacts on amphibian habitats, including improved water availability for amphibians in the Upper Colorado River Basin.

6.7.4.3 Federally Listed Fish, Amphibians, and Designated Critical Habitat

Federally Listed Fish

Federally listed fish are unlikely to occur in the SWCD Area, and construction would take place outside of the irrigation season, when canals would be dry and fish would not be present. Potential impacts on the four Colorado River listed fishes would result from continued water depletions in the Colorado River Basin. Water depletions in the Colorado River Basin have the potential to diminish backwater spawning areas in downstream designated critical habitat in the basin. Depletions originating from the entire SWCD Area were previously determined to fall under the Programmatic Biological Opinion (PBO; USFWS 1999; TAILS FWS/R6 ES/GJ-6-CO-99-F-033).

The Proposed Action would not result in new water depletions; thus, the four Colorado River listed fish species and their critical habitat do not require further consultation for the SWCD Project (ERO 2021). Effects determinations for the federally listed fish species are provided in more detail in the *SWCD Watershed Plan Biological Assessment* (ERO 2021; provided in **Appendix A**).

The Upper Colorado River PBO applies to federal projects and all existing nonfederal water depletions in the Upper Colorado River Basin for the four Colorado River endangered fishes and their designated critical habitat. The Upper Colorado River PBO (USFWS 1999) states, “For projects involving water depletions less than 100 af/year, the Federal agency must document the project location, the amount of water depletion, identify if the depletion is new or historic, and provide the information to the Service when consultation is initiated.” The PBO also states, “A Recovery Agreement must be offered and signed for individual projects depleting more than 100 af/yr, prior to conclusion of section 7 consultation.”

Construction of the project-specific measures would be limited to site ditches, canals, reservoirs, and tunnels; no construction is proposed in streams or rivers. Construction of the action alternatives could temporarily increase the potential for sediment entry into waterways due to construction disturbance; however, mitigating measures would 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 action alternatives would result in permanent beneficial impacts on fish habitats, including improved water quality (reduced salinity and selenium) and water availability for fish in the Upper Colorado River Basin.

Indirect impacts of the watershed improvements include improved water availability in downstream waterways, beneficially impacting suitable habitats for federally listed fish. No new depletions are anticipated with the action alternatives, and appropriate conservation measures and AMM Measures (below) would be used. Therefore, implementation of the action alternatives, in accordance with the Upper Colorado River PBO (USFWS 1999; TAILS FWS/R6 ES/GJ-6-CO-99-F-033), would have no effect on bonytail chub, Colorado pikeminnow, humpback chub, or razorback sucker.

Table 6-10 lists the preliminary effects determinations for ESA-listed fish species and their critical habitat. The effects of the action alternatives have been fully analyzed in the *Silt Water Conservancy District Watershed Plan Biological Assessment* (ERO 2021; provided in **Appendix A**), and potential impacts have been addressed through Section 7 consultation with the USFWS, as required by the ESA. The USFWS provided concurrence in a Biological Opinion (BO) dated December 17, 2021 (USFWS 2021f; provided in **Appendix A**).

Table 6-10. Preliminary effects determinations for federally listed fish species for the action alternatives.

GVC				East Bypass Pipeline
Flow Control Gate Reconstruction	**Tunnel End Shoring**	**Piping Measures**	**Bypass Rebuild**	**East Bypass Pipeline and Pump Station**
No adverse effects on the bonytail chub, Colorado pikeminnow, humpback chub, or razorback sucker would occur. The action alternatives would not impact their designated critical habitat on the Colorado River. Adverse effects from historic depletions are mitigated by participation in the Recovery Program for Colorado River endangered fish (USFWS 1999).				

Federally Listed Amphibians

No federally listed amphibian species have potential to occur in the SWCD Area.

6.7.4.4 BLM and CPW Sensitive Fish and Amphibians

BLM and CPW Sensitive Fish

Based on species' potential for occurrence (**Table 4-14**; CPW 2020a), none of the sensitive fish species have potential range in any project measure areas. Construction of the action alternatives 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 SWCD Area waterways. The action alternatives would result in permanent beneficial impacts on fish habitats, including improved water availability. The action alternatives may impact individual bluehead sucker, flannelmouth sucker, and roundtail chub, but they are not likely to result in a loss of viability or cause a trend toward federal listing for these species. Prior to implementation, the effects of the action alternatives on BLM sensitive fish are analyzed in the Biological Evaluation in **Appendix E**.

BLM and CPW Sensitive Amphibians

The northern leopard frog, a BLM and CPW sensitive species, may use riparian, wetland, and aquatic habitats in the SWCD Area. Construction may result in habitat removal and displacement or mortality of individuals that may be present in the SWCD Area during construction. Permanent impacts on BLM and CPW sensitive amphibians from the action alternatives would include the piping of 10 percent of the open GVC; piping this small section of canal is unlikely to have an effect on this species. Long-term beneficial impacts would include improved water availability for amphibian habitats in the Upper Colorado River Basin. The action alternatives may impact individual northern leopard frogs, but they are not likely to result in a loss of viability or cause a trend toward federal listing.

SWCD Area Fisheries

The action alternatives are not expected to impact species composition or use in SWCD Area fisheries. No construction is proposed along native streams or rivers in the SWCD Area, and channel morphology of streams and rivers in the SWCD Area would not be impacted by the action alternatives. In addition, increases in irrigation efficiency in the SWCD Area would likely result in increased water availability. The effects of the action alternatives have been fully analyzed in the *Silt Water Conservancy District Watershed Plan Biological Assessment* (ERO 2021; provided in **Appendix A**).

6.7.4.5 Project-Specific Components

GVC

Construction of the GVC Project has the potential to result in temporary impacts on the fishery in East Rifle Creek, including increased potential for sediment entry into nearby waterways. The GVC Project would have no impact on bluehead sucker, flannelmouth sucker, or roundtail chub as the project area is outside of their known ranges. Construction may result in habitat removal and displacement or mortality of northern leopard frogs that may be present in the project area during construction. Permanent impacts on BLM and CPW sensitive amphibians from the action alternatives would include the removal of linear wetland features along the canal. The action alternatives may impact the northern leopard frog, but they are not likely to result in a loss of viability or cause a trend toward federal listing. Adherence to the AMM Measures listed in **Table 8-2** before, during, and after construction would minimize or avoid impacts on fishes and amphibians. The proposed activities are expected to result in permanent improvements to water quality and availability in the SWCD Area and Upper Colorado River Basin.

East Bypass Pipeline

Except for temporary impacts on East Rifle Creek described above, temporary impacts on fish and amphibians from construction of the East Bypass Pipeline Project would be the same as those listed above for the GVC Project. Benefits to aquatic habitat are expected from an additional 1,300 AF of water supplied to the SWCD system.

6.7.4.6 Cumulative Impacts

Past, present, and reasonably foreseeable future actions that may impact fish and amphibians in the SWCD Area are similar to those described in the wetlands and riparian section and wildlife section of this Plan-EA. Residential development could result in conversion of irrigated agricultural or grazing rangelands, which may impact water availability and habitats for amphibians.

The Upper Colorado River Basin is included in two ongoing water quality improvement programs: (1) the Colorado River Basin Salinity Control Program and (2) the Upper Colorado River Endangered Fish Recovery Program. The proposed construction areas and duration of disturbance under the action alternatives are relatively small and temporary, and permanent impacts are not expected to increase cumulative negative impacts on a significant level. The action alternatives are expected to work concurrently with these ongoing programs to improve fish and amphibian habitats in the Upper Colorado River Basin.

The action alternatives would comply with all relevant federal, state, and local permits. In combination with other past, present, and reasonably foreseeable future actions, the action alternatives are expected to contribute to improved water quality and availability, resulting in permanent beneficial impacts on fish and amphibian habitats.

6.8 Cultural and Historic Resources

Effects on historic properties may occur directly from canal/ditch repair and maintenance, piping, lining, or other modification. Direct effects could also occur on historic properties from road maintenance activities. Indirect effects on historic properties could occur from increased human presence and activity

in the vicinity of historic properties in the project area. All cultural resource inventory and SHPO consultation has been completed as of April 29, 2022. A MOA has been prepared through consultation among the NRCS, BLM, Reclamation, SWCD, and six tribal nations (Southern Ute Indian Tribe, the Ute Mountain Ute Tribe, Ute Indian Tribe - Uintah & Ouray Reservation, Apache Tribe of Oklahoma, Shoshone-Bannock Tribes of the Fort Hall Reservation, and Fort Belknap Indian Community of the Fort Belknap Reservation of Montana); and finalized in June 2025 (**Appendix A**). Resolution will include a story map detailing the adversely affected historical ditches.

6.8.1 No Action Alternative

Under the No Action Alternative, ongoing OMR would continue as is. No piping or lining of canals or shoring up of tunnel inlets and outlets would occur. No direct impacts on historic properties would occur; however, indirect effects from flood and failure events could occur, specifically in the extremely steep areas along the GVC. Section 106 compliance would be required if federal funds were used to implement future proposed improvements.

6.8.2 Action Alternatives

The project components have the potential to adversely impact historic properties. Piping supporting segments of NRHP-eligible canals and ditches impacts the integrity of materials, design, and workmanship of those historic properties.

6.8.2.1 Project-Specific Components

Project-specific components in the SWCD Area are described in detail in **Section 5.3** and listed in **Table 5-2**. Historic properties in the APE have the potential to be subject to direct, indirect, or cumulative impacts during or after construction of the project components, unless impacts are avoided.

The preconstruction cultural resource survey for the project-specific components and subsequent consultation with the Colorado SHPO resulted in a determination of "historic properties adversely affected" due to impacts on Segments 6, 7, and 9 of the GVC and Segment 1 of the Dry Elk Lateral. The originally proposed lining of the Dry Elk Lateral has been subsequently removed from the project measures, and this resource would not be adversely affected.

GVC (Common to All Alternatives)

The GVC Project would moderately impact historic properties. This project component includes rebuilding the flow control gate near East Rifle Creek, tunnel end reconstruction at three locations, piping projects, and reconstructing the historic ditch around Harvey Gap Reservoir. The new flow control gate would be rebuilt in the existing location. The extant gate is modern and does not contribute to the NRHP eligibility of the GVC. The GVC tunnel end shoring would consist of using concrete and anchors to reinforce inlets and outlets of three tunnels along the north-to-south-trending section of the GVC. Four segments of the GVC would be piped to prevent system failure. A fifth segment of the GVC on the west side of Harvey Gap Reservoir would be rehabilitated; this segment of canal was abandoned when the reservoir was constructed. The canal would be excavated in its previous location and maintained as an open earthen ditch.

Seven potential historic properties could be impacted by the project activities (**Table 6-11**). Adverse effects on three of these sites would be avoided; rehabilitating Segment 3 of the GVC would not constitute an adverse effect and would result in a beneficial effect, as it would restore the historic property. The remaining three segments of the GVC that are determined supporting of the eligibility would be adversely affected by piping and tunnel inlet and outlet shoring. A MOA has been prepared to resolve adverse effects (**Appendix A**).

Table 6-11. Historic properties in the GVC Project components.

Resource Type/Name	NRHP Eligibility Recommendation	Project Effects
GVC Segment 3	Eligible, supporting	Rehabilitating previously abandoned segment of canal—no adverse effect
GVC Segment 6	Eligible, supporting	Piping segment and shoring up tunnel—adverse effect on resource
GVC Segment 7	Eligible, supporting	Piping segment—adverse effect on resource
GVC Segment 9	Eligible, supporting	Piping segment—adverse effect on resource
Dugout and can dump	Eligible	Limit access to existing road prism—no adverse effect
Dugout	Eligible	Limit access to existing road prism—no adverse effect
Rifle Falls State Park	Needs data	No adverse effect

East Bypass Pipeline (Alternative 2)

The East Bypass Pipeline Project consists of the East Bypass Pipeline and Pump Station. This includes installation of 8,925 feet of plastic pipe along a previously undisturbed corridor to connect the extant East Bypass Pipeline with the FICo East Lateral. One historic property is in the East Bypass Pipeline Project (**Table 6-12**). No changes are proposed to Segment 2.

Table 6-12. Historic properties in the East Bypass Pipeline Project components.

Resource Type/Name	NRHP Eligibility Recommendation	Project Effects
FICo East Lateral segment	Eligible, supporting	No adverse effect on the resource

6.8.2.2 Cumulative Impacts

Actions that could cumulatively affect cultural and historic resources in the SWCD Area include past, ongoing, and future irrigation improvement projects; subdivision and residential development; and infrastructure development and/or maintenance (including public and private roads and energy transmission corridors). These actions have the potential to result in additional impacts on historic properties, but are not expected to rise to the level of significance. Section 106 compliance would be required should federal permitting, land, or funds be involved in future development.

6.8.2.3 Compliance and Best Management Practices

The eligibility for all newly recorded and previously recorded sites and the project effects were determined by the NRCS and have been agreed upon by the consulting parties (BLM and Reclamation) and the Colorado SHPO. Tribal consultation has been conducted per the NHPA and NRCS policy. Any design changes that result in changes to the APE may require additional cultural resource survey and consultation prior to construction.

As mentioned above, any finding of "historic properties adversely affected" requires that the consulting parties enter into a MOA requiring a method of treatment for the adverse effect that is acceptable to all of the consulting parties, and the MOA would stipulate that all field documentation be successfully completed prior to the initiation of project construction. The MOA has been completed and was signed in June 2025 (**Appendix A**).

During construction activities, the NRCS as Lead Federal Agency, and the SHPO or the BLM cultural resources staff, as applicable, would be notified if there are any unanticipated discoveries of cultural resources during construction, in accordance with applicable guidance and law.

6.9 Resources of Scientific Value Other Than Cultural Resources

6.9.1 No Action Alternative

Under the No Action Alternative, ongoing OMR would continue as is. No piping or lining of canals or shoring up of tunnel inlets and outlets would occur. No direct impacts on resources of scientific value other than cultural resources would occur. However, indirect effects from flood and failure events could occur, specifically in the extremely steep areas along the GVC in areas of high potential fossil yield; damage to unidentified resources is possible. Compliance with the Paleontological Resources Preservation Act of 2009 would be required if federal lands were involved in future proposed improvements.

6.9.2 Action Alternatives

Although no significant paleontological resources have been documented in the individual project components, there is very high potential for fossils in the project area. In the GVC Project components, very high potential for fossils exists at the Tunnel End #1 location; in Piping Measures #1, #2, and #3; and along portions of the access road leading into Piping Measures #2 and #3. The access road and Piping Measure #4 also cut across areas with moderate potential. The extreme southern end of the reconstructed portion of the GVC adjacent to Harvey Gap Reservoir has very high potential for fossils, as does a portion of the East Bypass Pipeline in the southern half of the alignment.

Piping portions of the ditch and using existing roads with minimal grading is unlikely to negatively impact undocumented resources that may exist in the project area. Reconstruction of tunnel ends and excavation of the East Bypass Pipeline could adversely affect paleontological resources if they exist. A preconstruction paleontological resources survey and monitoring for paleontological resources during ground-disturbing construction activities in areas of very high potential fossil yield on federal lands in the project area would be required for the project. These areas include Tunnel End #1 and Tunnel End #2, both of which are on BLM land. Recommended actions in the event of an unexpected fossil discovery during any phase of the project (on private or public land) are included in **Section 8.4**.

6.9.2.1 Cumulative Impacts

Actions that could cumulatively affect other noncultural resources in the SWCD Area include past, ongoing, and future irrigation improvement projects; subdivision and residential development; and infrastructure development and/or maintenance (including public and private roads and energy transmission corridors). These actions have the potential to result in additional impacts on paleontological

resources. Compliance with the Paleontological Resources Preservation Act of 2009 would be required if federal lands are involved in future development.

6.10 Land Use

Beneficial effects on land use, particularly agricultural land uses, may occur directly from canal/ditch repair and maintenance, piping, lining, or other modification. Direct and indirect short-term negative impacts may occur on some land uses, such as recreation and residential land uses, due to disturbance associated with construction of project components.

6.10.1 No Action Alternative

Under the No Action Alternative, ongoing OMR would continue as is. No flow control gate reconstruction, piping, or bypass rebuilding would occur. No direct impacts on land use would occur; however, indirect effects from flood and failure events could occur, specifically in the extremely steep areas along the GVC.

6.10.2 Action Alternatives

The project components have the potential to beneficially impact land uses, particularly agricultural uses, which would benefit from efficient and reliable water storage and management, increased water supply, and preparation for periods of prolonged drought. Indirect impacts on recreation land use are potentially adverse and are described in **Section 6.11, Recreation**. Overall, adverse impacts would be short-term and negligible and would be offset by long-term moderate beneficial impacts.

6.10.2.1 Project-Specific Components

Project-specific components in the SWCD Area are outlined in and are shown on **Figures B-1** through **B-8** in **Appendix B**. The GVC brings water into the system from East Rifle Creek and is critical to maintaining water levels in Harvey Gap Reservoir and to serving irrigators along the Dry Elk Lateral and throughout the SWCD. As a result, land use has the potential to be subject to direct, indirect, and cumulative impacts during or after construction of the project components.

GVC

The GVC Project includes rebuilding the flow control gate near East Rifle Creek, tunnel end reconstruction at three locations, piping projects, and reconstructing the historic ditch around Harvey Gap Reservoir. These system improvements would lead to beneficial direct and indirect effects on agricultural land uses over the long term. Reconstruction of the flow control gate would mitigate East Rifle Creek flood risk to adjacent lands. Piping in hazard areas and reconstruction of the tunnel would similarly mitigate flood risks to adjacent lands and alleviate the risk of system failure. Reconstruction of the bypass around Harvey Gap Reservoir would benefit agricultural land uses on private lands by providing water management and flows for downstream irrigators. There may be long-term adverse impacts on any small-scale timber harvest or firewood cutting that is occurring on public and private land in the project area; however, any impacts are expected to be negligible.

During construction of project components, there may be temporary impacts on land uses, including grazing and wildlife habitat, on BLM (federal grazing leases Elk Park Com CO 18032 and Weaver CO

18009), private, and CPW-managed lands (see also **Section 6.7**). Temporary impacts may include short-term habitat disruption where construction is occurring and vegetation has not regrown and road access conflicts due to use and/or grading of existing access roads for project tasks. Because construction would generally occur between October 15 and April 15, there would be little or no adverse impact on agricultural land uses dependent on irrigation water.

East Bypass Pipeline

The East Bypass Pipeline Project includes the East Bypass Pipeline and Pump Station as described in **Section 5.3.3.2**. This project would create capacity to bring approximately 1,300 additional AF of SWCD water into the system annually, benefiting water levels at Harvey Gap Reservoir and agricultural land uses on private lands dependent on irrigation water. Because approximately 777 feet of new access road would be constructed within a 20-foot ROW north of the pump station, there may be some permanent disturbance to existing agricultural land uses on private land; these disturbances would be minor, and the land is not considered prime farmland (NRCS 2022b). There also may be temporary impacts on agricultural uses (primarily access, but also production) and short-term disruptions (dust and noise) to adjacent residential land uses during construction of the pump station, access road, and bypass pipeline.

6.10.2.2 Cumulative Impacts

Actions that could cumulatively affect land use in the SWCD Area include past, ongoing, and future irrigation improvement projects; subdivision and residential development; and infrastructure development and/or maintenance (including public and private roads and energy transmission corridors). The action alternatives would not be expected to contribute significantly to cumulative impacts on land uses relative to these other actions. Impacts from the action alternatives would be minor and would primarily occur in modified landscapes with existing agricultural uses. Impacts of the action alternatives are consistent with the dominant agricultural uses in the SWCD Area.

6.11 Recreation

Adverse effects on recreation may occur directly from canal/ditch repair and/or maintenance and piping. Indirect effects on recreation could occur from increased human presence and activity in the vicinity of recreational opportunities in the project area, including temporary delays of access to recreation facilities due to construction hauling or other activities.

6.11.1 No Action Alternative

Under the No Action Alternative, ongoing OMR would continue as is. No flow control gate reconstruction, canal piping, or bypass rebuilding would occur. No direct impacts on recreation would occur; however, indirect effects from flood and failure events could occur, specifically in the extremely steep areas along the GVC.

6.11.2 Action Alternatives

The project components have the potential to adversely impact recreation on a short-term basis during construction. Land-based recreation, primarily hiking and picnicking, may also be affected by the action alternatives. Piping canals or shoring up of tunnel inlets and outlets could disrupt the usual recreation pattern of visitors to Rifle Falls State Park and Harvey Gap State Park.

The action alternatives would have long-term beneficial effects on recreation due to more consistent water levels over the recreation season in Harvey Gap Reservoir. The increase in water supply from Green Mountain Reservoir would result in less need to pull from Harvey Gap Reservoir to satisfy water rights in the FICo East Lateral of the Farmers Irrigation Ditch, leading to a longer recreation season for Harvey Gap Reservoir. Temporary construction impacts would be less during low-use and shoulder seasons of recreation in the parks.

6.11.2.1 Project-Specific Components

Project-specific components in the SWCD Area are described in **Section 5.3** and listed in **Table 5-2**. Recreation has the potential to be subject to direct, indirect, and cumulative impacts during or after construction of the project components, unless impacts are avoided.

GVC

The GVC Project includes rebuilding the flow control gate near East Rifle Creek, tunnel end reconstruction at three locations, piping projects, and reconstructing the historic ditch around Harvey Gap Reservoir.

Recreation would be minimally disturbed for 3 weeks in Rifle Falls State Park during the flow control gate reconstruction. The Coyote Trail runs through the construction area, which may disturb users accessing the eastern portion of the trail near Rifle Falls. The eastern portion of the trail past the flow control gate would be closed during the reconstruction period. Equipment such as a concrete truck, trackhoe, front-end loader, and small-scale anchor/drill would need to access the construction site with a crew of two to four people. During construction, noise and visual impacts may also affect hikers in the area and fishermen using East Rifle Creek. Impacts on recreation during the flow control gate reconstruction would be minimal due to the short time frame and small area in which the impacts would take place.

Recreation for fishermen and boaters would be minimally impacted by noise and visual impacts at Harvey Gap State Park for approximately 2 weeks during the bypass rebuild. These impacts would be present because a loader would be excavating a historic canal approximately 0.59 mile around the western side of Harvey Gap Reservoir. Impacts on recreation during the bypass rebuild would be minimal because the project does not intersect existing recreation amenities.

The tunnel end shoring and piping projects would have short-term adverse effects on recreation during construction due to increased traffic on access roads that are also used to access BLM lands near and adjacent to the GVC. No long-term impacts on recreation are expected as a result of GVC piping and tunnel end shoring.

East Bypass Pipeline

The East Bypass Pipeline Project includes the East Bypass Pipeline and Pump Station, as described in **Section 5.3** and listed in **Table 5-2**. This project would result in additional water supply in the SWCD system that would have beneficial impacts on the length of the recreation summer season at Harvey Gap Reservoir. Because more water would be coming into the southern part of the system, specifically the FICo East Lateral of the Farmers Irrigation Ditch, water supplies in Harvey Gap Reservoir could be stored for a longer period during the summer when recreation use is the highest. A higher number of

recreation user days would likely result if the reservoir level were high for a longer period. Effects on recreation are expected to be long-term and beneficial. No adverse impacts on recreation are expected during construction due to the distance between the project measure location and the reservoir and its location on private lands.

6.11.2.2 Cumulative Impacts

Actions that could cumulatively affect recreation in the SWCD Area include past, ongoing, and future irrigation improvement projects; subdivision and residential development; and infrastructure development and/or maintenance (including public and private roads and energy transmission corridors). The action alternatives would not be expected to contribute significantly to cumulative impacts on recreation relative to these other actions.

6.12 Scenic Beauty and Visual Resources

Impacts on scenic beauty and visual resources occur when project activities create an intrusion or perceptible contrast with existing visual appeal of the landscape. 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. 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 the action alternatives. 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
- Strong—the element contrast demands attention, will not be overlooked, and is dominant on the landscape (BLM 1986)

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 may have less impact. BMPs and AMM Measures minimize visual impacts by reducing visual contrast.

6.12.1 No Action Alternative

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. Harvey Gap Reservoir would continue to lose water storage capacity. Long-term adverse impacts could occur if salinity were to continue to build up in agricultural soils, which could affect agricultural productivity and reduce the visual quality of agricultural crops.

6.12.2 Action Alternatives

6.12.2.1 Watershed Improvements

Improvements under the action alternatives would have minor effects on scenic beauty and visual resources. Visual contrast rating worksheets were completed at four key observation points. Canal

conversions to underground pipe would impact scenic beauty and visual resources by removing water features from the landscape and by creating visual contrast during construction activities. Loss of irrigation-related wetlands and vegetation would result in brown and dying vegetation in the future. On-farm upgrades and soil practices are unlikely to impact scenic beauty and visual resources.

Water typically has high visual weight or a dominating effect in a landscape due to characteristics of movement, reflectivity, and color that naturally draw attention. However, water in open canals and ditches tends to have lower visual weight than natural water features. Canal banks are often maintained and kept clear of vegetation that may otherwise make the feature more prominent. Water levels vary seasonally, and the water may be visible only at certain times of year or from certain positions relative to the canal or ditch. Irrigation waters tend to flow evenly without the rocks, bends, ripples, or waves that give natural water bodies their dynamic character. Overall, the level of contrast from canal conversions would be weak to none and would be expected to have a minor to negligible impact. Unless parallel or perpendicular to roads, canals are generally visible only at a distance, where they are seen as linear features that accentuate existing lines created by field edges, especially where they abut natural landscapes. Further, background landforms are often dominant features of viewsheds in the SWCD Area. These massive landforms, especially the Grand Hogback, draws the eye upward and outward, resulting in a focus on the overall view rather than individual details. Short-term impacts on scenic quality would occur during construction and until disturbed areas are replanted with vegetation, as appropriate.

Movement and bright colors often associated with construction equipment would tend to draw attention during the construction period. Dust from construction activities would be minor and localized, similar to existing ranching activities. Ground disturbance would expose soils, which would contrast with adjacent vegetated areas. AMM Measures such as dust abatement and revegetation would minimize the magnitude and duration of construction-related impacts. AMM Measures incorporated into the action alternatives are discussed in **Section 8.4** and provided in **Table 8-2**.

6.12.2.2 Project-Specific Measures

Project-specific components in the SWCD Area are described in **Section 5.3** and listed in **Table 5-2**. The visual effects from the project-specific components are described in **Table 6-13**. Viewers of the specific projects would be travelers on local county roads, nearby residents, and recreationists using Harvey Gap Reservoir or Rifle Falls State Park. AMM Measures to minimize the visual impacts are provided in **Table 8-2**.

Table 6-13. Visual impacts from project-specific components.

System	Project and Location	Description of Visual Impacts	VRM Class	Consistency with VRM Class
GVC	**Flow Control Gate Reconstruction** near East Rifle Creek	Temporary bright excavation equipment would be visible for approximately 15 days to visitors at Rifle Falls as they walk on the road to the viewing platform to view the waterfalls. The viewing platform is located 300 feet northwest of the flow control gate, and construction would be visible only while walking to the falls. Exposed red dirt, concrete, and metal debris would be visible during construction and cause moderate contrast. Once construction is completed, the new gate would be similar in materials, scale, color, and form to the existing gate. Therefore, contrast would be weak. No long-term visual impacts would occur. Access road improvements would not be noticeable because the roads already exist.	II	By replacing the existing flow control gate with similar materials and using the same scale, colors, and form, the VRM Class II would be maintained.
	Tunnel End Shoring at three locations along three tunnels south of the headgate	One of the three tunnel end shoring projects (#1) would be visible to pedestrians walking on the existing canal access road near Rifle Falls; the other two tunnels are not accessible or visible to the public. The grate over Tunnel End #1 is currently steel bars painted white (**Figure 4-4**). The replacement of the grate would use materials, scale, color, and form similar to the existing tunnel end. Adding concrete and anchors to tunnel ends would be a minor visual change to a small area, visible only to pedestrians walking on the access road that dead-ends at the tunnel. Access road improvements would not be noticeable because the roads already exist. Visual contrast would be moderate during construction and weak after construction.	II and III	By replacing the existing visible tunnel end shoring grate (#1) with similar materials and using a similar scale, colors, and form, the VRM Class II and Class III would be unchanged. Tunnel Ends #2, #3, and #4 are not accessible to the public. Therefore, the VRM classes would be maintained.
	Piping Projects at four locations (#1, #2, #3, and #4) south of the shoring area, in the northern part of the system	The piping projects would remove the open earthen ditch that contains flowing water and replace it with buried pipe, filled in with dirt and backfilled to grade. The open canals that would be piped are visible only to close observers, and, in all locations, there is no public access to the canal. Segment #4 is visible from CR 226 as a horizontal scar on an eroded hillside. Piping the canal would stop water leakage from the ditch, and some wetland vegetation would turn brown and die over several years. Installing new concrete aprons and trash racks would not be visible unless the observer is directly adjacent to the canal. Construction equipment and pipe may be stored and visible at three staging areas for up to 2 months, resulting in moderate contrast in the short term. Staging areas would be placed at existing disturbed areas adjacent to existing access roads. Access road improvements would not be noticeable because the roads already exist.	II and III	VRM Class III allows for moderate changes to the landscape. The loss of wetland and deciduous vegetation along newly piped segments of the GVC would be a weak contrast and would not attract viewers' attention. Also, the piping projects would be visible to few travelers on CR 325 and CR 226. Therefore, the VRM Class III would be maintained.

System	Project and Location	Description of Visual Impacts	VRM Class	Consistency with VRM Class
	Bypass Rebuild around Harvey Gap Reservoir	Bright construction equipment would be visible during active construction for approximately 15 days. The bypass is located on the southwestern hillside of Harvey Gap Reservoir, and boaters and paddleboarders using the lake may see equipment during construction. The existing bypass horizontal scar is visible from Harvey Gap Road as a vegetation cut in the hillside 0.6 mile away. The rebuild may clear additional vegetation along the bypass and expose the light tan soils, adding additional contrast to the existing scar. As vegetation regrows, the linear scar would return to current conditions, with gray-green sagebrush obscuring the exposed soils and appearing as a gray-green stripe in the darker green hillside.	III	VRM Class III allows for moderate changes to the landscape. Additional vegetation clearing would primarily occur in the existing ditch footprint and would be a short-term visual impact. The Grand Hogback ridgeline and the reservoir both dominate the viewshed, and the improved bypass ditch would be a weak contrast that would not attract viewers' attention. Therefore, the VRM Class III would be maintained.
East Bypass Pipeline	**East Bypass Pipeline** between the Silt Pump Canal and FICo East Lateral, and **East Bypass Pump Station** at the inlet	The temporary removal of vegetation and excavation of the canal to install the new pipeline would be noticeable for approximately 3 months. The new pipeline would be placed adjacent to linear roads, until the southern 0.2 mile of the alignment where it would cross a dry, grassy field on private land. This area and the 0.24-acre co-located staging area and pump station may be visible as tan soil scars during construction. Topography screens these visual impacts from nearby residents. The 700 feet of new access (grading and gravel) would be created along an existing Reclamation pipeline ROW and would also be screened from nearby residents by topography. All visual impacts would be temporary, appearing as cleared vegetation and construction equipment along existing roads during construction. The pipeline would be revegetated in areas that were previously vegetated.	III	VRM Class III allows for moderate changes to the landscape. Visual impacts from the project would be temporary, during construction only. The pipeline would be revegetated after construction, and the new access road and pump station would be screened from nearby residences by topography. Therefore, the VRM Class III would be maintained.

6.12.2.3 Cumulative Impacts

Actions that could cumulatively affect scenic beauty and visual resources in the SWCD Area include past, ongoing, and future irrigation improvement projects; subdivision and residential development; and infrastructure development and/or maintenance (including public and private roads and energy transmission corridors). The action alternatives would not be expected to contribute significantly to cumulative impacts on visual resources relative to these other actions. Impacts from the action alternatives would be short-term and negligible to minor. Project components would primarily occur in modified landscapes, and visual contrast would be moderate in the short term and weak to none in the long term. Visual elements of the action alternatives are consistent with the dominant agricultural quality in the SWCD Area.

6.12.2.4 Compliance and Best Management Practices

AMM Measures to reduce negative consequences for visual resources are listed in **Section 8.4** in **Table 8-2**. The AMM Measures would minimize ground disturbance and ensure restoration of the visual environment to existing conditions. Visual-resource-specific AMM Measures consist of using nonreflective materials, color matching, and vegetative screening. These AMM Measures are important for reducing visual contrast.

6.13 Socioeconomics and Environmental Justice

6.13.1 No Action Alternative

Under the No Action Alternative, ongoing OMR would continue as is. No flow control gate reconstruction, GVC piping and bypass rebuilding, or East Bypass Pipeline construction would occur. Direct, indirect, and cumulative effects on the regional economy and environmental justice communities could result if the action alternatives are not implemented. Damage to this infrastructure, by natural hazards or degrading, could cause supply disruptions, resulting in the loss of farm incomes and livelihoods, impairments to environmental and recreation values, and other negative effects on the system's users. In addition to damage caused by natural hazards and age, the operation of irrigation system components in the SWCD is impaired by lack of conveyance and storage capacity. For example, the relatively small amount of water available during dry conditions creates a situation in the FICo East and West Laterals and the Silt Pump Canal where there is not enough water to convey supplies to users at the far ends of canals.

6.13.2 Action Alternatives

There would be no direct, indirect, or cumulative impacts on population and demographic trends in Garfield County or the SWCD Area from the action alternatives. There are minority populations in the project area greater than those of the reference area of the state and county. The action alternatives would not have disproportionately high or adverse human health or environmental effects on minority or low-income populations. Implementation of the proposed project measures would result in construction job opportunities, which would in turn result in some spending by workers in local communities; however, the increased spending would not likely be perceptible for local businesses, and impacts on local spending would be negligible.

Implementation of the project would have direct and indirect effects on employment and farm production. Short-term economic benefits would occur due to additional employment in the SWCD during the off-season construction of the irrigation projects. There could be long-term adverse and negligible economic impacts from reduced O&M demands for SWCD operators due to system improvements, but no loss of permanent jobs is anticipated to occur.

The continued improvement of water delivery systems in the SWCD creates improved maintenance and operation of the system, a more reliable and secure water supply for irrigation, higher reservoir levels, and improved ability to tolerate drought conditions. Investing in improvements that mitigate failure risk and increase the system's ability to convey or store additional water creates economic and cultural value for its users and the broader community. Reducing the risk of supply disruptions diminishes the possibility that irrigators would be economically harmed by unforeseen events such as rockfalls and mudslides. Investments in additional conveyance and storage can improve the operating efficiency of the system in addition to enhancing recreation and environmental values. Short-term adverse impacts would result from construction activities but are expected to be offset by long-term beneficial impacts resulting from the extended recreation season due to increased water supply.

6.13.2.1 Cumulative Impacts

The action alternatives would contribute minor beneficial cumulative impacts on area employment and income in the SWCD as a result of increased crop productivity and the anticipated damage reduction benefits. However, overall, the action alternatives would not result in cumulative impacts on any socioeconomic trends (population, demographics, and poverty) for Garfield County.

6.14 Ecosystem Services

See **Appendix D: Investigation and Analysis for the National Economic Efficiency Report** for detailed descriptions of the economic analyses and estimates.

6.14.1 No Action Alternative

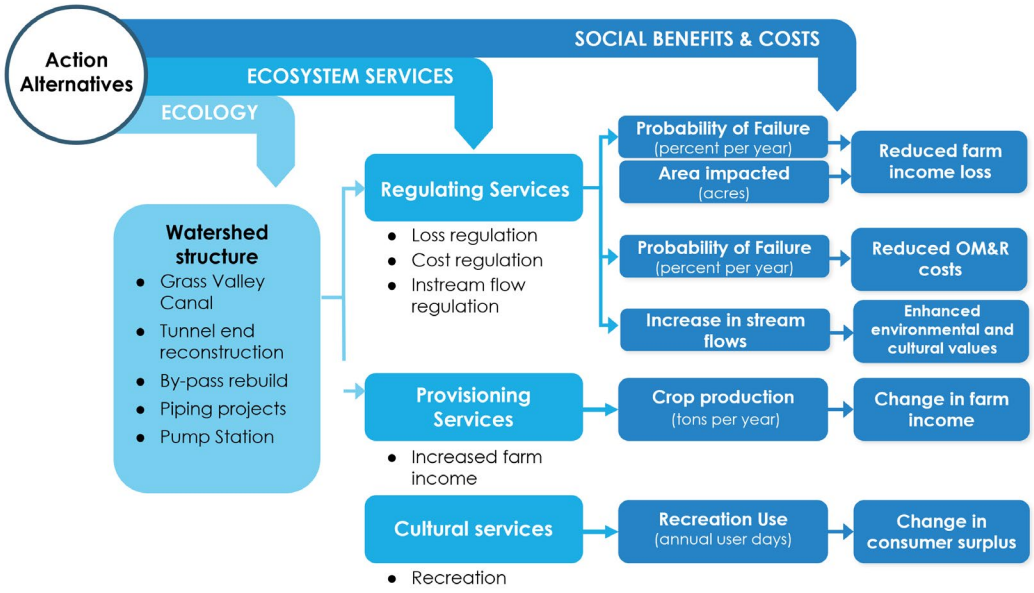
Under the No Action Alternative, ongoing OMR would continue as is. No increase in ecosystem services would occur. Current SWCD infrastructure would continue to have a high risk of failure and lack regulating services. The current water supply would provide the same level of provisioning services, and Harvey Gap Reservoir would continue to provide recreational (cultural) values at the current level.

6.14.2 Action Alternatives

The action alternatives would provide long-term beneficial impacts on regulating, provisioning, and cultural services for the area, primarily through the increased water supply and the reduced risk of system failure (**Figure 6-1**). The change in watershed structure under the action alternatives would enhance ecosystem services in the watershed by regulating the loss of farm income, OMR costs, and instream flows by replacing degraded infrastructure and installing the East Bypass Pipeline and Pump Station to capture flows from Green Mountain Reservoir. In addition, the action alternatives would improve provisioning services by conserving water through the installation of piping and increasing the water supply to the system by 1,300 AF per year. Harvey Gap Reservoir provides direct food sources for humans (fish and waterfowl); extending the moderate/high water season in the reservoir could positively

impact fishing and hunting for reservoir users. The conserved water could be stored for use later in the season, thereby increasing crop yields and farm income. Lastly, the action alternatives would allow water to be stored in Harvey Gap Reservoir for longer periods. The longer recreation season would increase the possible recreation user days, enhance the desirability of the reservoir, and potentially attract new users. Construction would result in short-term negligible adverse impacts on aesthetic and recreational values of the area, particularly the BLM lands near the GVC and Harvey Gap Reservoir.

Figure 6-1. Description of proposed measures within the ecosystem services framework.



6.14.2.1 Cumulative Impacts

Actions that could cumulatively affect ecosystem services in the SWCD Area include past, ongoing, and future irrigation improvement projects; subdivision and residential development; and infrastructure development and/or maintenance (including public and private roads and energy transmission corridors). The action alternatives, in combination with other irrigation improvement projects, would result in long-term beneficial impacts on provisioning, regulating, and cultural services in the area. The proposed project measures would not be expected to contribute significantly to negative cumulative impacts on these services relative to these other actions.

6.15 Risk and Uncertainty

Determining the effects of the action alternatives comes with a level of uncertainty. An extensive amount of engineering analysis and survey data were collected to minimize the risk and uncertainty of the outcomes of the proposed project measures. The cost estimates used current data and engineering analysis; however, future costs are often difficult to predict with certainty. Should inflation continue at recent levels, the cost of the project could outpace the benefits. The project should progress as soon as possible to offset this risk.

Environmental effects have been evaluated using both field and desktop data that are current; climate change could introduce additional factors that may not be readily apparent at this time. Although not

quantified for the SWCD Area, anecdotal evidence indicates that precipitation events are becoming more intense and warming trends could result in changes to the typical amount of snow cover. The risks associated with climate change include increased risk of failure due to intense precipitation events and reduced water supply as a result of decreases in the average amount of snow cover. Future land use, whether that be from continued or expanded use for agriculture or changes resulting from increased residential development or mineral extraction/exploration, could impact water needs and supply. This would affect some of the underlying assumptions of the analysis, such as increased water supply resulting in a longer seasonal recreation period.

Scheduling restrictions could introduce risk and uncertainty into completion of the project as well. Multiple timing restrictions because of the irrigation season, migratory bird and raptor nesting season, or other seasonal restrictions create some uncertainty on the proposed schedule of construction. A total of 2 to 3 months a year in the fall/early winter are available for construction. The uncertainty of the schedule is reduced as a result of a phased construction approach.

Chapter 7. Consultation, Coordination, and Public Participation

7.1 Public Participation

Prior to the release of the Draft Plan-EA, public participation activities included:

- Three public notices in the *Glenwood Post Independent* on August 9, 11, and 13, 2021.
- Public notification via the SWCD website.
- Public notification via the SWCD Facebook page.
- A meeting flyer, which was emailed to the stakeholder list and posted locally.
- An in-person and virtual meeting, which was hosted at the SWCD office on August 18, 2021, in Silt, Colorado.
- A 30-day scoping period, which began on August 19, 2021, and closed on September 20, 2021. During the scoping phase, one written comment regarding the Plan-EA was received from CPW. No other public comments were received.

Announcements for the publication of the Draft Plan-EA were sent to stakeholders via email and placed in the *Glenwood Post Independent* in both English and Spanish and on the SWCD website and Facebook page. The Draft Plan-EA was published on the NRCS website for public review. During the Draft Plan-EA review period, two comment letters (one from Reclamation and one from CPW) were collected or received regarding the project. The 30-day review and comment period for the Draft Plan-EA began on December 4, 2024 and closed on January 10, 2025. The Draft Plan-EA public review meeting was held on December 19, 2024, at the Silt Public Library in Silt, Colorado, and online (via Teams).

7.2 Agency Coordination

The following is a summary of the status of coordination with Reclamation, BLM, CPW, USACE, SHPO, and USFWS:

- Cooperating agency request letters were sent out on July 14, 2021, to Reclamation, USACE, USFWS, CPW, and BLM.
- Reclamation agreed to be a cooperating agency on the project in a letter dated August 12, 2021.
- As the East Bypass Pipeline will tie into the Silt Pump Canal on Reclamation lands, additional environmental permitting will be required with Reclamation prior to construction.
- No official response accepting or rejecting cooperating agency status was received from the BLM, USFWS, or CPW.
- As some of the project measures occur on BLM lands, coordination with the BLM resource specialists occurred prior to and throughout the biological and cultural resource surveys and associated reporting.
- The USACE agreed to be a cooperating agency on the project in a letter dated August 20, 2021, under the authority of Section 404 of the CWA. ERO consulted with Benjamin Wilson, senior project manager, NW Colorado Branch, from the USACE, on June 27, 2023. RGP 5 would apply to the action alternatives. A preconstruction notification would be submitted to the USACE office at least 60 days prior to construction. Because this project is a ditch-to-pipe conversion and qualifies as construction, a permit is required. RGP 5 requires complete notification in the form of a preconstruction notification unless the project is part of a salinity or selenium control project

per a binding agreement with Reclamation or the USDA. The notification requirement includes quantification of wetlands and waters impacted by the project. Project-specific mapping of wetlands/waters as required (with accuracy to 0.001 acre) would be conducted in the affected reaches for each project element so that notification and authorization from the USACE can be completed. Mr. Wilson indicated that, with design and construction more than 1 year in the future, it makes sense to wait to submit notification. Specifically, the RGP 5 expires on July 30, 2024. While this RGP may be reissued, any modifications that may be made prior to reissuance are not known at this time.

- Consultation with the SHPO per Section 106 of the NHPA was completed on April 29, 2022. A MOA among invited consulting parties, the SHPO, and the NRCS was developed to address adverse impacts on cultural resources and was signed in June 2025 (**Appendix A**). Mitigation would occur prior to project implementation.
- Consultation with the USFWS per Section 7 of the ESA and Section 12 of P.L. 83-566 has been completed for all known projects described in this Plan-EA. The NRCS sent a notification of NRCS Actions for this project on April 23, 2024. A BA was prepared to address both short-term and long-term impacts of the watershed improvement projects and was submitted to the USFWS on November 18, 2021. In a BO dated December 17, 2021, the USFWS concurred with the effects determinations outlined in the BA. Threatened or endangered species in the watershed are not likely to be adversely affected by the action alternatives, except through water depletions affecting four endangered 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 (TAILS FWS/R6 ES/GJ-6-CO-99-F-033; USFWS 1999). If potential effects on DeBeque phacelia, ULTO, or their habitat are anticipated, appropriate planning/implementation conservation measures explained in the BO (USFWS 2021f) will be applied.
- Coordination and technical consultations with the following people were also conducted in support of the development of this Plan-EA, BA, and Section 106 compliance:
  - Krystal Phillips, Colorado state biologist, NRCS
  - Hilary Boyd, wildlife biologist, BLM CRVFO
  - Creed Clayton, supervisory fish and wildlife biologist, USFWS
  - Kathleen Gissing, fish and wildlife biologist, USFWS
  - Brian Gray, area district wildlife manager for Rifle North, CPW
  - Erin Leifeld, archaeologist, BLM CRVFO

7.3 Tribal Coordination

In accordance with EO 13175, the 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. The NRCS recognizes that tribal governments are sovereign nations located in and dependent on the United States. The 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.

SHPO and tribal consultation was conducted in accordance with the NHPA of 1966 and EO 13175. The tribal consultation process began with letters of invitation to participate in the planning process to the Ute Indian Tribe-Uintah & Ouray Reservation, the Ute Mountain Ute Tribe, and the Southern Ute Indian Tribe on July 28, 2021. All three tribes were provided a copy of the Cultural Resources Survey Report (Engleman 2021) for this project and were invited to be consulting parties on the MOA on April 18, 2023. Additional tribal consultation was conducted with the Apache Tribe of Oklahoma, Shoshone-Bannock

Tribes of the Fort Hall Reservation, and Fort Belknap Indian Community of the Fort Belknap Reservation of Montana via letters sent September 3, 2024. No responses were received as of June 2025.

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Chapter 8. The Preferred Alternative

8.1 Selection of the Preferred Alternative

The Preferred Alternative for the project is Alternative 2 based on the ability of the alternative to meet the purpose and need for the project and provide the most beneficial impacts on environmental and social resources. This alternative was considered within the ecosystem services framework, specifically provisioning and cultural services. The Preferred Alternative is a set of specific projects that (1) reduce failure risk, (2) increase water supply to provide climate change and drought resilience, (3) improve system efficiency in delivery of water to current irrigation and livestock water users, and (4) reduce infrastructure damage costs. As detailed in **Chapter 6** of this Plan-EA, the project components would have negligible or minor effects on water quality, minor effects on wetland and riparian vegetation along sections of canals that would be piped, long-term effects on cultural and historical resources and visual resources, and minor effects on other resources. These effects would be mitigated through AMM Measures outlined in **Section 8.4**. A trade-off to these effects would be positive economic benefits (provisioning services), including increases in canal flow, agricultural yield enhancement, reduced O&M costs, and reduced failure risk. When compared to the No Action Alternative and Alternative 1, in the face of current conditions and future environmental changes, Alternative 2 would support the health and resiliency of the ecosystem downstream as well as the agricultural resiliency of SWCD patrons. There were no trade-offs that warranted selecting any option other than the NEE alternative.

8.2 Measures to Be Installed

The Preferred Alternative consists of five project-specific measures receiving NRCS funding that would result in increased water efficiency in the SWCD. The project-specific components are described in **Section 5.3** and listed in **Table 5-2**. The GVC Project includes rebuilding the flow control gate near East Rifle Creek, tunnel end shoring at three locations, piping four sections of the GVC, and reconstructing the historic ditch around Harvey Gap Reservoir. The East Bypass Pipeline Project consists of construction of a pump station and installation of 8,925 feet of plastic pipe to connect the extant Silt Pump Canal with the FICo East Lateral.

In addition to the direct actions required by the project-specific measures, construction of the Preferred Alternative would include mobilizing and staging construction equipment, grading existing access, constructing new access, and restoring and reseeding the disturbed areas. Appropriately sized construction equipment would be used to minimize disturbance in the construction area.

Construction would occur during the October-to-April nonirrigation season, with project construction beginning as early as the 2025 nonirrigation season.

8.3 Responsibilities

The NRCS is responsible for leading the planning efforts, providing engineering design and construction oversight assistance, and certifying completion of the project. The SWCD would be responsible for engineering design, project administration, permitting, contracting, and construction implementation, in

coordination with the NRCS. The SWCD has the needed authorities to implement the actions described in this Plan-EA.

8.3.1 Cost and Cost Sharing

Table 8-1 itemizes the costs for the Preferred Alternative and how the costs would be shared by the project Sponsor and the NRCS.

Table 8-1. Itemized costs and cost sharing.[1,2]

Project Costs	P.L. 83-566 Funds		Other Funds[3]		Total	
Construction	$2,821,982	75%	940,661	25%	$3,762,642	100%
Engineering	$648,065	100%	0		$648,065	100%
Technical assistance	Not applicable					
Relocation[4]	Not applicable					
Real property rights[4]			$58,292	100%	$58,292	100%
Permits			0	100%	0	100%
Project administration (NRCS-administered)	$376,264	100%			$376,264	100%
Project administration (Sponsor-administered)			$75,253	100%	$75,253	100%
TOTAL COSTS	$3,846,311	79%	$1,074,205	21%	$4,920,516	100%
Annual O&M			$22,600	100%	$22,600	100%
TOTAL COSTS: $4,920,516						

[1]Construction costs account for all material, labor, and equipment associated with the Preferred Alternative. These costs were estimated based on costs for similar installations in Colorado. 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.
[2]Engineering and administrative assistance costs were estimated as a percentage of the cost of construction.
[3]The SWCD is responsible for securing funding for the percentage of costs not funded under P.L. 83-566, including funds that are not eligible under the National Watershed Program.
[4]The East Bypass Pipeline and Pump Station Project measures will require an easement through private property.

8.3.2 Operation, Maintenance, and Replacement

The project Sponsor 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 between the NRCS and SWCD 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 the NRCS's approval.

Annual inspections would be made by the SWCD and NRCS to assure the quality of ongoing O&M. The SWCD would be responsible for scheduling the O&M inspections and for any necessary work. The O&M would consist of an infrastructure inspection program that would cover the inspection of the entire system installed over a period of several years.

Generally, the SWCD would conduct monitoring and inspections year-round while operating the system, and work to maintain the project measures would be performed as needed, with oversight from the SWCD board. During winter months, the project Sponsor would perform maintenance including filter maintenance, valve repairs, meter maintenance, battery changes, vegetation and weed management for disturbed areas, and more. All procedures would be followed as specified in the O&M agreement between the project Sponsor and NRCS. The assumed lifespan of HDPE pipe is 50 to 70 years; replacement of proposed project measures is not expected within the project lifespan.

8.4 Avoidance, Minimization, and Mitigation Measures

AMM Measures (referred to throughout this Plan-EA as AMM Measures or BMPs) include conservation measures stipulated by the USFWS that would be applied during construction of the project components to avoid and minimize impacts on environmental and social resources; these measures are described in **Table 8-2**.

The SWCD is responsible for complying with all AMM Measures and impact minimization efforts described in **Chapter 5** and in **Table 8-2**, and for obtaining and complying with any permits, should they be required.

Table 8-2. AMM Measures.

Construction Phase	AMM Measures
Preconstruction	**General** • Ground disturbances would be limited to only those areas necessary to safely implement the Preferred Alternative. • 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 limits would be clearly flagged on-site to avoid unnecessary plant loss or ground disturbance. **Paleontology** • A preconstruction paleontological resources survey and monitoring for paleontological resources during ground-disturbing construction activities in areas of very high potential fossil yield on federal lands in the project area would be required for the project. These areas include Tunnel End #1 and Tunnel End #2, both on BLM land. **Water** • A stormwater management plan would be prepared, and a construction general permit would be obtained from the 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, grubbing, and ground-disturbing activities. Inspections would occur according to CDPHE regulations. • The depth and extent of sedimentation removal for the Harvey Gap Reservoir dredging project would be determined during preconstruction planning. Planning would be conducted in coordination with the CPW. **Vegetation** • Prior to construction of future projects, habitat evaluation surveys would be completed for DeBeque phacelia and ULTO. • 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. 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. • If requested by the BLM CRVFO, surveys for Harrington's beardtongue would occur in suitable habitat on BLM land in the GVC Bypass Rebuild project area during the May through June blooming season prior to construction and vegetation removal. • 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 and riparian areas.

Construction Phase	AMM Measures
	Cultural Resources • Any areas not surveyed during the 2021 cultural resource survey due to subsequent design changes would be surveyed and reported in an addendum report. • 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 in the location 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. One historic property would be adversely affected by the project activities. To mitigate adverse effects, the consulting parties have entered into a MOA outlining 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. **Resources of Scientific Value Other Than Cultural Resources—Paleontology** • A preconstruction paleontological resources survey, performed by a BLM-permitted paleontologist, would be conducted in the PFYC 5 formations on BLM land. These areas include Tunnel End #1 and Tunnel End #2. **Recreation** • Construction activities would occur during the off-season as much as possible.
During Construction	**General** • Vegetation and topsoil removal would be confined to the smallest portion of the project area necessary for completion of the work. • 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. • Any 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 coordinated with CPW and communicated to travelers via websites, prerecorded messages, and other similar mechanisms. • Construction operations would occur during daylight hours, trash would be removed daily, and noise and light would be minimized to avoid disturbance to wildlife in the area. **Soils and Geology** • Topsoil would be stockpiled during construction 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. **Water** • CPW would inspect all dredging equipment prior to work in Harvey Gap Reservoir to ensure the equipment is disinfected. • 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.

Construction Phase	AMM Measures
	• 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, and storing equipment. • 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. **Wildlife** • During construction, direct disturbance impacts on terrestrial wildlife would be minimized by completing construction of individual project components 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 scheduled as much as possible outside the December 1 to April 30 winter months to avoid impacts on big game in winter concentration areas and severe winter range. If timing restrictions cannot be met and winter construction is necessary, the operator would coordinate with CPW regarding whether time-of-day restrictions would be required to avoid impacts on wintering big game. Time-of-day restrictions may be needed based on migration patterns for wildlife, which are difficult to predict, and particularly in the later part of the winter and near production areas. • The project proponents would adhere to seasonal closures in the Dry Rifle Creek Winter Closure Area and avoid construction of the GVC Bypass Rebuild project area around Harvey Gap Reservoir on BLM lands from October 1 to April 15. • Trench covers that are strong enough to prevent large animals from falling through would be secured in place, or wildlife escape ramps would be used. • Construction activities would be completed outside of the March through July primary raptor nesting period. Note that golden eagles may commence nesting as early as December (December 15 through July 15). If construction activities are to occur during the primary raptor nesting period, the project proponents would complete a nesting raptor survey and operate outside of the CPW-recommended buffer distance (CPW 2020b) or follow other USFWS-approved guidance for buffer distances. If nesting raptors are present inside recommended buffer zones, the project proponents would work with the local USFWS biologist to adjust the buffer distance if warranted (e.g., 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). Construction work would cease if a nesting raptor were discovered within a recommended buffer distance during construction, and the local USFWS biologist would be consulted for next steps. • Construction activities would be completed outside the April 1 through August 31 primary nesting period for migratory birds of concern. 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 2 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 were discovered during construction, work would cease, and the local USFWS biologist would be consulted for next steps. **Cultural Resources** • During construction activities, the SHPO, the NRCS, BLM cultural resources staff, and tribes, as applicable, would be notified if any inadvertent discoveries of cultural resources 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

Construction Phase	AMM Measures
	implemented. The SWCD 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 SWCD 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 the next bullet). Furthermore, pursuant to 43 CFR 10.4(c) and (d), the SWCD 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** • Monitoring during construction would be conducted by a BLM-permitted paleontologist in the PFYC 5 formations on BLM land. These areas include Tunnel End #1 and Tunnel End #2. • 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 (3) The handling and disposition of any findings would be in accordance with applicable federal and state laws. **Visual Resources** • Ground disturbance would be minimized. • 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. • For the dredged material stockpiled at Harvey Gap Reservoir, the soil would be contoured no more than 7 to 8 feet tall, and the area would be reseeded in a timely manner (within one growing season following construction) with a seed mix consistent with the surrounding sagebrush shrubland vegetation community. • Lands previously in agricultural production would be returned to agricultural production following construction. **Vegetation** • Reseeding would occur at appropriate times as soon as practicable following construction with certified weed-free seed mixes per NRCS or BLM instructions, as appropriate. • Seed sources used for revegetation would be weed-free. • The project proponents would implement weed control to county or BLM standards (at a minimum). • After any surface disturbance, proper rehabilitation procedures would be implemented to prevent the infestation of invasive riparian species.

No compensatory mitigation is anticipated to be required for the Preferred Alternative. For the known project components, the 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 measures performed under this 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.

8.5 Permits and Compliance

Permits and authorizations that may be required prior to construction of project components would be obtained; those permits not analyzed in full in this Plan-EA are described below. SWCD will be responsible for all additional permits and authorizations.

- SWCD will be required to obtain a temporary access permit for the construction of the East Bypass on Reclamation lands. Reclamation will complete their agency NEPA requirements when SWCD provides Reclamation with the SF-299 requesting the permit.
- 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).
- Land Rights Acquisition: The East Bypass Pipeline and Pump Station Project measures will require acquisition of an easement through private property.
- USACE: Coordination with the USACE regarding permitting options for measures in this Plan-EA would occur during final design of the project measures. A preconstruction notification would be submitted to the USACE office at least 60 days prior to construction. The USACE has a clear path for permitting the project, based on field reviews of wetland areas and conversations with the USACE. RGP 5 provides for ditch-to-pipe conversions, which is the remaining project measure that would result in potential impacts on jurisdictional waters. However, because regular maintenance is an exempted activity under 404 and can affect the wetlands present along ditches and canals, ERO recommends revisiting the mapping of canals and ditches 3 months prior to submittal of the preconstruction notification required for USACE permitting purposes.

  RGP 5 is effective as of July 30, 2021, and expires on July 30, 2026. Activities authorized by RGP 5 include constructing irrigation ditches, relocating/realigning existing irrigation ditches, converting existing ditches into pipes, filling existing ditches, and lining or armoring existing ditches. RGP 5 also authorizes temporary structures, fills, and work necessary to conduct the ditch-related work (USACE 2021). The notification package includes (1) the respective agency's documentation for compliance with the ESA and NHPA and/or the Lead Federal Agency NEPA document containing the same, (2) a project description, (3) project plans, and (4) a location map.

- USFWS: For any potential impacts on special status species in areas not currently considered, clearance surveys and/or appropriate coordination with the BLM or consultation with the USFWS under Section 7 of the ESA and P.L. 83-566 Section 12 would be required before construction activities could be initiated, if it has not already been completed.
- Section 106 Compliance: All treatment measures outlined in the MOA would be completed prior to project construction. Mitigation costs are included in the cost analysis.

8.6 Installation Sequence and Financing

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 10-year period commencing in 2025 and ending by 2034, following a phasing schedule based on engineering and funding constraints (**Table 8-3**).

The NRCS would provide 75 percent of the shareable cost for the Preferred Alternative through P.L. 83-566. The SWCD is responsible for securing funding for the remaining 25 percent of shareable costs, as well as funds that are not eligible under the National Watershed Program. **Table 8-4** and **Table 8-5** (contained in **Section 8.7** and in **Appendix D**) present cost details for the proportion of funding through P.L. 83-566 funding and other funding sources. The majority of the required match funding is expected to be provided through grants and loans.

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

Table 8-3. Installation sequence.

Project Measure	Implementation Year[1]		P.L. 83-566 Funds Needed ($)	Other Funds Needed ($)
	Start	Finish		
GVC				
- Piping Measures #1–#4	0	2	1,546,377	396,354
- Tunnel Ends #1–#3 Reconstruction	3	4	161,751	41,593
- Harvey Gap Bypass Ditch Reconstruction	5	6	129,350	33,004
- GVC Flow Control Gate Reconstruction	7	8	79,082	20,335
East Bypass				
- Pressure Pipe	9	10	1,546,494	473,417
- Pump Station	9	10	383,257	109,502

[1]Implementation year is the number of years after initial project authorization.

8.7 Economic and Structural Information

Economic analysis is provided in **Section 6.13.2** of this Plan-EA, as well as **Appendix D**. Economic and structural tables are included in this section (**Table 8-4** through **Table 8-8**). Implementation of the Preferred Alternative would result in an average annual benefit-cost ratio of 1.8, the result of approximately $299,700 in annual agricultural benefits and $0 in nonagricultural benefits for a total of approximately $299,700 in total annual benefit. The average annual NEE cost of the Preferred Alternative is $165,800.

The NRCS reserves the right and authority to reduce or discontinue program benefits to support this Plan-EA based on fund availability, changes in agency priorities, and inability of the SWCD to deliver resources or provisions of this Plan-EA.

Table 8-4. Economic Table 1—estimated installation cost of the Preferred Alternative, SWCD, Colorado, 2024$.[1,2]

Works of Improvement	Unit	Number		Estimated Cost				
				P.L. 83-566 Funds		Other Funds		Total
		Nonfederal Land	Total	Nonfederal Land NRCS	Total	Nonfederal Land	Total	
GVC								$2,407,847
Piping Measures #1–#4	Feet	22,605	22,605	$1,546,377	$1,546,377	$396,354	$396,354	$1,942,731
Tunnel Ends #1–#3 Reconstruction	Count	3	3	$161,751	$161,751	$41,593	$41,593	$203,344
Harvey Gap Bypass Ditch Reconstruction	Feet	3,120	3,120	$129,350	$129,350	$33,004	$33,004	$162,354
Flow Control Gate Reconstruction	Count	1	1	$79,082	$79,082	$20,335	$20,335	$99,418
East Bypass								$2,512,669
Pressure Pipe	Feet	8,925	8,925	$1,546,494	$1,546,494	$473,417	$506,757.49	$2,346,099
Pump Station	Count	1	1	$349,657.88	$349,657.88	$96,572.18	$96,572.18	$446,230
Total Project					$9,545,092.35			$4,920,516

Notes: Totals may differ due to rounding.
Prepared November 2021, rev. January 2024.
[1]Price base: 2024 dollars.
[2]Project cost prepared by Bell Consulting (2024).

Table 8-5. Economic Table 2—estimated Proposed Action cost distribution, SWCD, Colorado, 2024$.[1,2]

Works of Improvement	Installation Costs—P.L. 83-566 Funds				Installation Cost—Other Funds[3]				
	Construction	Engineering	Project Admin	Total P.L. 83-566	Construction	Project Admin	Real Property Rights	Total Other	Total
GVC									
Piping Measures #1–#4	$1,100,984	$298,596	$146,798	$1,546,377	$366,995	$29,360	$--	$396,354	**$1,942,731**
Tunnel Ends #1–#3 Reconstruction	$115,536	$30,810	$15,405	$161,751	$38,512	$3,081	$-$-	$41,593	**$203,344**
Harvey Gap Bypass Ditch Reconstruction	$91,679	$25,448	$12,224	$129,350	$30,560	$2,445	$-$-	$33,004	**$162,354**
Flow Control Gate Reconstruction	$56,487	$15,063	$7,532	$79,082	$18,829	$1,506	$-$-	$20,335	**$99,418**
East Bypass									
Pressure Pipe	$1,183,542	$205,147	$157,806	$1,546,494	$394,514	$31,561	$47,342	$473,417	**$2,019,911**
Pump Station	$273,755	$73,001	$36,501	$383,257	$91,252	$7,300	$10,950	$109,502	**$492,758**
Total	$2,821,982	$648,065	$376,264	$3,904,603	$940,661	$75,253	$58,292	$1,074,205	**$4,920,516**

Notes: Totals may differ due to rounding.
Prepared November 2021, rev. January 2024.
[1]Price base: 2024 dollars.
[2]Project cost prepared by Bell Consulting (2024).
[3]No "Other Funds" expended for Engineering Cost Category.

Table 8-6. Structural Table 3b—Canal Lining, SWCD, Colorado.

Channel Name (Reach)	Existing Channel Characteristics				Proposed Piping Characteristics		
	Reach Length (feet)	Maximum Discharge (cfs)	Existing Channel Type	Present Flow Condition	Material	Nominal Diameter (inches)	Required Structures/ Turnouts (no.)
GVC Piping	2,605	100	Man made	Intermittent	HDPE	48	0
East Bypass Pipeline	8,925[1]	0	0	0	C900	15	2

[1]Length here refers to proposed length; no channel currently exists.

Table 8-7. Economic Table 4—estimated average annual NEE costs, SWCD, Colorado, 2024$.[1]

Preferred Alternative Component	Project Outlays (Amortization of Installation Cost)	Other Direct Costs[2,3,4] (OMR)	Total Cost*
GVC (Alternative 1 and Alternative 2)			
Piping Measures #1–#4	$63,200	$4,500	$67,700
Tunnel Ends #1–#3 Reconstruction	$6,300	$400	$6,700
Harvey Gap Bypass Ditch Reconstruction	$4,700	$300	$5,000
GVC Flow Control Gate Reconstruction	$2,700	$200	$2,900
East Bypass (Alternative 2)			
Pressure Pipe	$52,700	$3,700	$56,400
Pump Station[3]	$12,900	$11,400	$24,300
Total (Alternative 1 and Alternative 2)	**$142,500**	**$20,500**	**$163,000**

*Totals may differ due to rounding.

Prepared November 2021, rev. May 2024.

[1]Price base: 2024 dollars, amortized over 60 years at a discount rate of 2.75 percent using the complete lag method using the lags represented in **Table 8-3**.

[2]Other direct costs include annual O&M associated with installation, operation, or replacement of project structures.

[3]Other direct costs also include electricity costs for pumping water. Electricity costs are based on estimates from the SWCD based on a similar pump operated by the SWCD.

[4]Other direct costs will be the sole responsibility of the SWCD.

The Preferred Alternative damage benefits include avoided infrastructure OMR costs, avoided crop yield damages, and avoided recreation damages. Additionally, the Preferred Alternative would enhance crop yields and recreation values and would positively impact instream flows in the Colorado River system reach between Green Mountain Reservoir and the SWCD's East Bypass Pump Station.

Using the resulting benefits and costs from the previous two tables, **Table 8-8** (NWPM 506.21, Economic Table 6; NRCS 2015) presents a comparison of the NEE average annual benefits and average annual costs for each subsystem of the Preferred Alternative. **Table D-5** also serves as the incremental analysis of the Preferred Alternative as each work of improvement serves as a separate increment of the overall project. Since the improvements to the infrastructure subsystems in the Preferred Alternative are not interdependent, their effects are additive in the sense that investing in improvements to one subsystem does not diminish the costs or benefits that would be realized by making investments in other subsystems.

Table 8-8. Economic Table 6—comparison of average annual NEE costs, avoided damages, and benefits, SWCD Plan, Colorado, 2024$.[1]

Works of Improvement	Agricultural Related			Average Annual Benefits[2]	Average Annual Cost	Benefit-Cost
	Reduced Infrastructure Damages	Reduced Crop Yield Damages	Additional Crop Yields			
GVC Piping and Reconstruction (Alternative 1 and Alternative 2)	$117,200	$97,800		$215,100	$82,300	2.6
East Bypass Pipeline and Pump Station (Alternative 2)			$83,100	$83,100	$80,700	1.0
Total (Alternative 1)	$117,200	$97,800		$215,100	**$82,300**	**2.6**
Total (Alternative 1 and Alternative 2)	$117,200	$97,800	$83,100	**$298,200**	**$163,000**	**1.8**

Notes: Totals may differ due to rounding.
Prepared November 2021, rev. May 2024.
[1]Price base: 2024 dollars amortized over 60 years at a discount rate of 2.75 percent using the complete lag method using the lags represented in **Table 8-3**.
[2]Recreation values and instream flow values were not quantified as part of the analysis.

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Chapter 10. List of Preparers

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Chapter 11. Distribution List

A Notice of Availability for this Plan-EA was distributed to federal, state, and local agencies; community representatives; and area nongovernmental organizations. A similar notice for the Final 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. The names of private stakeholders and members of the public who received notice of this Plan-EA are not listed in this section for privacy.

- Bookcliff and South Side Conservation District
- Bureau of Land Management
- Bureau of Reclamation
- 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 Natural Resources Conservation Service State Office
- Colorado Open Lands
- Colorado Parks and Wildlife
- Colorado River Water Conservation District
- Colorado State Farm Service Agency
- Colorado State Historic Preservation Office
- Colorado Trail Foundation
- Colorado Water Conservation Board
- Community Counts Colorado
- Conservation Colorado
- Department of Agriculture
- Ducks Unlimited
- East Lateral Farmers Irrigation District
- Federal Aviation Authority
- Garfield County
- Mountain Area Land Trust
- Office of the Governor
- Project 7 Water Authority
- Rifle Heritage Center & Museum
- Rocky Mountain Wild
- Sierra Club, Rocky Mountain Chapter
- Silt Historical Park and Museum
- Southern Ute Indian Tribe
- The Nature Conservancy
- Town of Rifle
- Town of Silt
- Trout Unlimited
- 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
- Ute Indian Tribe-Uintah & Ouray Reservation
- Ute Mountain Ute Tribe
- Water Information Program
- West Lateral Farmers Irrigation Company

Chapter 12. Acronyms, Abbreviations, and Short Forms

AF	acre-feet
AMM Measures	Avoidance, Minimization, and Mitigation Measures
APE	area of potential effects
BA	Biological Assessment
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
CDSS	Colorado Decision Support System
CFR	Code of Federal Regulations
cfs	cubic feet per second
CNHP	Colorado Natural Heritage Program
CPW	Colorado Parks and Wildlife
CR	County Road
CRVFO	Colorado River Valley Field Office
CWA	Clean Water Act
CWCB	Colorado Water Conservation Board
EA	Environmental Assessment
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FICo	Farmers Irrigation Company
GAP	Gap Analysis Project
GIS	Geographic Information System
GVC	Grass Valley Canal
HDPE	high-density polyethylene
IF	isolated find
IPaC	Information for Planning and Conservation
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
NEE	National Economic Efficiency
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWPM	National Watershed Program Manual
O&M	operation and maintenance
OMR	operations, maintenance, and repair

PBO	Programmatic Biological Opinion
PFYC	Potential Fossil Yield Classification
P.L.	Public Law
PR&G	Principles, Requirements, and Guidelines
PSGCN	Plant Species of Greatest Conservation Need
Reclamation	Bureau of Reclamation
RGP	Regional General Permit
ROW	right-of-way
SGCN	Species of Greatest Conservation Need
SHPO	Colorado State Historic Preservation Office
SLO	Sponsoring Local Organization
SWCD	Silt Water Conservancy District
ULTO	Ute ladies'-tresses orchid
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRM	Visual Resource Management

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Appendix A
Comments, Responses, and Consultation

USDA United States Department of Agriculture

Silt Water Conservancy District Watershed Plan-EA

Scoping Notice - Fact Sheet

Project Information

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), with the assistance of the Silt Water Conservancy District (SWCD) as the project sponsor, is considering whether to provide technical and financial assistance to make improvements to the irrigation system operated by the SWCD. The SWCD operates an integrated irrigation system that supports approximately 500 producers and over 6,000 acres across the service area with significant economic, local and regional benefits. The infrastructure could fail, and a set of proposed projects at Harvey Gap Reservoir, Grass Valley Canal, Dry Elk Lateral and the Pump Canal system would provide needed solutions and improvements.

The NRCS will assist the Silt Water Conservancy district in preparing a watershed project plan and environmental assessment, which will be combined into a single document, called a Plan-EA. The Plan-EA will be prepared to comply with the National Environmental Policy Act (NEPA). Technical studies are currently being conducted, with a Draft Plan-EA anticipated in the spring of 2022. At this time, we are requesting comments on the project to identify issues and resource sensitivities. Written comments can be submitted during the open period starting **August 19, 2021**, and ending on **September 20, 2021**. Additional information can be found at theproject website: *https://www.siltwatercd.org/ projects/*

Public Meetings

Those members of the public who may have interest or involvement in the project are invited to attend, discuss, and submit comments during the following public meetings:

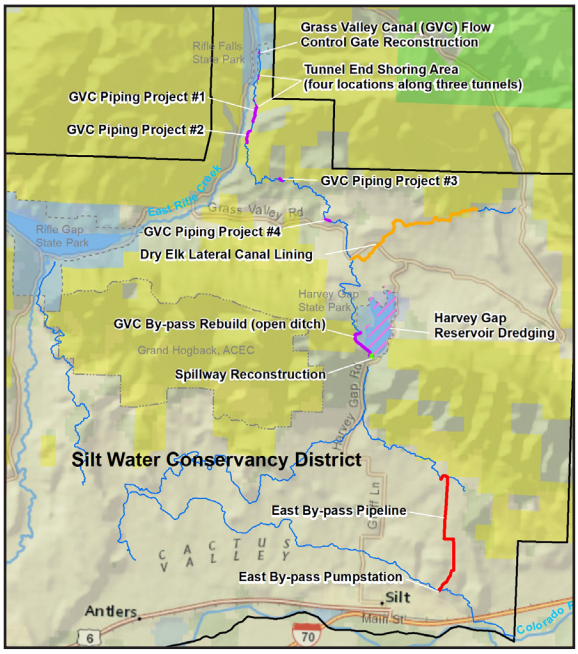
Virtual

Date: Thursday, August 19, 2021
Time: 4:00-5:00 p.m. Place: Online at *zoom.us*
Meeting ID: 233 991 3039, Passcode: 454369.
Call-in Number: (720) 707-2699

In-person

Date: Thursday, August 19, 2021
Time: 5:30-6:30 p.m.
Place: SWCD Office (120 S 7th St, Silt CO)

Project Area Overview



How to Submit a Comment

Comments may be submitted through the following options:

Website:
www.siltwatercd.org/contact/

Email:
cshenk@eroresources.com

Address:
ERO Resources
Attn: Cassandra Shenk
PO Box 932 Hotchkiss CO

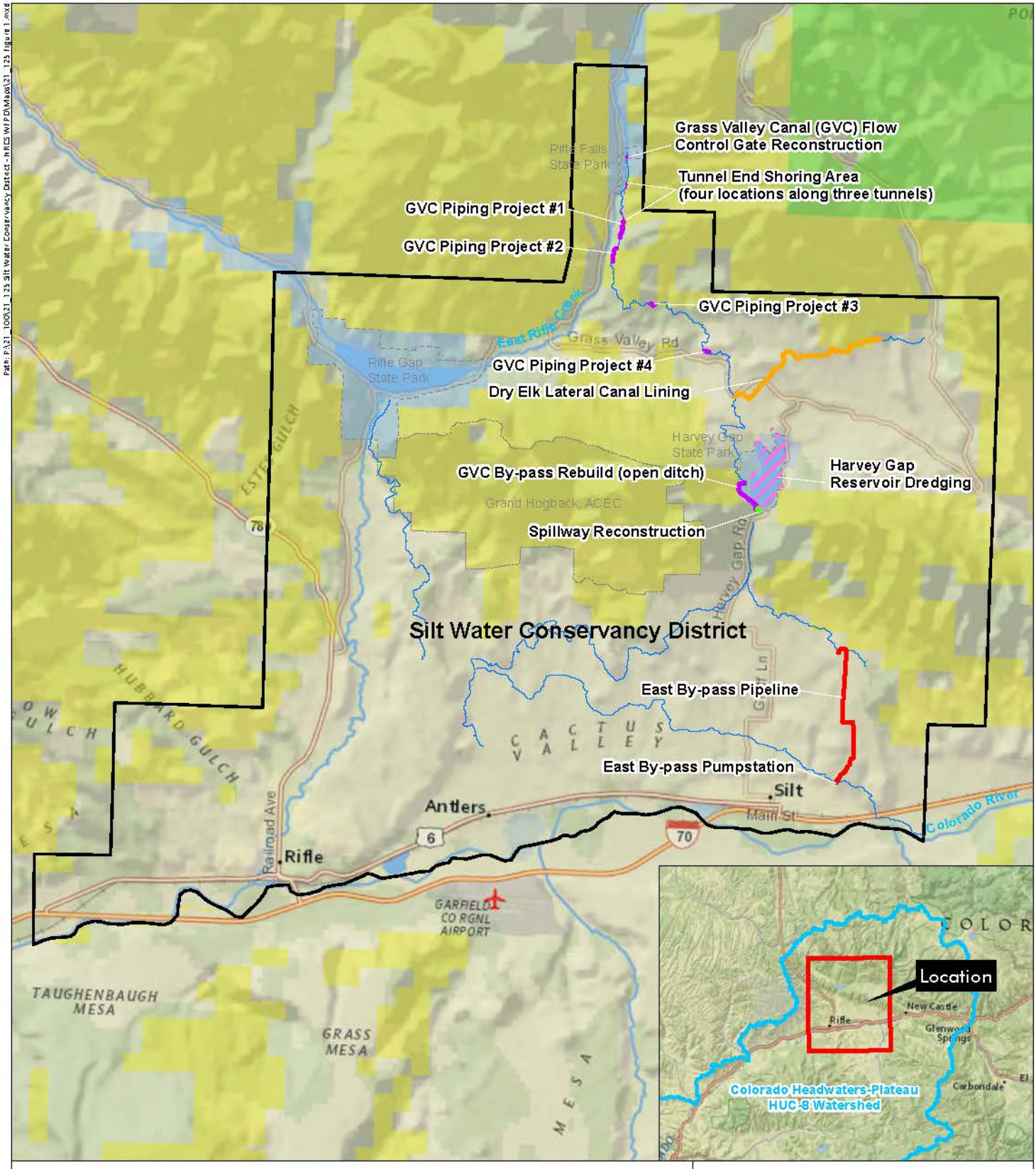
Phone:
(970) 872-3020

Colorado State Office

Natural Resources Conservation Service

nrcs.usda.gov/

USDA is an equal opportunity provider, employer, and lender.



Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement
- Pump Station Improvement - East By-pass
- Grass Valley Canal System Improvement
- Harvey Gap Reservoir Dredging
- Spillway Reconstruction
- SWCD Canal
- Water Conservancy District Boundary
- BLM
- State
- USFS

0 5,000 10,000 Feet

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Figure 1
Vicinity Map

Prepared for: Silt Water Conservancy District
File: 21_125 Figure 1.mxd (GS)
July 27, 2021

ERO Resources Corp.

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Table 1. Preliminary Description of Project Proponents for the Silt Water Conservancy District Watershed (SWCD) Plan EA. August 5, 2021.

System	Project, Location	Description
Grass Valley Canal (GVC)	Flow Control Gate Reconstruction near East Rifle Creek	An existing gate used to control flows into Grass Valley Canal would be rebuilt to improve functionality and mitigate flooding risk. Temporary disturbance includes a 20-foot by 20-foot construction area around the gate.
	Tunnel End Shoring south of headgate	Concrete and anchors would be used to shore inlets and outlets to three tunnels, preventing blockage from caving or rockfalls that could cause blockage and flooding, and system failure. Temporary disturbance includes a 15-foot by 30-foot area at four locations.
	Piping Sections at four locations (#1,2,3 and 4) in northern part of system	A total of 3,173 feet of open canal would be piped along four hazardous and steep sections of the canal to prevent system failure. The pipe would be made of plastic material and would be 48-inches in diameter. The pipe would be bedded in the existing canal and backfilled to grade. Concrete aprons and a trash rack would be installed at the inlet where necessary. One 0.21-acre staging area has been identified, and 2 additional staging areas will be used at locations to be determined.
	By-pass construction around Harvey Gap Reservoir	A 4-foot wide, 2,827 feet long ditch would be constructed along the historic Grass Valley Canal alignment to serve as a by-pass around the Harvey Gap reservoir, to provide a functional by-pass to downstream irrigators if needed for water flows and water management.
Dry Elk Lateral	Lining from Grass Valley Road east	14,527 linear feet of concrete and plastic lining would be installed beneath the Dry Elk Lateral to prevent water seepage and water loss. Temporary disturbance during construction would include a 30-foot disturbance width along the canal and maintenance road (an existing disturbed area), and three staging areas (about 0.6 acres total).
Harvey Gap Reservoir	Spillway reconstruction southwest of Reservoir	A 450-foot-long concrete spillway, 15 feet wide (necked down to 5 feet wide at the south end) would be reconstructed to meet flood release specifications, allowing for Harvey Gap Reservoir to be filled completely (about 400 acre-feet of increased storage). Temporary disturbance for construction includes a 10-foot buffer on either side of the spillway, a 1-acre staging area, and added disturbance width of up to 12 feet wide along 920 feet of access. Some cottonwood trees may need to be removed to make room for construction.
	Dredging reservoir center	Fines and fill within the reservoir would be removed, dried, and stockpiled at a staging area adjacent to the reservoir to increase water storage capacity in Harvey Gap Reservoir. About 750 feet of shoreline may be used for access between the reservoir and the staging/stockpile area.
Pump Canal	East by-pass Pressure Pipe between the pump canal and east lateral, and pump station. East by-pass Pump station at inlet	8,925 feet of plastic pipe would be installed to connect the pump canal and the east lateral, creating capacity to bring about 2,500-acre feet of District water into the system annually (the water is currently stored at Green Mountain Reservoir about 70 miles east of Silt and not being used). The project would help secure SWCD water rights, benefit water levels at Harvey Gap Reservoir, Colorado River flows between Green Mountain Reservoir and the pump station, and irrigation water users within the District. Temporary disturbance includes a 30-foot-wide construction disturbance width and two staging areas on either end of the project (0.24 acre at the southern end co-located with the pump station, and a 0.25 acre staging area at the northern end). Pumps to pressurize the new pipeline would be installed within a 12-foot by 10-foot building near the Pump Canal inlet. About 700 feet of new access (grading and gravel) would be created along an existing USBR pipeline right-of-way.

COLORADO
Parks and Wildlife
Department of Natural Resources

711 Independent Ave
Grand Junction, CO 81505

September 16, 2021

Cassandra Shenk, Environmental Scientist/NEPA Specialist
ERO Resources Corporation
PO Box 932
Hotchkiss, CO 81419

RE: Silt Water Conservancy District Watershed Plan-EA

Dear Ms. Shenk,

CPW staff has had the opportunity to review the scoping documents for these various projects for the Silt Water Conservancy District. The following comments and concerns have been initiated by CPW staff.

- Harvey Gap reservoir dredging - Will the reservoir be drawn down for the dredging project (or during any of the other proposed projects)? If so, how low will the reservoir be drawn down, for how long of a time period, and during what time of year? What are the expected impacts to water quality and what mitigation options will be considered? Will CPW's fish structures need to be removed prior to dredging? CPW will be responsible for inspecting dredging equipment prior to any work on the reservoir to ensure the equipment is disinfected. CPW typically conducts several fish stocking and aquatic inventories annually. The dredging project will compromise several of the aquatic projects throughout the year. Additionally, the stockpiling of dredged material will have the potential to propagate noxious weeds on surrounding land during the stockpiling period.

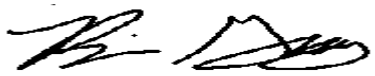
- Harvey Gap reservoir bypass channel - What criteria will determine use of the bypass channel vs. traditional delivery of water through Harvey Gap Reservoir? How often and when (seasonally) is it expected that the bypass channel will be operated? Does construction of the bypass channel affect reservoir operations? The potential exists for water quality concerns with less water passing through reservoir when the bypass channel is operational. If increased connectivity with the Colorado River is established, the potential for future stocking of certain fish species could be compromised.

- Harvey Gap reservoir spillway reconstruction - Will the increased 400 acre-feet of storage or potential operational changes result in the need for a Fish and Wildlife Mitigation Plan? CPW will need to determine whether the proposed projects at Harvey Gap require a FWMP, since projects such as these could trigger the state process. As mentioned previously, if increased connectivity with the Colorado River is established, the potential for future stocking of certain fish species could be compromised.

Dan Prenzlow, Director, Colorado Parks and Wildlife • Parks and Wildlife Commission: Carrie Besnette Hauser, Chair • Charles Garcia, Vice-Chair
Luke B Schafer, Secretary • Taishya Adams • Karen Bailey • Betsy Blecha • Marie Haskett • Dallas May • Duke Phillips, IV • James Jay Tutchton • Eden Vardy

Thank you for the opportunity to provide comments for this scoping period. If you have any questions, please contact me.

Sincerely,



Brian Gray / District Wildlife Manager

cc: Kirk Oldham / AWM
Ben Felt / Aquatic Biologist
Brian Palcer / Park Manager
file

From:	Cassandra Shenk
To:	Heidi McGrath
Cc:	Aimee Way; Kathy Croll
Subject:	FW: Silt Water Conservancy District Watershed Plan-EA
Date:	Monday, October 11, 2021 1:26:00 PM
Attachments:	image002.png

From: Silt Water <swcd@rof.net>
Sent: Tuesday, September 28, 2021 4:27 PM
To: Cassandra Shenk <CShenk@eroresources.com>; Gray - DNR, Brian <brian.gray@state.co.us>
Cc: natebell1020@gmail.com; nbell@bellconsultingllc.com
Subject: RE: Silt Water Conservancy District Watershed Plan-EA

Brain,
Thank you for your feedback concerning our projects, primarily the projects for Harvey Gap. I will give you my answers, as I know them, concerning where the projects are right now. Please keep in mind we are still in the infancy stage with most of these and are still gathering data and doing studies.

Dredging: This is a very lofty project and the timeline, should it be something we acquire funding for, is quite a ways out. Understanding how much sediment is indeed lying in the reservoir is crucial to us planning for delivery season. Since Harvey Gap has been storing water for over 120 years, there is a possibility that this sediment takes up more space than we realize. This will help us ascertain our share days for the year. Should the time come that we need to dredge, this would be done by a professional company educated on the potential impact it could cause. Due to our irrigation season, the process would have to be done while the reservoir is low and prior to us filling for the following year. No discussion has been entertained that would keep the reservoir low, or empty, for any extended period of time—that just isn't a feasible option for our shareholders. We plan on having a survey done this fall to provide data concerning the sediment and that will give us the information we need to decide if this is a viable project. You will of course be party to those discussions. SWCD and FICo both appreciate the relationship we have with CPW and your feedback is crucial.

Bypass channel/ditch: This is not a new project—simply a clean-out and re-establishment of the old by-pass ditch that used to be in place and maintained. This is for the rare occasion that if something were to go wrong with the outlet works of the dam. Should something go awry, this ditch gives us a way to continue to delivery water without actually using the valves to release water while addressing the issue. It could also help alleviate a burden on the dam should there be flood water conditions above HG and help bypass the reservoir and release excess flood waters down the canyon instead.

Spillway Reconstruction: I am unaware of when the Fish and Wildlife mitigation Plan was put into place, so I can't speak on how our spillway reconstruction would affect that. However, I can tell you that we 'lost' that two feet of storage in 2016—long after our agreement with Parks. We base our delivery on the full lake and losing that two feet (at the top) has raised questions of the actual amount of water we are storing in Harvey Gap. Reconstruction of the spillway will put us in

compliance with dam safety and should not affect any other aspects of operation. Harvey Gap does not have connectivity to the river, ever, during our scope of operation. Both ditches end at the tail of the east and west lateral ditches and do not have any return flow to the CO river.

Thanks again for your participation!
Tina Bergonzini
Silt Water Conservancy District
PO Box 8
Silt, CO 81652
970-876-2393

From: Cassandra Shenk <CShenk@eroresources.com>
Sent: Thursday, September 23, 2021 6:58 PM
To: Gray - DNR, Brian <brian.gray@state.co.us>
Cc: natebell1020@gmail.com; nbell@bellconsultingllc.com; Silt Water <swcd@rof.net>
Subject: RE: Silt Water Conservancy District Watershed Plan-EA

Received, thank you Brian! Nate and Tina and I will incorporate your questions/concerns into the EA as it develops, and reach out again to discuss as needed.

Nate and Tina- please see attached and if you can, provide any answers to Brian and myself? Thanks!

As a cooperating agency, CPW will be able to review and comment on the draft EA before it gets finalized and released for public review. For your records, I have attached the invitation sent from the NRCS to CPW in July, inviting cooperating participation.

We appreciate your input and interest in helping foresee and manage/mitigate potential impacts.
Have a good evening!
Best,
Cass

Celebrating 40 Years
ERO Resources

Cassandra Shenk, Environmental Scientist
161 S. 2nd St, PO Box 932 | Hotchkiss, CO 81419
970.872.3020 O | 970.208.7716 C | cshenk@eroresources.com |
www.eroresources.com
Stay tuned on our web site to see how we celebrate our 40th Year!
ERO is DBE, MWBE, and SBE certified in Colorado.

From: Gray - DNR, Brian <brian.gray@state.co.us>

Sent: Monday, September 20, 2021 2:52 PM
To: Cassandra Shenk <CShenk@eroresources.com>
Subject: Re: Silt Water Conservancy District Watershed Plan-EA

Cassandra,
attached are comments from CPW for these project proposals.
Thanks

Brian Gray
District Wildlife Manager / Rifle North

P 970-255-6157 / C 970-366-1908
711 Independent Ave. Grand Junction, CO 81505
brian.gray@state.co.us | cpw.state.co.us

On Thu, Aug 12, 2021 at 11:50 AM Cassandra Shenk <CShenk@eroresources.com> wrote:

> Dear Mr. Gray, Mr. Romatske, and Ms. Timberman:
> A scoping package is attached for the Silt Water Conservancy District Watershed Plan-EA. The NRCS is the lead agency for NEPA compliance, and I have also attached letters sent last month inviting your agency to cooperate on the project.
>
> A scoping period will be held August 19 through September 20, 2021, and you'll see information about the August 19th public meeting in the scoping package.
>
> If you would like to attend a monthly NRCS team meeting discussing the NEPA project/status and agency authorizations, the next meeting will be held on August 31 at 10 a.m. We expect a draft EA to be ready for your review by November or December 2021.
>
> Thank you for your time and attention!
> Best,
> Cass
> Assistant Project Manager, SWCD Plan-EA
> Cassandra Shenk
> Environmental Scientist/NEPA Specialist
> ERO Resources Corporation
> 970.872.3020 (office) 970.208.7716 (cell) cshenk@eroresources.com | www.eroresources.com

United States Department of the Interior

FISH AND WILDLIFE SERVICE
445 W Gunnison Ave, Suite 240
Grand Junction, Colorado 81501

In Reply Refer to:
FWS/IR05/IR07

TAILS 06E24100-2022-I-0032

December 17, 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 is a response to your request, dated November 17, 2021 (revised from October 19, 2021), requesting informal 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 Services (NRCS), in conjunction with the Silt Water Conservancy District (SWCD), relating to Batch 1 of the SWCD Watershed Plan and Environment Assessment (EA) project, located within the Colorado River and its tributaries in Garfield County, Colorado.

This Batch 1 project and future SWCD projects under the Watershed Plan and EA will be evaluated with a programmatic approach. For Batch 1 projects, you have requested consultation on the DeBeque phacelia (*phacelia submutica*) and Ute ladies'-tresses (*spiranthus diluvialis*). In summary, the Batch 1 projects are proposed to improve the water quality, agricultural productivity and economic stability in the SWCD boundary. This is being done in a number of ways: modernization of specific systems, prevent system failure, capitalize on opportunities to be more efficient with water, better manage water delivery and protect areas from flooding. Batch 1 will use existing access roads and disturbed areas for staging, with some exceptions as referenced within the BA-SWCD Batch 1. Batch 1 projects are being planned within the boundaries of the SWCD boundary area and meet the definition of a watershed as outlined in the NRCS's National Watershed Program Manual (NRCS 2015). There are four identified project components within this Batch 1 project:

- Grass Valley Canal (GVC)
- Dry Elk Lateral
- Harvey Gap Reservoir
- Pump Canal

The timeframe for these projects are scheduled to occur approximately October 15 through April 15, beginning in Winter 2023, with an estimated date of completion in 2028.

For the Canada lynx *(Lynx canadensis*), Mexican spotted owl (*Strix occidentalis lucida*), and western yellow-billed cuckoo (*Coccyzus americanus*), 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 Services will not address these species further. However, we do appreciate you informing us of your analyses for these species.

The Upper Colorado River programmatic biological opinion (PBO)(USFWS 1999; TAILS FWS/R6 ES/GJ-6-CO-99-F-033) applies to federal projects, and all existing nonfederal water depletions in the Upper Colorado River Basin, for the four Colorado River listed fishes (bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker) and their designated critical habitat. No new depletions will occur as a result of the Batch 1 Projects.
The Batch 1 projects are outside of the river habitat occupied by bonytail chub and humpback chub and only rare occurrences of Colorado pikeminnow and razorback sucker have been reported in the Colorado River as high up as Rifle, CO; further the fish are unlikely to occur in the SWCD boundary area and construction will take place outside of the irrigation season, when canals will be dry and fish will not be present. You have determined that these listed fish species and their critical habitats would not be affected; therefore, you have not requested consultation for these species.

DeBeque phacelia. Recent surveys, July 2021, were performed at component specific areas in this Batch 1 project that have potential for suitable habitat due to geological association – Wasatch formation. These habitat evaluation surveys were performed outside the blooming season (late April to late June), individual plants were not identified nor was potential suitable habitat, including distinctive clay soils. Habitat is not suitable at all other component specific site locations but has potential to occur in the southwest portion of the SWCD boundary formations (Wasatch formation). Additionally, conservation measures listed for preconstruction, construction, and post construction include a variety of actions to help minimize disturbance, erosion, invasive species, dust suppression, buffers, reseeding/revegetation and avoidance for this Batch 1 project. **Therefore, we concur with your determination of May Affect, Not Likely to Adversely Affect for DeBeque phacelia**.

Ute Ladies Tresses. Review of Batch 1 specific locations with Service biologists and field surveys conducted July 27 and 28, 2021, during the blooming season, did not document any suitable habitat or individuals at the Batch 1 Project specific component areas or within a 100 foot buffer. There is potential to occur in the southwest portion of the SWCD boundary formations (Wasatch formation). Additionally, conservation measures listed for preconstruction, construction, and post construction include a variety of actions to help minimize disturbance, erosion, invasive species, dust suppression, buffers, reseeding/revegetation and avoidance for this Batch 1 project. **Therefore, we concur with your determination of May Affect, Not Likely to Adversely Affect for Ute ladies'-tresses.**

This concludes our consultation for Batch 1 projects within the SWCD Watershed Plan boundary area. Future project batches may need project-level evaluation to ensure site specific components are reviewed for impacts to any known T&E and candidate species occurring at the time of the project.

Sincerely,

for Ann Timberman
Western Colorado S

USDA
United States Department of Agriculture

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

July 28, 2021

Ms. Betsy Chapoose
Director, Cultural Rights and Protection
Ute Indian Tribe- Unitah & Ouray Reservation
P.O. Box 190
Ft. Duchesne, UT 84026
betsyc@utetribe.com

Ms. Chapoose:

The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), in partnership with Garfield County, Colorado, is preparing a Watershed Plan and Environmental Assessment for the Silt Water Conservancy District. The undertaking involves conducting an environmental assessment and preparing a watershed plan for the entire district. Specific projects will also be evaluated as part of the Watershed Plan EA process.

Projects include piping portions of the Grass Valley Canal; reconstructing the entrance and exit points of siphons and tunnels along the Grass Valley Canal, reconstructing a formerly abandoned portion of the Grass Valley Canal; lining the Dry Elk Lateral; reconstruction of the Harvey Gap Reservoir spillway; dredging of Harvey Gap Reservoir; and installation of a pump station for the proposed East Bypass and construction of the East Bypass. The Area of Potential Effects (APE) will also include any construction staging and activity areas and newly proposed access roads associated with the specific projects.

NRCS would like to invite you to enter into consultation on this project. A scoping notice and scoping period will be announced soon. If you would like to be involved in the public scoping and development of plans for cultural resources surveys, please let us know at your earliest convenience. Please also let us know your preferred communication method for coordinating invitations to these meetings. Please feel free to contact Craig Dengel, State Cultural Resources Specialist, at (719) 749-8596.

Sincerely,

CRAIG DENGEL
State Cultural Resources Specialist

cc:
Heidi Ramsey, NRCS State Watershed Programs Manager

United States Department of Agriculture

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

July 28, 2021

Mr. Terry Knight
Tribal Historic Preservation Officer
Ute Mountain Ute Tribe
P.O. Box 468
Towaoc, CO 81334
Email: tknight@utemountain.org

Mr. Knight:

The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), in partnership with Garfield County, Colorado, is preparing a Watershed Plan and Environmental Assessment for the Silt Water Conservancy District. The undertaking involves conducting an environmental assessment and preparing a watershed plan for the entire district. Specific projects will also be evaluated as part of the Watershed Plan EA process.

Projects include piping portions of the Grass Valley Canal; reconstructing the entrance and exit points of siphons and tunnels along the Grass Valley Canal, reconstructing a formerly abandoned portion of the Grass Valley Canal; lining the Dry Elk Lateral; reconstruction of the Harvey Gap Reservoir spillway; dredging of Harvey Gap Reservoir; installation of a pump station for the proposed East Bypass and construction of the East Bypass; and rehabilitation of the West End Ditch outflow. The Area of Potential Effects (APE) will also include any construction staging and activity areas and newly proposed access roads associated with the specific projects.

NRCS would like to invite you to enter into consultation on this project. A scoping notice and scoping period will be announced soon. If you would like to be involved in the public scoping and development of plans for cultural resources surveys, please let us know at your earliest convenience. Please also let us know your preferred communication method for coordinating invitations to these meetings. Please feel free to contact Craig Dengel, State Cultural Resources Specialist, at (719) 749-8596.

Sincerely,

CRAIG DENGEL
State Cultural Resources Specialist

cc:
Heidi Ramsey, NRCS State Watershed Programs Manager

United States Department of Agriculture

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

July 28, 2021

Ms. Christine Sage, Chairman
Southern Ute Indian Tribe
P.O. Box 737
356 Ouray Drive,
Ignacio, CO 81137
Email: csage@southernute-nsn.gov

Ms. Sage:

The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), in partnership with Garfield County, Colorado, is preparing a Watershed Plan and Environmental Assessment for the Silt Water Conservancy District. The undertaking involves conducting an environmental assessment and preparing a watershed plan for the entire district. Specific projects will also be evaluated as part of the Watershed Plan EA process.

Projects include piping portions of the Grass Valley Canal; reconstructing the entrance and exit points of siphons and tunnels along the Grass Valley Canal, reconstructing a formerly abandoned portion of the Grass Valley Canal; lining the Dry Elk Lateral; reconstruction of the Harvey Gap Reservoir spillway; dredging of Harvey Gap Reservoir; installation of a pump station for the proposed East Bypass and construction of the East Bypass; and rehabilitation of the West End Ditch outflow. The Area of Potential Effects (APE) will also include any construction staging and activity areas and newly proposed access roads associated with the specific projects.

NRCS would like to invite you to enter into consultation on this project. A scoping notice and scoping period will be announced soon. If you would like to be involved in the public scoping and development of plans for cultural resources surveys, please let us know at your earliest convenience. Please also let us know your preferred communication method for coordinating invitations to these meetings. Please feel free to contact Craig Dengel, State Cultural Resources Specialist, at (719) 749-8596.

Sincerely,

CRAIG DENGEL
State Cultural Resources Specialist

cc:
Heidi Ramsey, NRCS State Watershed Programs Manager

USDA
United States Department of Agriculture

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

July 28, 2021

Ms. Cassandra Atencio, NAGPRA Coordinator
Southern Ute Indian Tribe
PO Box 737 MW#88
Ignacio, CO 81137
catencio@southernute-nsn.gov

Ms. Atencio:

The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), in partnership with Garfield County, Colorado, is preparing a Watershed Plan and Environmental Assessment for the Silt Water Conservancy District. The undertaking involves conducting an environmental assessment and preparing a watershed plan for the entire district. Specific projects will also be evaluated as part of the Watershed Plan EA process.

Projects include piping portions of the Grass Valley Canal; reconstructing the entrance and exit points of siphons and tunnels along the Grass Valley Canal, reconstructing a formerly abandoned portion of the Grass Valley Canal; lining the Dry Elk Lateral; reconstruction of the Harvey Gap Reservoir spillway; dredging of Harvey Gap Reservoir; installation of a pump station for the proposed East Bypass and construction of the East Bypass; and rehabilitation of the West End Ditch outflow. The Area of Potential Effects (APE) will also include any construction staging and activity areas and newly proposed access roads associated with the specific projects.

NRCS would like to invite you to enter into consultation on this project. A scoping notice and scoping period will be announced soon. If you would like to be involved in the public scoping and development of plans for cultural resources surveys, please let us know at your earliest convenience. Please also let us know your preferred communication method for coordinating invitations to these meetings. Please feel free to contact Craig Dengel, State Cultural Resources Specialist, at (719) 749-8596.

Sincerely,

CRAIG DENGEL
State Cultural Resources Specialist

cc:
Heidi Ramsey, NRCS State Watershed Programs Manager

MEMORANDUM OF AGREEMENT
BETWEEN
NATURAL RESOURCES CONSERVATION SERVICE AND THE COLORADO STATE HISTORIC PRESERVATION OFFICER
REGARDING
VARIOUS UNDERTAKINGS ASSOCIATED WITH THE
SILT WATER CONSERVANCY DISTRICT WATERSHED PLAN
ENVIRONMENTAL ASSESSMENT GARFIELD COUNTY, COLORADO

WHEREAS, the Natural Resources Conservation Service (NRCS), as lead federal agency, is working in partnership with the Silt Water Conservancy District (SWCD) to evaluate system improvements through completion of a NRCS Watershed Plan Environmental Assessment. Improvements to the irrigation system will include piping portions and shoring tunnel ends along one ditch, rebuilding a previously abandoned section of ditch, and construction of a new pumpstation and pipeline (hereafter the "Project"); and

WHEREAS, the NRCS is providing funding through the Watershed Protection and Flood Prevention Program, Public Law 83-566 (P.L. 83-566), authorized by Congress in 1954, thereby making the Project an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA) (54 USC § 306108), as amended, and its implementing regulations, 36 CFR Part 800; and

WHEREAS, the NRCS, in consultation with the Colorado State Historic Preservation Officer (SHPO), has defined the Project's Area of Potential Effects (APE) as 317.8 acres, including a portion of Rifle Falls State Park and Fish Unit (5.03 acres), Harvey Gap State Park (204.5 acres), private property (84.6 acres), and lands managed by the Bureau of Land Management Colorado River Valley Field Office (BLM-CRVFO) (23.6 acres) (see Appendix A for map(s) of the project APE); and

WHEREAS, the NRCS completed historic property identification of the entire APE in 2021 that identified 25 cultural resources. Of the documented resources, four sites are eligible for listing to the National Register of Historic Places (NRHP), two are not eligible for the NRHP, seven support eligibility of an eligible linear resource, one does not support the eligibility of an eligible linear resource, one supports a needs data linear resource, two need data prior to determination of eligibility to the NRHP, and the four isolated finds are not eligible to the NRHP; and

WHEREAS, NRCS has determined in consultation with the SHPO that three recorded segments of the Grass Valley Canal (5GF.3946.6, 5GF.3946.7, and 5GF.3946.9) are supporting segments of a resource that is eligible for listing in the NRHP under Criterion A, and that the Project will result in an adverse effect to this historic property; and

WHEREAS, the BLM-CRVFO is the federal land managing agency with affected historic properties from the Undertaking, has acknowledged NRCS as lead federal agency and has accepted the invitation to participate in the Memorandum of Agreement (Agreement) as a Concurring Party; and

WHEREAS, the Colorado Parks and Wildlife is the state land managing agency with affected historic properties from the Undertaking, and has accepted the invitation to participate in the Agreement as a Concurring Party; and

WHEREAS, SWCD, as the proponent for this Project, has participated in the consultation, and has accepted the invitation to participate in the Agreement as a Concurring Party; and

WHEREAS, the NRCS has consulted with the Garfield County Commissioners and Town of Silt Historic Preservation Committee, via letters sent September 3, 2024, and as of the signing of this document no response has been received; and

WHEREAS, in accordance with 36 CFR § 800.2(c)(2)(ii)(A), 800.3(f)(2), and 800.6(a)(2), NRCS has consulted with the Southern Ute Indian Tribe, the Ute Mountain Ute Tribe, and the Ute Indian Tribe - Uintah & Ouray Reservation, Apache Tribe of Oklahoma, Shoshone-Bannock Tribes of the Fort Hall Reservation, and Fort Belknap Indian Community of the Fort Belknap Reservation of Montana as of signing this Agreement, the tribes did not respond, NRCS will continue to consult with all the listed tribal nations throughout the development and implementation of this Agreement; and

WHEREAS, in accordance with 36 CFR § 800.6(a)(1), the NRCS has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination providing the specified documentation, and the ACHP has declined to participate in consultation via a letter dated April 11, 2023, pursuant to 36 CFR § 800.6(a)(1)(iii);

NOW, THEREFORE, pursuant to Section 106 of the NHPA, the NRCS and the SHPO agree that the Project shall be implemented in accordance with the following stipulations in order to take into account the effect of the Project on historic properties.

STIPULATIONS

The NRCS shall ensure that the following measures are carried out:

I. MITIGATION

A. NRCS shall develop, host, and maintain an interactive website intended to document the history and development of agricultural irrigation in Garfield County and other surrounding areas in western Colorado. NRCS shall publish the website and maintain such open and free for the larger public for a period of no less than five (5) years following initial publication of the final, approved website content (see Stipulation I.B below). The website shall include information on the Grass Valley Canal (5GF3946) but will be designed to allow the incorporation of other irrigation-related resources as part of future potential mitigation projects.

B. NRCS shall develop all content for the website described in Stipulation I.A. NRCS shall make all draft language, information, photographs, maps, images, etc. available to SHPO, BLM-CRVFO, CPW, SWCD, Garfield County Commissioners and Town of Silt Historic Preservation Committee, and consulting Tribes for a review period of no less than thirty (30) calendar days. All parties to this Agreement shall have the opportunity to provide comments and edits, and approve the website's final content. NRCS shall provide draft content in either digital format or as links to the draft website along with an appropriate comment matrix document in .docx (Word) format. All parties shall provide comments to NRCS via email within thirty (30) calendar days. NRCS shall consider all comments and edits provided by the parties and shall make all efforts to include such in the final website content as deemed appropriate by NRCS. NRCS shall notify all parties when the final, approved website has been published for public access. The notification from NRCS to all parties of the final, approved website being made live on the internet shall constitute the beginning of the five-year publication period as required under Stipulation I.A. of this Agreement.

C. NRCS shall publish the final, approved website content within no less than thirty-six (36) months of the execution of this Agreement.

D. The website will be in ArcGIS StoryMap format and will be targeted towards the general public as well as historic researchers. The website will include, at minimum, the following elements:

a. A history of the Grass Valley Canal (5GF3946) and the Dry Elk Lateral Ditch (5GF5811) as well as the role these irrigation structures played in the agricultural development in the western Colorado region. This history should also include brief mention of national and state trends and developments that are pertinent to the discussion of the history of the irrigation structures (see Stipulation I.D.c. below).
b. Historic and modern images and maps of the ditches, if available, including at least Segments 5GF.3946.6, 5GF.3946.7, 5GF.3946.9.
c. A brief discussion of the importance of agriculture and irrigation as well as the development of such within the State of Colorado. The focus of such can be primarily of the Western Slope region of Colorado, but the website content should at least briefly discuss all this within the larger national and state trends and developments of agriculture and irrigation in the Western United States.
d. Links to additional information, source materials, libraries, archives, and/or other websites that provide further context about agriculture and irrigation within the State of Colorado.

E. NRCS will publicize the website in a variety of ways, including, but not limited to the following:

a. Inclusion in NRCS email newsletters sent to conservation partners across the State.
b. Posting notices at local NRCS offices and Conservation Districts.
c. Informing organizations dedicated to historic research and water use, such as the CCPA and local area museums, specifically the Rifle Heritage Center & Museum.

F. NRCS shall prepare a report of all final, approved content prepared for the StoryMap for this Agreement. The report will be published in two formats: 1) as a digital PDF file; and 2) printed on archival quality paper. Copies of the report in both digital and paper formats will be provided free of charge to the Rifle Heritage Center & Museum. In addition, a digital report will be provided to the SHPO and CPW.

G. All work, research, recording, documentation, etc. intended to fulfill Stipulation I of this Agreement shall be completed by qualified professionals meeting the *Secretary of the Interior's Historic Preservation Professional Qualification Standards* for the applicable field (see 48 FR 44716, September 29, 1983, and 62 FR 33708, June 20, 1997). NRCS may hire a consultant to complete any work, research, or documentation required for this Agreement so long as the consultant meets the aforementioned professional qualification standards.

II. POST-REVIEW DISCOVERIES

If historic properties are discovered or unanticipated effects on historic properties found, the NRCS shall implement the discovery plan included as Appendix B of this Agreement.

III. DISPUTE RESOLUTION

Should any signatory or concurring party to this Agreement object at any time to any actions proposed or the manner in which the terms of this Agreement are implemented, the NRCS shall consult with such party to resolve the objection. If the NRCS determines that such objection cannot be resolved, the NRCS will:

A. Forward all documentation relevant to the dispute, including the NRCS's proposed resolution, to the ACHP. The ACHP shall provide the NRCS with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, the NRCS shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP and the Signatories, and provide them with a copy of this written response. The NRCS will then proceed according to its final decision.

B. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, the NRCS may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the NRCS shall prepare a written response that takes into account any timely comments regarding the dispute from the Signatories to this Agreement, and provide them and the ACHP with a copy of such written response.

C. It will be the responsibility of the NRCS to carry out all other actions subject to the terms of this Agreement that are not the subject of the dispute.

IV. AMENDMENTS

This Agreement may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

V. DURATION

If the terms of this Agreement have not been implemented within five (5) years from the date of its execution, then this Agreement shall be considered null and void. In such an event, the NRCS shall notify the Signatories to this Agreement and, if it chooses to continue with the Project, then it shall reinitiate review of and consultation on the Project in accordance with 36 CFR §§ 800.3 through 800.7.

VI. TERMINATION

If any signatory to this Agreement determines that its terms will not or cannot be carried out, that party shall immediately consult with the other signatories to attempt to develop an amendment per Stipulation IV, above. If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the Agreement upon written notification to the other signatories.

Once the Agreement is terminated, and prior to work continuing on the undertaking, NRCS must either (a) execute an Agreement pursuant to 36 CFR § 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7. NRCS shall notify the signatories as to the course of action it will pursue.

VII. USDA STIPULATIONS

A. The NRCS, the BLM-CRVFO, and the SHPO and their respective agencies will handle their own activities and utilize their own resources, including the expenditure of their own funds, in pursuing these objectives. Each party will carry out its separate activities in a coordinated and mutually beneficial manner.

B. Any transfer of funds from one party to another shall be done via a separate instrument as appropriate. Specific work projects or activities that involve the transfer of funds, services, or property among the NRCS, the BLM-CRVFO, and the SHPO and their respective agencies will require execution of separate agreements and be contingent upon the availability of appropriated funds. Negotiation, execution, and administration of each such agreement must comply with all applicable statutes and regulations.

Execution of this Agreement by the NRCS and SHPO and implementation of its terms evidence that NRCS has taken into account the effects of this undertaking on historic properties and afforded the ACHP an opportunity to comment.

SIGNATORY PAGE

MEMORANDUM OF AGREEMENT
BETWEEN
NATURAL RESOURCES CONSERVATION SERVICE AND THE COLORADO STATE HISTORIC PRESERVATION OFFICER
REGARDING
VARIOUS UNDERTAKINGS ASSOCIATED WITH THE
SILT WATER CONSERVANCY DISTRICT WATERSHED PLAN
ENVIRONMENTAL ASSESSMENT GARFIELD COUNTY, COLORADO

NATURAL RESOURCES CONSERVATION SERVICE

CLINTON EVANS Digitally signed by CLINTON EVANS
Date: 2025.06.20 13:38:59 -06'00'

Date: 6/20/2025

Clinton Evans, Colorado State Conservationist

SIGNATORY PAGE

MEMORANDUM OF AGREEMENT
BETWEEN
NATURAL RESOURCES CONSERVATION SERVICE AND THE COLORADO STATE HISTORIC PRESERVATION OFFICER
REGARDING
VARIOUS UNDERTAKINGS ASSOCIATED WITH THE
SILT WATER CONSERVANCY DISTRICT WATERSHED PLAN
ENVIRONMENTAL ASSESSMENT GARFIELD COUNTY, COLORADO

COLORADO STATE HISTORIC PRESERVATION OFFICER

Dr. Holly Kathryn Norton

Date: 5/9/2025

Dawn DiPrince, Colorado State Historic Preservation Officer

CONCURRING PARTY

MEMORANDUM OF AGREEMENT
AMONG
NATURAL RESOURCES CONSERVATION SERVICE, BUREAU OF LAND MANAGEMENT, COLORADO PARKS AND WILDLIFE, SILT WATER CONSERVANCY DISTRICT, AND THE COLORADO STATE HISTORIC PRESERVATION OFFICER
REGARDING
VARIOUS UNDERTAKINGS ASSOCIATED WITH THE SILT WATER CONSERVANCY DISTRICT WATERSHED PLAN ENVIRONMENTAL ASSESSMENT GARFIELD COUNTY, COLORADO

BUREAU OF LAND MANAGEMENT

ELIZABETH DAWSON Digitally signed by ELIZABETH DAWSON
Date: 2025.06.06 14:26:30 -06'00'

Date: 06/06/2025

Elizabeth A. Dawson, Field Manager for the Colorado River Valley Field Office

CONCURRING PARTY

MEMORANDUM OF AGREEMENT
BETWEEN
NATURAL RESOURCES CONSERVATION SERVICE AND THE COLORADO STATE HISTORIC PRESERVATION OFFICER
REGARDING
VARIOUS UNDERTAKINGS ASSOCIATED WITH THE
SILT WATER CONSERVANCY DISTRICT WATERSHED PLAN
ENVIRONMENTAL ASSESSMENT GARFIELD COUNTY, COLORADO

COLORADO PARKS AND WILDLIFE

Jacob Brey, NW Deputy Region Mgr.
Jeff Davis, Director, Colorado Parks and Wildlife

Date: 06/13/2025

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CONCURRING PARTY

MEMORANDUM OF AGREEMENT
BETWEEN
NATURAL RESOURCES CONSERVATION SERVICE AND THE COLORADO STATE HISTORIC PRESERVATION OFFICER
REGARDING
VARIOUS UNDERTAKINGS ASSOCIATED WITH THE SILT WATER CONSERVANCY DISTRICT WATERSHED PLAN ENVIRONMENTAL ASSESSMENT GARFIELD COUNTY, COLORADO

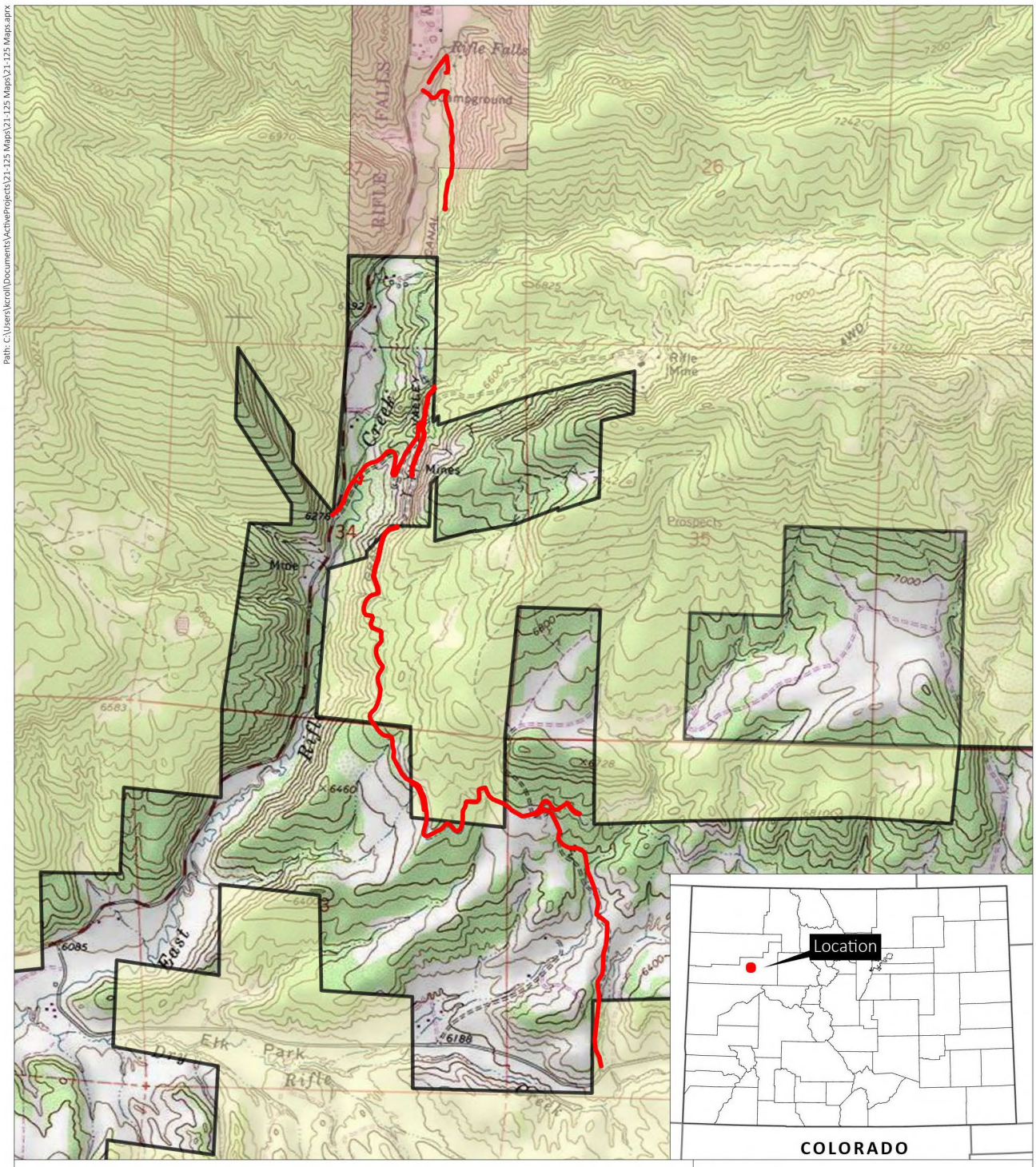
SILT WATER CONSERVANCY DISTRICT

Signed by:
Charles R. Terrell
41467B8F4935404...
Charlie Terrell, President

Date: 6/2/2025

APPENDIX A

AREA OF POTENTIAL EFFECTS



Cultural Resource Survey
Silt Water Conservancy District
Garfield County, Colorado

Sections 27 and 34, T4S, R92W; 6th PM
Sections 1, 2, and 3, T5S, R92W; 6th PM
USGS Rifle Falls, CO Quadrangle (1:24,000; 1984)
Garfield County, Colorado

Area of Direct Effect
BLM
Private/CPW Managed
Private

N
0 1,000 2,000 Feet
1:24,000

Figure A1
Cultural Resource Location Map

Prepared for:
Silt Water Conservancy District
File: 21-125 Maps.mxd (ME)
December 7, 2023

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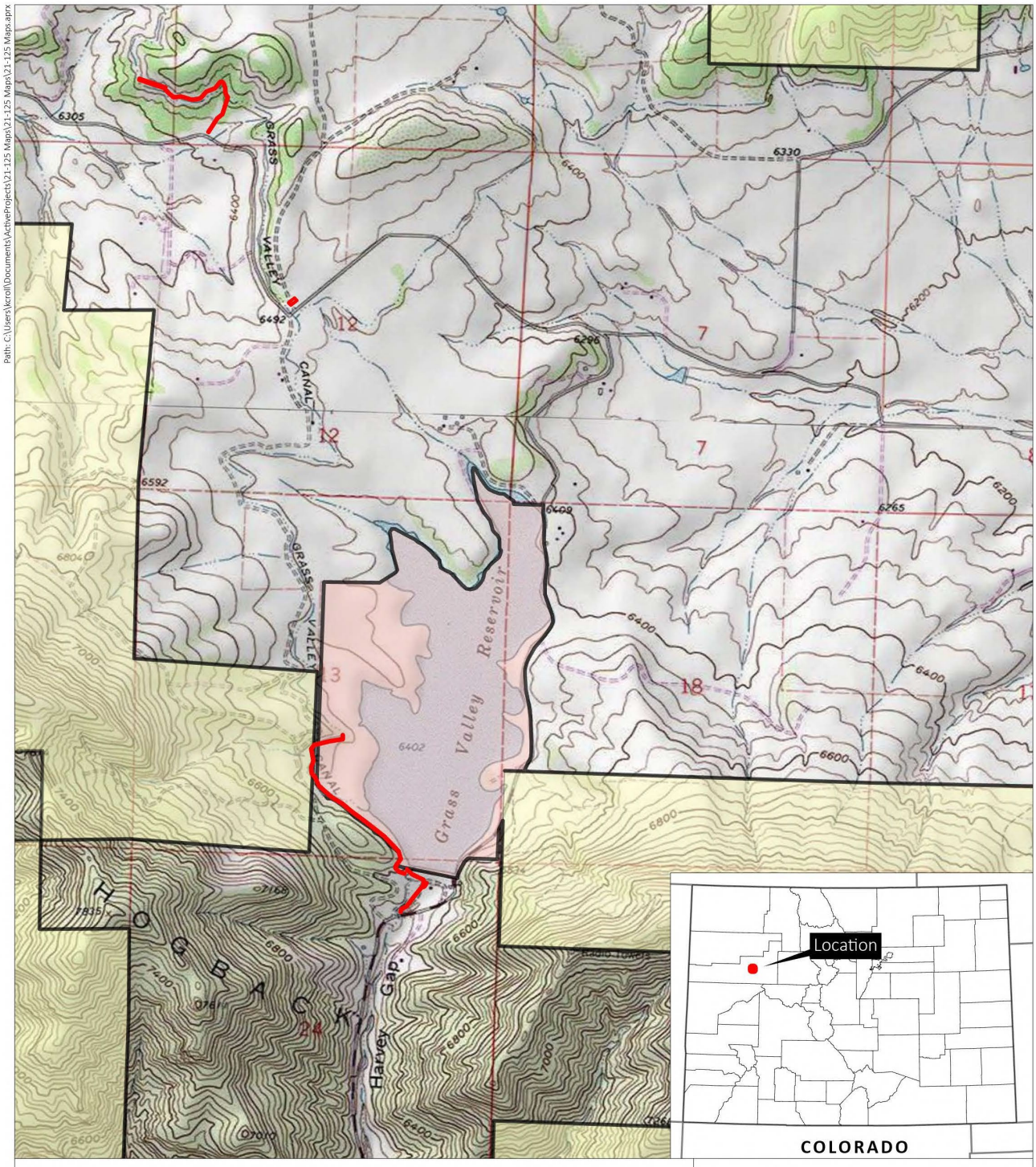

Cultural Resource Survey
Silt Water Conservancy District
Garfield County, Colorado

Sections 5, 6, 7, and 18, T5S, R91W; 6th PM
Sections 1, 2, 12, 13, and 24, T5S, R92W; 6th PM
USGS Rifle Falls, and Silt, CO Quadrangles (1:24,000; 1984)
Garfield County, Colorado

Area of Direct Effect
BLM
Private/CPW Managed
Private

N 0 1,000 2,000 Feet
1:24,000

Figure A2
Cultural Resource Location Map

Prepared for:
Silt Water Conservancy District
File: 21-125 Maps.mxd (ME)
December 7, 2023

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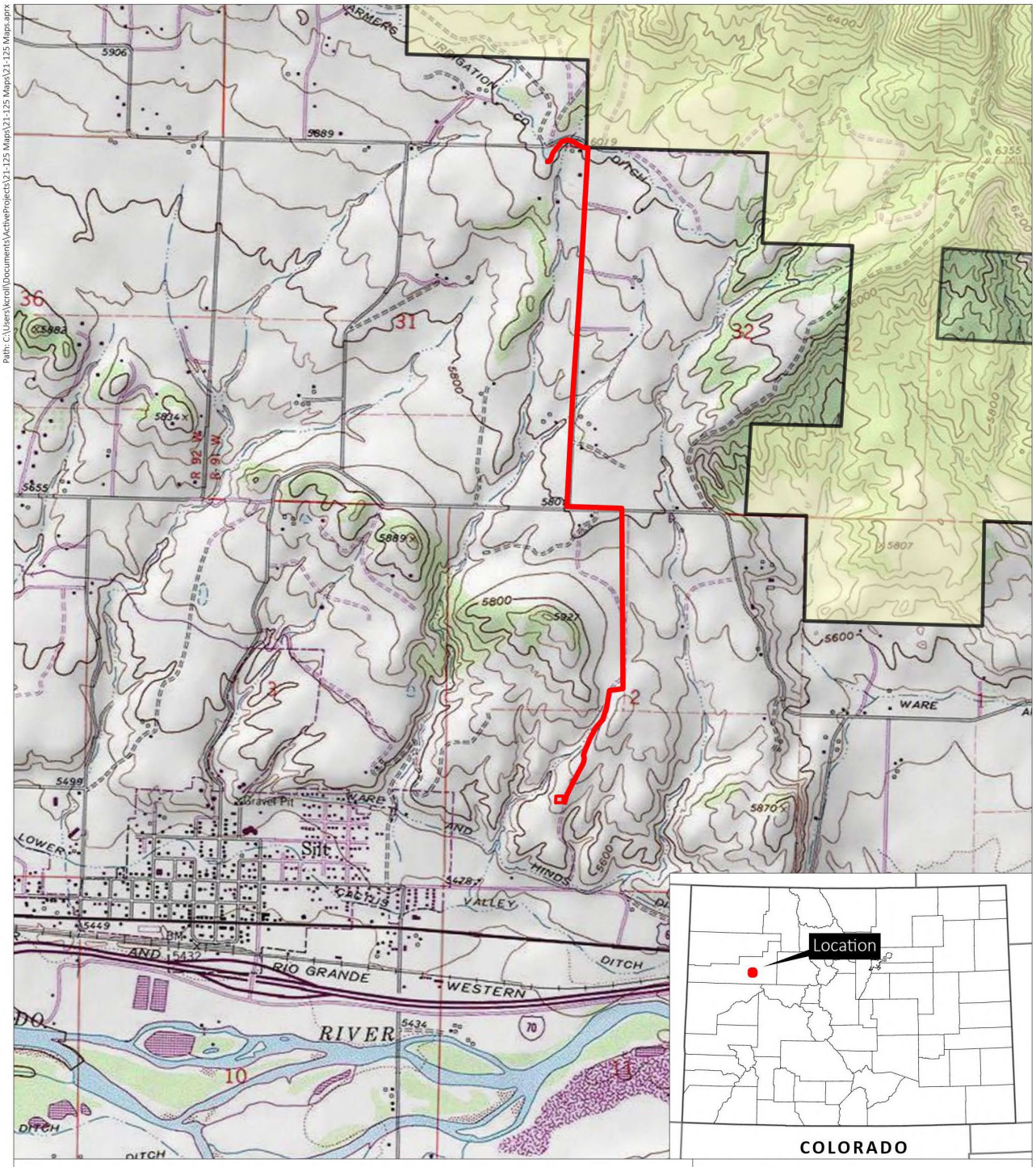

Cultural Resource Survey
Silt Water Conservancy District
Garfield County, Colorado

Sections 29, 30, 31, and 32, T5S, R91W; 6th PM
Section 2, T6S, R92W; 6th PM
USGS Silt, CO Quadrangle (1:24,000; 1984)
Garfield County, Colorado

Area of Direct Effect
BLM
Private/CPW Managed
Private

N 0 1,000 2,000 Feet
1:24,000

Figure A3
Cultural Resource Location Map

Prepared for:
Silt Water Conservancy District
File: 21-125 Maps.mxd (ME)
December 7, 2023

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APPENDIX B

POST-REVIEW DISCOVERY PLAN

PLAN AND PROCEDURES FOR THE UNANTICIPATED DISCOVERY OF CULTURAL RESOURCES

THE SILT WATER CONSERVANCY DISTRICT ENVIRONMENTAL ASSESSMENT
WATERSHED PLAN PROJECT
GARFIELD COUNTY, COLORADO

I. INTRODUCTION

The Silt Water Conservancy District, in partnership with the Natural Resources Conservation Service (NRCS), plans to improve irrigation systems in Delta County by implementing irrigation system efficiency modernization, including piping, water control facilities, and Supervisory Control and Data Acquisition (SCADA) improvements within the North Fork watershed area and Crawford watershed area. The following Post-Review Discovery Plan outlines procedures to follow, in accordance with state and federal laws depending on land jurisdiction, if cultural resource materials are discovered during construction.

II. RECOGNIZING CULTURAL RESOURCES

A cultural resource discovery could be prehistoric or historic. Examples include, but are not limited to:

- An accumulation of shell, burned rocks, or other food related materials
- An area of charcoal or very dark stained soil with artifacts,
- Stone tools or waste flakes (i.e. an arrowhead, or stone chips),
- Clusters of tin cans or bottles, logging or agricultural equipment that appears to be older than 50 years,
- Buried railroad tracks, decking, or other industrial materials.

When in doubt, assume the material is a cultural resource.

III. UNANTICIPATED DISCOVERIES PROCEDURES

A. In the event that previously unidentified cultural resources are identified, or if unanticipated effects to historic properties occur, the following steps shall be taken:

1. Construction will be immediately halted in the area of the discovery, and measures taken to protect the resource until such time that an NRCS Cultural Resources Specialist (CRS) or qualified professional inspects the work site.
2. Notify the NRCS CRS: Katie Arntzen, 970-694-0289, Katherine.Arntzen@usda.gov. The NRCS CRS will notify the appropriate property owner (CPW or BLM).

3. The NRCS CRS shall inspect the discovery within one (1) business day, if weather permits, and in consultation with the project sponsor, consulting Native American Tribes, the Colorado State Historic Preservation Officer (SHPO), property owner, consulting local government(s), and consulting certified local governments (CLGs), the NRCS CRS shall establish a protective buffer zone surrounding the discovery.
4. All NRCS contact with media shall occur only under the direction of the NRCS Public Affairs Officer, as appropriate, and the NRCS State Conservationist.
5. Security shall be established to protect the resources/historic properties, workers, and private property. Local law enforcement authorities will be notified in accordance with applicable State law and NRCS policy in order to protect the resources. Construction and/or work may resume outside the buffer only when the State Conservationist determines in writing that it is appropriate and safe for the resources and workers.
6. The NRCS CRS shall notify the project sponsor, consulting Native American Tribes, the SHPO, property owner, consulting local governments, and CLG's,no later than two (2) business days after the discovery and describe NRCS' assessment of the National Register eligibility of the property, as feasible and proposed actions to resolve any adverse effects to historic properties. The eligibility determination may require the assessment and advice of Native American Tribes, the SHPO, property owner, consulting local government(s), consulting CLG(s), and technical experts not employed by the NRCS.
7. The project sponsor, Native American Tribes, the SHPO, property owner, consulting local governments, and CLGs shall respond within two (2) business days from receipt of the notification with any comments on the discovery and proposed actions.
8. NRCS Colorado shall take any comments provided into account and carry out appropriate actions to resolve any adverse effects.
9. NRCS Colorado shall provide a report to the SHPO, respective landowner, and concerned Tribes of the actions when they are completed.

B. The project is located on federal, state, and private lands. On federal land the requirements under the Native American Graves Protection and Repatriation Act (NAGPRA) apply (43 CFR § 10). For all discoveries, the kinds of objects considered and referred to as NAGPRA items as defined in 43 CFR § 10.2 (d) include: human remains, funerary objects, sacred objects, and objects of cultural patrimony.

   The requirements under State Law Colorado Revised Statute (CRS) for the Unmarked Human Graves Colorado Statute (CRS § 24-80-1301-1305) applies if the human remains are on state or private lands. Additionally, the process described in the 2008 guidelines titled "Process for consultation, Transfer, and Reburial of culturally Unidentifiable Native American Human Remains and Associated Funerary Objects Originating from Inadvertent Discoveries on Colorado State and Private Lands" would be followed to ensure appropriate treatment for such discoveries.

   The following steps shall be taken if human remains or suspected human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered in the project area during planning or during implementation.

1. Stop all work in the immediate vicinity of the remains. The area is considered an active crime scene until local law enforcement has determined otherwise.
2. Immediately notify the NRCS CRS and appropriate project manager. The NRCS CRS will notify the appropriate landowner and law enforcement.
3. Mark the area in which the remains or objects are located, as well as a minimum buffer area, with a radius of 30 meters (100 feet) surrounding the remains or objects. The buffer area may be larger if more remains or objects in the area are anticipated or, in the case of slopes or cut banks, where work located nearby may impact the site of the remains or objects. It is imperative that the remains or objects are protected from possible impacts while the appropriate parties are contacted to determine next steps.
4. Approaches for protecting the remains or objects from the elements include covering them with a tarp or other material, shoring up cut banks or trench walls so that no further exposure occurs, and making sure that no water will collect on or around the remains.
5. If remains are found that may not be human but are suspected to be, a qualified specialist must be called in for identification. The following contacts will be coordinated with immediately:

   Garfield County Coroner
   970-319-0311

   Garfield County Sheriff
   970-945-0453

6. If the coroner determines that the remains are archeological and not of forensic interest, the coroner will notify the NRCS CRS, Colorado State Archaeologist (Holly Norton, (303) 866-2736/ holly.norton@state.co.us) and consulting tribes of the discovery. Notifications can be made by phone or email and should include a detailed description of the nature and extent of the remains and an accurate and precise legal location.
7. Planning and construction activities at the site can recommence only after the plan for treating the remains as outlined by Colorado Revised Statute 24-80-1301 et seq. on private and state lands or 43 CFR 10 on federal lands is complete.

Appendix B
Project Maps

Path: P:\21_100\21_125 Silt Water Conservancy District - NRCS WFPO\Maps\2025\Appendix B\21_125 Figure B-1.mxd

Figure B-2

Figure B-3

Figure B-4

Figure B-5

Figure B-6

Figure B-7

Figure B-8

140100050502 Middle Rifle Creek

140100050501 West Rifle Creek

140100050504 Government Creek

140100050503 East Rifle Creek

140100050505 Rifle Gap Reservoir

140100050204 Middle Elk Creek

140100050203 West Elk Creek

140100050603 Dry Hollow Creek-Colorado River

140100050604 Dry Creek-Colorado River

140100050701 Beaver Creek-Colorado River

Benefitted Area

Benefitted Area

GARFIELD COUNTY

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Existing Access Road
- Access Road - Grading Required
- New Access
- Project-Specific Component
- Staging Area
- BLM Land
- Bureau of Reclamation Land
- CPW Managed (Privately Owned)
- Private Land
- State Land
- HUC 12 Watershed Boundary
- Silt Water Conservancy District Boundary

0 1 2 Miles

N

Figure B-1
Index

Prepared for: Silt Water Conservancy District
File: 21_125 Figure B-1.mxd (GS)
March 11, 2025

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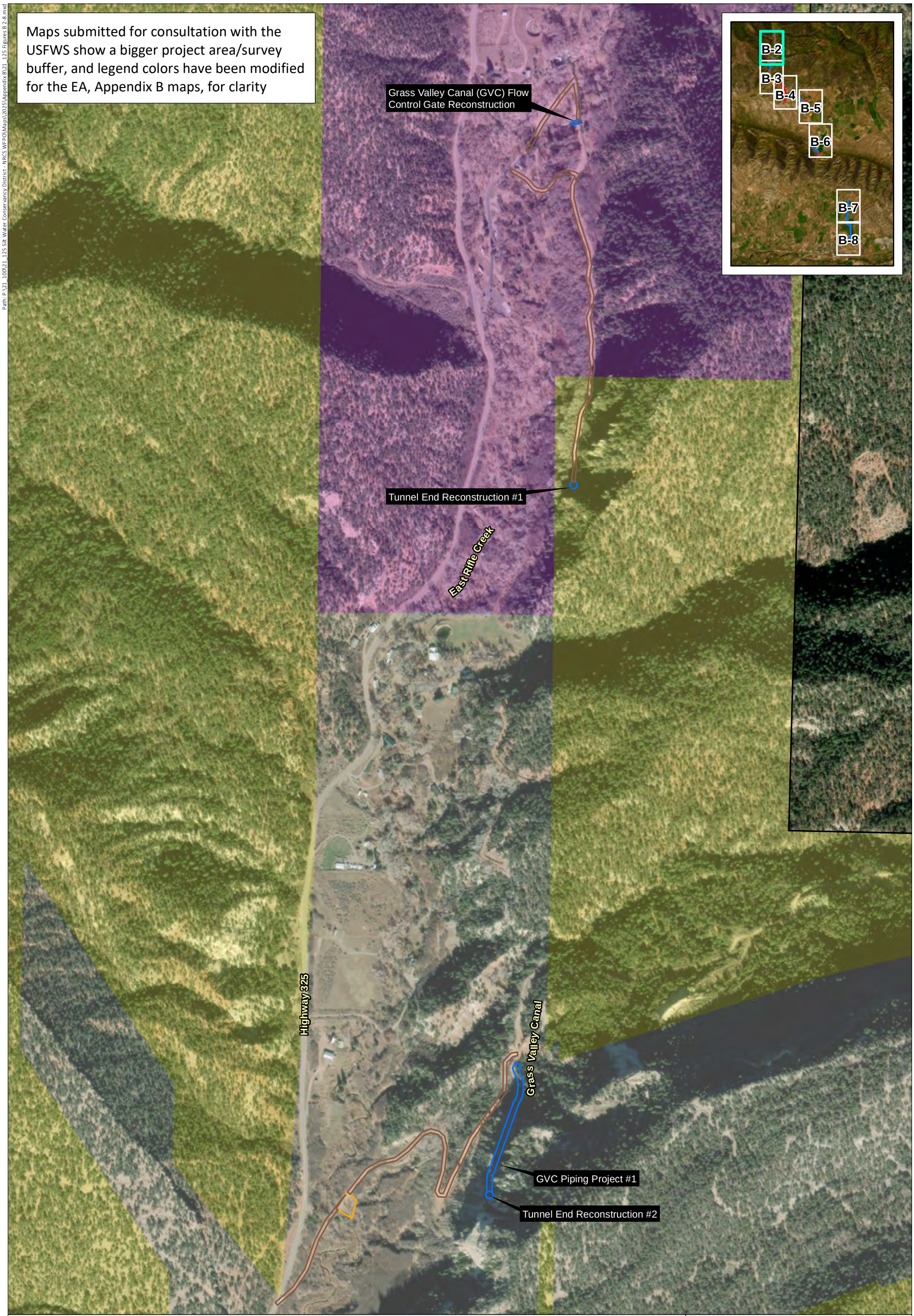
Maps submitted for consultation with the USFWS show a bigger project area/survey buffer, and legend colors have been modified for the EA, Appendix B maps, for clarity



Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Existing Access Road
- Access Road - Grading Required
- New Access
- Project-Specific Component
- Staging Area
- BLM Land
- Bureau of Reclamation Land
- CPW Managed (Privately Owned)
- Private Land
- State Land
- Silt Water Conservancy District Boundary

0 250 500 Feet

N

Figure B-2
Project Map
Grass Valley Canal

Image Source: Maxar Technologies©, October 6, 2023

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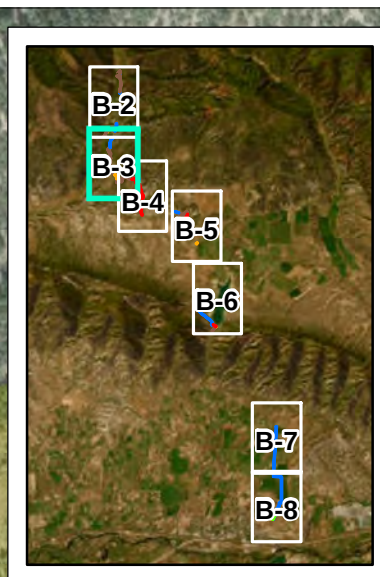
GVC Piping Project #1

Tunnel End Reconstruction #2

Tunnel End Reconstruction #3

GVC Piping Project #2



Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Existing Access Road
- Access Road - Grading Required
- New Access
- Project-Specific Component
- Staging Area
- BLM Land
- Bureau of Reclamation Land
- CPW Managed (Privately Owned)
- Private Land
- State Land
- Silt Water Conservancy District Boundary

0 250 500 Feet

N

Figure B-3
Project Map
Grass Valley Canal

Image Source: Maxar Technologies©, October 6, 2023

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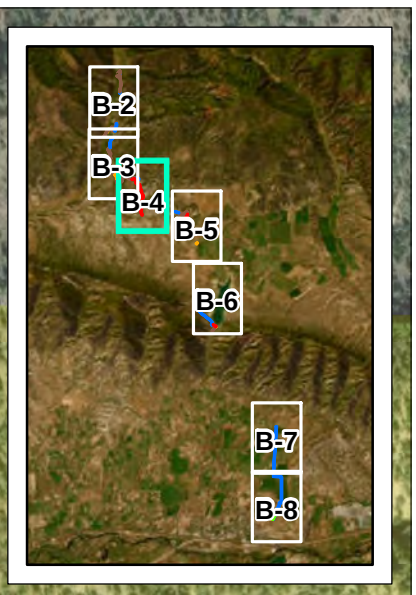

GVC Piping Project #3

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Existing Access Road
- Access Road - Grading Required
- New Access
- Project-Specific Component
- Staging Area
- BLM Land
- Bureau of Reclamation Land
- CPW Managed (Privately Owned)
- Private Land
- State Land
- Silt Water Conservancy District Boundary

0 250 500 Feet

N

Figure B-4
Project Map
Grass Valley Canal

Image Source: Maxar Technologies©, October 6, 2023

Prepared for: Silt Water Conservancy District
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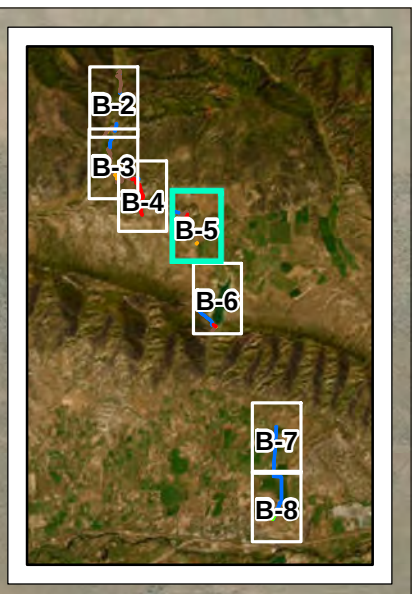

Grass Valley Canal

GVC Piping Project #4

Minor Grading Required

Dodero Road

Evelyn Road

Grass Valley Road

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Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Existing Access Road
- Access Road - Grading Required
- New Access
- Project-Specific Component
- Staging Area
- BLM Land
- Bureau of Reclamation Land
- CPW Managed (Privately Owned)
- Private Land
- State Land
- Silt Water Conservancy District Boundary

0 250 500 Feet

N

Figure B-5
Project Map
Grass Valley Canal

Image Source: Maxar Technologies©, October 6, 2023

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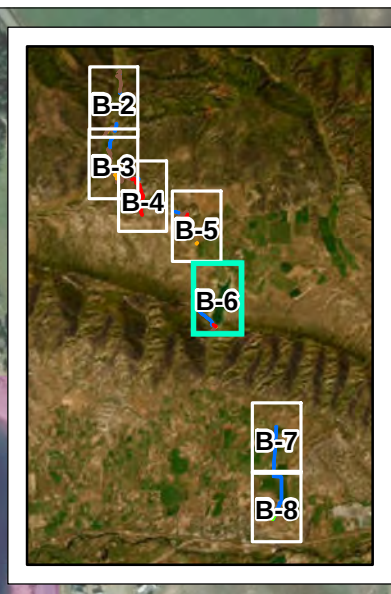

Grass Valley Canal

GVC Bypass Rebuild (open ditch)

Harvey Gap Road

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Existing Access Road
- Access Road - Grading Required
- New Access
- Project-Specific Component
- Staging Area
- BLM Land
- Bureau of Reclamation Land
- CPW Managed (Privately Owned)
- Private Land
- State Land
- Silt Water Conservancy District Boundary

0 250 500 Feet

N

Figure B-6
Project Map
Harvey Gap Reservoir
Grass Valley Canal

Image Source: Maxar Technologies©, October 6, 2023

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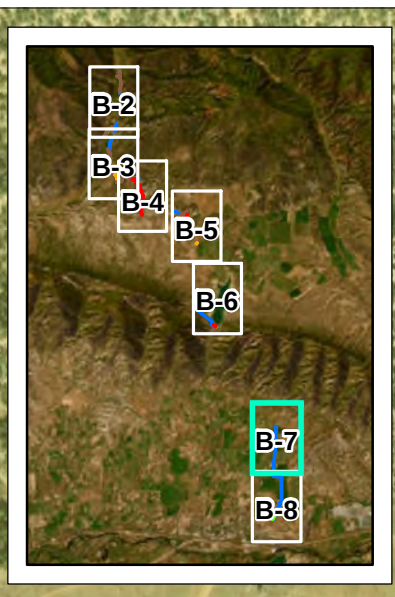

East Lateral Farmers Irrigation Company Ditch

Bendetti Road

Ram Lane

East Bypass Pipeline

Smith Doll Coal Mine Road

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Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Existing Access Road
- Access Road - Grading Required
- New Access
- Project-Specific Component
- Staging Area
- BLM Land
- Bureau of Reclamation Land
- CPW Managed (Privately Owned)
- Private Land
- State Land
- Silt Water Conservancy District Boundary

0 250 500 Feet

N

Figure B-7
Project Map
Pump Canal

Image Source: Maxar Technologies©, October 6, 2023

Prepared for: Silt Water Conservancy District
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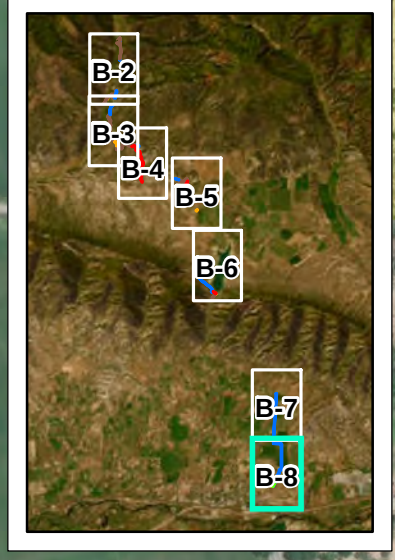

East Bypass Pipeline

East Bypass Pump Station

Ware and Hinds Ditch

Grand Avenue

Lower Cactus Valley Ditch

6

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Existing Access Road
- Access Road - Grading Required
- New Access
- Project-Specific Component
- Staging Area
- BLM Land
- Bureau of Reclamation Land
- CPW Managed (Privately Owned)
- Private Land
- State Land
- Silt Water Conservancy District Boundary

0 250 500 Feet

N

Figure B-8
Project Map
Pump Canal

Image Source: Maxar Technologies©, October 6, 2023

Prepared for: Silt Water Conservancy District
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March 11, 2025

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Appendix C

Support Maps

C-1 Geology in the Watershed Plan Area

C-2 Soils in the Watershed Plan Area

C-3 Watersheds in the Watershed Plan Area

C-4 Annual Precipitation in the Watershed Plan Area

C-5 Impaired Waters in the Watershed Plan Area

C-6 Vegetation Communities in the Watershed Plan Area

C-7 USFWS Section 7 Modeled Ranges for Federally Protected Plants

C-8 Wetlands / Riparian Resources in the Watershed Plan Area

C-9 Elk Range in the Watershed Plan Area

C-10 Mule Deer Range in the Watershed Plan Area

C-11 Bald Eagle Range, Roosts, and Nest Sites in the Watershed Plan Area

C-12 Grazing Allotments in the Watershed Plan Area

C-13 Land Use in the Watershed Plan Area

C-14 Visual Resource Management in the Watershed Plan Area

C-15 FEMA Firmette Map

Path: P:\21_100\21_125 Silt Water Conservancy District - NRCS WFPO\Maps\2024\Support Maps (Appendix C)\21_125 Figure C-1.mxd

Code, Formation

- JTRmg, Morrison, Curtis, Entrada, and Glen Canyon Formations
- Kd, Dakota Sandstone
- Kfd, Frontier Sandstone and Mowry Shale Members of Mancos Shale and Dakota Sandstone
- Ki, Iles Formation
- Km, Mancos Shale
- Kmfm, Frontier Sandstone and Mowry Shale Members and intervening shale zone
- Kw, Williams Fork Formation
- PNee, Evaporitic Facies
- PNm, Minturn Formation in west-central and south-central and other units of middle Pennsylvanian age
- PPNwm, Weber Sandstone and Maroon Formation
- Qa, Modern alluvium
- Qg, Gravels and alluviums (Pinedale and Bull Lake age)
- TRPcs, Chinle and State Bridge Formations
- Two, Wasatch Formation (including Fort Union equivalent at base) and Ohio Creek Formation
- Water

Data Source: US Geological Survey

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement (Alts. 1 & 2)
- Grass Valley Canal (Alts. 1 & 2)
- East Bypass (Alt. 2)
- Watershed Plan Area

0 3,750 7,500 Feet

N

Figure C-1
Geology in the
Watershed Plan Area

Prepared for: Silt Water Conservancy District
File: 21_125 Figure C-1.mxd (GS)
April 2, 2024

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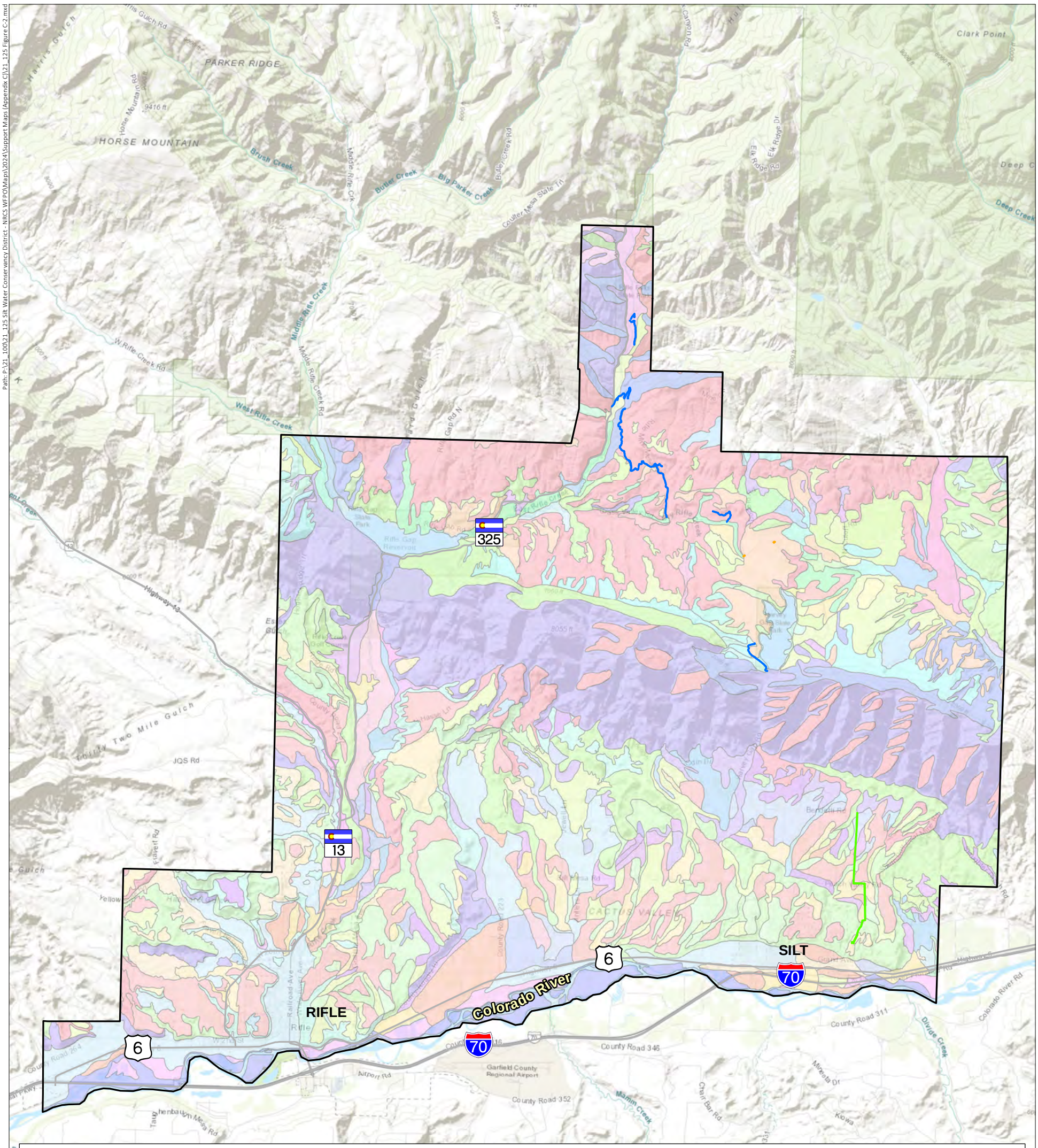

Symbol - Mapping Unit

- 1 - Almy variant loam, 25 to 65 percent slopes
- 10 - Begay sandy loam, 1 to 6 percent slopes
- 11 - Begay sandy loam, 6 to 12 percent slopes
- 12 - Bucklon-Inchau complex, 25 to 50 percent slopes
- 13 - Chilton channery loam, 3 to 6 percent slopes
- 14 - Chilton channery loam, 6 to 12 percent slopes
- 15 - Chilton channery loam, 12 to 25 percent slopes
- 2 - Arle-Ansari-Rock outcrop complex, 12 to 65 percent slopes
- 21 - Cushman-Lazear stony loams, 15 to 65 percent slopes
- 24 - Dollard-Rock outcrop, shale, complex, 25 to 65 percent slopes
- 27 - Halaquepts, nearly level
- 28 - Heldt clay loam, 1 to 3 percent slopes
- 29 - Heldt clay loam, 3 to 6 percent slopes
- 3 - Arvada loam, 1 to 6 percent slopes
- 30 - Heldt clay loam, 6 to 12 percent slopes
- 31 - Heldt clay loam, 12 to 25 percent slopes
- 32 - Holderness variant clay loam, 6 to 25 percent slopes
- 34 - Ildefonso stony loam, 25 to 45 percent slopes
- 35 - Ildefonso-Lazear complex, 6 to 65 percent slopes
- 4 - Arvada loam, 6 to 20 percent slopes
- 40 - Kim loam, 3 to 6 percent slopes
- 41 - Kim loam, 6 to 12 percent slopes
- 43 - Limon silty clay loam, 3 to 12 percent slopes
- 44 - Morval loam, 3 to 12 percent slopes
- 47 - Nihill channery loam, 6 to 25 percent slopes
- 48 - Northwater loam, 15 to 65 percent slopes
- 49 - Olney loam, 1 to 3 percent slopes
- 5 - Ascalon fine sandy loam, 1 to 6 percent slopes
- 50 - Olney loam, 3 to 6 percent slopes
- 51 - Olney loam, 6 to 12 percent slopes
- 54 - Potts loam, 1 to 3 percent slopes
- 55 - Potts loam, 3 to 6 percent slopes
- 56 - Potts loam, 6 to 12 percent slopes
- 57 - Potts-Ildefonso complex, 3 to 12 percent slopes
- 58 - Potts-Ildefonso complex, 12 to 25 percent slopes
- 59 - Potts-Ildefonso complex, 25 to 45 percent slopes
- 6 - Ascalon fine sandy loam, 6 to 12 percent slopes
- 65 - Torrifluvents, nearly level
- 66 - Torriorthents-Camborthids-Rock outcrop complex, steep
- 67 - Torriorthents-Rock outcrop complex, steep
- 68 - Vale silt loam, 3 to 6 percent slopes
- 69 - Vale silt loam, 6 to 12 percent slopes
- 7 - Ascalon-Pena complex, 6 to 25 percent slopes
- 70 - Vale silt loam, 12 to 25 percent slopes
- 72 - Wann sandy loam, 1 to 3 percent slopes
- 73 - Water
- 9 - Badland

Data Source: US Department of Agriculture

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement (Alts. 1 & 2)
- Grass Valley Canal (Alts. 1 & 2)
- East Bypass (Alt. 2)
- Watershed Plan Area

0 3,750 7,500 Feet

N

Figure C-2
Soils in the Watershed Plan Area

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140100050505 Middle Rifle Creek

140100050502 West Rifle Creek

140100050505 Government Creek

140100050505 East Rifle Creek

140100050206 Middle Elk Creek

140100050204 West Elk Creek

140100050604 Rifle Gap Reservoir

140100050505 Government Creek

140100050604 Dry Hollow Creek-Colorado River

140100050701 Dry Creek-Colorado River

140100050702 Beaver Creek-Colorado River

Colorado River

RIFLE

SILT

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement (Alts. 1 & 2)
- Grass Valley Canal (Alts. 1 & 2)
- East Bypass (Alt. 2)
- HUC 12 Watershed Boundary
- Watershed Plan Area

0 3,750 7,500 Feet

N

Figure C-3
Watersheds in the
Watershed Plan Area

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Data Source: Natural Resources Conservation Service

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement (Alts. 1 & 2)
- Grass Valley Canal (Alts. 1 & 2)
- East Bypass (Alt. 2)
- Watershed Plan Area

Annual Precipitation (Inches)

- 11
- 13
- 15
- 17
- 19
- 21

0 3,750 7,500 Feet

N

Figure C-4
Annual Precipitation in the Watershed Plan Area

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Data Source: Colorado Department of Public Health & Environment

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement (Alts. 1 & 2)
- Grass Valley Canal (Alts. 1 & 2)
- East Bypass (Alt. 2)
- Colorado 303(d) Listed Stream
- Watershed Plan Area

0 3,750 7,500 Feet

N

Figure C-5
Impaired Waters in the Watershed Plan Area

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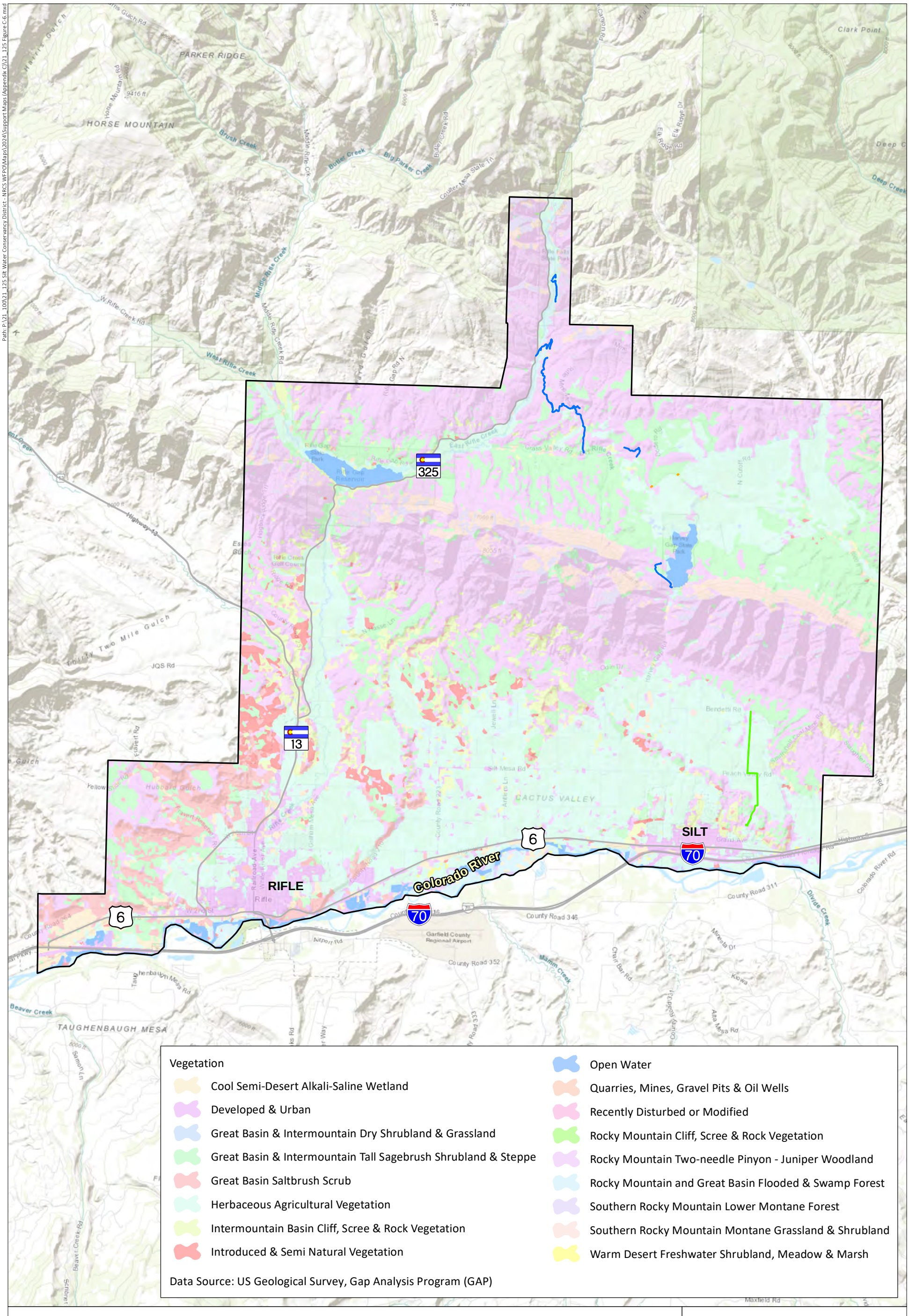

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement (Alts. 1 & 2)
- Grass Valley Canal (Alts. 1 & 2)
- East Bypass (Alt. 2)
- Watershed Plan Area

0 3,750 7,500 Feet

N

Figure C-6
Vegetation Communities in the Watershed Plan Area

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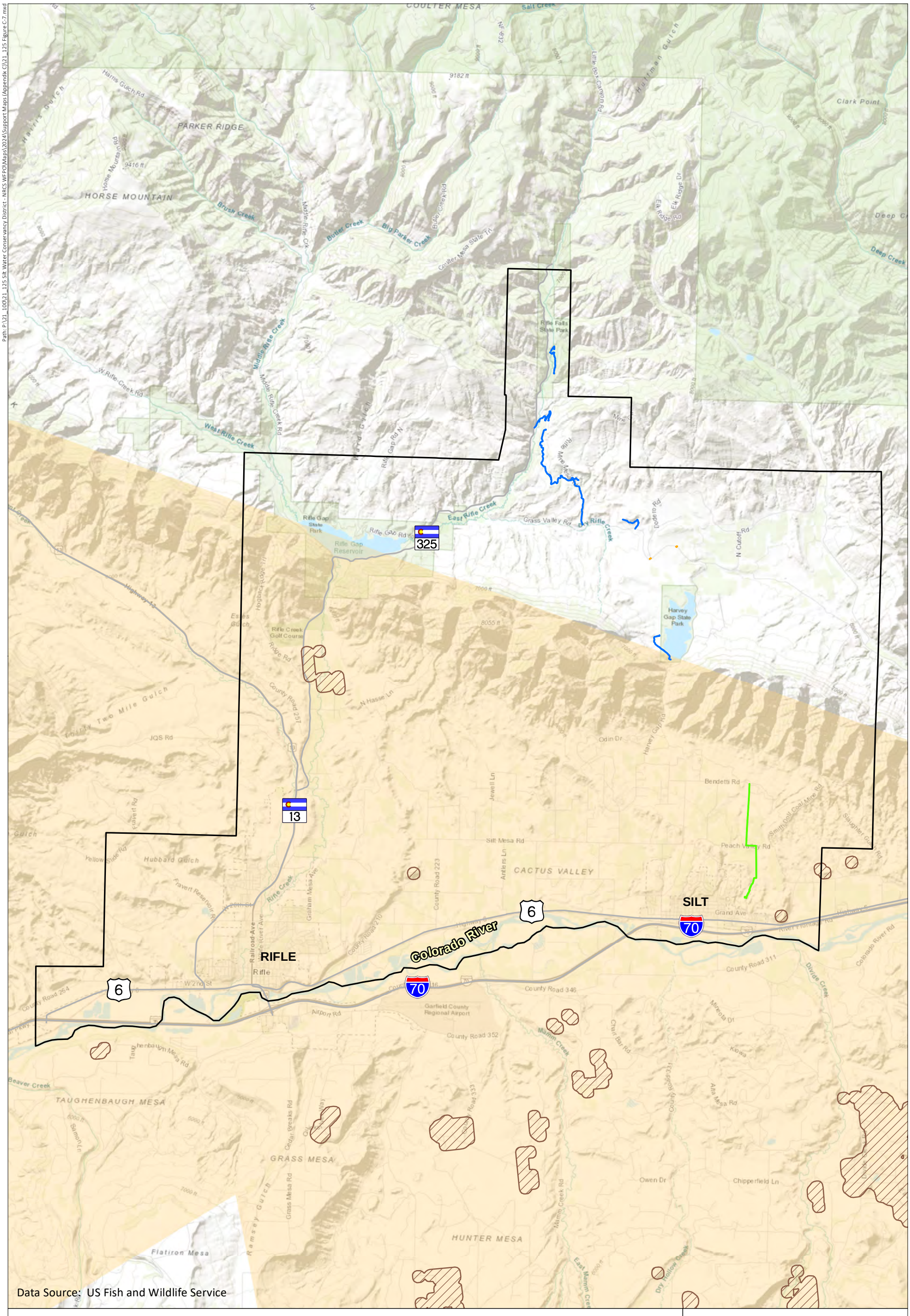

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement (Alts. 1 & 2)
- Grass Valley Canal (Alts. 1 & 2)
- East Bypass (Alt. 2)
- Watershed Plan Area
- DeBeque Phacelia Habitat
- Ute Ladies'-Tresses Habitat

0 3,750 7,500 Feet

N

Figure C-7
USFWS Section 7 Modeled Ranges for Federally Protected Plants

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Data Source: US Fish and Wildlife Service

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement (Alts. 1 & 2)
- Grass Valley Canal (Alts. 1 & 2)
- East Bypass (Alt. 2)
- Watershed Plan Area

National Wetlands Inventory

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine

0 3,750 7,500 Feet

N

Figure C-8
Wetlands / Riparian Resources in the Watershed Plan Area

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Data Source: Colorado Parks and Wildlife

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement (Alts. 1 & 2)
- Grass Valley Canal (Alts. 1 & 2)
- East Bypass (Alt. 2)
- Watershed Plan Area
- Severe Winter Range
- Winter Concentration Area
- Winter Range
- Dry Rifle Creek Winter Closure Area

0 3,750 7,500 Feet

N

Figure C-9
Elk Range in the Watershed Plan Area

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Data Source: Colorado Parks and Wildlife

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement (Alts. 1 & 2)
- Grass Valley Canal (Alts. 1 & 2)
- East Bypass (Alt. 2)
- Watershed Plan Area
- Dry Rifle Creek Winter Closure Area
- Highway Crossing
- Concentration Area
- Resident Population Area
- Severe Winter Range
- Winter Concentration Area

0 3,750 7,500 Feet

N

Figure C-10
Mule Deer Range in the Watershed Plan Area

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Data Source: Colorado Parks and Wildlife

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement (Alts. 1 & 2)
- Grass Valley Canal (Alts. 1 & 2)
- East Bypass (Alt. 2)
- Watershed Plan Area
- Roost Site
- Winter Range
- Active Nest Site
- Destroyed Nest Site
- Unknown Status Nest Site

0 3,750 7,500 Feet

N

Figure C-11
Bald Eagle Range, Roosts, and Nest Sites in the Watershed Plan Area

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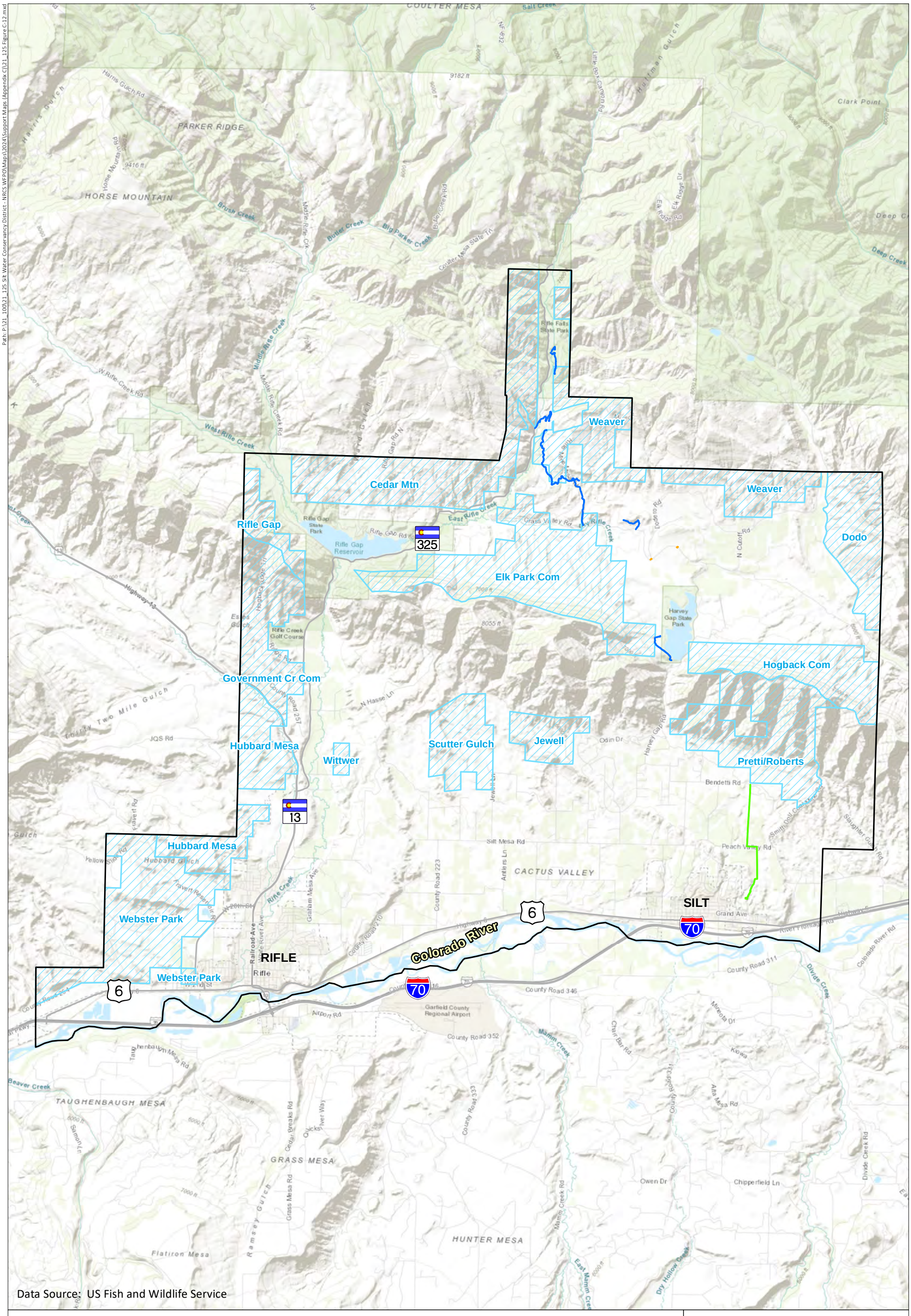

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement (Alts. 1 & 2)
- Grass Valley Canal (Alts. 1 & 2)
- East Bypass (Alt. 2)
- Grazing Allotment
- Watershed Plan Area

0 3,750 7,500 Feet

N

Figure C-12
Grazing Allotments in the Watershed Plan Area

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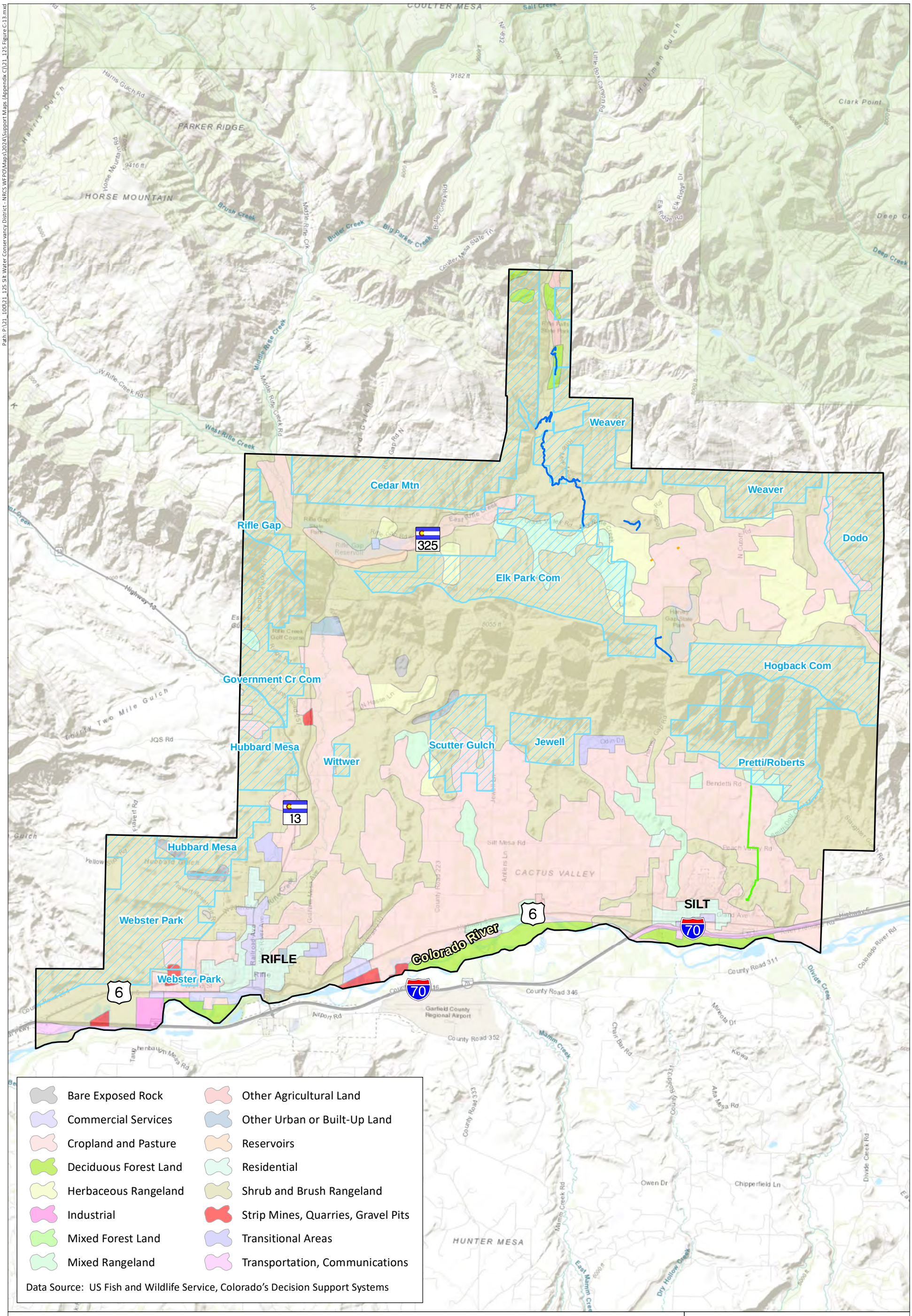

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement (Alts. 1 & 2)
- Grass Valley Canal (Alts. 1 & 2)
- East Bypass (Alt. 2)
- Grazing Allotment
- Watershed Plan Area

0 3,750 7,500 Feet

N

Figure C-13
Land Use in the Watershed Plan Area

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Data Source: Bureau of Land Management

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement (Alts. 1 & 2)
- Grass Valley Canal (Alts. 1 & 2)
- East Bypass (Alt. 2)
- Watershed Plan Area

BLM Visual Resource Management (VRM) Classes

- II
- III
- IV

BLM Land

0 3,750 7,500 Feet

N

Figure C-14
Visual Resource Management in the Watershed Plan Area

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National Flood Hazard Layer FIRMette

FEMA

107°39'3"W 39°32'48"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

107°38'26"W 39°32'20"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/27/2023 at 12:45 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix D
Investigation and Analysis for the National Economic Efficiency Report

Silt Water Conservancy District Watershed Plan and Environmental Assessment
Garfield County, Colorado

Appendix D – Investigation & Analysis Report

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National Economic Efficiency Benefit-Cost Analysis of Alternatives

1. Introduction

Federal guidelines for the evaluation of watershed improvement projects require that the economics of system improvements be analyzed in terms of public costs and benefits, as measured through the change in production of ecosystem services. Therefore, this appendix to the Silt Water Conservancy District (SWCD) Watershed Plan and Environmental Assessment (Plan-EA) estimates the benefits and costs of proposed system improvements to infrastructure owned and operated by the SWCD in central-west Colorado. The SWCD is situated in Garfield County, a predominantly rural county with a history of ranching and agriculture.

Benefits and costs are considered for several system improvement measures. These measures would reduce the risk of damage to infrastructure and the resulting damage to farm incomes, increase water supplies, and extend the recreation season at the Harvey Gap storage reservoir and state park. Specific components of the SWCD irrigation system included in the Plan-EA consist of the Grass Valley Canal (GVC) and the proposed East Bypass Pipeline and Pump Station. The benefits and costs of the action alternatives are compared against a baseline of no action, which is also referred to as the Future Without Federal Investment (FWOFI).

The following sections discuss the methodologies and data used in the National Economic Efficiency (NEE) benefit-cost analysis (BCA) and presents the results using the Economic and Structural Tables (National Watershed Program Manual [NWPM] Part 506, Natural Resources Conservation Service [NRCS] 2014a).

2. Economics of Irrigation System Improvements

The SWCD irrigation infrastructure serves an important role in the agriculture and recreation economy of the surrounding communities in central-west Colorado. System components convey, store, and distribute water for irrigated pasture (primarily grass hay and alfalfa) supporting small- and large-scale livestock production, generating export crop income, and supporting hobby farming in Garfield County (U.S. Department of Agriculture [USDA] 2017). SWCD's infrastructure, including its canals and storage reservoirs, also provide recreational opportunities and wildlife habitat, contributing to the watershed's quality of life.

As SWCD's infrastructure ages, it faces increased risks from natural hazards and capital deterioration. Rockfalls, canal seepage, water shortages, and other hazards can impair the watershed's ability to provide economic benefits to residents and visitors. For example, a rockfall that disrupts SWCD's ability to convey water would result in the loss of farm income, harm wildlife habitat, and impede recreation. Risks are not always hypothetical. The SWCD has already noted that during dry periods, users at the far end of its distribution system cannot receive water because the canals are too dry and the water is absorbed into the ground before it reaches the pasture.

Investing in improvements that mitigate risks and increase the SWCD system's operating resiliency can enhance the economic value of the watershed. Reducing the risk of supply disruptions diminishes the possibility that irrigators will be economically harmed by unforeseen events such as rockfalls and mudslides, and investments in conveyance infrastructure can improve the operating efficiency in addition to enhancing recreational and environmental values.

Improving an irrigation system requires strategic investments in built and natural infrastructure, relocation of existing structures, and other management actions. To make sure the investments are justified, costs must be

carefully considered against the resulting benefits. Since costs occur in the present and benefits occur in the future, time's effect on value must be neutralized. If the benefits of a project equal or exceed its costs once time's effect on value is controlled for, it is a good indication that the investment in the project can be justified.

3. Federal Guidelines of National Economic Efficiency Analysis of Watershed Plans

The NEE BCA conducted as part of this report uses federal water resource project and NRCS guidelines for the evaluation of benefits and costs of the FWOFI and action alternatives, relying primarily on the Principles, Requirements and Guidelines (PR&G) (Council on Environmental Quality [CEQ] 2014), the NRCS Natural Resources Economics Handbook (NRCS 1998), and the NWPM (NRCS 2014b).

With the federal law passage of the 2007 Water Resources Development Act, Congress directed the federal government to update and consolidate its past guidance on federal investments. The original Principles and Guidelines was replaced by PR&G as of April 2019. The PR&G allow for:

"… maximizing public benefits (of all types) relative to costs, the use of quantified and unquantified information in the tradeoff analysis, flexibility in decision making to promote localized solutions, ability to rely on the best available science and objectivity, and advance transparency for Federal investments in water resources."

The PR&G further state:

"Federal investments in water resources as a whole should strive to maximize public benefits, with appropriate consideration of costs. Public benefits encompass environmental, economic, and social goals; include monetary and non-monetary effects; and allow for the consideration of both quantified and unquantified measures."

The PR&G also require benefits and costs to be evaluated in an ecosystem service framework to ensure that:

"Federal investments in water resources…protect and restore the functions of ecosystems and mitigate any unavoidable damage to these natural systems."

This framework gives economic, social, and environmental costs and benefits equal standing in decision making processes and accomplishes the federal objectives of maximizing sustainable economic development, ensuring federal investments protect and restore ecosystem functions and values, and avoiding irreversible impacts (CEQ 2014). The ecosystem framework adopted in the PR&G and used in this report is shown in Table 1.

Table 1. Ecosystem Service Framework Used to Evaluate Benefits and Costs, Plan-EA.

Service Type	Examples
Provisioning	The supply of food, fuel, fiber, water, timber, genetic resources, etc.
Regulating	The regulation of air, climate, natural hazards, water quality, pests, and disease
Cultural	Services that enhance cultural values, like aesthetics, recreation, tourism, and spiritual or religious values
Supporting	Nutrient cycling, soil formation, and primary production

Source: USDA 2014.

The framework classifies ecosystem services into four broad categories of provisioning, regulating, cultural, and supporting services. The primary services impacted by flood mitigation and recreation enhancement projects are regulating and cultural services. Projects designed to provide additional irrigation water may primarily impact provisioning services. Supporting services, which underlie most regulating and provisioning services, are generally regarded as redundant from the perspective of BCA.

The BCA presented here follows the PR&G by considering a broad set of benefits to evaluate the economic, social, and environmental impacts of each alternative. The benefits and costs were selected based on expert opinion, previous experience with agricultural water management projects, and comments received during public scoping.

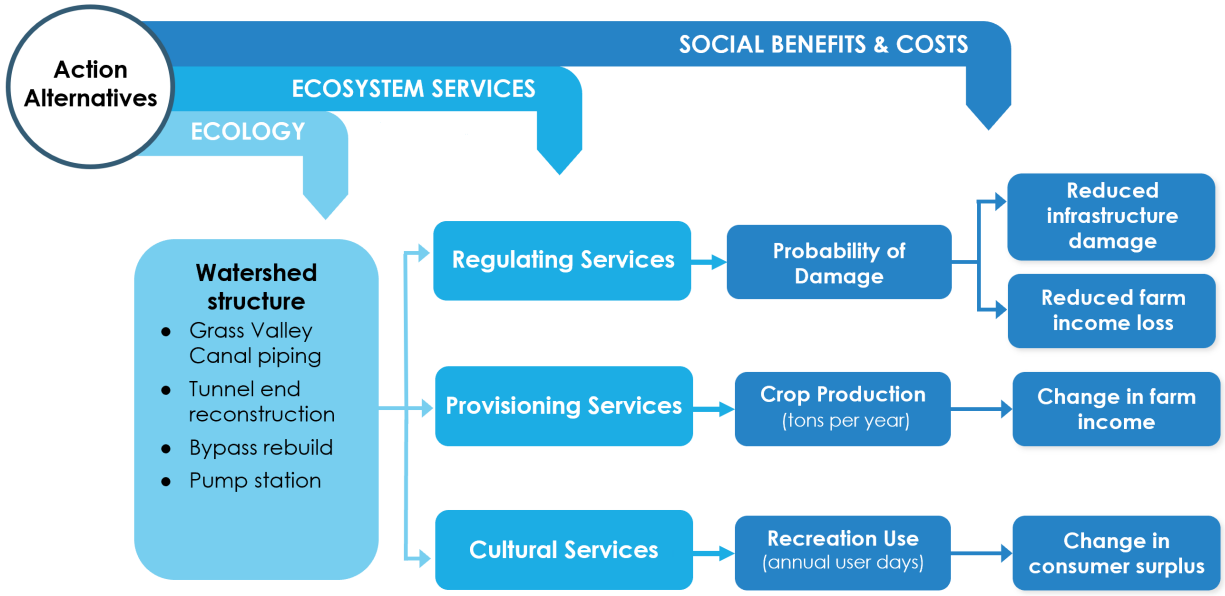
4. Ecosystem Services Evaluated

The individual measures in the action alternatives would be installed on or proximate to agricultural land in a rural setting in central-west Colorado in the same vicinity where the effects of the measures would be experienced. Public scoping comments, planning documents, watershed plans from surrounding areas, and discussions with the project proponent and federal agencies further suggest the project will create several primary benefits by replacing degraded infrastructure in the SWCD's service area.

Figure 1 shows the causal chain describing how the action alternatives would create social benefits and costs in the watershed. Causal chains are models describing how changes to the structure of an ecosystem affect its functioning and the goods and services it provides to society (Olander et al. 2016). When used as part of a BCA, a causal chain assessment traces changes in ecosystem composition all the way through to effects on social outcomes and human well-being, which allows most changes to be quantified and valued.

As Figure 1 shows, the action alternatives would change the ecological structure of the watershed through the replacement of degraded infrastructure and the installation of new infrastructure. The action alternatives would change the functioning of the ecosystem and the value of ecosystem services generated by the watershed.

Figure 1. Description of Alternatives Evaluated and Anticipated Impacts, Plan-EA, Colorado.



The change in watershed structure under the action alternatives would enhance ecosystem services in the watershed by regulating damage to infrastructure and farm incomes. The action alternatives would also improve provisioning services by conserving water through the installation of piping projects. The conserved water could be stored for use later in the season, thereby increasing crop yields and farm income. As an indirect benefit, if the conserved water were stored in Harvey Gap Reservoir, it would increase its surface acreage, thereby extending the recreation season.

4.1 Ability to Characterize, Quantify, and Monetize Services. The ecosystem services shown on Figure 1 can be characterized, quantified, and monetized to varying degrees. For example, under the action alternatives, the benefit of regulating infrastructure damage and farm income losses can be characterized and quantified using information on the probability of infrastructure damage based on previous events and the number of acres that would be impacted in the event of damage. With this information in hand, the loss of farm income that would occur because of infrastructure damage can be calculated using crop yield data, normalized crop prices, and farm budgets.

The change in provisioning services under the action alternatives is measured through changes in farm income and the number of recreation user days. Farm income changes can be characterized, quantified, and valued using information on the change in water supply, crop water requirements, normalized crop prices, and production cost information. Changes in recreation user days are more difficult to characterize, quantify, and value because there is more uncertainty about recreation use patterns and values and how they may change as a result of the project.

The regulation of instream flows is another potential benefit that is difficult to characterize and quantify because it depends on a multitude of external factors. As a result, the potential for the project to benefit instream flows is addressed qualitatively.

4.2 Prioritizing Ecosystem Services. Ecosystem services were prioritized based on their expected contribution to the project's primary purpose of improving agricultural water management and overall impact on

ecosystem services in the watershed. As a result, the regulating, provisioning, and cultural services shown on Figure 1 were all prioritized for analysis.

In addition to the benefits shown on Figure 1, the action alternatives may result in smaller, secondary changes to other ecosystem services. For example, many farm and ranch operators work land passed down through generations and place a high cultural value on continuing their rural way of life. Knowing their ability to earn a living from their land is more secure could create cultural benefits for the project's direct beneficiaries (Fabbricattie et al. 2020).

4.3 Summary and Comparison of Ecosystem Service Changes. A summary of the action alternatives' impact on ecosystem services in the watershed is shown in Table 2. Action Alternative 2 is the Preferred Alternative. It was created and supported through a local stakeholder process. As part of this process, stakeholders were invited to provide public comment and input into the design and evaluation of the Preferred Alternative. As a result of this input, the Preferred Alternative is the locally preferred alternative. The FWOFI is the nonstructural alternative in that, without federal investment, there would be no change in the structure of the watershed. The Preferred Alternative is the alternative that increases NEE by improving water use efficiency, thereby increasing farm incomes and reducing maintenance and infrastructure costs in the watershed. The Preferred Alternative is also the environmentally preferred alternative as defined in Section 101 of the National Environmental Policy Act (NEPA).

> *Section 101 of NEPA states that "… It is the continuing responsibility of the Federal Government to (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain wherever possible an environment which supports diversity and variety of individual choice; (5) achieve balance between population and resource use which will permit high standards of living and wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."*

The Preferred Alternative, which used a watershed approach to characterize problems and solutions in the watershed, meets the federal principles for investments in water resources. The Preferred Alternative would enhance the watershed's ability to provide regulating, provisioning, and cultural services. The Preferred Alternative improves sustainable economic development by improving the economic well-being of users of SWCD's system, including irrigators, recreationists, and residents living in the watershed. The Preferred Alternative would not adversely affect environmental justice communities because there are no such communities located in the watershed.

In terms of tradeoffs, the Preferred Alternative's investment in the watershed would generate public benefit by decreasing damages to infrastructure, reducing agricultural income losses, increasing agricultural income generation, and providing a greater supply of flatwater recreational opportunities as compared to the FWOFI. The average annualized value of these benefits is approximately $298,200. However, the Preferred Alternative will require upfront investment of an average annual amount of $163,000 in built infrastructure to regulate risks and expand the water supply in the watershed. Still, the benefits of the Preferred Alternative outweigh the costs.

While the FWOFI does not require any investment of public money, the tradeoff of avoiding monetary investments in infrastructure is accepting higher levels of risks and expected damage, resulting in income loss, farm productivity loss, and lower levels of recreation use as compared to the action alternatives. Under the FWOFI, annualized costs from infrastructure damages and income losses amount to approximately $215,100 per year (Table 2).

Table 2. Summary of Project Alternatives and Ecosystem Services Evaluated as Part of the NEE BCA in the Plan-EA, Colorado (2024 $).

	Alternatives		
	FWOFI	**Action Alternative 1**	**Action Alternative 2 (Preferred Alterative)[1]**
Total Project Investment (Annualized Average)[2]	**$-**	**$82,300**	**$163,000**
Monetized Net Benefits (Annualized Average)[3]	**-$215,100**	**$215,100**	**$298,200**
Regulating Services (Annualized Average)			
Reduced infrastructure damages	-$117,200	$117,200	$117,200
Reduced agricultural income loss	-$97,800	$97,800	$97,800
Improved instream flows	$-	$-	Could have a positive effect of unknown magnitude on flows in a limited reach of the Colorado River
Provisioning Services (Annualized Average)			
Increased agricultural income	$-	$-	$83,300
Cultural Services (Annualized Average)			
Increased recreation values	$-	Could have a positive effect of unknown magnitude on the number of recreation user days	Could have a positive effect of unknown magnitude on the number of recreation user days

Notes: (1) Note that all costs and benefits for the Preferred Alternative are compared to the FWOFI here and elsewhere in this document. Benefits and costs were lagged using the complete lag method assuming a 60-year analysis period using a discount rate of 2.75 percent. All values are reported in 2024 dollars.

(2) Annualized costs for the Preferred Alternative include design, engineering, administration, permitting, construction, and operations and maintenance.

(3) The net benefits of the FWOFI are negative to reflect the annual costs of expected damages.

5. NEE BCA Data and Methodology

Benefits and costs were calculated based on the expected effects of the individual structures included in the action alternatives. Benefits and costs were analyzed using an ecosystem services framework shown on Figure 1. All benefits and costs were reported as differences from the FWOFI, or No Action Alternative. Effects of the action alternatives were lagged using the complete lag method and evaluated over a 60-year time horizon, which is equal to the 10-year installation period for all of the measures plus the evaluation period over which the structures are expected to have significant beneficial effects.

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 2.75 percent for 2024 (NRCS 2024). Supporting information on costs and benefits are reported in *current year values*, while results are reported in *average annualized values*.[1]

The unit of analysis in this study is an infrastructure subsystem. As discussed elsewhere in the Plan-EA, the SWCD manages several interdependent pieces of infrastructure, such as the GVC and the East Bypass, that are used to divert, store, and convey water. Each of these components can be considered a subsystem of the overall system. For this study, costs and benefits are estimated separately for each subsystem.

To assess the economic benefits and costs of the action alternatives, engineering estimates of system failure risk, damage repair costs, supply disruptions, water storage, and water conveyance were calculated for the action alternatives and the FWOFI.

Engineering data sources for design and costs are summarized below.

- GVC Flow Control Gate Reconstruction: Preliminary calculations for size based on prior GVC inlet gate construction.
- GVC Tunnel End Reconstruction: (#1) Preliminary calculations for size based on prior GVC inlet gate construction. (#2) Inspection/review of pipe outlet that occurs at tunnel end with structural shoring expert; preliminary design as a component of a 2019 Technical Assistance for Federal Cost-Share (TAFC) grant (SWCD 2019, 2020; Colorado River Engineering 2021a, 2021b). (#3 and #4) Inspection/review of pipe outlet that occurs at tunnel end with structural shoring expert; preliminary design considerations based on drilled anchors and shotcrete specifications from specialized shoring company.
- GVC Piping Projects: (#1 and #2) Engineer inspection of hillside and 80% Engineer Design from the 2019 TAFC grant (SWCD 2020; Colorado River Engineering 2021a, 2021b). (#3 and #4) Increased water flow backup has been observed during high-flow periods with occasional overtopping. Culvert undersized based on other piping design calculations. Evaluation of flow capacity conducted for entire GVC (SWCD 2020; Colorado River Engineering 2021a, 2021b).
- GVC Bypass Rebuild: Preliminary calculations for the GVC rebuild are based on field measurements, labor, and material expenses.
- Pump Canal East Bypass Pipeline: Selected route for piping field mapped with preliminary layout and preliminary pump and pipe size calculations.

The BCA used information from these and other sources to characterize, quantify and value of the benefits and costs associated with the action alternatives wherever possible. Further explanation of the data and methods used in the study are provided below.

5.1 Benefits. Analysis of project benefits reduction of infrastructure damages, regulation, and provisioning of agricultural income, regulation of instream flows, and changes in recreation use.

[1] The *current year value* refers to the real-time value at a specific point in the present year. The *average annualized value* involves calculating a discounted average over a period of time and expressing it on an annual basis to provide a fair comparison of present costs and future benefits.

5.1.1 Reduction of Infrastructure Damages. The following components of the action alternatives would help the SWCD regulate damage to its irrigation conveyance infrastructure compared to the FWOFI.

5.1.1.1 GVC Piping and Reconstruction. The GVC is located upstream of Harvey Gap Reservoir and receives water from an inlet structure on East Rifle Creek. The GVC is crucial to water delivery operations, including transferring water from East Rifle Creek to Harvey Gap Reservoir and the Dry Elk Lateral. Most of the irrigation water in the SWCD system is diverted and conveyed by the GVC. The first 2 miles of canal are constructed along the steep sidehill of East Rifle Creek with specific sections subject to failure and water supply disruptions due to rockslides and mudslides.

Bell Consulting prepared a memorandum documenting structural evaluations and anticipated issues with the GVC based on four previous studies:[2]

- Colorado River Engineering Inc. report: RE Grass Valley Canal – Preliminary Engineering – Letter Report System Improvements – TAFC
  - GVC design for piping sections
  - Outlines problem prone areas with descriptions
- Colorado River Engineering Inc. Memorandum: RE Grass Valley Canal – Preliminary Engineering Hydraulic Model – TAFC
  - Hydraulic evaluation of the entire GVC
  - Noted problem areas along canal
- Silt Water Conservancy District Updated Water Management Plan 2019
  - Includes a list of priorities projects (measures) delineated at the time by staff and consultants
  - Provides context for continuing concerning measures in the SWCD
  - Notes 2007 GVC breach and repair
- Report specific to the GVC - Prepared as part the "Middle Colorado River Integrated Water Management Plan," a joint project of the Middle Colorado Watershed Council and The Mt. Sopris, Bookcliffs, And Southside Conservation District – final report February 2021.
  - Notes problem areas for Piping Sections #1 and #2

The studies, along with field investigations, documented numerous structural issues with the GVC that increase the probability of a system failure, which would disrupt the ability of SWCD customers to irrigate their crops and pastures in addition to creating millions of dollars of emergency repair costs.

The canal is commonly divided into four distinct sections. Section 1 is extremely steep with cliffs on both sides; a failure in this area would most likely destroy a large section of ditch, requiring difficult, expensive, and time-consuming reconstruction. Sections 2 and 3 have lower-angle side slopes, but the sections are still at risk from above as mudslides and rockslides may plug the ditch, causing bank failure. In addition, the canal's ability to divert and convey water is at risk at the entrances and exits of the three tunnels the canal passes through. These locations have been damaged by rockfall caused by freeze-thaw cycles in the past, and a collapse of the tunnel entrances and exits would disrupt diversion, conveyance, and storage operations.

Currently no reports are available that calculate rockfall hazard probabilities, land slide probabilities, site-specific storm event induced failures, or other catastrophic failure events. The cost of such studies is prohibitive to the SWCD. However, the studies above, in addition to SWCD managers reports going back to 2007, have detailed events that provide an indication of a failure event potential, as shown in Table 3.

Table 3. Record of GVC Rockfall and Debris Events Since 2007.

Event Date	Event Description	Event type/cause
2007	Canal breach and repair.	Flood event
2009	Siphon #1 replacement due to aging infrastructure and inlet/outlet degradation.	Lifespan exceeded
2011	Remove debris upstream of covered section, Piping Section #1.	Freeze/thaw - snowmelt
2014	Significant slide in sheeting covered section.	Freeze/thaw - snowmelt
2019	Boulder removal from GVC Piping Section #1. Required breaking boulder to remove with large excavator.	Freeze/thaw - snowmelt
2020	Removal of significant debris at Tunnel #3 entrance.	Freeze/thaw - snowmelt
2023	Significant sized boulder left debris on ditch bank after skipping over ditch. Had the boulder entered the ditch, it would have caused severe water supply disruptions based on visual inspection.	Freeze/thaw - snowmelt

Source: Bell Consulting 2023.

Bell Consulting analyzed the events in Table 3 and the technical studies of the GVC discussed above, and provided a professional opinion that indicated a significant rockfall or slide event has the potential to occur in any given year above sections of the GVC in the canyons. In total, Bell Consulting's memorandum analyzed data from 17 irrigation seasons. During that time, there was one damaging event, which equates to an observed frequency of 1/17 years = 0.06 annual risk from flooding. There were also five debris events caused by freeze and thaw cycles, including three events that required significant repairs. This event frequency equates to a 0.6 x 0.3 = 0.18 annual risk of occurrence. Noting the above risk frequencies, the analysis also noted that the risk of damage to the GVC for a 25-year flood event is about 50 percent, which equates to a 0.5 x 0.04 = 0.02 annual chance of occurrence. Since the annual risk of occurrence is lowest under these assumptions, the benefit-cost analysis used the two percent annual damage probability for estimating the average annual repair cost to be as conservative as possible.

Under the FWOFI, failure of any section of the canal would have major and immediate impacts on SWCD's ability to convey and store irrigation water. In addition, a failure would require the SWCD to pay to repair damages. Repair costs were estimated to be twice the expense of hardening SWCD's infrastructure against future failures (Bell Consulting 2023; SWCD Project Selection Process, attached).

Table 4 shows the expected annual damages under existing conditions (FWOFI) based on the cost and failure parameters discussed in this section. Under the action alternatives, which would bury open sections of canal and thereby reducing the probability of damage to zero, the expected annual benefit of reducing damage is the product of the emergency repair costs (approximately $5.8 million) and the probability of annual occurrence (2 percent), which equals approximately $117,000 per year in 2024 dollars (Table 4).

Table 4. Estimated Emergency Repair Costs for Sections of SWCD's GVC at Risk from Weather-Related Events without Federal Funding, Plan-EA, Colorado (2024 $)[1].

GVC Section	Estimated Emergency Repair Cost[2]	Annual Probability of Catastrophic Weather-Related Damage without Project[3]	Expected Annual Cost of Weather-Related Damage Repairs without Project[1]
Piping Section #1 (Alternative 1 and Alternative 2)	$1,916,300	2%	$38,300
Piping Section #2 (Alternative 1 and Alternative 2)	$1,872,100	2%	$37,400
Piping Section #3 (Alternative 1 and Alternative 2)	$467,200	2%	$9,300
Piping Section #4 (Alternative 1 and Alternative 2)	$599,900	2%	$12,000
Tunnels #1, #2, and #3 (Alternative 1 and Alternative 2)	$484,200	2%	$9,700
Bypass ditch (Alternative 1 and Alternative 2)	$310,500	2%	$6,200
Bypass headgate (Alternative 1 and Alternative 2)	$199,600	2%	$4,000
Total (Alternative 1 and Alternative 2)	**$5,849,800**	**2%**	**$117,000**

Note: [1] Totals may differ due to rounding.
Source: [2]. Bell, pers. comm. 2021; [3] Bell Consulting 2023.

5.1.2 Regulation and Provision of Agricultural Income. Several components of the two action alternatives would help the SWCD regulate crop production by avoiding supply disruptions, while other components would increase the provision of crops by increasing SWCD's supply of irrigation water. To estimate the benefits of improving the regulation and provision of crop production, engineering estimates were used to calculate the amount of water at risk from supply disruptions as well as the amount of new water available for SWCD customers.

5.1.2.1 Reduced Water Losses and Increased Water. Supply hydrology estimates for the GVC suggest a major failure of any one of the canal's sections would decrease the available water supply by approximately 13,200 acre-feet (AF) in the year in which the failure occurred. As discussed in Section 5.1.1, there is a 2 percent annual probability that rockfall and mudslides damage a section of the canal so badly that water cannot be conveyed.[2] The expected annual reduction in water supply is 13,200 AF multiplied by the 2 percent annual probability, which equals an expected annual supply disruption of 264 AF (Table 5).

Piping and burying the canal as proposed under the action alternatives would eliminate the risk of damage and the resulting loss of agricultural income. An added benefit of piping the canal is that it reduces seepage,

[2] Bell Consulting 2023. Grass Valley Canal – Structural Review and Evaluation. Memorandum.

which makes more water available for irrigators and generates additional agricultural income. According to the SWCD's estimates, the canal currently loses an average of 870 AF per year to seepage in the proposed piping sections. Under the action alternatives, this water would be used for agricultural production (Table 5).

The East Bypass Pipeline and Pump Station component of the action alternatives would allow the SWCD to fully use its shares of Green Mountain Reservoir water, thereby increasing the supply of irrigation water by 1,300 AF per year according to data from the Bureau of Reclamation. The water from Green Mountain Reservoir would be pumped out of the Colorado River at SWCD's Pump Station and distributed to customers via SWCD's Farmers Irrigation Company (FICo) East Lateral. Like the other components above, the additional water from Green Mountain Reservoir is expected to be fully used 90 percent of the time (Bell, pers. comm. 2021) (Table 5).

Table 5. Estimated Reduction in Water Supply Disruptions and Additions of Water Supply Availability Under the Action Alternatives, Plan-EA, Colorado.

Action Alternatives Component	Irrigation Supply (AF)	Annual Probability of Occurrence	Expected Annual Irrigation Supply (AF)
Reduced Damages			
GVC Piping and Reconstruction (Alternative 1)	13,200	2%	264
Increased Water Supply			
Reduced Seepage from GVC Piping and Reconstruction (Alternative 1 and Alternative 2)	870	100%	870
East Bypass Pipeline and Pump Station (Alternative 2)	1,300	90%	1,170
Total (Alternative 1)	**14,070**	**-**	**1,134**
Total (Alternative 1 and Alternative 2)	**15,370**	**-**	**2,304**

Source: Bell, pers. comm. 2021.

5.1.2.2 Valuing Changes in Irrigation Water Supply. The primary crop grown with irrigation water from the SWCD is alfalfa (90 percent) followed by grass hay (10 percent; Bell, pers. comm. 2021). To estimate the potential benefit of increasing the supply of irrigation water, the study team developed simplified basin-specific crop enterprise budgets for grass hay and alfalfa. The basin-specific crop budgets were developed from county-level data regarding yields per acre from annual surveys conducted by the National Agricultural Statistics Service (NASS)[3], price data were collected from the USDA's normalized crop price estimates for Colorado[4], operating expense data were from Colorado State University's (CSU) western Colorado crop enterprise budgets (CSU 2019), and water use data were from the 2019 Technical Update to the Colorado State Water Plan.

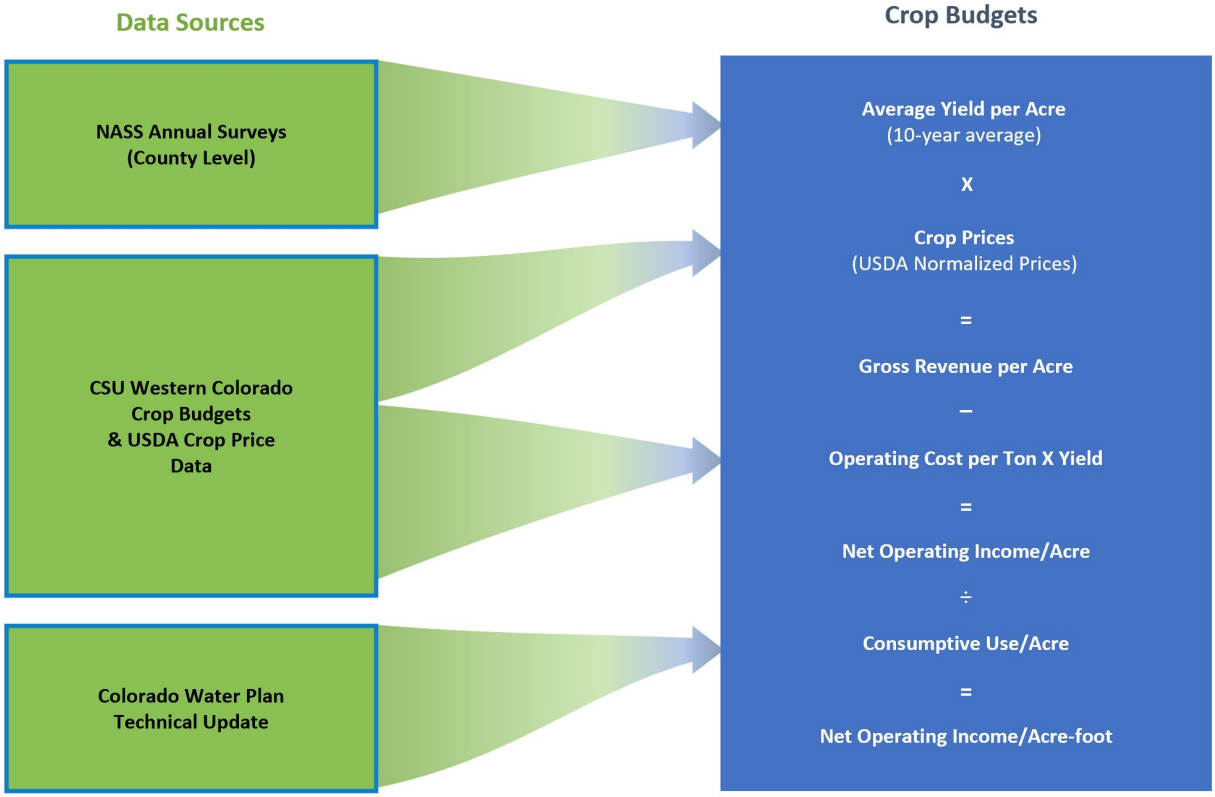
Figure 2 illustrates the process and data used to estimate the value of an AF of irrigation water in SWCD's system. A key component of the simplified crop budgets was the average yield per acre. Every farm or ranch

[3] The NASS surveys have not distinguished between irrigated and non-irrigated yields since 2008. Although relatively few non-irrigated acres are included in the harvested acres in most counties, the reported NASS yields from 2009 forward were adjusted upward based on the relationship between yields on irrigated lands and yields on all harvested lands in each county from 1989 to 2018.

[4] https://www.ers.usda.gov/data-products/normalized-prices/.

operation is unique, and yields can vary considerably based on elevation, irrigation supply, soil quality, management, and other factors. In general, however, variations in yield are strongly correlated with variations in consumptive water use; therefore, yield per AF may be similar between high-yielding operations and lower-yielding operations. For purposes of this study, basin-wide average yields were used.

Figure 2. Data Sources Used to Estimate the Value of Irrigation Water in SWCD's System, Plan-EA, Colorado.



Another important component of the crop enterprise budgets was the average prices for grass hay and alfalfa. Current normalized prices from the USDA Economic Research Service were used to calculate the net income associated with grass hay and alfalfa production.[5] The normalized price data are required to be used in analyses of agricultural impacts as stated in NREH 611.0102(b)(1). The data report state-level price averages for agricultural commodities use a 3-year moving average and the ratio of state to national commodity prices.

Table 6 and Table 7 display the annual yield for grass hay and alfalfa from 2009 through 2018 and combine that information with production costs and normalized prices to estimate the net value of an AF of water in the watershed using 5-year average costs and yields.

Water use information from the Technical Update to the Colorado State Water Plan was used to derive the average net income per AF. According to the Technical Update, 3.3 million acres of agricultural land are irrigated in Colorado, and annual agricultural diversions are approximately 13 million AF per year (Colorado Department of Natural Resources, Colorado Water Conservation Board 2019). This equates to an average agricultural water use of approximately 4 AF per acre. Since irrigation efficiency (the ratio of the total amount

[5] https://www.ers.usda.gov/data-products/normalized-prices/documentation/.

of water diverted for an irrigation use to the volume of water the crop consumes through evapotranspiration) varies with delivery efficiency, net income per AF was estimated for each crop assuming a high and low efficiency as shown in Table 6 and Table 7. High efficiency assumed an irrigation rate of 4.2 AF per acre, and low efficiency assumed an irrigation rate of 4.8 AF per acre.

Table 6. Grass Hay Yields, Revenue, Production Expense, and Net Income per AF for the Colorado River Basin (2024 $).

Year	Avg. Yield (tons/ acre)	Normalized Price ($/ton)	Gross Revenue ($/acre)	Production Expense ($/acre)	Net Income ($/acre)	Net Income (Low) ($/AF)	Net Income (High) ($/AF)
2018	1.45	$214	$310	$133	$177	$36.94	$42.21
2017	1.46	$214	$312	$85	$227	$47.38	$54.15
2016	1.59	$214	$340	$87	$253	$52.76	$60.30
2015	1.89	$214	$404	$90	$314	$65.51	$74.87
2014	1.41	$214	$302	$90	$212	$44.11	$50.41
2013	1.59	$214	$340	$120	$220	$45.89	$52.44
2012	1.13	$214	$242	$86	$156	$32.46	$37.10
2011	1.22	$214	$261	$92	$169	$35.23	$40.26
2010	1.56	$214	$334	$147	$187	$38.93	$44.49
2009	2.41	$214	$516	$240	$276	$57.45	$65.65
Average	**1.6**	**$214**	**$336**	**$117**	**$219**	**$46**	**$52**

Source: Yield data from the USDA NASS Annual Survey (USDA 2010-2019). Crop price data from United States Department of Agriculture's Economic Research Services' normalized crop price data for 2024 available at: https://www.ers.usda.gov/data-products/normalized-prices/documentation. Operating expenses per ton in 2011-2013 are based on average expenses per ton from crop enterprise budgets from 2009 to 2018 from CSU.

Table 7. Alfalfa Yields, Revenue, Production Expense, and Net Income per AF for the Colorado River Basin (2024 $).

Year	Avg. Yield (tons/acre)	Normalized Price ($/ton)	Gross Revenue ($/acre)	Production Expense ($/acre)	Net Income ($/acre)	Net Income (Low) ($/AF)	Net Income (High) ($/AF)
2018	3.41	$214	$730	$328	$402	$84	$96
2017	3.32	$214	$710	$325	$385	$80	$92
2016	2.58	$214	$552	$226	$326	$68	$78
2015	3.11	$214	$666	$276	$390	$81	$93
2014	3.05	$214	$653	$243	$410	$85	$98
2013	2.65	$214	$567	$248	$319	$66	$76
2012	2.44	$214	$522	$228	$294	$61	$70
2011	3.17	$214	$678	$272	$406	$85	$97
2010	2.62	$214	$561	$178	$383	$80	$91
2009	3.46	$214	$740	$332	$408	$85	$97
Average	**3.0**	**$214**	**$638**	**$266**	**$372**	**$78**	**$89**

Source: Yield data from the USDA NASS Annual Survey (USDA 2010-2019). Crop price data from United States Department of Agriculture's Economic Research Services' normalized crop price data for 2024 available at: https://www.ers.usda.gov/data-products/normalized-prices/documentation. Operating expenses per ton in 2011-2013 are based on average expenses per ton from crop enterprise budgets from 2009 to 2018 from CSU.

The net income per AF for high and low irrigation efficiency was averaged for each crop over a 5-year period. The average net income per AF for grass hay was $46 for low efficiency and $52 for high efficiency. For alfalfa, the average income per AF for low efficiency was $78 and $89 for high efficiency. The two high-efficiency average net incomes per AF for grass hay and alfalfa were then combined into a single average

assuming that 90 percent of net income per AF comes from alfalfa and 10 percent comes from grass hay. This calculation yielded an average net income per AF of water of $85.30 in 2024 dollars. This information was used to estimate the reduction in agricultural income losses that would occur under the action alternatives as shown in Table 8.

Table 8. Estimated Average Annual Reduction in Farm Income Losses and Provision of Additional Farm Income Under the Action Alternatives, Plan-EA, Colorado (2024 $).

Action Alternative Component	Expected Annual Irrigation Supply (AF)	Average Net Income Per AF	Annual Change in Farm Income
Reduced Income Damages			
GVC Piping and Reconstruction (Alternative 1 and Alternative 2)	1,134	$85.30	$96,730
Total (Alternative 1)	**1,134**	**-**	**$96,730**
Provision of Additional Income			
East Bypass Pipeline and Pump Station (Alternative 2)	1,170	$85.30	$99,801
Total (Alternative 1 and Alternative 2)	**2,304**	**-**	**$196,530**

Source: Bell, pers. comm. 2021.

As Table 8 shows, the action alternatives would reduce farm income losses by $96,730 per year under Action Alternative 1 and $196,801 per year under Action Alternative 2. It is important to note that this estimate is not meant to reflect the total economic value of increasing SWCD's water supply on the local economy. Studies of the value of irrigation water on Colorado's West Slope have shown that considerable indirect impacts are associated with irrigating crops (BBC Research & Consulting [BBC] et al. 2020). Farmers must purchase inputs from local businesses, including seed, fertilizer, custom labor, hauling, and other services that support jobs, local income, and tax revenue in the surrounding area. Expanding the supply of irrigation water would allow water users to increase crop production, thereby increasing their purchase of goods and services from local businesses. Additionally, there could be nonmarket values associated with farming that are not capitalized into the value of irrigation water, including the value farmers place on rural lifestyles, agricultural landscapes, and their sense of place.

5.1.3 Regulation of Instream Flows. Additional releases from Green Mountain Reservoir, which is approximately 75 linear miles from Harvey Gap Reservoir, as called for under the East Bypass Pipeline and Pump Station component of the Proposed Action, would increase instream flows in the Colorado River system between Green Mountain Reservoir and SWCD's Pump Station. Relative to the annual flows of Western Colorado's major rivers (as measured near the state border), the potential annual flow increases from additional releases at Green Mountain Reservoir would be relatively small, and any environmental and recreation benefits would be highly dependent on the specific locations where an increase in streamflow may occur and the timing of any additional flows related to releases from Green Mountain Reservoir. As a result of this uncertainty, the value of additional streamflow was not quantified as part of the BCA.

5.1.4 Changes in Recreation Use. The action alternatives may indirectly affect recreation at Harvey Gap Reservoir, which is used by SWCD for storage and managed as a state park by Colorado Parks and Wildlife (CPW). Harvey Gap Reservoir provides several flatwater recreational opportunities. In addition to allowing

boating for motorized vessels with 10 horsepower or less, the reservoir attracts many paddle sport users, including kayakers, canoers, and paddleboarders (Palcer, pers. comm. 2021). Fishing is also a popular activity.

According to CPW, an annual average of 49,501 people visited Harvey Gap Reservoir from 2015 to 2021 (Palcer, pers. comm. 2021). In 2020, visitation increased to more than 196,000 visitors before declining to 66,284 visitors in 2021. Most visitation occurs from mid-May through mid-August. The increase in visitation created parking issues and competition for space on the reservoir. The reservoir is also challenged by low water levels in August, which have resulted in early closure of the boat ramp (Palcer, pers. comm. 2021).

The works of improvement proposed as part of the action alternatives would result in more water being stored in Harvey Gap Reservoir, which would maintain higher water levels as a result. Water conserved by the works of improvement would be stored in the reservoir beginning in the spring and held until it is released in the early fall to irrigate crops, resulting in high average water levels during the recreation season, which occurs from mid-May through mid-August.

In particular, the East Bypass Pipeline and Pump Station would result in higher water levels in Harvey Gap Reservoir because SWCD would divert flows from the Colorado River in the late spring and early summer, thereby leaving water in Harvey Gap Reservoir for use in the late summer and early fall. Approximately 1,071 AF of water would be stored in Harvey Gap Reservoir through the recreation season because of the East Bypass Pipeline and Pump Station. The additional storage is expected to increase the recreation season by four weeks (Bell, pers. comm. 2021).

5.2 Costs. Project costs include all expenses incurred as part of the development, installation, operation, and maintenance of a project. Preliminary engineering work was completed by Bell Consulting, which was hired by the SWCD to lead design and planning work as part of the 2019 Water and District Management Plan (SWCD 2019) and the Watershed and Flood Prevention Operation Program. Based on this preliminary engineering work and field measurements, Bell Consulting provided cost estimates for the Proposed Action. The cost estimates were allocated to particular categories, consistent with definitions contained in 390-NWPM, Part 506, Subpart E, Section 506.50K, which included:

- Construction, including procurement and construction project management
- Design and engineering
- Permitting
- Project administration (contract administration and permitting)
- Operations and maintenance

Each cost was allocated to federal sources or the project Sponsor.

Table 8-4 (NWPM 506.11, Economic Table 1; NRCS 2014a), Table 8-5 (NWPM 506.12, Economic Table 2; NRCS 2014a), and Table 8-7 (NWPM 506.18, Economic Table 4; NRCS 2014a) in the Watershed Plan and Environmental Assessment summarize installation costs, distribution of costs, and total annual average costs for the action alternatives. In addition to the installation costs, Action Alternative 2 would incur energy costs to pump water from the Colorado River as part of the East Bypass Pump Station infrastructure subsystem. These costs are included in the "Other Direct Costs" in Table 8-7 (Economic Table 4) in the Watershed Plan

and Environmental Assessment. Detail on the derivation of the values in the tables is discussed in more detail below.

5.2.1 Project Construction Costs. Construction costs for each infrastructure subsystem of the action alternatives were estimated by Bell Consulting and are reported in 2024 dollars, rounded to the nearest dollar. The total cost of the Preferred Alternative was estimated to be $4.9 million in 2024 dollars as shown in Table 8-4 in the Watershed Plan and Environmental Assessment (NWPM 506.11, Economic Table 1; NRCS 2014a).

Design costs were assumed to be approximately 5 percent of construction costs, with the following exceptions: the design costs for reconstruction of the GVC bypass headgate were assumed to be 7 percent of construction costs, and design costs for the East Bypass Pump Station were assumed to be 10 percent of construction costs (Bell, pers. comm. 2021). Similarly, permitting and mitigation costs were included in the cost estimates reported below. Specifically, $3,000 was included for cultural resource mitigation, $3,000 was included for permitting, and $21,500 was included for paleo mitigation.

5.2.2 Other Direct Costs. In addition to construction costs, the infrastructure subsystems of the action alternatives require expenditures for engineering and design, permitting, procurement, and operations and maintenance (Table 8-7 (Economic Table 4) in the Watershed Plan and Environmental Assessment). These costs were estimated as a percentage of each subsystem's total construction costs. Operations and maintenance costs were set equal to 0.33 percent of construction costs. The operations and maintenance costs include activities including inspection and monitoring, leak repair, debris removal, corrosion control, pump maintenance, safety inspections, vegetation management, and other similar activities. Electricity costs to estimate the East Bypass Pump Station were calculated separately assuming about 500 kWh of electricity are needed to move one AF of water and that the cost of a kWh is equal to $0.14.

5.3 Lags of Benefits and Costs. Benefits and costs of the FWOFI and Action Alternatives occur at different points in time as shown in Table 8-3 (installation sequence) of the Watershed Plan and Environmental Analysis. To account for the timing of costs and benefits, the information in Table 8-3 was used in conjunction with the complete lag method described in the Natural Resource Conservation Service's Natural Resources Economics Handbook. The analysis period used a 60-year period of analysis which covers the 10 years of installation for the measures and the 50-year period over which the measures are anticipated to produce reliable benefits. The analysis used a 2.75 percent discount rate over the period of analysis.

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Attachment to Appendix D: SWCD Project Selection Process / Alternatives Considered during Formulation

This attachment presents the alternatives considered in the formulation phase. According to the PR&G, alternatives should reflect a range of scales and management measures and be evaluated against the Federal Objective and Guiding Principles; against the extent to which they address the problems and opportunities identified in the purpose and need; and against the criteria of completeness, effectiveness, efficiency, and acceptability.

Areas of concern and resulting measures selected as part of the Plan-EA were cooperatively developed over several years using a project prioritization and selection process centered on the problems and opportunities identified in the purpose and need. Table 1 below is a summary of the measures identified and retained as part of the Proposed Action, or eliminated. Areas of concern are consistent with the federal objectives of maximizing sustainable economic development and minimizing adverse impacts and vulnerabilities in any case where a floodprone area must be used. Specific to the SWCD, these areas included:

- Where infrastructure could be replaced or augmented to mitigate failure and flooding risk
- Where water storage/water supply could be increased
- Where water management could be improved
- Measures that reduce the operational and maintenance burden

Funding/fundability and whether the project could be achieved within the 15-year time frame were also considered.

Measures that were eliminated during the Proposed Action formulation are identified in Section 5.2 of the Plan-EA. Five measures selected for further evaluation are part of the Proposed Action and are discussed in the Plan-EA. Once compiled, the five measures that comprise the Proposed Action were evaluated against the criteria of completeness, effectiveness, efficiency, and acceptability, defined below (DM 9500-013: b(4)(a)).

1. Completeness is the extent to which an alternative provides and accounts for all features, investments, and/or other actions necessary to realize the planned effects, including any necessary actions by others. It does not necessarily mean that alternative actions need to be large in scope or scale.
2. Effectiveness is the extent to which an alternative alleviates the specified problems and achieves the specified opportunities.
3. Efficiency is the extent to which an alternative alleviates the specified problems and realizes the specified opportunities at the least cost.
4. Acceptability is the viability and appropriateness of an alternative from the perspective of the nation's public and consistency with existing federal laws, authorities, and public policies. It does not include local or regional preferences for particular solutions or political expediency.

Table 1. Measures Considered during the Proposed Action Formulation Phase.

Project	Which Purpose and Need Criteria Does the Project Achieve?				Selected as Part of the Proposed Action, for Further Evaluation
	Mitigate Risk of System Failure	Increase Water Storage Capacity or Water Supply	Improve Water Management/Reduce infrastructure damage costs	Fundable, Feasible within 15-Year Time Frame	
GVC—Flow Control Gate Reconstruction	X		X	X	X
GVC—Tunnel End Reconstruction at three locations where there is 30% or 40% probability of failure	X		X	X	X
Pipe four portions of the GVC that have 40% to 60% probability of failure	X		X	X	X
Line the entire length of the Dry Elk Lateral	X	X	X		
Line the first 8,000 feet of the Dry Elk Lateral	X	X	X	X	X
Pipe the first 8,000 feet of or entire length of the Dry Elk Lateral	X	X	X	X	
GVC Bypass Rebuild around Harvey Gap	X		X	X	X
Spillway Reconstruction at Harvey Gap Dam	X	X	X	X	X
Dredge silt deposited in Harvey Gap Reservoir		X		X	X
Address a leaky intersection of the West Lateral and interconnect	X	X	X		
Install a measurement device on the East Lateral and West Lateral, and Pump Canal			X		
Pipe a section of the Pump Canal	X	X	X	X	
Install a Bypass from the Pump Canal to the East Lateral FICo		X	X	X	X
Address the Davie Ditch's leak and failing pipe[1]	X	X	X	X	
Update the office building and shop			X		

[1]Davie Ditch improvements have current funding under the Bureau of Reclamation.

The following measures were eliminated from the Proposed Action:

- GVC—Shore up/reinforce three tunnel ends and one pipe inlet where there is 20 percent probability of failure: Based on additional field inspection by SWCD contract engineers, the time frame estimated for repairs at these tunnel entrances exceeded the 15-year horizon established as part the Plan-EA.
- Line the entire length of the Dry Elk Lateral: Lining the entire Dry Elk Lateral was eliminated due to the cost-and-benefit ratio. The first 8,000 feet of the lateral contains the most seepage loss based on calculations of grade and flow volume. Lining the remainder of the Dry Elk Lateral is considered an unreasonable cost, compared to the water savings associated with lining that section.
- Pipe the Dry Elk Lateral: Piping was eliminated due to expense as well as the desire by local landowners to be able to continue to use the ditch as a source for livestock and wildlife watering.
- Address leaky intersection of the FICo West Lateral and Interconnect: The leaking area required repair in a short time frame, which necessitated making repairs before the completion time frame for the Plan-EA.
- Install a measurement device on the East Lateral and West Lateral, and Pump Canal: Measuring devices are not a requirement at this time and may not serve much purpose for water administration. Potentially small project that would be better suited to in-house funding.
- Pipe a section of the Pump Canal: A lower-priority project that would not occur within the 15-year time frame.
- Address the Davie Ditch's leak and failing pipe: Already has funding and is under design by the Bureau of Reclamation under Memorandum of Agreement 1.
- Update the office building and shop: Deemed a lower-priority project not within the 15-year window.
- On-farm measures were not considered because the SWCD does not have any authority over on-farm measures on private lands.

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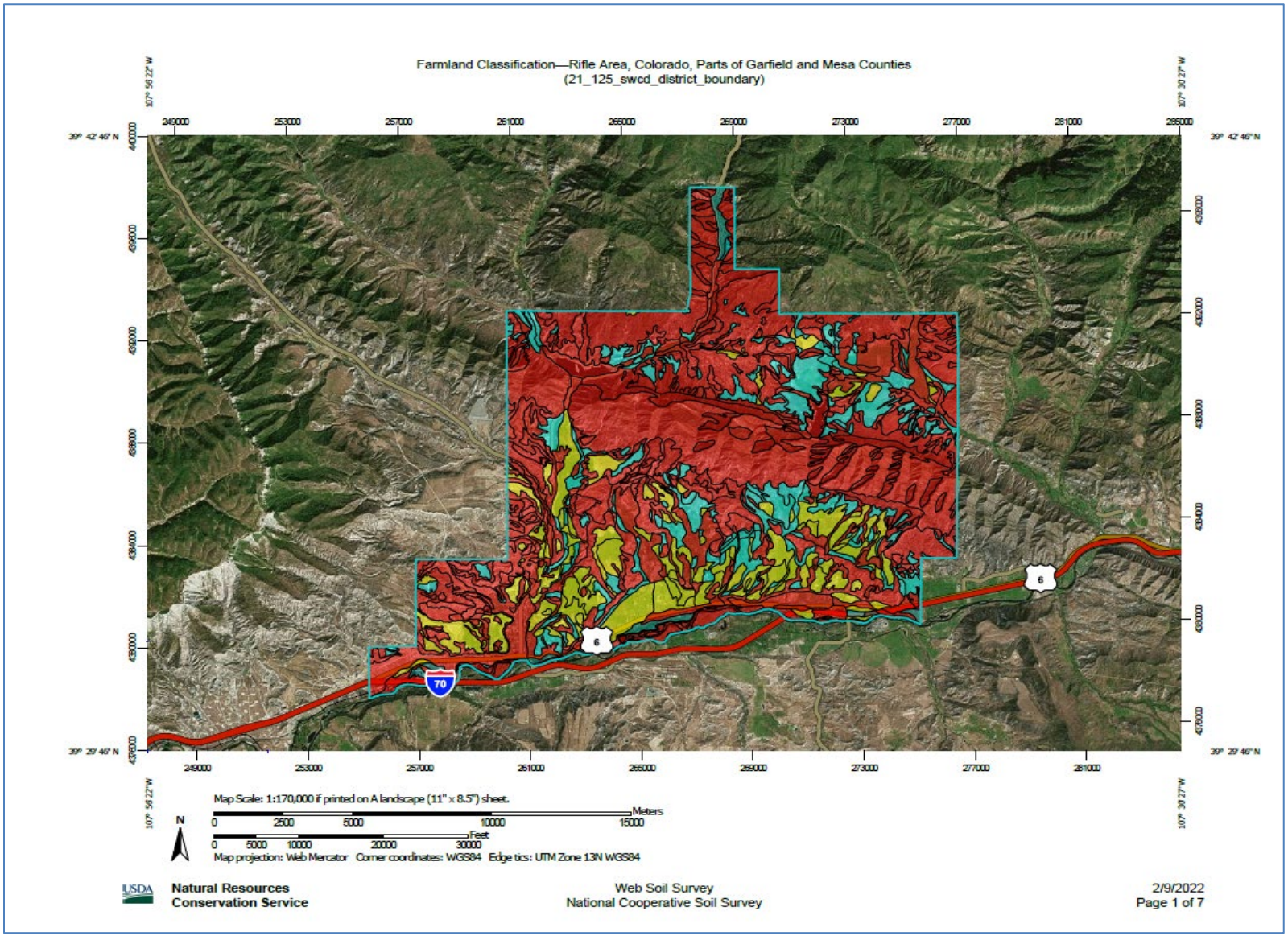
Supporting Information for Soil Resources

TABLE E-1. Soils in the Watershed Plan Area

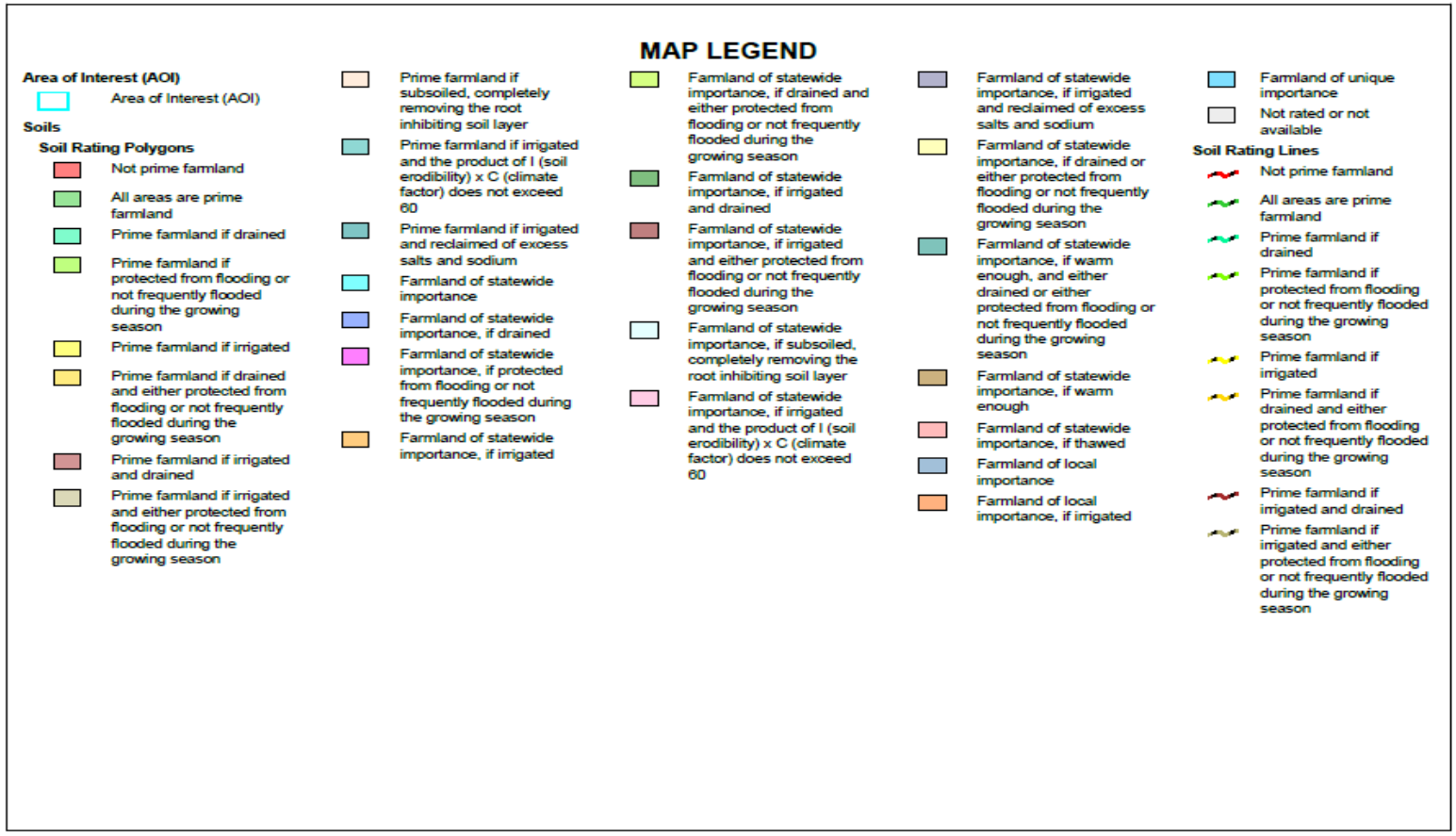
Map Unit Symbol	Map Unit Name	Rating	Acres in SWCD Area	Percent of AOI
67	Torriorthents-Rock outcrop complex, steep	Not prime farmland	8,924.80	15.80
21	Cushman-Lazear stony loams, 15 to 65 percent slopes	Not prime farmland	7,781.40	13.80
66	Torriorthents-Camborthids-Rock outcrop complex, steep	Not prime farmland	4,368.00	7.70
55	Potts loam, 3 to 6 percent slopes	Prime farmland if irrigated	3,721.60	6.60
3	Arvada loam, 1 to 6 percent slopes	Not prime farmland	3,561.00	6.30
34	Ildefonso stony loam, 25 to 45 percent slopes	Not prime farmland	3,184.10	5.60
56	Potts loam, 6 to 12 percent slopes	Farmland of statewide importance	2,759.10	4.90
24	Dollard-Rock outcrop, shale, complex, 25 to 65 percent slopes	Not prime farmland	1,503.70	2.70
57	Potts-Ildefonso complex, 3 to 12 percent slopes	Not prime farmland	1,448.40	2.60
35	Ildefonso-Lazear complex, 6 to 65 percent slopes	Not prime farmland	1,277.20	2.30
69	Vale silt loam, 6 to 12 percent slopes	Farmland of statewide importance	1,267.80	2.20
40	Kim loam, 3 to 6 percent slopes	Prime farmland if irrigated	1,208.00	2.10
54	Potts loam, 1 to 3 percent slopes	Prime farmland if irrigated	1,163.20	2.10
31	Heldt clay loam, 12 to 25 percent slopes	Not prime farmland	1,121.10	2.00
65	Torrifluvents, nearly level	Not prime farmland	1,065.70	1.90
29	Heldt clay loam, 3 to 6 percent slopes	Farmland of statewide importance	937.90	1.70
7	Ascalon-Pena complex, 6 to 25 percent slopes	Not prime farmland	886.40	1.60
73	Water	Not prime farmland	919.70	1.60
4	Arvada loam, 6 to 20 percent slopes	Not prime farmland	859.20	1.50
41	Kim loam, 6 to 12 percent slopes	Farmland of statewide importance	785.20	1.40
50	Olney loam, 3 to 6 percent slopes	Prime farmland if irrigated	763.20	1.40
30	Heldt clay loam, 6 to 12 percent slopes	Farmland of statewide importance	714.60	1.30
27	Halaquepts, nearly level	Not prime farmland	692.40	1.20
72	Wann sandy loam, 1 to 3 percent slopes	Prime farmland if irrigated and reclaimed of excess salts and sodium	672.60	1.20
43	Limon silty clay loam, 3 to 12 percent slopes	Not prime farmland	608.80	1.10
51	Olney loam, 6 to 12 percent slopes	Farmland of statewide importance	603.30	1.10
28	Heldt clay loam, 1 to 3 percent slopes	Prime farmland if irrigated	564.00	1.00
9	Badland	Not prime farmland	455.20	0.80
13	Chilton channery loam, 3 to 6 percent slopes	Not prime farmland	399.70	0.70
49	Olney loam, 1 to 3 percent slopes	Prime farmland if irrigated	373.50	0.70
58	Potts-Ildefonso complex, 12 to 25 percent slopes	Not prime farmland	359.90	0.60
6	Ascalon fine sandy loam, 6 to 12 percent slopes	Farmland of statewide importance	280.10	0.50
47	Nihill channery loam, 6 to 25 percent slopes	Not prime farmland	158.10	0.30
5	Ascalon fine sandy loam, 1 to 6 percent slopes	Prime farmland if irrigated	92.50	0.20
10	Begay sandy loam, 1 to 6 percent slopes	Prime farmland if irrigated	105.70	0.20

Map Unit Symbol	Map Unit Name	Rating	Acres in SWCD Area	Percent of AOI
12	Bucklon-Inchau complex, 25 to 50 percent slopes	Not prime farmland	123.00	0.20
48	Northwater loam, 15 to 65 percent slopes	Not prime farmland	103.70	0.20
59	Potts-Ildefonso complex, 25 to 45 percent slopes	Not prime farmland	129.50	0.20
1	Almy variant loam, 25 to 65 percent slopes	Not prime farmland	82.00	0.10
2	Arle-Ansari-Rock outcrop complex, 12 to 65 percent slopes	Not prime farmland	39.00	0.10
14	Chilton channery loam, 6 to 12 percent slopes	Not prime farmland	28.30	0.10
15	Chilton channery loam, 12 to 25 percent slopes	Not prime farmland	81.40	0.10
32	Holderness variant clay loam, 6 to 25 percent slopes	Not prime farmland	80.80	0.10
68	Vale silt loam, 3 to 6 percent slopes	Prime farmland if irrigated	83.10	0.10
70	Vale silt loam, 12 to 25 percent slopes	Not prime farmland	77.20	0.10
11	Begay sandy loam, 6 to 12 percent slopes	Not prime farmland	9.10	0.00
44	Morval loam, 3 to 12 percent slopes	Not prime farmland	10.90	0.00
Totals for AOI			**56,435.10**	**100.00**

FIGURE E-1. Map of Farmland Classification in the Watershed Plan Area.



Farmland Classification—Rifle Area, Colorado, Parts of Garfield and Mesa Counties
(21_125_swcd_district_boundary)



Supporting Information for Water Resources

TABLE E-2. In-stream Flow Requirements in the Watershed Plan Area

Stream Name	Appropriation Date	Upper Terminus	Lower Terminus	Segment Length (miles)	Flow Amounts (cubic feet per second, with dates)
West Rifle Creek	5/7/1980	Headwaters	Confluence at Rifle Gap Reservoir	10.8	1 (1/1 - 12/31)
Rifle Creek	5/7/1980	Outlet of Rifle Gap Reservoir	Confluence with Colorado River	9.9	5 (10/1 - 4/30), 9 (5/1 - 9/30)
East Rifle Creek	5/7/1980	Confluence with Three Forks Creek	Confluence with Rifle Gap Reservoir	10.8	6 (1/1 - 12/31)
Three Forks Creek	5/7/1980	Headwaters, in vicinity of	Confluence with East Rifle Creek	5.2	3 (1/1 - 12/31)
Middle Rifle Creek	5/7/1980	Headwaters, in vicinity of	Confluence with West Rifle Creek	10.6	3 (1/1 - 12/31)
East Rifle Creek	5/7/1980	Headwaters, in vicinity of	Confluence with Three Forks Creek	2.0	3 (1/1 - 12/31)
Elk Creek	5/7/1980	Confluence with Middle and West Elk Creeks	Confluence with East Elk Creek	2.6	6 (10/1 - 4/30); 10 (5/1 - 9/30)
Elk Creek	5/7/1980	Confluence with East Elk Creek	Confluence with the Colorado River	1.4	8 (10/1 - 4/30); 15 (5/1 - 9/30)

Source: Colorado Water Conservation Board 2022.

FIGURE E-2. Discharge at Colorado River Below Glenwood Springs USGS 09085100 (Upstream) (Source: U.S. Geological Survey (USGS) 2022).

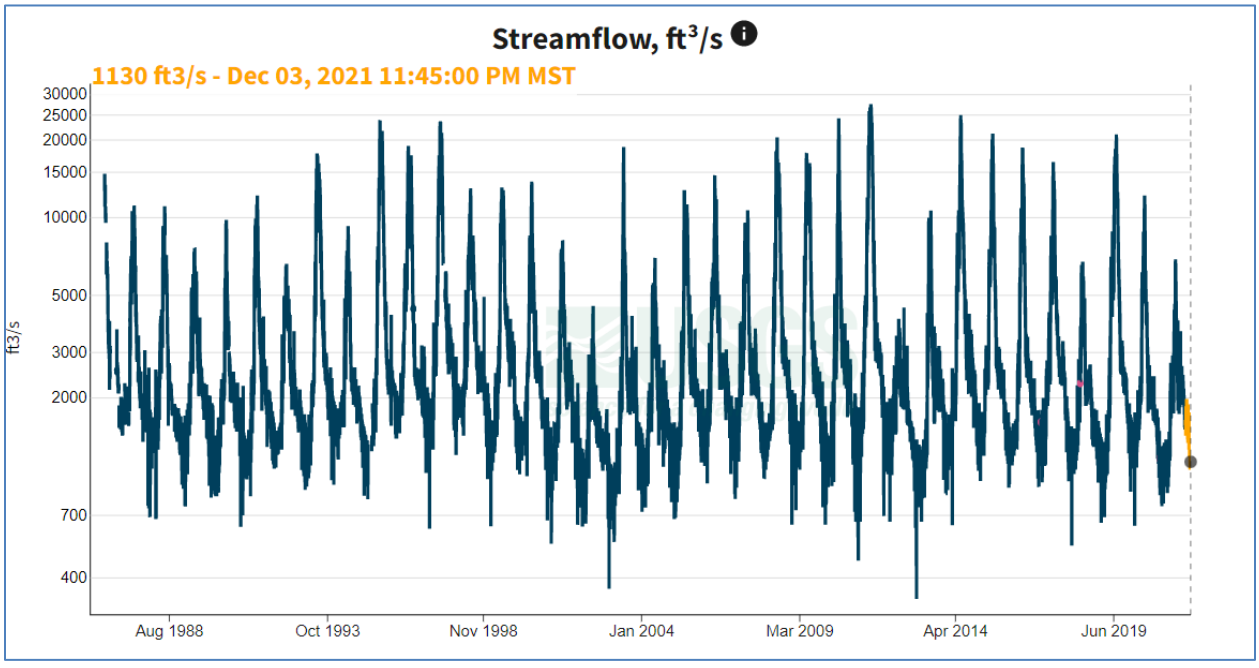


FIGURE E-3. Discharge at USGS 09095500 Colorado River Near Cameo (Downstream) (Source: USGS 2022).

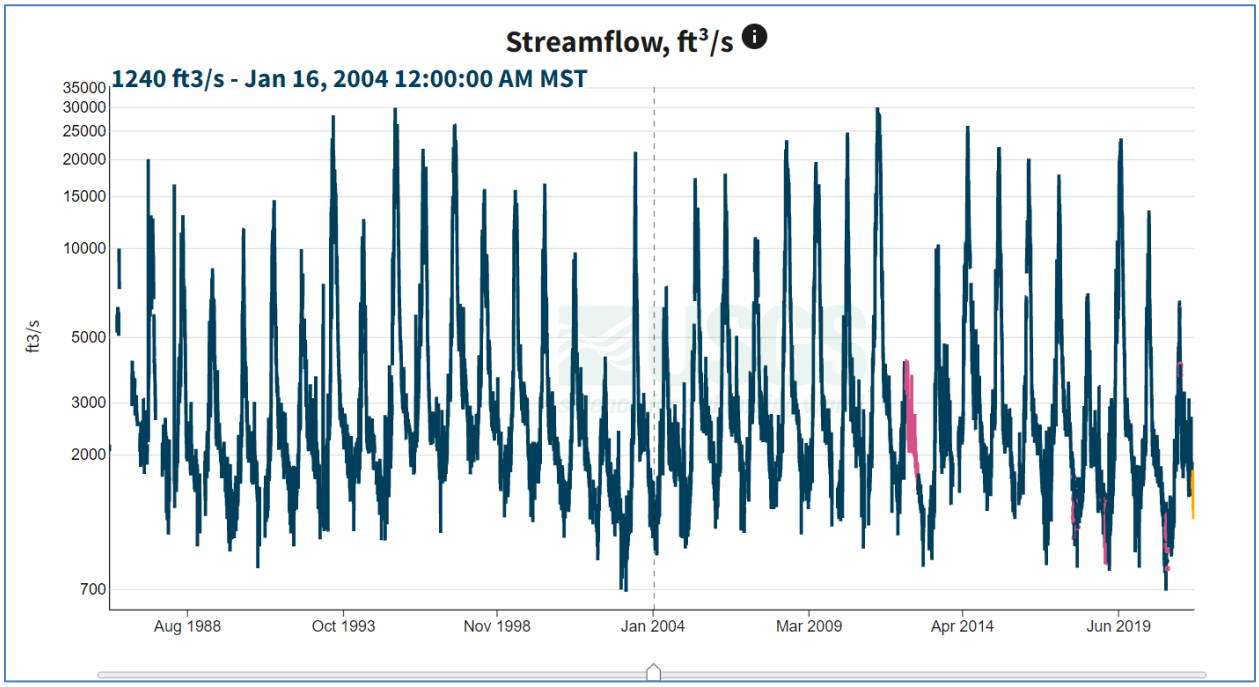


FIGURE E-4. Rifle Gap Reservoir Storage Levels (Source: USGS 2022).

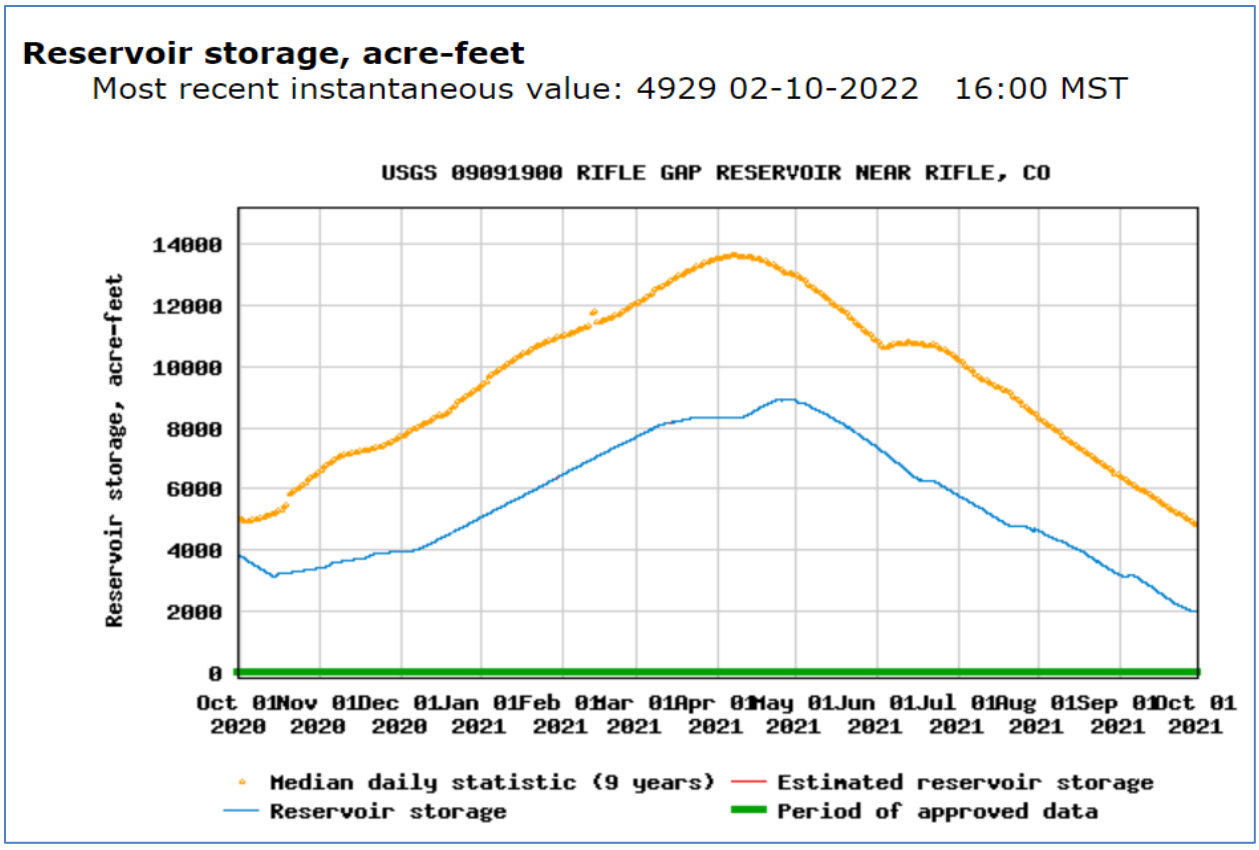
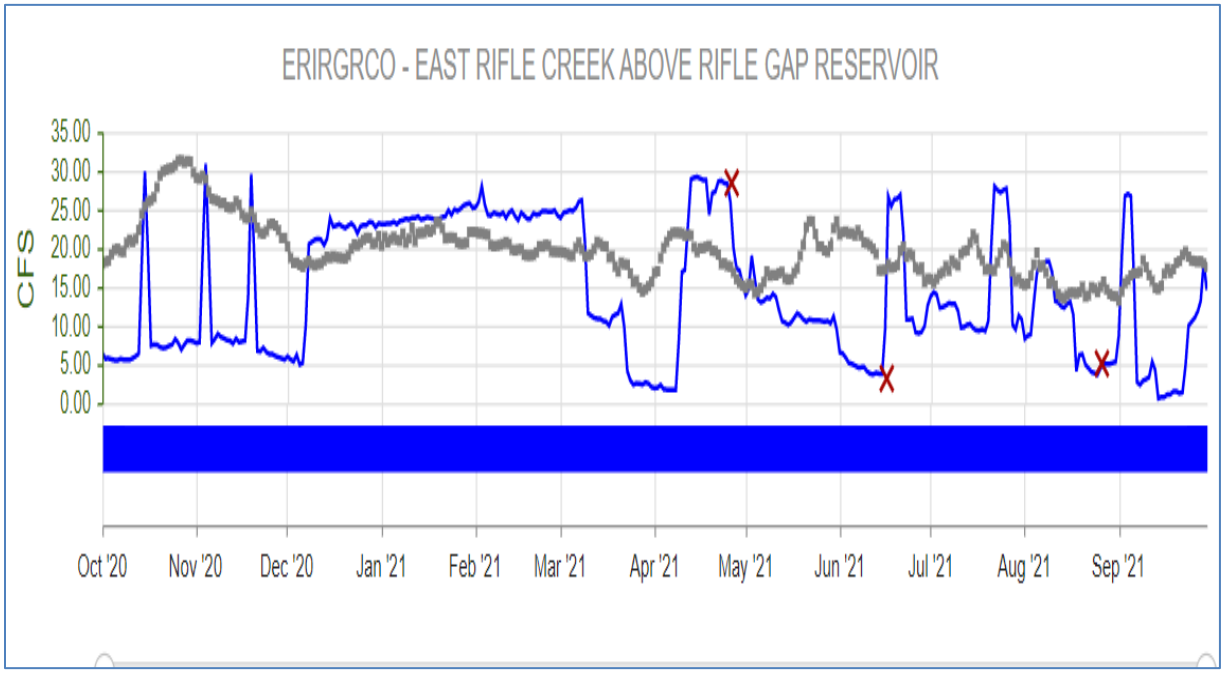


FIGURE E-5. Discharge at East Rifle Creek above Rifle Gap Reservoir; 2021 Water Year and Average 1992-2022 (Source Department of Water Resources 2022).



Supporting Information for Biological Resources

Vegetation

Special Status Plant Species

Federally Protected Plants and Their Critical Habitats

Two Endangered Species Act (ESA)-protected plant species have the potential to occur in the Silt Water Conservancy District (SWCD) planning area (Watershed Plan Area): DeBeque phacelia and Ute ladies'-tresses orchid.

DeBeque Phacelia

DeBeque phacelia was listed as threatened in 2011 at 75 Federal Register (FR) 45054-45075, July 27, 2011 due to its small geographic range, highly specific soil and germination requirements, limited seed dispersal, prolonged seed dormancy, potential seed bank depletion by prolonged drought, and fragmented habitat that is subject to human-caused (i.e., natural gas exploration and production and off-highway vehicles [OHVs]) and livestock and wildlife disturbances (U.S. Fish and Wildlife Service [USFWS] 2011). The USFWS also designated critical habitat for DeBeque phacelia in 2012 (USFWS 2012). No designated critical habitat areas occur in the Watershed Plan Area; the closest designated critical habitat area occurs approximately 20 miles to the southwest (Appendix C; Figure C-7).

DeBeque phacelia is restricted to exposures of chocolate to purplish brown and dark charcoal gray alkaline clay soils derived from the Atwell Gulch and Shire members of the Wasatch Formation. These expansive clay soils often have high shrink-swell potential and are found on moderately steep slopes, benches, and ridgetops adjacent to valley floors of the southern Piceance Basin in Mesa and Garfield Counties, Colorado. DeBeque phacelia is currently known from only three small sites in the Colorado River Valley Field Office (CRVFO) planning area, all in the foothills of Mount Logan, just east of DeBeque, Colorado. The species is adapted to grow in areas with sparse vegetation cover at elevations from 5,000 to 6,545 feet (Colorado Natural Heritage Program [CNHP] 2019; USFWS 2022a).

Ute Ladies'-Tresses Orchid

Ute ladies'-tresses orchid was listed as threatened in 1992 at 55 FR 2048-2054 on January 17, 1992 due to reduced and fragmented habitat from urban development, riparian habitat modification, stream alterations, recreation, livestock grazing, and invasive plant species (CNHP 2019; USFWS 1992). No critical habitat has been designated for Ute ladies'-tresses orchid.

Ute ladies'-tresses orchid occurs in moist meadows associated with perennial stream terraces, floodplains, and oxbows as well as seasonally flooded river terraces, subirrigated or spring-fed abandoned stream channels and valleys, and lakeshores. It has also been discovered along irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, reservoirs, and other human-modified wetlands. Typically, this species occurs where vegetation is not too dense or overgrown, at elevations from 4,500 to 7,750 feet (CNHP 2019; USFWS 2022a).

BLM Sensitive Plant Species

Two Bureau of Land Management (BLM) CRVFO sensitive plant species, DeBeque milkvetch and Harrington's beardtongue, have potential to occur in the Watershed Plan Area.

DeBeque Milkvetch

DeBeque milkvetch occupies a very small geographic range between Rifle and DeBeque, Colorado. This species is only found in varicolored, fine-textured, saline soils of the Atwell Gulch Member of the Wasatch Formation, in areas surrounded by pinyon-juniper woodlands, and desert shrub. Plants are mostly clustered on toe slopes and along drainages, but many occur on steep side slopes (CNHP 2019). Potential threats to DeBeque milkvetch include natural gas development, agricultural uses, residential development, and OHV activity (BLM 2014). The only known occurrences in the CRVFO planning area are in the Roan Plateau Resource Management Plan Amendment planning area, just west and outside of the Watershed Plan Area (BLM 2014, 2016).

Harrington's Beardtongue

Harrington's beardtongue is known to occur in northwestern Colorado. Harrington's beardtongue occurs in sagebrush shrublands and mixed mountain shrublands. This species is typically found in open stands of sagebrush and on the edges of pinyon-juniper or oakbrush habitats under a moderate canopy of shrubs, but not in the deeper-soiled sagebrush along drainages. Harrington's beardtongue is occasionally found along cattle trails or roadsides, but not in roadcuts or other frequently disturbed areas. This species is found on rocky clay loams derived from calcareous materials at elevations from 6,100 to 10,000 feet. The closest known occurrence to the Watershed Plan Area is near Flatiron Mesa in central Garfield County, approximately 3 miles south of the Colorado River and the southern boundary of the Watershed Plan Area (BLM 2014; CNHP 2019).

Invasive Plant Species

TABLE E-3 presents the state-listed noxious weeds (Colorado Department of Agriculture [CDA] 2020) known from and potentially occurring in Garfield County and the Watershed Plan Area (Garfield County 2016; Lyon et al. 2001) along with the current management priority for each weed assigned by Garfield County (CDA 2017). The BLM CRVFO's treatment of invasive and noxious weeds is guided by the BLM's *Final Programmatic Environmental Impact Statement for Vegetation Treatment on Bureau of Land Management Lands in 17 Western States* (BLM 2007, 2014) and the Colorado Noxious Weed Act (CDA 2017). Only species listed by Garfield County or that have been observed in Garfield County are included in TABLE E-3. Species that were observed in and near the project areas during the July 2021 site visits are indicated with an asterisk (*).

TABLE E-3. State-Listed Noxious Weeds in Garfield County, with Associated Management Priorities

Common Name[1]	Scientific Name	State Noxious Weed List[2]	Garfield County Management Priority
Cypress spurge	*Euphorbia cyparissias*	A	E
Meadow knapweed	*Centaurea x moncktonii*	A	x
Mediterranean sage	*Salvia aethiopis*	A	E
Myrtle spurge	*Euphorbia myrsinites*	A	x
Purple loosestrife	*Lythrum salicaria*	A	x
Yellow starthistle	*Centaurea solstitialis*	A	x
Absinth wormwood	*Artemisia absinthium*	B	C
Black henbane	*Hyoscyamus niger*	B	E
Bouncing bet	*Saponaria officinalis*	B	E
Bull thistle*	*Cirsium vulgare*	B	S
Canada thistle*	*Cirsium arvense*	B	S
Chinese clematis*	*Clematis orientalis*	B	E
Common tansy	*Tanacetum vulgare*	B	C
Common teasel	*Dipsacus fullonum*	B	E
Cutleaf teasel	*Dipsacus laciniatus*	B	E
Dalmatian toadflax	*Linaria dalmatica*	B	C
Dame's rocket	*Hesperis matronalis*	B	E
Diffuse knapweed	*Centaurea diffusa*	B	E
Hoary cress	*Cardaria draba*	B	S
Houndstongue*	*Cynoglossum officinale*	B	S
Jointed goatgrass*	*Aegilops cylindrica*	B	S
Leafy spurge	*Euphorbia esula*	B	E
Mayweed chamomile	*Anthemis cotula*	B	E
Moth mullein	*Verbascum blattaria*	B	E
Musk thistle*	*Carduus nutans*	B	E
Oxeye daisy	*Leucanthemum vulgare*	B	C
Perennial pepperweed	*Lepidium latifolium*	B	S
Plumeless thistle	*Carduus acanthoides*	B	C
Russian knapweed*	*Acroptilon repens*	B	S
Russian olive	*Elaeagnus angustifolia*	B	S
Salt cedar*	*Tamarix* sp.	B	S
Scentless chamomile	*Tripleurospermum perforatum*	B	E
Scotch thistle*	*Onopordum* sp.	B	C
Spotted knapweed	*Centaurea stoebe*	B	E
Sulfur cinquefoil	*Potentilla recta*	B	E
Yellow nutsedge	*Cyperus esculentus*	B	E
Yellow toadflax	*Linaria vulgaris*	B	C
Chicory	*Cichorium intybus*	C	x
Common burdock*	*Arctium minus*	C	x
Downy brome (cheatgrass)*	*Bromus tectorum*	C	x
Field bindweed*	*Convolvulus arvensis*	C	x
Halogeton	*Halogeton glomerata*	C	x
Poison hemlock	*Conium maculatum*	C	x
Redstem filaree	*Erodium cicutarium*	C	x
Siberian elm*	*Ulmus pumila*	W	x
Corn chamomile	*Anthemis arvensis*	x	E
Curly dock	*Rumex crispus*	x	x

[1] * indicates species that were observed during the July 2021 site visits.

[2.] "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. "Watch List (W)" species are not regulated by the Colorado Noxious Weed Act.

x = present but without assigned priority or management directive; E = eliminate; C = contain; S = suppress.

Special Status Wildlife

Federally Listed Mammals

Gray Wolf

The gray wolf was listed as endangered in 1978 in the lower 48 United States, except Minnesota, at 43 FR 9607, due to unregulated hunting, trapping, and widespread use of poisons in the eradication of wolves across most of the species' historical range (USFWS 2022b). In 2020, the gray wolf was delisted under the ESA (85 FR 69778 69895,2020). In 2022, the U.S. District Court vacated the USFWS's 2020 rule delisting gray wolves, returning management authority of gray wolves in Colorado to USFWS (Colorado Parks and Wildlife [CPW] 2022a). The gray wolf is also listed as a Colorado endangered species (CPW 2022b). The gray wolf historically occurred throughout Colorado in all major habitat types with ample prey but were eradicated by the mid-1940s. Wolves were reintroduced to Yellowstone National Park in the mid-1990s, and wolves have been dispersing from that population. In fall 2008, a wolf dispersed from a pack in southwest Montana to northwest Colorado near Rifle. More recently, a lone wolf was confirmed in north-central Colorado near Walden, and a group of six wolves was confirmed in Moffat County in northwest Colorado (CPW 2022a; Center for Human-Carnivore Coexistence 2020). In the near future (2023), wolves may occur near the Watershed Plan Area due to reintroduction efforts in Colorado. It is unlikely that the gray wolf would be present in the Batch 1 project-specific component project areas before implementation of the Proposed Action.

BLM Sensitive Mammals

Bats

Five species of bats potentially found in appropriate habitat in the Watershed Plan Area are considered sensitive by BLM—fringed myotis, hoary bat, little brown myotis, spotted bat, and Townsend's big-eared bat (see EA, Table 4-12). The following information about the five BLM sensitive bat species was synthesized from the Colorado Bat Working Group (CBWG 2021) and the BLM Colorado Sensitive Species List (BLM 2023).

The fringed myotis, thought to occur in scattered populations at moderate elevations in Colorado, feeds on moths, spiders, and beetles over semidesert shrublands, coniferous woodlands, Gambel oak shrublands, and meadows, especially near water. It uses caves, mines, and buildings as day and night roosts, and seasonal migration is not thought to be extensive. No nursery colonies have been reported in Colorado.

The hoary bat occurs in forested habitat and is a tree roosting species. Most of the suitable habitat for the hoary bat is located in BLM-administered lands. The species feeds primarily on moths as well as other insects. This is a migratory species and is known to occur in the state from April through November.

CPW (2020) maps the Watershed Plan Area as little brown myotis overall range. The little brown myotis is also listed as a Species of Greatest Conservation Need (SGCN) Tier 1 species by CPW. Tier 1 species are those with the highest conservation priority in the state; thus, Tier 2 species are not analyzed in this document. The little brown myotis occurs in wooded areas including riparian woodlands in the mountains and lower valleys, urban areas, and woodlots up to 11,000 feet in elevation. Night roosts are located in tree hollows, beneath

tree bark, in or under buildings, under bridges, in rock crevices, or beneath eaves. Hibernation sites include caves, mines, and buildings. Some bats may hibernate in Colorado (CBWG 2021). This bat species could be expected to forage in appropriate habitats in the Watershed Plan Area and use a variety of wooded habitat as roosts.

Apparently quite rare in Colorado, spotted bats prefer rocky canyons and have been observed or captured in ponderosa pine woodlands, montane forests, pinyon-juniper woodlands, semidesert shrublands, riparian vegetation, and over open sandbars. Individuals forage alone for moths, grasshoppers, beetles, katydids, and other insects. Lactating females have been captured in Colorado, but nursery and roost sites have not been located. Little is known about hibernation or its migratory movements.

The Townsend's big-eared bat feeds on moths, beetles, flies, and wasps along the edges of semidesert shrublands, pinyon-juniper woodlands, and open montane forests. It can be found throughout Colorado, but its distribution may be limited to areas near caves and abandoned mines, which it uses for day roosts, nursery colonies, and hibernacula. Day roosts have also been documented in crevices on rock cliffs and abandoned buildings. Like the fringed myotis, Townsend's big-eared bats do not make major seasonal migrations. Both Townsend's big-eared bat and fringed myotis have confirmed populations in the CRVFO planning area; an unnamed mine near the Grass Valley Canal (GVC) staging area is used by Townsend's big-eared bats (Lyon et al. 2001). Suitable habitat for the spotted bat occurs but no populations have been documented (BLM 2014). Each of these bat species could be expected to forage in appropriate habitats in the Watershed Plan Area and use rock outcrops, tunnels, caves, or buildings as roosts.

River Otter

The river otter, a Colorado threatened species (CPW 2022a), requires water year-round and feeds on fish, crustaceans, and frogs. This species historically occupied every major river drainage in Colorado but was extirpated from the state by the early twentieth century. In 1976, CPW began to reintroduce populations to several drainages, including the Upper Colorado River (Rocky Mountain National Park), the Gunnison River, the Piedra River, and the Dolores River (Colorado Division of Wildlife 2003). River otters have recently been observed in the Colorado River in the CRVFO planning area (BLM 2014; CPW 2018). CPW (2020) maps the Colorado River and Rifle Creek in the Watershed Plan Area as river otter habitat. There is no habitat for the river otter at any of the Batch 1 project-specific components.

BLM Sensitive Birds

Raptors

Each of the BLM sensitive raptor species in EA Table 4-12 has the potential to occur in appropriate habitat in the Watershed Plan Area. Each raptor has documented nest sites, potential nesting, and/or foraging habitat in or near the Watershed Plan Area.

Bald eagles are fairly common late fall and winter residents in the Watershed Plan Area. CPW (2020) maps bald eagle winter range and winter foraging habitat throughout most of the Watershed Plan Area (Appendix C, Figure C-11). Bald eagles forage across open pastures and low shrublands in winter for rodents and carrion and along riverbanks for stranded fish or

waterfowl. Bald eagle summer foraging habitat overlaps the Rifle Gap Reservoir area. Active nest and roost sites are documented (Appendix C, Figure C-11) along the Colorado River corridor near the southern boundary of the Watershed Plan Area. Nests are typically constructed in the crowns of tall trees along forested rivers and lakes. Nesting is initiated as early as January, and young are typically fledged before August. Human disturbance is thought to cause stress to nesting bald eagles, although some pairs have successfully nested near golf courses and other areas of high human activity (Kingery 1998).

The golden eagle hunts widely for rabbits and rodents over a variety of habitats in and near the Watershed Plan Area, from low-elevation shrublands to alpine tundra. Nests are constructed on cliffs and steep escarpments in shrublands and grasslands. Mated pairs return to the same nest site or nearby alternate nest sites each year. Nest building can initiate as early as January, with occupancy usually occurring in mid-April. Young are fledged between May and early August, depending on the year (Kingery 1998). ERO Resources Corporation (ERO) biologists observed a golden eagle flying over the Watershed Plan Area near the GVC piping project #1 project area during the July 2021 site visits. No nests are documented; however, several cliffs provide potential nesting habitat in the Watershed Plan Area, and two potential golden eagle nests were observed east of the GVC piping project. No activity was observed in these nests.

The peregrine falcon hunts in open country near cliff habitat, often near water such as rivers, lakes, and marshes. It nests on ledges or holes on cliff faces and crags between mid-March and mid- August. CPW (2020) maps potential peregrine nesting habitat to the east and west within 4.5 miles of the Watershed Plan Area. Craig and Enderson (2004) estimated the home range of peregrine falcons in Colorado to be between 138 and 582 square miles with individuals traveling beyond 15 miles on foraging trips. Potential foraging habitat for the peregrine falcon occurs in the Watershed Plan Area as evidenced by the reservoirs, proximity to the Colorado River, and the open agricultural and shrub habitat.

The ferruginous hawk prefers open, rolling, and rugged terrain in grasslands, shrub-steppe communities, or cultivated fields. It nests on cliffs, rock outcrops, trees, utility structures, and the ground or dirt outcrops. Junipers are the trees used most often for nesting. The ferruginous hawk is uncommon during any season, and nests have not been documented in the CRVFO planning area (BLM 2014). Wintering birds could be present in appropriate habitat in the Watershed Plan Area, especially open agricultural fields observed during the July 2021 site visits where burrowing rodents are present, but spring and fall migrants are more likely (Bechard and Schmutz 1995).

Black Swift

Black swifts breed in Colorado (Colorado Bird Atlas Partnership [CBAP] 2016). They arrive in mid-June for the breeding season and depart to wintering grounds by late September. Black swift nest sites are associated with the following features: falling or dripping water, high relief, inaccessibility to ground predators, unobstructed flyways in the immediate nest vicinity, shade during a major portion of the day, and the presence of suitable nest niches. Surveys completed in Colorado suggest that nests are typically placed on recesses or ledges near waterfalls or dripping water cliffs at 7,000 to 11,000 feet in elevation, often 8 to 10 feet aboveground and

sometimes up to 100 feet aboveground (Wiggins 2004). During the July 2021 site visits, ERO biologists observed black swifts in Rifle Falls State Park in the Watershed Plan Area.

Brewer's Sparrow

Brewer's sparrow breeds primarily in sagebrush shrublands, less commonly in tall semidesert shrublands, and occasionally in open pinyon-juniper woodlands with shrub understories. This species requires relatively large contiguous shrubland patches for nesting. Breeding records exist for Garfield County, and CPW maps the entire Watershed Plan Area as Brewer's sparrow breeding range (Kingery 1998; CBAP 2016). Nest building begins in mid-May, nests are occupied by June, and young are fledged by late July. Brewer's sparrows select nest sites in open shrublands with relatively tall shrubs on gentle slopes far from habitat edges. Migrants occur in wooded, brushy, and weedy riparian, agricultural, and urban areas, and occasionally in pinyon-juniper woodlands.

Greater Sage-Grouse

The greater sage-grouse is listed as a federal candidate in other areas of the state but not for Garfield County or the Watershed Plan Area (USFWS 2022b). The greater sage-grouse can be found in northwest Colorado; CPW (2020) maps greater sage-grouse historic habitat throughout the Watershed Plan Area. Greater sage-grouse priority and general habitat is approximately 5 miles west of the Watershed Plan Area. Priority and general habitat includes occupied range, production areas, and summer, winter, and breeding habitat (CPW 2020). Greater sage-grouse are found only in areas with abundant sagebrush (CPW 2022b). Leks are located in clear areas, such as broad ridgetops, grassy swales, dry lakebeds, and sometimes recently burned areas (USFWS 2022a). None of the Batch 1 project-specific components in the CRVFO planning area provide suitable habitat for greater sage-grouse; however, potential habitat may be available in the Watershed Plan Area.

Burrowing Owl

The burrowing owl, a BLM sensitive species, Colorado state threatened, and SGCN Tier 1 species, prefers level to gently sloping grasslands and semidesert grasslands. Prairie dog colonies are commonly used for shelter and nesting. In Colorado, burrowing owls are considered rare to uncommon on the western slope (BLM 2014). CPW (2020) maps the western portion of the Watershed Plan Area as burrowing owl breeding range. The CRVFO planning area has limited white-tailed prairie dog colonies, so it is unlikely that high numbers of burrowing owls would inhabit the area. Additionally, the burrowing owl is not listed as occurring in the CRVFO planning area (BLM 2015). The BLM considers any prairie dog burrows potential nest sites for burrowing owls across the Watershed Plan Area (BLM 2014). No prairie dogs or burrows were observed during the July 2021 site visits; however, only Batch 1 project-specific components were surveyed at that time. Burrowing owl nesting occurs from April through July.

Colorado State-Listed Birds

Greater Sandhill Crane

The greater sandhill crane, a SGCN Tier 1 species, spends winters in Arizona and New Mexico and summers in breeding and nesting habitats in northwest Colorado, Wyoming, Idaho, and Montana. Greater sandhill cranes from the Rocky Mountain population migrate through the CRVFO planning area in the spring and fall. Migrating birds use habitat in mudflats around reservoirs, in moist meadows, and in agricultural areas. No known breeding or nesting grounds are in the CRVFO planning area (BLM 2014).

BLM Sensitive Reptiles

Midget Faded Rattlesnake

The midget faded rattlesnake, known only from Mesa, Delta, and Garfield Counties in Colorado (Hammerson 1999), is a BLM sensitive species due to its apparent rarity and small range. A major threat to the species is the long-term persecution by humans killing snakes out of concern for public safety. Taxonomists do not agree on whether this small distinctly colored snake represents a subspecies of the western rattlesnake or is a separate species (Hammerson 1999). The midget faded rattlesnake reaches approximately 24 inches in length, with brownish dorsal blotches on a tan, cream, or yellow-brown background color. In older adults, the blotches are faded or sometimes absent. The species can occupy a wide range of vegetation communities, but appears to prefer rocky areas, often near riparian corridors, especially with a southern aspect. They are active outside their hibernacula from about May to September, and young are produced between late August and early October. Little is known about the midget faded rattlesnake's population size and occurrence in the CRVFO planning area, but several sightings occurred in recent years (BLM 2014).

Federally Listed Insects

Silverspot Butterfly

The silverspot butterfly was listed as threatened on February 15, 2024 (8 FR 11750-11772, February 15, 2024) due to habitat loss and fragmentation, hydrologic alteration, livestock grazing, genetic isolation, and climate change (USFWS 2024a). The silverspot butterfly's range includes southeast and southwest Colorado and northwest New Mexico from 5,000 to 8,500 feet in elevation (USFWS 2023).

The silverspot butterfly occurs in permanent spring-fed meadows, seeps, marshes, and boggy streamside meadows with bog violet. Bog violet is the only known larval host plant for silverspot butterflies. Microhabitat for the bog violet is soggy soil and shade, often under willows or other shrubs at the edge of the habitat that are mixed with herbaceous vegetation such as sedges, grasses, and forbs. Forbs provide nectar for adult silverspot butterflies (USFWS 2023).

In Colorado, it is possible that Rifle Gap Reservoir and Dam degraded and fragmented previously suitable habitat, as one silverspot butterfly was observed at a small wetland downstream of the dam (USFWS 2022). However, the majority of the planning area is located in upland habitat, and suitable habitat for the silverspot butterfly is unlikely to occur in the Watershed Plan Area and project-specific component areas.

Monarch Butterfly

The monarch butterfly (monarch) was designated as a proposed threatened species in December 2024 (89 FR 100662 100716, December 12, 2024) due to widespread drought, habitat loss, fragmentation, and low population abundance (USFWS 2024b).

North America contains two migratory populations of the monarch, separated by the Rocky Mountains. The largest migratory population breeds across the central and eastern parts of the continent and winters in Mexico. A smaller migratory population breeds in western North America and winters primarily along the California coast south into Baja California, Mexico. Colorado is considered a contact zone between the eastern and western populations with summer breeding areas but is not included in the two migratory populations. Monarchs occur at elevations from 4,300 to 11,500 feet (rarely above 9,000 feet), mainly in lowlands near larval food plants. Milkweed is an essential feature of quality monarch habitat. Common places where milkweed occurs include shortgrass and tallgrass prairies, livestock pastures, agricultural margins, roadsides, wetland and riparian areas, sandy areas, and gardens in addition to deserts, open forests, and woodlands. Monarchs migrate in the spring (March to June) and fall (August to October) to breeding and overwintering sites (USFWS 2020b). In western Colorado, monarch occurrence is typically between July and October.

Milkweed is common throughout the region. Whorled milkweed was observed near the GVC project area during the July 2021 site visits. It is likely that milkweed occurs throughout the Watershed Plan Area and near additional Batch 1 project-specific components, particularly near riparian corridors, ditches, stream edges, and roadsides.

Suckley's Cuckoo Bumble Bee

Suckley's cuckoo bumble bee was proposed for listing as endangered on December 17, 2024 (89 FR 102074-102091) (USFWS 2024c). Suckley's cuckoo bumble bee is an obligate social parasite of social bumble bees in the genus *Bombus*. Suckley's cuckoo bumble bee cannot successfully reproduce without the availability of suitable host colonies. It is a semi-specialist parasite and confirmed to usurp nests of western bumble bees *(Bombus occidentalis)* and Nevada bumble bees (*Bombus nevadensis*) (USFWS 2024d). Based on the best available information, there have been no observations of Suckley's cuckoo bumble bee since 2014 despite ongoing surveys. The Species Status Assessment shows recent observations (since 2018) occur only in northern latitudes, primarily in Canada (USFWS 2024d). Based on this information, Suckley's cuckoo bumble bee is considered extirpated from Colorado. Because of this, Suckley's cuckoo bumble bee is unlikely to occur in the project area.

Federally Protected Fish Species

Bonytail Chub

The bonytail chub was listed as an endangered species in 1980, and critical habitat was designated in 1994 (USFWS 1994). Bonytail chubs are the rarest fish in the Colorado River Basin and can reach lengths of up to 22 inches and weigh as much as 2.4 pounds (USFWS 1994, 2002a).

Bonytail chubs were historically widespread in large rivers of the Colorado River Basin; however, beginning in the 1950s, the species' population and range shrank dramatically, and they are now the rarest fish in the Colorado River Basin (USFWS 2002a). The wild population generally consists of low numbers of mature fish and very low to nonexistent recruitment (USFWS 1994). In the Lower Colorado River Basin, the species has been documented in Lake Mojave and Lake Havasu; in the Upper Colorado River Basin, the species has been documented in the Yampa River in Dinosaur National Monument, the Green River in Desolation Canyon and Gray Canyon, and the Colorado River in Black Rock Canyon and Cataract Canyon (USFWS 1994). The species is rarely found in the Green River and Colorado River subbasins (USFWS 2002a).

The bonytail chub inhabits pools and eddies in the warm waters of the Colorado River mainstem and tributaries (USFWS 2002a). Because the species was extirpated from most of its historic range prior to extensive surveys, little is known about specific habitat preferences. Spawning takes place in pools and eddies over rocky substrates with silt-boulder mixtures, and flooded bottomlands are used for nursery habitat (USFWS 2002a). Ongoing recovery efforts by the Upper Colorado River Endangered Fish Recovery Program (Recovery Program) have included a stocking program for bonytail chub. As part of this program, fish have been released into the Yampa River, Green River, and Colorado River (Upper Colorado River Endangered Fish Recovery Program 2015). The primary threats to the bonytail chub include streamflow regulation, habitat modification, predation by nonnative fish species, hybridization, and pesticides and pollutants (USFWS 2002a).

Bonytail chubs released in DeBeque Canyon were detected moving upstream through the Grand Valley Project Diversion Dam on the Colorado River, approximately 32 linear miles from the Watershed Plan Area (Upper Colorado River Endangered Fish Recovery Program 2021). Based on their habitat preferences, federally listed fish species are not expected to use the irrigation canals or ditches, and the bonytail chub has not been documented in the Colorado River near the Watershed Plan Area (BLM 2014).

Colorado Pikeminnow

The Colorado pikeminnow was listed as an endangered species in 1967, and critical habitat was designated in 1994 (USFWS 1994). The species is North America's largest minnow species and can reach up to approximately 6 feet in length and weigh as much as 80 pounds (USFWS 2002b). Colorado pikeminnows prefer fast, muddy rivers with quiet backwaters, pools, deep runs, and eddies maintained by high spring flows (USFWS 2002b).

Colorado pikeminnows have historically occurred throughout the Colorado River system in Colorado, Wyoming, Utah, New Mexico, Arizona, Nevada, California, and Mexico. Presently, three wild populations occur in the Green River, Upper Colorado River, and San Juan River subbasins (USFWS 2002a). Ongoing recovery efforts have included a stocking program for Colorado pikeminnow in the Green River, Upper Colorado River, and San Juan River subbasins; however, release of propagated Colorado pikeminnows into these river basins has been limited because the wild populations are considered self-sustaining. In 2004, approximately 1,800 fish were released into the Colorado River near Rifle, Colorado (USFWS 2020c). The decline of the species throughout its range is attributed to extensive habitat loss, modification, fragmentation, and blocked fish passage associated with dam construction and

operations. Other threats include competition with and predation by nonnative fish species, and decreased water quality from pesticides and contaminants (specifically selenium and mercury) (USFWS 2002a). Colorado pikeminnow larvae has not been detected in the Colorado River upstream of Westwater Canyon since the 1990s (USFWS 2020c).

Recovery efforts include developing low-flow recommendations, mechanically removing nonnative fishes, modifying or removing instream water diversion structures to provide fish passage, monitoring fish population numbers, and developing backwaters for early life stages (USFWS 2020c). The Colorado pikeminnow has been recorded near the Watershed Plan Area. The Colorado pikeminnow has been documented moving upstream through the Grand Valley Project Diversion Dam toward the top of its range near Rifle, Colorado (USFWS 2020c). However, based on their habitat preferences, federally listed fish species are not expected to use the irrigation canals or ditches in the Watershed Plan Area (BLM 2014).

Humpback Chub

The humpback chub was listed as an endangered species in 1967, and critical habitat was designated in 1994 (USFWS 1994). Humpback chubs are a medium sized minnow (averaging less than 20 inches in length) endemic to the Colorado River Basin (USFWS 1990). The species has a unique body shape that is believed to aid in navigating turbulent deep-water habitats of the Colorado River system.

Humpback chubs are highly adapted to turbid water conditions with fluctuating hydrology; the species lives and completes its life cycle in the canyon-bound reaches of the Colorado River mainstem and larger tributaries (USFWS 2002c). In the mainstem of the Colorado River, humpback chubs have been recorded in a variety of habitats – including swift currents, deep pools, riffles, shoreline eddies, and rapids (USFWS 1994). Adults and juveniles require eddies and sheltered shoreline habitats (USFWS 2002c). Humpback chubs reproduce from May through July, depending on the location. Spawning generally occurs over gravel and cobble deposits at or soon after peak flows in spring (USFWS 2002c).

The humpback chub's historic distribution included portions of the mainstem Colorado River and four tributaries: the Green River, Yampa River, White River, and Little Colorado River (USFWS 1994). The most recently known distribution of the species includes the Yampa River in Dinosaur National Monument (Colorado); the Green River in Desolation Canyon, Gray Canyon, and Dinosaur National Monument (Utah and Colorado); the Little Colorado River (Arizona); and several stretches of the Colorado River – Marble Canyon and Grand Canyon (Arizona), Cataract Canyon and Westwater Canyon (Utah), and Black Rocks (Colorado) (USFWS 1990).

The primary threats to the humpback chub include streamflow regulation, habitat modification, predation by nonnative fish species, parasitism, hybridization with other native *Gila* species, and pesticides and pollutants (USFWS 2002c). Based on their habitat preferences, federally listed fish species are not expected to use the irrigation canals or ditches, and the humpback chub has not been documented near the Watershed Plan Area (BLM 2014).

Razorback Sucker

The razorback sucker was listed as an endangered species in 1991 (USFWS 1991), and critical habitat was designated in 1994 (USFWS 1994). The razorback sucker can reach 3 feet in length and weigh up to 13 pounds, qualifying as one of North America's largest suckers (USFWS 2002d). The razorback sucker is found in large rivers with depths ranging from 4 to 10 feet as well as some reservoirs. Habitat for the razorback sucker varies seasonally, with deep runs, eddies, backwaters, and flooded off-channels used in spring; runs and shallow pools used in summer; and low-velocity runs, pools, and eddies used in winter (USFWS 2002d). Turbidity can range from clear to muddy, and substrate can range from mud to sand to gravel. This species may spawn in a variety of river or reservoir habitats, and young require nursery environments with quiet, warm, and shallow waters (USFWS 2002d).

Historically, the razorback sucker was widespread in warm water reaches of large rivers in the Colorado River Basin, from Wyoming south to Mexico (USFWS 2002d). The species is currently found in the Green River, Upper Colorado River, and San Juan River subbasins; Lower Colorado River between Lake Havasu and Davis Dam; reservoirs of Lake Mead and Lake Mohave; tributaries of the Gila River subbasin; and in local areas under intensive management such as Cibola High Levee Pond, Achii Hanyo Native Fish Facility, and Parker Strip (USFWS 2002d). Razorback suckers have been documented near Rifle, Colorado (USFWS 1999).

Ongoing recovery efforts have included a stocking program for razorback suckers. As part of this program, fish have been released into all reaches except for Lake Mead (Upper Colorado River Endangered Fish Recovery Program 2021). The Recovery Program experimentally stocked razorback suckers in the Upper Colorado River (i.e., upstream of Parachute, Colorado) during the mid-1990s and initiated an integrated stocking plan in 2003 (Bureau of Reclamation 2008). Successful spawning activity has been documented in the Colorado River through the Grand Valley near Palisade, Colorado (USFWS 2018).

The primary threats to the razorback sucker include streamflow regulation, habitat modification, predation by nonnative fish species, and pesticides and pollutants (USFWS 2002d).

The razorback sucker has been recorded near the Watershed Plan Area; razorback suckers have been documented moving upstream through the Grand Valley Project Diversion Dam toward the top of its range near Rifle, Colorado (USFWS 2018). However, based on their habitat preferences, federally listed fish species are not expected to use the irrigation canals or ditches in the Watershed Plan Area (BLM 2014).

BLM Sensitive Amphibian and Fish Species

Northern Leopard Frog

The northern leopard frog is known to occur in Garfield County and throughout the CRVFO planning area (CPW 2020). Typical habitats include wet meadows, springs, and the banks and shallows of marshes, ponds, glacial kettle ponds, beaver ponds, lakes, reservoirs, streams, and irrigation ditches (NatureServe 2021). The northern leopard frog will breed in shallow quiet areas of permanent water bodies, in beaver ponds, and in seasonally flooded areas adjacent

to or contiguous with permanent pools or streams. They may forage along the water's edge or in nearby meadows or fields. Part of their statewide decline seems to be due to predation by the bullfrog, which was native to the eastern United States but was introduced in Colorado (Lyon and Williams 1998).

Bluehead Sucker

The bluehead sucker is found in only 45 percent of its historic range but is known to occur in Garfield County (Bezzerides and Bestgen 2002; CPW 2015a). The bluehead sucker occurs in the Colorado River, from New Castle downstream into DeBeque Canyon, and has been collected in Rifle Creek (CNHP 2001; CPW 2015a). The bluehead sucker prefers large rivers and mountain streams and is rarely found in lakes. Occupied habitat is variable, from cold, clear mountain streams to warm, turbid streams. This fish typically prefers moderate to fast flowing water above rubble-rock substrate. Young prefer quiet shallow areas near shoreline. Spawning at higher elevations occurs mid- to late summer. Dams and reservoirs, water diversions, and associated changes in flow, stream channelization, and general deterioration of riparian corridors are major threats to this species (Ptacek et al. 2005).

Hybridization between the nonnative white sucker and bluehead sucker has been documented as well as individuals with genetic contributions from the white sucker, bluehead sucker, and native flannelmouth sucker (McDonald et al. 2008).

The bluehead sucker is vulnerable to predation from nonnative fish species including northern pike and brown trout (Webber et al. 2012). Development in riparian areas can affect the quality of occupied bluehead sucker habitat. CPW manages Rifle Creek in the Watershed Plan Area and the Colorado River downstream for native fish, including bluehead sucker (CPW 2015a). A population of bluehead suckers occurs in Rifle Creek in the western portion of the Watershed Plan Area (Thompson and Hooley-Underwood 2019).

Colorado River Cutthroat Trout

The Colorado River cutthroat trout is native to Colorado but is seldom found to be genetically pure due to hybridization with introduced rainbow trout. Historic range of this species was on the West Slope (west of the Continental Divide) and included the Yampa River and White River (USFWS 2014). The species' range has been reduced due to competition with introduced nonnative trout species such as brook trout, hybridization with nonnative trout, disease (i.e., whirling disease), and habitat alteration such as fragmentation and dewatering by water diversions. Colorado River cutthroat trout typically occur as isolated populations in high-elevation lakes and streams.

The Colorado Headwaters-Plateau watershed is in the historic range for Colorado River cutthroat trout (Hirsch et al. 2013). Of the 580 miles of historic stream habitat in the Colorado Headwaters-Plateau watershed, only 187 miles are currently occupied by the Colorado River cutthroat trout, representing 15 percent of the historic range (Albeke 2020; Hirsch et al. 2013). This fish has been documented in the Colorado Headwaters-Plateau watershed but not in the Watershed Plan Area. A core population occurs in Butler Creek, a tributary to Middle Rifle Creek that flows into Rifle Creek in the Watershed Plan Area (Albeke 2020; Hirsch et al. 2013).

However, a complete barrier on Butler Creek (Albeke 2020) likely prevents the dispersal of Colorado River cutthroat trout into the Watershed Plan Area.

Flannelmouth Sucker

The flannelmouth sucker prefers warm moderate- to large-sized rivers. They are seldom captured in small creeks and are typically absent from impoundments (Utah Department of Natural Resources [UDNR] 2006). They prefer pool habitat and deeper runs, often near tributary mouths. They also occupy riffles and backwaters. Flannelmouth suckers generally occupy streams with minimal vegetation, moderate to high turbidities, and high spring flows. Channel depths can range from 1 to 6 feet, with substrates consisting of rocks, gravel, or mud. Young usually occupy shallower water than adults. Seasonal migrations are made in the spring to suitable spawning habitat. Flannelmouth suckers are found in the large rivers of western Colorado, though they have disappeared from the Gunnison River. The flannelmouth sucker occurs in the Colorado River from New Castle downstream into DeBeque Canyon and has been collected in Rifle Creek (CNHP 2001; CPW 2015a). Habitat degradation (including changes in substrate, instream habitat complexity, and flow regimes) and interactions with nonnative species have been identified as primary threats to the flannelmouth sucker. Obstruction to movement caused by dams or diversions has resulted in the loss of spawning habitat and habitat quality (changes to channel geometry, water chemistry, water temperature, and flow regimes) (Rees et al. 2005). Some dams may have a positive impact by creating a barrier to the upstream spawning of nonnative fish species that prey on, hybridize, and compete with flannelmouth suckers for resources (CPW 2015b). Therefore, dams and diversions can be part of a conservation strategy to maintain species survival. CPW manages Rifle Creek in the Watershed Plan Area and the Colorado River downstream for native fish, including flannelmouth sucker (CPW 2015a). A population of flannelmouth suckers occurs in Rifle Creek in the western portion of the Watershed Plan Area (Thompson and Hooley-Underwood 2019).

Mountain Sucker

The mountain sucker occurs primarily in small to medium streams with gravel, sand, or mud bottoms, but also occurs in select lakes and reservoirs. They are typically found in low-gradient stream reaches with a mix of pools, riffles, and runs. During nonbreeding periods, they are usually found in deeper parts of streams with lower velocities (Belica and Nibbelink 2006). CPW (2020) maps potential mountain sucker presence approximately 3 miles upstream of the Watershed Plan Area in the Colorado River. Mountain suckers could travel downstream to the Watershed Plan Area. However, this species has not been collected near the Watershed Plan Area (Belica and Nibbelink 2006).

Roundtail Chub

The roundtail chub uses slow-moving, deep pools for cover and feeding (UDNR 2006). They occupy medium to large warm water streams and rivers with rocky runs, rapids, and pools. The historical range for the roundtail chub included the Colorado River and its tributaries from southwestern Wyoming, Utah, and Colorado southward to the Little Colorado River confluence in Arizona, south of which the species occurred only in primary tributaries of the Colorado River (Carman 2006). The roundtail chub occurs in the Colorado River from New Castle

downstream into DeBeque Canyon and has been collected in Rifle Creek (CNHP 2001; CPW 2015a). They also inhabit large reservoirs in the Upper Colorado River system. They generally prefer cobble-rubble, sand-cobble, or sand-gravel substrates. Adults prefer pools associated with undercut banks and other types of cover, while young fish inhabit shallower water with lower flows. Runs and riffles are used to feed. Spawning begins in June to early July. CPW manages Rifle Creek in the Watershed Plan Area and the Colorado River downstream for native fish, including roundtail chub (CPW 2015a). A population of roundtail chub occurs in Rifle Creek in the western portion of the Watershed Plan Area (Thompson and Hooley-Underwood 2019).

CPW High Priority Habitat

In 2021, CPW released a High Priority Habitat (HPH) table and map layers that identify species and habitats as well as recommendations to avoid and minimize impacts on wildlife from land use development (CPW 2023, CPW 2025a). CPW identified five HPH areas in the Watershed Plan Area. CPW recommendations for avoidance and protections are included for each HPH (CPW 2025a).

Aquatic Sportfish Management Waters HPH

Aquatic sportfish management waters HPH areas are streams and lakes that are managed by CPW for sportfish. These water resources are buffered by 500 feet (CPW 2023).

The GVC flow control gate reconstruction, tunnel end reconstruction #1, a staging area near Highway 325, and existing access roads associated with the GVC occur within the HPH due to their proximity to East Rifle Creek. Additionally, portions of the GVC bypass rebuild and project components for the Harvey Gap Reservoir (staging area and access roads) occur within the HPH.

CPW recommends no surface occupancy or ground disturbance within 500 feet of the ordinary high water mark (OHWM) of the stream or lake (CPW 2025b). Minimal effects are anticipated within 500 feet of the OHWM of any stream, lake, or water resources from the proposed project. Stormwater Pollution Prevention Plan best management practices would be used during construction to avoid impacts on this HPH.

Bat Winter Hibernacula HPH

Bat winter hibernacula HPH is mapped south of and adjacent to Rifle Falls State Park. For the HPH, CPW buffered winter hibernacula by 350 feet (CPW 2024). This HPH provides winter hibernacula for Townsend's big-eared bat, Mexican free-tailed bat, and myotis due to nearby mining caves. These bat species typically hibernate from late October to April (CPW 2025c). The GVC flow control gate reconstruction project is located outside of the HPH. An existing access road that travels through the HPH would be used to access the GVC tunnel end reconstruction #1 project component.

CPW recommends no surface occupancy or ground disturbance within the 350-foot buffer of a cave or mine entrance of the hibernacula. The proposed project would not disturb any ground within the HPH, and any equipment used would travel on the existing access road outside of the winter months, thus reducing impacts on bat winter hibernacula.

Elk Severe Winter Range and Winter Concentration Areas

Elk are a migratory species that travel from higher to lower elevations in the winter and move back to higher elevations in warmer weather. The Watershed Plan Area provides elk overall winter range, winter concentration areas, and severe winter range (CPW 2023, 2025a). Portions of the GVC and East Bypass Pipeline are in mapped elk severe winter range. Except for the GVC Bypass Rebuild, all of the project measures are located entirely or partially in mapped elk winter concentration area. CPW recommends no surface activity be conducted from December 1 to April 30 in elk severe winter range and winter concentration areas (CPW 2025b).

Golden Eagle Active Nest Sites

Two golden eagle active nest site HPHs are mapped in the Watershed Plan Area. As stated in the *BLM Sensitive Birds* section, one golden eagle and two potential nest sites were observed during the July 2021 site visits near the GVC piping project #1 project area. No activity was observed at the nest sites. None of the project-specific component areas fall within 0.5 mile of a golden eagle active nest site.

Mule Deer Severe Winter Range and Winter Concentration Areas

Mule deer are a migratory species that travel from higher to lower elevations in the winter and move back to higher elevations in warmer weather. The Watershed Plan Area provides mule deer overall winter range, winter concentration areas, and severe winter range (CPW 2025a). Most of the project measure areas are located entirely or partially in mapped mule deer winter concentration areas. Portions of the GVC and East Bypass Pipeline are in mapped mule deer severe winter range.

CPW recommends no surface activity be conducted from December 1 to April 30 in mule deer severe winter range and winter concentration areas (CPW 2025b).

BLM and CPW Sensitive Wildlife Species Dismissed from Further Analysis in the EA

TABLE E-4 lists BLM and CPW sensitive species that have been dismissed from further analysis in the EA based on a lack of suitable habitat or range in the Watershed Plan Area (BLM 2014, 2015; CPW 2015b, 2021a).

TABLE E-4. Common and Scientific Names of BLM and CPW Sensitive Wildlife, Fish, and Amphibian Species Dismissed from Further Analysis in the EA[1]

Common Name	Scientific Name	BLM Sensitive Species[1]	CPW Sensitive Species[2]
Mammals			
American pika	*Ochotona princeps*		Tier 1
Black-footed ferret	*Mustela nigripes*		FE, Tier 1, SE
Black-tailed prairie dog	*Cynomys ludovicianus*		SC
Botta's pocket gopher	*Thomomys bottae rubidus*		SC
California myotis	*Myotis californicus*	X	
Grizzly bear	*Ursus arctos*		FT, SE
Gunnison's prairie dog	*Cynomys gunnisoni*		Tier 1
Kit fox	*Vulpes macrotis*		SE

Common Name	Scientific Name	BLM Sensitive Species[1]	CPW Sensitive Species[2]
Long-eared myotis	*Myotis evotis*	X	
New Mexico meadow jumping mouse	*Zapus hudsonius luteus*		FT, Tier 1
Northern pocket gopher	*Thomomys talpoides macrotis*		SC
Olive-backed pocket mouse	*Perognathus fasciatus*		Tier 1
Preble's meadow jumping mouse	*Zapus hudsonius preblei*		FT, Tier 1, ST
Rocky Mountain bighorn sheep	*Ovis canadensis*	X	
Swift fox	*Vulpes velox*		SC
Western small-footed myotis	*Myotis ciliolabrum*	X	
White-tailed prairie dog	*Cynomys leucurus*		Tier 1
Wolverine	*Gulo gulo*		Tier 1, SE
Yuma myotis	*Myotis yumanensis*	X	
Birds			
Broad-tailed hummingbird	*Selasaphorus platycercus*	X	
Brown-capped rosy-finch	*Leucosticte australis*	X	Tier 1
Columbian sharp-tailed grouse	*Tympanuchus phasianellus Columbian*	X	Tier 1, SC
Gunnison sage-grouse	*Centrocercus minimus*		FT, Tier 1, SC
Least tern	*Sterna antillarum*		SE
Lesser prairie-chicken	*Tympanuchus pallidicinctus*		FT, Tier 1, ST
Lewis's woodpecker	*Melanerpes lewis*	X	
Long-billed curlew	*Numenius americanus*		SC
Mexican spotted owl	*Strix occidentalis lucida*		FT, ST
Mountain plover	*Charadrius montanus*		Tier 1, SC
Northern goshawk	*Accipiter gentilis*	X	
Piping plover	*Charadrius melodus circumcinctus*		FT, ST
Plains sharp-tailed grouse	*Tympanuchus phasianellus jamesii*		Tier 1, SE
Prairie falcon	*Falco mexicanus*	X	
Southern white-tailed ptarmigan	*Lagopus leucura altipetens*		Tier 1
Southwestern willow flycatcher	*Empidonax traillii extimus*		FE, Tier 1, SE
Western snowy plover	*Charadrius alexandrines*		SC
Whooping crane	*Grus americana*		FE, SE
Fish			
Arkansas darter	*Etheostoma cragini*		Tier 1, ST
Bonytail	*Gila elegans*		FE, SE
Brassy minnow	*Hybognathus hankinsoni*		Tier 1, ST
Colorado pikeminnow	*Ptychocheilus lucius*		FE, ST
Colorado roundtail chub	*Gila robusta*		SC
Common shiner	*Luxilus cornutus*		Tier 1, ST
Flathead chub	*Platygobio gracilus*		Tier 1, SC
Greenback cutthroat trout	*Oncorhynchus clarkia stomias*		FT, Tier 1, ST
Humpback chub	*Gila cypha*		FE, ST
Iowa darter	*Etheostoma exile*		SC
Lake chub	*Couesius plumbeus*		SE
Northern redbelly dace	*Phoxinus eos*		Tier 1, SE
Orangespotted sunfish	*Lepomis humilis*		Tier 1
Plains minnow	*Hybognathus placitus*		Tier 1, SE
Plains orangethroat darter	*Etheostoma spectabile*		Tier 1
Plains topminnow	*Fundulus sciadicus*		Tier 1
Rio Grande chub	*Gila pandora*		Tier 1, SC
Rio Grande cutthroat trout	*Oncorhynchus clarkii virginalis*		Tier 1, SC
Rio Grande sucker	*Catostomus plebeius*		Tier 1, SE
Southern redbelly dace	*Phoxinus erythrogaster*		Tier 1, SE

Common Name	Scientific Name	BLM Sensitive Species[1]	CPW Sensitive Species[2]
Stonecat	*Noturus flavus*		Tier 1, SC
Suckermouth minnow	*Phenacobius mirabilis*		Tier 1, SE
Reptiles			
Colorado checkered whiptail	*Aspidoscelis neotesselata*		Tier 1
Common garter snake	*Thamnophis sirtalis*		SC
Common king snake	*Lampropeltis getula*		SC
Longnose leopard lizard	*Gambelia wislizenii*		SC
Massasauga	*Sistrurus catenatus*		Tier 1, SC
Roundtail horned lizard	*Phrynosoma modestum*		SC
Texas blind snake	*Leptotyphlops dulcis*		SC
Texas horned lizard	*Phrynosoma cornutum*		SC
Triploid checkered whiptail	*Cnemidophorus neotesselatus*		SC
Yellow mud turtle	*Kinosternon flavescens*		SC
Amphibians			
Boreal toad	*Anaxyrus boreas boreas*		Tier 1, SE
Couch's spadefoot	*Scaphiopus couchii*		SC
Great Plains narrowmouth toad	*Gastrophryne olivacea*		SC
Northern cricket frog	*Acris crepitans*		SC
Plains leopard frog	*Rana blairi*		SC
Wood frog	*Rana sylvatica*		SC
Mollusks			
Rocky Mountain capshell	*Acroloxus coloradensis*		SC
Cylindrical papershell	*Anodontoides ferussacianus*		SC
Insects			
Suckley's cuckoo bumblebee	*Bombus suckleyi*	X	
Western bumblebee	*Bombus occidentalis*	X	

[1] Only BLM sensitive species that have the potential to occur in the CRVFO planning area were identified for brevity (BLM 2023). [2] FE = Federally Endangered; FT = Federally Threatened; SE = State Endangered; ST = State Threatened; SC = Special Concern; Tier 1 = CPW designated Tier 1 SGCN (CPW 2015b, 2024). Only Tier 1 species and species listed on the state threatened and endangered list are listed, as they are identified as species that have highest conservation priority in the state (CPW 2015b, 2024).

Lists of Species Mentioned in the EA Text or Appendix E

TABLE E-5 and TABLE E-6 list plant and wildlife species, respectively, mentioned in the EA or Appendix E.

TABLE E-5. Common and Scientific Names of Plant Species Mentioned in the EA Text or Appendix E

Common Name	Scientific Name	Threatened and Endangered Species	BLM Sensitive Species	Nonnative
Absinth wormwood	*Artemisia absinthium*			X
Alder	*Alnus* sp.			
Alfalfa	*Medicago sativa*			
Aspen	*Populus tremuloides*			
Barnyardgrass	*Echinochloa crus-gallii*			
Basin big sagebrush	*Artemisia tridentata* ssp. *tridentata*			
Black henbane	*Hyoscyamus niger*			X
Black sagebrush	*Artemisia nova*			
Bouncing bet	*Saponaria officinalis*			X
Bull thistle	*Cirsium vulgare*			X
Bulrush	*Schoenoplectus* sp.			
Canada thistle	*Cirsium arvense*			X
Cathedral Bluff meadow-rue	*Thalictrum heliophilum*		X	

Common Name	Scientific Name	Threatened and Endangered Species	BLM Sensitive Species	Nonnative
Cattail	*Typha* sp.			
Cheatgrass (downy brome)	*Bromus tectorum*			X
Chicory	*Cichorium intybus*			X
Chinese clematis	*Clematis orientalis*			X
Common burdock	*Arctium minus*			X
Common cocklebur	*Xanthium strumarium*			X
Common reed	*Phragmites australis*			
Common spikerush	*Eleocharis palustris*			
Common tansy	*Tanacetum vulgare*			X
Common teasel	*Dipsacus fullonum*			X
Corn chamomile	*Anthemis arvensis*			X
Cottonwood	*Populus* sp.			
Coyote willow	*Salix exigua*			
Curly dock	*Rumex crispus*			X
Cutleaf teasel	*Dipsacus laciniatus*			X
Cypress spurge	*Euphorbia cyparissias*			X
Dalmation toadflax	*Linaria dalmatica*			X
Dame's rocket	*Hesperis matronalis*			X
DeBeque milkvetch	*Astragalus debequaeus*		X	
DeBeque phacelia	*Phacelia submutica*	X		
Diffuse knapweed	*Centaurea diffusa*			X
Field bindweed	*Convolvulus arvensis*			X
Fourwing saltbush	*Atriplex canescens*			
Gambel oak	*Quercus gambelii*			
Greasewood	*Sacrobatus vermiculatus*			
Giant reed	*Arundo donax*			
Halogeton	*Halogeton glomerata*			x
Harrington's beardtongue	*Penstemon harringtonii*		X	
Hoary cress (whitetop)	*Cardaria* sp.			X
Houndstongue	*Cynoglossum officinale*			X
Jointed goat grass	*Aegilops cylindrica*			X
Juniper	*Juniperus* sp.			
Leafy spurge	*Euphorbia esula*			X
Mayweed chamomile	*Anthemis cotula*			X
Meadow knapweed	*Centaurea x moncktonii*			X
Mediterranean sage	*Salvia aethiopis*			X
Milkweed	*Asclepias* sp.			
Moth mullein	*Verbascum blattaria*			X
Mountain mahogany	*Cercocarpus montanus*			
Mountain big sagebrush	*Artemisia tridentata* ssp. *vaseyana*			
Musk thistle	*Carduus nutans*			X
Myrtle spurge	*Euphorbia myrsinites*			X
Narrowleaf cottonwood	*Populus angustifolia*			
Naturita milkvetch	*Astragalus naturitensis*		X	
Oxeye daisy	*Leucanthemum vulgare*			X
Perennial pepperweed	*Lepidium latifolium*			X
Piceance bladderpod	*Physiaria parviflora (Lesquerella parviflora)*		X	
Pinyon pine	*Pinus edulis*			
Plumeless thistle	*Carduus acanthoides*			X
Poison hemlock	*Conium maculatum*			X
Ponderosa pine	*Pinus ponderosa*			
Purple loosestrife	*Lythrum salicaria*			X

Common Name	Scientific Name	Threatened and Endangered Species	BLM Sensitive Species	Nonnative
Rabbitbrush	*Chrysothamnus* sp.			
Redstem filaree (stork's bill)	*Erodium cicutarium*			X
Reed canarygrass	*Phalaroides arundinacea*			
Roan Cliffs blazing star	*Nuttallia rhizomata (Mentzelia rhizomata)*		X	
Rocky Mountain juniper	*Juniperus scopulorum*			
Rush	*Juncus* sp.			
Russian knapweed	*Acroptilon repens*			X
Russian olive	*Elaeagnus angustifolia*			X
Sagebrush	*Artemisia* sp.			
Salt cedar (tamarisk)	*Tamarix* sp.			X
Scentless chamomile	*Tripleurospermum perforata*			X
Scotch thistle	*Onopordum* sp.			X
Sedge	*Carex* sp.			
Serviceberry	*Amelanchier* sp.			
Siberian elm	*Ulmus pumila*			
Skunkbush sumac	*Rhus trilobata*			
Snowberry	*Symphoricarpos* sp.			
Spotted knapweed	*Cantaurea stoebe*			X
Sulfur cinquefoil	*Potentilla recta*			X
Thinleaf alder	*Alnus incana* ssp. *tenuifolia*			
Tumbleweed (Russian thistle)	*Salsola kali*			X
Utah juniper	*Juniperus osteosperma*			
Utah serviceberry	*Amelanchier utahensis*			
Ute ladies'-tresses orchid	*Spiranthes diluvialis*	X		
Whorled milkweed	*Asclepias verticillata*			
Willow	*Salix* sp.			
Wyoming big sagebrush	*Artemisia tridentata* ssp. *wyomingensis*			
Yellow nutsedge	*Cyperus esculentus*			X
Yellow starthistle	*Centaurea solstitialis*			X
Yellow toadflax	*Linaria vulgaris*			X

TABLE E-6. Common and Scientific Names of Wildlife Species Mentioned in the EA Text and in Appendix E

Common Name	Scientific Name	Mammal	Fish	Reptile	Amphibian	Bird	Invertebrate
American avocet	*Recurvirostra americana*					X	
American bullfrog	*Lithobates catesbeianus*				X		
American coot	*Fulica americana*					X	
American kestrel	*Falco sparverius*					X	
American peregrine falcon	*Falco peregrines*					X	
American pika	*Ochotona princeps*	X					
American robin	*Turdus migratorius*					X	
American white pelican	*Pelecanus erythrorhynchos*					X	
American wigeon	*Mareca americana*					X	
Arkansas darter	*Etheostoma cragini*		X				
Badger	*Taxidea taxus*	X					
Bald eagle	*Haliaeetus leucocephalus*					X	
Barrow's goldeneye	*Bucephala islandica*					X	
Beaver	*Castor canadensis*	X					
Belted kingfisher	*Ceryle alcyon*					X	
Big free-tailed bat	*Nyctinomops macrotis*	X					
Black bear	*Ursus americanus*	X					
Black bullhead	*Ameiurus melas*		X				

Common Name	Scientific Name	Mammal	Fish	Reptile	Amphibian	Bird	Invertebrate
Black crappie	*Pomoxis nigromaculatus*		X				
Black rosy-finch	*Leucosticte atrata*					X	
Black swift	*Cypseloides niger*					X	
Black-billed magpie	*Pica pica*					X	
Black-footed ferret	*Mustela nigripes*	X					
Black-headed grosbeak	*Pheucticus melanocephalus*					X	
Black-tailed prairie dog	*Cynomys ludovicians*	X					
Black-throated gray warbler	*Setophaga nigrescens*					X	
Blue grosbeak	*Passerina caerulea*					X	
Blue-winged teal	*Anas discors*					X	
Bluegill	*Lepomis macrochirus*		X				
Bluehead sucker	*Catostomus discobolus*		X				
Bobcat	*Lynx rufus*	X					
Bonytail chub	*Gila elegans*		X				
Boreal toad	*Anaxyrus boreas boreas*				X		
Botta's pocket gopher	*Thomomys talpoides macrotis*	X					
Brassy minnow	*Hybognathus hankinsoni*		X				
Brewer's sparrow	*Spizella breweri*					X	
Broad-tailed hummingbird	*Selasphorus platycercus*					X	
Brook trout	*Salvelinus fontinalis*		X				
Brown-capped rosy-finch	*Leucosticte australis*					X	
Brown trout	*Salmo trutta*		X				
Bufflehead	*Bucephala albeola*					X	
Bullfrog	*Lithobates catesbeianus*				X		
Bullock's oriole	*Icterus bullockii*					X	
Bullsnake	*Pituophis catenifer*			X			
Burrowing owl	*Athene cunicularia*					X	
California gull	*Larus californicus*					X	
California myotis	*Myotis californicus*	X					
Canada goose	*Branta canadensis*					X	
Cassin's finch	*Carpodacus cassinii*					X	
Channel catfish	*Ictalurus punctatus*		X				
Chipping sparrow	*Spizella passerina*					X	
Chukar	*Alectoris chukar*					X	
Cinnamon teal	*Anas cyanoptera*					X	
Clark's grebe	*Aechomophorus clarkia*					X	
Clark's nutcracker	*Nucifraga columbiana*					X	
Collared lizard	*Crotaphytus collaris*			X			
Colorado checkered whiptail	*Aspidoscelis neotesselata*			X			
Colorado pikeminnow	*Ptychocheilus lucius*		X				
Colorado River cutthroat trout	*Oncorhynchus clarki pleuriticus*		X				
Colorado roundtail chub	*Gila cypha*		X				
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*					X	
Common carp	*Cyprinus carpio*		X				
Common garter snake	*Thamnophis sirtalis*			X			
Common king snake	*Lampropeltis getula*			X			
Common merganser	*Mergus merganser*					X	
Common raven	*Corvus corax*					X	
Common shiner	*Luxilus cornutus*		X				
Cooper's hawk	*Accipiter cooperii*					X	
Couch's spadefoot	*Scaphiopus couchii*				X		

Common Name	Scientific Name	Mammal	Fish	Reptile	Amphibian	Bird	Invertebrate
Coyote	*Canis latrans*	X					
Cylindrical papershell	*Anodontoides*						X
Desert cottontail	*Sylvilagus audubonii*	X					
Dusky grouse	*Dendragapus obscurus*					X	
Elk	*Cervus canadensis*	X					
Evening grosbeak	*Coccothraustes vespertinus*					X	
European starling	*Sturnus vulgaris*					X	
Fence lizard	*Sceloporus undulatus*			X			
Ferruginous hawk	*Buteo regalis*					X	
Flammulated owl	*Otus flammeolus*					X	
Flannelmouth sucker	*Catostomus latipinnis*		X				
Flathead chub	*Platygobio gracilus*		X				
Fringed myotis	*Myotis thysanodes*	X					
Gadwall	*Anas strepera*					X	
Golden eagle	*Aquila chrysaetos*					X	
Golden shiner	*Notemigonus crysoleucas*		X				
Gray flycatcher	*Empidonax wrightii*					X	
Gray vireo	*Vireo vicinior*					X	
Gray wolf	*Canis lupus*	X					
Great Basin spadefoot toad	*Spea intermontane*				X		
Great blue heron	*Ardea herodias*					X	
Great Plains narrowmouth toad	*Gastrophryne olivacea*				X		
Greater sage-grouse	*Centrocercus urophasianus*					X	
Greater sandhill crane	*Grus canadensis tabida*					X	
Great-horned owl	*Bubo virginianus*					X	
Greenback cutthroat trout	*Oncorhynchus clarki stomias*		X				
Green sunfish	*Lepomis cyanellus*		X				
Green-winged teal	*Anas crecca*					X	
Grizzly bear	*Ursus arctos*	X					
Gunnison sage-grouse	*Centrocercus minimus*					X	
Gunnison's prairie dog	*Cynomys gunnisoni*	X					
Hoary bat	*Lasiurus cinereus*	X					
Horned lark	*Eremophila alpestris*					X	
House wren	*Troglodytes aedon*					X	
Humpback chub	*Gila cypha*		X				
Iowa darter	*Etheostoma exile*		X				
Juniper titmouse	*Baeolophus griseus*					X	
Killdeer	*Charadrius vociferus*					X	
Kit fox	*Vulpes macrotis*	X					
Lake chub	*Couesius plumbeus*		X				
Largemouth bass	*Micropterus salmoides*		X				
Lark sparrow	*Chondestes grammacus*					X	
Least tern	*Sterna antillarum*					X	
Lesser goldfinch	*Spinus psaltria*					X	
Lesser prairie-chicken	*Tympanuchus pallidicinctus*					X	
Lesser scaup	*Aythya affinis*					X	
Lesser yellowlegs	*Tringa flavipes*					X	
Lewis's woodpecker	*Melanerpes lewis*					X	
Little brown myotis	*Myotis lucifigus*	X					
Long-billed curlew	*Numenius americanus*					X	
Long-eared myotis	*Myotis evotis*	X					
Long-eared owl	*Asio otus*					X	

Common Name	Scientific Name	Mammal	Fish	Reptile	Amphibian	Bird	Invertebrate
Longnose leopard lizard	*Gambelia wislizenii*			X			
Lynx	*Lynx canadensis*	X					
MacGillivray's warbler	*Geothlypis tolmiei*					X	
Mallard	*Anas platyrhynchos*					X	
Massasauga	*Sistrurus catenatus*			X			
Mexican spotted owl	*Strix occidentalis lucida*					X	
Midget faded rattlesnake	*Crotalus viridis concolor*			X			
Monarch butterfly	*Danaus plexippus*						X
Mottled sculpin	*Cottus bairdii*		X				
Mountain bluebird	*Sialia currucoides*					X	
Mountain chickadee	*Poecile gambeli*					X	
Mountain cottontail	*Sylvilagus nuttallii*	X					
Mountain lion	*Puma concolor*	X					
Mountain plover	*Charadrius montanus*					X	
Mountain sucker	*Catostomus platyrhynchus*		X				
Mule deer	*Odocoileus hemionus*	X					
Muskrat	*Ondatra zibethicus*	X					
New Mexico meadow jumping mouse	*Zapus hudsonius luteus*	X					
Northern cricket frog	*Acris crepitans*				X		
Northern harrier	*Circus cyaneus*					X	
Northern goshawk	*Accipiter gentilis*					X	
Northern leopard frog	*Rana pipiens*				X		
Northern pike	*Esox lucius*		X				
Northern pocket gopher	*Thomomys talpoides macrotis*	X					
Northern raccoon	*Procyon lotor*	X					
Northern redbelly dace	*Phoxinus eos*		X				
Olive-backed pocket mouse	*Perognathus fasciatus*	X					
Olive-sided flycatcher	*Contopus cooperi*					X	
Orange-crowned warbler	*Vermivora celata*					X	
Orangespotted sunfish	*Lepomis humilis*		X				
Orangethroat darter	*Etheostoma spectabile*		X				
Peregrine falcon	*Falco peregrinus*					X	
Pied-billed grebe	*Podilymbus podiceps*					X	
Pinyon jay	*Gymnorhinus cyanocephalus*					X	
Piping plover	*Charadrius melodus circumcinctus*					X	
Plains leopard frog	*Rana blairi*				X		
Plains minnow	*Hybognathus placitus*		X				
Plains orangethroat darter	*Etheostoma spectabile*		X				
Plains topminnow	*Fundulus sciadicus*		X				
Plains sharp-tailed grouse	*Tympanuchus phasianellus*					X	
Plateau striped whiptail	*Cnemidophorus velox*			X			
Plumbeous vireo	*Vireo plumbeus*					X	
Porcupine	*Erethizon dorsatum*	X					
Prairie falcon	*Falco mexicanus*					X	
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	X					
Rabbit	*Sylvilagus* sp.	X					
Rainbow trout	*Oncorhynchus mykiss*		X				
Razorback sucker	*Xyrauchen texanus*		X				
Red fox	*Vulpes vulpes*	X					
Red shiner	*Cyprinella lutrensis*		X				

Common Name	Scientific Name	Mammal	Fish	Reptile	Amphibian	Bird	Invertebrate
Red-tailed hawk	*Buteo jamaicensis*					X	
Rio Grande chub	*Gila pandora*		X				
Rio Grande cutthroat trout	*Oncorhynchus clarkii virginalis*		X				
Rio Grande sucker	*Catostomus plebeius*		X				
River otter	*Lontra canadensis*	X					
Rocky Mountain bighorn sheep	*Ovis canadensis*	X					
Rocky Mountain capshell	*Acroloxus coloradensis*						X
Roundtail chub	*Gila robusta*		X				
Roundtail horned lizard	*Phrynosoma modestum*			X			
Rufous hummingbird	*Selasphorus rufus*					X	
Sagebrush lizard	*Sceloporus graciosus*			X			
Say's phoebe	*Sayornis saya*					X	
Short-eared owl	*Asio flammeus*					X	
Short-horned lizard	*Phrynosoma hernandesi*			X			
Silverspot butterfly	*Speyeria nokomis nokomis*						X
Smallmouth bass	*Micropterus dolomieu*		X				
Smooth green snake	*Liochlorophis vernalis*			X			
Song sparrow	*Melospiza melodia*					X	
Sora	*Porzana carolina*					X	
Southern redbelly dace	*Phoxinus erythrogaster*		X				
Southern white-tailed ptarmigan	*Lagopus leucura altipetens*					X	
Southwestern willow flycatcher	*Empidonax traillii extimus*					X	
Speckled dace	*Millicoma daces*		X				
Spotted bat	*Euderma maculatum*	X					
Spotted sandpiper	*Actitis macularia*					X	
Spotted towhee	*Pipilo maculatus*					X	
Stonecat	*Noturus flavus*		X				
Striped skunk	*Mephitis mephitis*	X					
Suckermouth minnow	*Phenacobius mirabilis*		X				
Suckley's cuckoo bumble bee	*Bombus suckleyi*						X
Swift fox	*Vulpes velox*	X					
Texas blind snake	*Leptotyphlops dulcis*			X			
Texas horned lizard	*Phrynosoma cornutum*			X			
Tiger salamander	*Ambystoma tigrinum*				X		
Townsend's big-eared bat	*Corynorhinus townsendii*	X					
Triploid checkered whiptail	*Cnemidophorus neotesselatus*			X			
Turkey vulture	*Cathartes aura*					X	
Utah milk snake	*Lampropeltis triangulum taylori*			X			
Veery	*Catharus fuscescens*					X	
Vesper sparrow	*Pooecetes gramineus*					X	
Virginia's warbler	*Vermivora virginiae*					X	
Vole	*Microtus* sp.	X					
Walleye	*Sander vitreus*		X				
Weasel	*Mustela* sp.	X					
Western bluebird	*Sialia Mexicana*					X	
Western bumble bee	*Bombus occidentalis*						X
Western chorus frog	*Pseudacris triseriata*				X		
Western grebe	*Aechmophorus occidentalis*					X	
Western kingbird	*Tyrannus verticalis*					X	

Common Name	Scientific Name	Mammal	Fish	Reptile	Amphibian	Bird	Invertebrate
Western meadowlark	*Sturnella neglecta*					X	
Western rattlesnake	*Crotalus viridis*			X			
Western small-footed myotis	*Myotis ciliolabrum*	X					
Western snowy plover	*Chardrius alexandrinus*					X	
Western terrestrial garter snake	*Thamnophis elegans*			X			
Western wood-pewee	*Contopus sordidulus*					X	
Western yellow-billed cuckoo	*Coccyzus americanus*					X	
White sucker	*Catostomus commersonii*		X				
White-crowned sparrow	*Zonotrichia leucophrys*					X	
White-faced ibis	*Plegadis chihi*					X	
White-tailed jackrabbit	*Lepus townsendii*	X					
White-tailed prairie dog	*Cynomys leucurus*	X					
Whooping crane	*Grus americanus*					X	
Wild turkey	*Meleagris gallopavo*					X	
Wilson's phalarope	*Phalaropus tricolor*					X	
Wolverine	*Gulo gulo luscus*	X					
Wood frog	*Rana sylvatica*				X		
Woodhouse's toad	*Anaxyrus woodhousii*				X		
Woodrat	*Neotoma* sp.	X					
Yellow perch	*Perca flavescens*		X				
Yellow mud turtle	*Kinosternon flavescens*			X			
Yellow warbler	*Dendroica petechia*					X	
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*					X	
Yellow-rumped warbler	*Dendroica coronata*					X	
Yuma myotis	*Myotis yumanensis*	X					

Determination of Effects for BLM and CPW Species

TABLE E-7 lists BLM and CPW sensitive species that have been analyzed in the EA and provides determination of effects from the Proposed Action.

Table E-7. Determination of Effects for BLM Sensitive, State Species of Concern, and CPW Tier 1 Species

Common Name	Status	Effect Determination
DeBeque milkvetch	BLM S	No effect
Harrington's beardtongue	BLM S	No effect
Hoary bat	BLM S	No effect
Fringed myotis	BLM S, CPW Tier 1	No effect
Spotted bat	BLM S, CPW Tier 1	No effect
Townsend's big-eared bat	BLM S, SC, CPW Tier 1	No effect
Little brown myotis	BLM S, CPW Tier 1	No effect
River otter	BLM S, ST	No effect
Bald eagle	BLM S, SC	May affect, not likely to measurably affect
Black swift	BLM S	No effect
Brewer's sparrow	BLM S	May affect, not likely to measurably affect
Burrowing owl	ST, CPW Tier 1	No effect
Ferruginous hawk	BLM S, SC	No effect
Golden eagle	BLM S, CPW Tier 1	May affect, not likely to measurably affect
Greater sage-grouse	BLM S, SC, CPW Tier 1	No effect
Greater sandhill crane	CPW Tier 1	No effect
Peregrine falcon	BLM S, SC	No effect

Common Name	Status	Effect Determination
Monarch butterfly	BLM S	May affect, not likely to measurably affect
Midget faded rattlesnake	BLM S, SC	May affect, not likely to measurably affect
Northern leopard frog	BLM S, SC, Tier 1	May affect, not likely to measurably affect
Bluehead sucker	BLM S, Tier 1	May affect, not likely to measurably affect
Colorado River cutthroat trout	BLM S, SC, Tier 1	No effect
Flannelmouth sucker	BLM S, Tier 1	May affect, not likely to measurably affect
Mountain sucker	BLM S, SC, Tier 1	No effect
Roundtail chub	BLM S, SC, Tier 1	May affect, not likely to measurably affect

[1] BLM S = BLM Sensitive; SE = State Endangered; ST = State Threatened; SC = Special Concern; CPW Tier 1 = CPW designated Tier 1 SGCN.

[2] Species without documented range in the Watershed Plan Area are eliminated from further analysis.

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Biological Assessment

United States Department of Agriculture

October 19, 2021
(Revised November 17, 2021)

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

Subject: Silt Water Conservancy District (SWCD) Watershed Plan

Re: Biological Assessment – SWCD Batch 1

Dear Ms. Timberman:

The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), in conjunction with the Silt Water Conservancy District, is proposing the Silt Water Conservancy District (SWCD) Watershed Plan (Project; Proposed Action – Batch 1), located within the Colorado River and its tributaries in Garfield County, Colorado (Enclosure A – Maps). The NRCS is currently preparing a SWCD Watershed Plan and Environmental Assessment (EA) for the Project. This letter documents the basis for our effect determinations of the Proposed Action – Batch 1 on federally listed species or designated critical habitat afforded protection under the Endangered Species Act (ESA) of 1973 (7 United States Code (U.S.C.) 136, 16 U.S.C. 1531 et seq.), as amended, as follows:

- **May Affect, Not Likely to Adversely Affect** for the DeBeque phacelia and Ute ladies'-tresses under this Programmatic Biological Assessment (BA).
- **No Effect** on all other ESA-listed species or proposed/designated critical habitat in the SWCD boundary area in Garfield County, Colorado.

This letter also serves as a request for U.S. Fish and Wildlife Service (USFWS) concurrence with our effect determinations of the Proposed Action – Batch 1 and future SWCD projects will be evaluated, as necessary, with a programmatic approach.

Project Coordination/Consultation

Colorado River Endangered Fish Programmatic Biological Opinion (PBO)

The Upper Colorado River PBO issued by the USFWS in 1999 (USFWS 1999; TAILS FWS/R6 ES/GJ-6-CO-99-F-033) addressed the impacts related to water depletions that occur above the confluence with the Colorado and Gunnison Rivers and impacts on critical habitat from Rifle to Lake Powell. The Bureau of Reclamation (Reclamation) projects included in the PBO are the following: Colorado-Big Thompson Project, Fryingpan-Arkansas Project, Collbran Project, Grand Valley Project, and Silt Project. The PBO addressed the continuation of existing depletions and 120,000 acre-feet (af) per year of new depletions above the confluence with the Gunnison River. 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, 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.

On August 27, 2021, ERO Resources Corporation (ERO; Cassandra Shenk and Heidi McGrath) and NRCS (Krystal Phillips) discussed the proposed Project over a Microsoft Teams meeting with USFWS biologists Creed Clayton and Kathleen Gissing to establish the scope and nature of this consultation. It was determined during the meeting that potential impacts on DeBeque phacelia and Ute ladies'-tresses habitat will be mitigated and disclosed if present. No other endangered species concerns are identified for the Proposed Action and no formal consultation will be required.

On October 18, 2021, NRCS (Krystal Phillips) discussed with the USFWS (Creed Clayton) the designation of the monarch butterfly as a candidate species on the USFWS Environmental Conservation Online System Information, Planning, and Conservation System (IPaC) resource list and the scope of consultation required. Because the monarch butterfly is a candidate species, no formal consultation is necessary for this species.

On November 4th, 10th, and 12th NRCS (Krystal Phillips) met with USFWS (Kathleen Gissing) to further refined the BA and clarify USFWS concerns for future consultation.

Proposed Action

The Proposed Action consists of a batch of projects (Batch 1) within the Silt Water Conservancy District boundary (SWCD boundary area). These projects have been selected by the SWCD board and determined to be priorities, with the goal of improving irrigation water control and mitigating potential flood damage and disruptions to water supplies serving recreation and irrigation in the SWCD boundary area. Several other benefits include improvements to water quality, agricultural productivity, and economic stability in the SWCD boundary area. Batch 1 Project-specific components being planned in the SWCD boundary area include:

- Reconstructing the Grass Valley Canal (GVC) Flow Control Gate; converting approximately 3,173 feet of GVC from open, earthen ditches to enclosed pipe in four sections to minimize risk of failure and off-farm delivery system losses; and installing concrete shoring at four locations to prevent failure and modernize the ends of three GVC tunnels;
- Rebuilding 2,827 feet of earthen ditch by-passing the Harvey Gap Reservoir to mitigate the risk of downstream water delivery loss should the reservoir outlet fail; reconstruction of the Harvey Gap Reservoir spillway to improve water storage and mitigate seepage and erosion hazards; and dredging Harvey Gap Reservoir to improve water storage capacity;
- Installing 14,527 feet of canal lining along the Dry Elk Lateral to minimize water seepage losses; and
- Installing the East By-pass Pump Station and 8,925 feet of piping (called the "East By-pass Pipeline) to connect the East Lateral to the Pump Canal, protect water storage rights, improve water storage in Harvey Gap and Rifle Gap Reservoirs, and increase flows in the Colorado River in low-flow years.

In summary, the Batch 1 projects are proposed to improve the systems managed by the SWCD in a number of ways: modernize the systems, prevent system failure, capitalize on opportunities to be more efficient with water, better manage water delivery, and protect areas from flooding (see Enclosure A –

Figure 1). The watershed boundary consists of the SWCD boundary area and meets the definition of a watershed as outlined in the NRCS's National Watershed Program Manual (NRCS 2015).

The Batch 1 projects will use existing access roads and disturbed areas for staging, with some exceptions: an approximately 5,500-foot section of an existing two-track road will need to be improved in Section 1 to access a tunnel shoring site along the Grass Valley Canal (GVC), about 49.3 acres will be needed for sediment storage after dredging the Harvey Gap Reservoir, and an approximately 700-foot section of new access road will need to be constructed with grading and gravel to access the East By-pass Pump Station at Pump Canal.

Project Location

The Project is located in the Colorado River Basin within the Colorado Headwaters – Plateau watershed (14010005) in Garfield County, Colorado. For the purposes of this Project, the "Upper Colorado River Basin" is generally defined as the river network above Lee's Ferry in northern Arizona and includes portions of Colorado, New Mexico, Utah, and Wyoming. Within the Upper Colorado River Basin, the Project will focus on the region above the confluence with the Gunnison River in Colorado encompassing 56,465 acres of the Colorado Headwaters – Plateau watershed. Table 1 shows the legal description of the SWCD boundary area. Project component descriptions and specific locations are described in Table 2 and shown on Figures 2a through 2i in Enclosure A. Representative photos of Batch 1 Project-specific components are shown in Photos 1 through 13 in Enclosure B. Acres of disturbance associated with the Batch 1 Project-specific components, including access roads and staging areas, are provided in Table 3.

Table 1. Legal locations of the SWCD boundary area.

Principal Meridian	Township	Range	Sections
6th	4 South	92 West	22, 27, 34, 35
6th	5 South	91 West	4, 5, 6, 7, 8, 9, 16, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32, 33
6th	5 South	92 West	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
6th	5 South	93 West	1, 12, 13, 24, 25, 36
6th	6 South	92 West	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
6th	6 South	93 West	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18
6th	6 South	94 West	13, 24

Table 2. SWCD Watershed Plan Batch 1 Project-specific components.

System Component	Project, Location	Legal Locations	Description
Grass Valley Canal (GVC)	**Flow Control Gate Reconstruction** near East Rifle Creek	T4S, R92W, Section 27	An existing gate used to control flows into GVC will be rebuilt to improve functionality and mitigate flooding risk (Photo 1). Temporary disturbance includes a 20-foot by 20-foot construction area around the gate. Construction will take about 15 days from start to finish.
	Tunnel End Shoring at four locations along three tunnels south of the headgate	T4S, R92W, Sections 27 and 34	Concrete and anchors will be used to shore inlets and outlets to three tunnels, preventing blockage from caving or rockfalls that could cause blockage and flooding, and system failure (Photo 2). Temporary disturbance includes a 15-foot by 30-foot area at four locations. Each tunnel site will take about 10 days to shore up, and construction will be sequenced to minimize disruption to water flows.

System Component	Project, Location	Legal Locations	Description
	Piping Projects at four locations (#1, #2, #3 and #4) south of the shoring area, in the northern part of the system	T4S, R92W, Section 34 T5S, R92W, Sections 1 and 2	A total of 3,173 feet of open canal will be piped along four hazardous and steep sections of the canal to prevent system failure (Photo 3). The pipe will be made of plastic material and will be 48 inches in diameter. The pipe will be bedded in the existing canal and backfilled to grade. Concrete aprons and a trash rack will be installed at the inlet where necessary. One 0.21-acre staging area has been identified, and two additional staging areas will be used at locations to be determined. Construction will take no more than a two-month period per segment.
	By-pass Rebuild around Harvey Gap Reservoir	T5S, R92W, Sections 13 and 24	A 4-foot wide, 2,827-foot-long ditch will be rebuilt along the historic GVC alignment to serve as a by-pass around the Harvey Gap Reservoir to provide a functional by-pass to downstream irrigators if needed for water flows and water management (Photo 4). Construction will take about two weeks.
Dry Elk Lateral	**Canal Lining** from Grass Valley Road to the east about 3 miles	T5S, R91W, Sections 5, 6, and 7 T5S, R92W, Sections 1 and 12	14,527 linear feet of concrete and plastic lining will be installed beneath the Dry Elk Lateral to prevent water seepage and water loss (Photo 5). Temporary disturbance during construction will include a 30-foot disturbance width along the canal and existing maintenance road (an existing disturbed area), and three staging areas (about 0.6 acre total). Construction will take about six weeks and will be phased.
Harvey Gap Reservoir	**Spillway Reconstruction** southwest of the reservoir	T5S, R92W, Sections 13 and 24	A 450-foot-long concrete spillway, 15 feet wide (necked down to 5 feet wide at the south end) will be reconstructed to meet flood release specifications, allowing for Harvey Gap Reservoir to be filled completely (about 400 af of increased storage) (Photos 6 and 7). Temporary disturbance for construction includes a 10-foot buffer on either side of the spillway, a 1-acre staging area, and an added disturbance width of up to 12 feet along 920 feet of access. Some cottonwood trees may need to be removed to make room for construction. Construction will take about two months.
	Dredging reservoir center	T5S, R91W, Sections 7 and 18 T5S, R92W, Sections 12 and 13	Accumulated sediment in the reservoir will be removed, dried, and stockpiled at a staging area adjacent to the reservoir to increase water storage capacity in Harvey Gap Reservoir (Photo 8). About 750 feet of shoreline may be used for access between the reservoir and the staging/stockpile area. Dredging will take about one month to complete.

System Component	Project, Location	Legal Locations	Description
Pump Canal	**East By-pass Pipeline** between the pump canal and east lateral, and **East By-pass Pump Station** at the inlet	T5S, R91W, Sections 29, 30, 31, and 32 T5S, R92W, Section 2	8,925 linear feet of plastic pipe will be installed to connect the pump canal and the east lateral, creating capacity to bring about 2,500 af of SWCD water into the system annually (Photo 9). The water is currently stored at Green Mountain Reservoir about 70 miles east of Silt and is not being used. The Project will help secure SWCD water rights, benefit water levels at Harvey Gap Reservoir, improve Colorado River flows between Green Mountain Reservoir and the pumpstation, and benefit irrigation water users within the SWCD. Temporary disturbance includes a 30-foot-wide construction disturbance and two staging areas on either end of the Project (0.24 acre at the southern end co-located with the pumpstation, and a 0.25-acre staging area at the northern end). Pumps to pressurize the new pipeline will be installed in a 12-foot by 10-foot building near the Pump Canal inlet. About 700 feet of new access (grading and gravel) will be created along an existing Reclamation pipeline right-of-way. The entire site is located on private lands. Construction will be phased and take about three months to complete.

T=Township, R=Range, S=South, W=West
Source: Bell Consulting, LLC, pers. comm. 2021.

Table 3. Acres of temporary and permanent disturbance associated with Batch 1 Project-specific components.

System Component	Project	Temporary Disturbance (acres)	Permanent Disturbance (acres)	Total Disturbance (acres)
Grass Valley Canal	Flow Control Gate Reconstruction	0.01	--	0.01
	Tunnel End Shoring	2.11	--	2.11
	Piping Projects	2.40	0.17	2.56
	By-pass Rebuild	1.04	0.26	1.30
Dry Elk Lateral	Canal Lining	10.59	--	10.59
Harvey Gap Reservoir	Spillway Reconstruction	1.42	--	1.42
	Dredging	0.17	49.30	49.47
Pump Canal	East By-pass Pipeline and Pump Station	6.64	0.32	6.96
Totals		**24.38**	**50.05**	**74.42**

Batch 1 Project-specific components of the 74.43-acre Proposed Action are located on Bureau of Land Management (BLM) Colorado River Valley Field Office (CRVFO), state, and private lands.

Schedule

Construction will generally occur between October 15 and April 15, when irrigation water is not being used, beginning in winter 2023 and with an anticipated end date of 2028. The GVC flows year-round, filling the Harvey Gap Reservoir during the winter; therefore, construction timing for the GVC will be as condensed as possible to minimize impacts on reservoir filling. Construction for each Project will be between two weeks, and three months to complete, as shown in Table 4.

Table 4. Construction timeframe, staging, and access.

Batch 1 Project-specific Component	Construction Timeframe	Construction Staging and Access
GVC Flow Control Gate Reconstruction	15 days	Existing access will be used, and a 20-foot by 20-foot construction area for staging will be adjacent to the gate.
GVC Tunnel End Shoring	Each tunnel will take about 1 to 10 days to shore up	About 5,500 feet of access road improvements may be needed along an existing two-track road to access the inlet for Tunnel 2, and possible improvements may be needed along 2,000 feet of access to Tunnel 1.
GVC Piping #1, #2, #3 and #4	Two months or less per piping segment	Access will be along existing routes with three staging areas.
GVC By-pass Rebuild around Harvey Gap Reservoir	15 days	Existing access routes will be used.
Dry Elk Lateral Canal Lining	1.5 months	Three staging areas will be used along existing access routes.
Harvey Gap Reservoir Spillway Reconstruction	Two months	About 920 linear feet of improvements (grading and gravel) will be made along an existing access route.
Harvey Gap Reservoir Dredging	One month	A stockpile area will be used for removed fill.
Pump Canal East By-pass Pipeline and Pumpstation	Three months, phased	Two staging areas and about 700 linear feet of new access, grading, and gravel may be needed.

For consultation purposes, areas of planned disturbance including the construction site, site access, staging/storage of equipment and materials, borrow areas, and stockpile areas will be referred to as part of the "Action Area." Material storage areas will be located on commercial or private land in the Action Area and will not be placed on federal land. Access to construction and storage areas will use existing disturbed access routes, except as listed in Table 4. If new disturbance is required for borrowing fill materials, for material storage, or for new access ways, the areas will be surveyed prior to construction to comply with requirements for protection of biological and cultural resources.

Methodology

Desktop Review

The USFWS Environmental Conservation Online System IPaC was accessed on October 18, 2021, and an IPaC resource list was obtained for the SWCD boundary area (Enclosure C) (USFWS 2021a). ERO biologists reviewed Batch 1 Project-specific components in ArcGIS against topographic maps, aerial photos, Colorado Parks and Wildlife (CPW) species range mapping (CPW 2020), USFWS critical habitat mapping, landcover mapping, geological formation mapping, and other ESA-listed species spatial data provided by the BLM CRVFO. Species' known occurrence information in the SWCD boundary area was requested from USFWS, Supervisory Fish and Wildlife Biologist, Creed Clayton, in the Western Colorado Ecological Services Field Office (Clayton, pers. comm. 2021).

Field Surveys

The following biological field surveys were conducted by ERO biologists (Aimee Way and Marie Russo) at Batch 1 Project-specific component sites where potential effects on ESA-listed species were identified during the desktop review and agency technical consultations:

- DeBeque phacelia and Ute-ladies' tresses habitat evaluation surveys at Batch 1 Project-specific component sites (July 27 and 28, 2021).
    - Habitat evaluation surveys were conducted within the Pump Canal and southern portion of the Harvey Gap Reservoir sites and a 100-foot buffer area. Because surveys were conducted outside of the blooming season for DeBeque phacelia (late April to late June), individual plants were not surveyed for or identified.
    - Habitat evaluation surveys were conducted at the GVC and Harvey Gap Reservoir Action Areas and a 100-foot buffer around the sites.

- Western yellow-billed cuckoo habitat evaluation surveys at the GVC Action Area near East Rifle Creek and along the Colorado River at the southern boundary of the SWCD boundary area (July 27 and 28, 2021).

Environmental Baseline

Watershed Condition

The Colorado Headwaters – Plateau watershed is part of the Upper Colorado River Basin that supplies water directly to the Colorado River. The Colorado River 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). The waters of the Colorado River are also used for hydropower production, recreation, and as habitat for fish and wildlife. Table 5 shows how much of the SWCD boundary area falls within the Colorado Headwaters – Plateau watershed.

Table 5. Size of watershed.

Watershed	Acres of Garfield County in Watershed[1]	Total Size of Watershed (acres)	Acres of SWCD Boundary Area in Watershed	% of Watershed in SWCD Boundary Area
Colorado Headwaters - Plateau	870,115	2,448,671	56,465	2.3

[1]Source: NRCS 2008.

Portions of five perennial flowing waterways occur in the SWCD boundary area: West Rifle Creek, Rifle Creek, East Rifle Creek, West Elk Creek, and the Colorado River. Two reservoirs – the Rifle Gap Reservoir and Harvey Gap Reservoir – occur in the SWCD boundary area. The perennial water sources feed the irrigation system in the SWCD boundary area.

The irrigation system in the SWCD boundary area includes the GVC, Dry Elk Lateral, Rifle Creek Canyon Ditch, Grand Tunnel Ditch, Davie Ditch, West Lateral Farmers Irrigation Company Ditch, East Lateral Farmers Irrigation Company Ditch, and the Silt Pump Canal. Both Rifle Gap and Harvey Gap Reservoirs in the SWCD boundary area are used primarily for irrigation. Rifle Gap Reservoir has a water surface of 359 acres and a total capacity of 13,602 af. Seventy-six percent (10,384 af) of the total capacity is allocated to lands owned by shareholders for irrigation. The West, Middle, and East Forks of Rifle Creek feed the reservoir, and their confluences at Rifle Gap Reservoir create mainstem Rifle Creek (CPW 2015). The Harvey Gap Reservoir was originally built in 1894 and is supplied completely with water from GVC. The Harvey Gap Reservoir is filled before the Rifle Gap Reservoir (Bell Consulting, LLC, pers. comm. 2021).

Habitat Overview

The SWCD boundary area lies mostly within the semiarid benchlands and canyonlands, shale deserts and sedimentary basins, and mid-elevation forests of the Colorado Plateaus Ecoregion (Chapman et al. 2006) (Enclosure A – Figure 3). The elevation of the SWCD boundary area ranges from about 5,250 to 7,900 feet above sea level.

The Grand Hogback monocline, a distinctive landform in the region, bisects the SWCD from north to south. The Grand Hogback is a 90-mile-long, s-shaped spine of uneven, narrow ridges and steeply sloping sides running from Meeker to Marble, Colorado (U.S. Forest Service 2002). The Grand Hogback is an extensive monocline characterized by steeply dipping rocks that range from Cretaceous to Pennsylvanian in age. In many areas, these formations have been exposed by erosional and fluvial processes that have resulted in steeply dipping fins, flatirons, and ridges (BLM 2007). Soils vary across the SWCD boundary area and are derived from sedimentary (Tertiary and Cretaceous) limestone, siltstone, shale, and sandstone (Chapman et al. 2006). The NRCS web soil survey shows 47 soil map units occurring in the

SWCD boundary area; Enclosure D shows the percentages of each soil map unit in the SWCD boundary area (NRCS 2020, 2021). The surface geology in the SWCD boundary area is primarily Wasatch Formation and Ohio Formation, Mancos Shale, modern alluvium, and Williams Fork Formation. Other secondary geological formations found in the SWCD boundary area are shown in Table 6 and Figure 4 (Enclosure A) (Green 1992). Table 6 also shows the surface geology in each of the Batch 1 Project-specific component sites.

Table 6. Surface geology in the SWCD boundary area and by Batch 1 Project-specific component sites.

Geological Formation	Percent of the SWCD Boundary Area (%)[1]	Percent of Batch 1 Project-specific Component Site			
		Grass Valley Canal (%)	Dry Elk Lateral Ditch (%)	Harvey Gap Reservoir (%)	Pump Canal (%)
Wasatch Formation (including Fort Union equivalent at base) and Ohio Creek Formation	40.5	--	--	--	96.8
Mancos shale	17.8	23.4	100	63.5	--
Modern alluvium	16.4	--	--	--	3.2
Williams Fork Formation	10.3	--	--	--	--
Iles Formation	3.8	11.0	--	19.8	--
Frontier Sandstone and Mowry Shale Members and intervening shale zone	3.3	26.1	--	--	--
Weber Sandstone and Maroon Formation	1.8	11.0	--	--	--
Dakota Sandstone	1.8	--	--	--	--
Frontier Sandstone and Mowry Shale Members of Mancos Shale and Dakota Sandstone	1.4	--	--	--	--
Water	1.0	--	--	16.7	--
Morrison, Curtis, Entrada, and Glen Canyon Formations	1.0	16.2	--	--	--
Chinle and State Bridge Formations	0.5	12.3	--	--	--
Evaporitic Facies	0.3	--	--	--	--
Gravels and alluviums (Pinedale and Bull Lake age)	0.2	--	--	--	--
Minturn Formation in west-central and south-central and other units of middle Pennsylvanian age	<0.1	--	--	--	--

[1]The percent of the geological formations in the SWCD boundary area totals more than 100 percent due to rounding errors.

The Southern Rockies Ecoregion in the SWCD boundary area is characterized by a temperate semi-arid climate of moderately warm and dry summers, cold winters without persistent snowpack, and less than approximately 15 inches of precipitation annually. High-elevation snowpack in the region provides a critical water source for the valleys in the watershed, where headwaters of streams 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 (Chapman et al. 2006). Mixed montane shrublands include sagebrush, Gambel oak, serviceberry, and bitterbrush intermixed with grasslands. The riparian corridors of perennial streams typically feature cottonwood or mixed cottonwood-conifer communities at lower elevations. Fauna in the watershed is typical of semi-arid or lower montane zones and includes mountain lions, cottontails, jackrabbits, foxes, coyotes, raccoons, skunks, rodents, golden and bald eagles, hawks, owls, and other bird species. Mule deer and elk are also abundant.

The Gap Analysis Project (GAP)/LANDFIRE National Terrestrial Ecosystems data set was used to characterize the spatial distribution of vegetation communities at the macro group level across the SWCD boundary area. At the macro group level, vegetation types are distinguished by diagnostic plant species

and growth forms, and regional differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes (U.S. Geological Survey [USGS] 2014). The GAP/LANDFIRE identifies a total of 17 land cover classes across the SWCD boundary area (Enclosure A – Figure 3). Table 7 provides the composition of the vegetation communities in the SWCD boundary area and the Batch 1 Project-specific component sites. A buffer of 30 feet was analyzed around the linear Batch 1 Project-specific component sites (i.e., the pipelines) to determine vegetation communities. A description of habitat at each Batch 1 Project-specific component site is provided below.

Table 7. Vegetation communities within the SWCD boundary area and by Batch 1 Project-specific component sites.

Vegetation Community[1]	Percent of the SWCD Boundary Area (%)	Acres and Percent of Batch 1 Project-specific Component Site			
		Grass Valley Canal	Dry Elk Lateral Ditch	Harvey Gap Reservoir	Pump Canal
Rocky Mountain Two-needle Pinyon – Juniper Woodland	36.7	7.11 acres (64.9%)	5.16acres (48.0%)	13.51 acres (5.5%)	1.25 acres (15.7%)
Herbaceous Agricultural Vegetation	26.5	0.72 acres (6.6%)	4.08 acres (38.0%)	24.90 acres (10.1%)	6.58 acres (82.6%)
Great Basin & Intermountain Tall Sagebrush Shrubland & Steppe	14.8	0.66 acres (6.0%)	1.5 acres (13.9%)	38.39 acres (15.5%)	0.13 acres (1.6%)
Intermountain Basin Cliff, Scree & Rock Vegetation	4.0	--	--	1.24 acres (0.5%)	--
Great Basin Saltbrush Scrub	3.3	--	--	--	--
Developed & Urban	3.3	--	--	--	--
Southern Rocky Mountain Montane Grassland & Shrubland	3.2	0.64 acres (5.8%)	--	--	--
Cool Semi-Desert Alkali-Saline Wetland	2.0	--	--	--	--
Rocky Mountain and Great Basin Flooded & Swamp Forest	1.8	1.8 acres (16.5%)	--	1.53 acres (0.6%)	--
Introduced & Semi Natural Vegetation	1.6	--	--	--	--
Open Water	1.5	0.001 acres (0.005%)	--	167.79 acres (67.8%)	--
Southern Rocky Mountain Lower Montane Forest	1.2	0.03 acres (0.3%)	--	--	--
Great Basin & Intermountain Dry Shrubland & Grassland	0.1	--	--	--	--
Warm Desert Freshwater Shrubland, Meadow & Marsh	<0.1	--	--	--	--
Recently Disturbed or Modified	<0.1	--	--	--	--
Quarries, Mines, Gravel Pits, and Oil Wells	<0.1	--	--	--	--
Rocky Mountain Cliff, Scree & Rock Vegetation	<0.1	--	--	--	--
Totals	100%	10.96 acres (100%)	10.74 acres (100%)	247.36 acres (100%)	7.97 acres (100%)

[1] Source: USGS 2014.

Grass Valley Canal

The GVC includes Batch 1 Project-specific components that are located in the East Rifle Creek drainage, traverse across rolling foothills and benches, and are at the southwest edge of Harvey Gap Reservoir. The majority of the vegetation communities in the approximately 11-acre GVC site consists of mature pinyon-juniper woodlands in the foothills (Enclosure B – Photo 10) and forested riparian, wetlands, and woodlands along the East Rifle Creek and portions of Harvey Gap Reservoir (Photo 11) (Table 7). A small portion of the site consists of agricultural vegetation, sagebrush shrublands, and semidesert shrublands (referred to as Great Basin & Intermountain Tall Sagebrush Shrubland & Steppe in Table 7) on the drier hillsides and terraces, and lower montane coniferous forests above the creek (Enclosure B – Photos 10 and 12; Enclosure A – Figures 2a through 2i, Figure 3). The northernmost component of the GVC Project, the GVC Flow Control Gate Reconstruction, is located in Rifle Falls State Park, an area noted for waterfalls, limestone caves, lush riparian forests, and wetlands surrounded by steep canyon terrain and pinyon-juniper woodlands. The majority of the GVC Project occurs on existing disturbance. Approximately 0.17 acre from access road improvements in Section 1 will occur in a mature pinyon-juniper woodland. Approximately 0.26 acre of disturbance to sagebrush shrubland and montane grassland and shrubland vegetation will occur from the by-pass rebuild around Harvey Gap Reservoir.

Dry Elk Lateral System Improvement

The Dry Elk Lateral System Improvement is located in the northwestern portion of the SWCD boundary area and traverses foothills adjacent to irrigated fields. The approximately 10.7-acre site traverses previously disturbed land (i.e., existing ditch) in pinyon-juniper woodlands, agricultural, and sagebrush shrubland and shrub-steppe vegetation communities (Table 7) (Enclosure A – Figure 3; Enclosure B – Photo 5).

Harvey Gap Reservoir

The Harvey Gap Reservoir is located at the base of and north of the Grand Hogback. Irrigated fields occur to the north of Harvey Gap Reservoir. The primary vegetation communities at Harvey Gap Reservoir include sagebrush shrubland and shrub-steppe vegetation and agricultural vegetation (Table 7). Smaller amounts of pinyon-juniper woodland; forested riparian, wetlands, and woodlands; and barren or sparsely vegetated cliffs and scree slopes occur in the approximately 247-acre Harvey Gap Reservoir site (Enclosure A – Figure 3; Enclosure B – Photos 7 and 8). The total disturbance at the Harvey Gap Reservoir site will be approximately 50.9 acres, with approximately 49.5 acres of permanent disturbance in a large sagebrush field from stockpiling dredged material.

Pump Canal

The East By-pass pipeline component of the Pump Canal travels from north to south through irrigated fields, residential development, and foothills in the southeastern portion of the SWCD boundary area. The East By-pass Pump Station is located on the southern end of the pipeline. Agricultural vegetation is the primary vegetation community in the approximately 8-acre site, followed by small amounts of sagebrush shrubland and shrub-steppe vegetation (Table 7) (Enclosure A – Figure 3; Enclosure B – Photos 9 and 13) Except for the new access road for an approximate disturbance of 0.3 acre in shrub-steppe vegetation, the majority of the Project is on existing disturbance.

Species Considered and Analysis of Effects

Threatened, Endangered, and Proposed Species and Designated Critical Habitat Considered and Analyzed

Table 8 identifies threatened, endangered, proposed, or candidate species that occur or potentially occur in the SWCD boundary area as generated by the USFWS IPaC (USFWS 2022a).

Canada lynx *(Lynx canadensis*), gray wolf (*Canis lupus*), Mexican spotted owl (*Strix occidentalis lucida*), and western yellow-billed cuckoo (*Coccyzus americanus*) were dismissed from further analysis based on a lack of documented occurrences or habitat in the specific sites. The four endangered Colorado River fish – bonytail chub (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), razorback sucker (*Xyrauchen texanus*), and their designated critical habitat have been previously consulted on for the SWCD Project in the *Final Programmatic Biological Opinion for Bureau of Reclamation's Operations and Depletions, Other Depletions, and Funding and Implementation of Recovery Program Actions in the Upper Colorado River Above the Confluence with the Gunnison River* (USFWS 1999; TAILS FWS/R6 ES/GJ-6-CO-99-F-033). The Proposed Action will not result in new water depletions; thus, the four Colorado River fishes and their critical habitat do not require further consultation for the SWCD Project.

Table 8. Federally listed threatened and endangered species potentially occurring in the SWCD boundary area.

Common Name[1, 2]	*ScientificName*	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 watershed, and suitable habitat (high-elevation spruce-fir and mixed-conifer forests at elevations between 8,000 and 11,500 feet) is not present in the SWCD boundary area.
Gray wolf	*Canis lupus*	Endangered	No	Yes	No	Eliminated. The proposed action is not a predator management program; therefore, gray wolf does not need to be analyzed further in this BA (USFWS 2022a).
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	No	No	No	Eliminated. The Mexican spotted owl is not known to occur in the watershed, and suitable habitat (mature to old-growth mixed conifer forests on steep slopes) is not present in the SWCD boundary area.
Yellow-billed cuckoo	*Coccyzus americanus*	Threatened	No	No	No	Eliminated. The yellow-billed cuckoo occurs in dense riparian habitat with cottonwood overstory. No suitable habitat is present in the SWCD boundary area. Additionally, no suitable habitat occurs along the Colorado River corridor near the SWCD boundary area due to urban and industrial developments.
Bonytail	*Gila elegans*	Endangered	No	No	Yes	Eliminated. Historic water depletions have been consulted on and are covered under the Upper Colorado River PBO (USFWS 1999; TAILS FWS/R6 ES/GJ-6-CO-99-F-033).
Colorado pikeminnow	*Ptychocheilus Lucius*	Endangered	No	No	Yes	Eliminated. Historic water depletions have been consulted on and are covered under the Upper Colorado River PBO (USFWS 1999; TAILS FWS/R6 ES/GJ-6-CO-99-F-033).
Humpback chub	*Gila cypha*	Endangered	No	No	Yes	Eliminated. Historic water depletions have been consulted on and are covered under the Upper Colorado River PBO (USFWS 1999; TAILS FWS/R6 ES/GJ-6-CO-99-F-033).
Razorback sucker	*Xyrauchentexanus*	Endangered	No	No	Yes	Eliminated. Historic water depletions have been consulted on and are covered under the Upper Colorado River PBO (USFWS 1999; TAILS FWS/R6 ES/GJ-6-CO-99-F-033).

Common Name[1, 2]	*ScientificName*	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]
Monarch butterfly	*Danaus plexippus*	Candidate	Yes	Yes	No	Eliminated. Although considered a breeding zone, Colorado is not included in the two migratory populations of the monarch butterfly and milkweed is common throughout the region. Suitable habitat occurs near the Batch 1 Project-specific components; whorled milkweed was observed near the GVC Action Area during the habitat evaluation surveys. It is likely milkweed occurs throughout the SWCD boundary area and near additional Batch 1 Project-specific components, particularly near riparian corridors, ditches, stream edges, and roadsides. Because monarch butterfly is a candidate species, no effects determination or formal consultation will be required (Clayton, pers. comm. 2021).
DeBeque phacelia	*Phacelia submutica*	Threatened	Yes	Yes	No	Carried forward. Suitable habitat (exposures of chocolate to purplish brown and dark charcoal gray alkaline clay soils derived from the Wasatch Formation) does not occur near Batch 1 Project-specific components but has potential to occur in the SWCD boundary area.
Ute ladies'-tresses	*Spiranthes diluvialis*	Threatened	Yes	Yes	No	Carried forward. Suitable habitat (moist meadows associated with perennial stream terraces, floodplains, and oxbows) does not occur near Batch 1 Project-specific components but has potential to occur in the SWCD boundary area.

[1]Source: USFWS 2022a.
[2]Colorado hookless cactus, a federally threatened species, was not included for analysis in this BA. Although on the USFWS IPaC list for the entirety of Garfield County, Colorado, it is not listed as a species that is known or expected to occur on or near the SWCD boundary area (USFWS 2022a).

Federally Listed Fish Species and Critical Habitat

Direct and Indirect Effects to the Four Colorado River Endangered Fishes

The Upper Colorado River PBO (USFWS 1999; TAILS FWS/R6 ES/GJ-6-CO-99-F-033) applies to federal projects, and all existing nonfederal water depletions in the Upper Colorado River Basin, for the four Colorado River endangered fishes (bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker) and their designated critical habitat. The Upper Colorado River PBO (USFWS 1999) states: *"For projects involving water depletions less than 100 af/year, the Federal agency must document the project location, the amount of water depletion, identify if the depletion is new or historic, and provide the information to the Service when consultation is initiated."* The PBO also states: *"A Recovery Agreement must be offered and signed for individual projects depleting more than 100 af/yr, prior to conclusion of section 7 consultation."*

No new depletions will occur as a result of the proposed Project. Due to an administrative decision, the Harvey Gap Reservoir has not been filled to capacity since 2010. Although reconstructing the spillway at Harvey Gap Reservoir will allow for the reservoir to be filled to capacity in the future, the Project will return the extent of open water to pre-2010 conditions, which were present at the time of the Upper Colorado River PBO issued for SWCD's historic depletions (USFWS 1999).

All occupied habitats and critical habitat designated for bonytail chub and humpback chub are found downstream of the SWCD boundary area. Rare occurrences of Colorado pikeminnow and razorback sucker are reported as far upstream as Rifle, Colorado and near the SWCD boundary area. Designated critical habitat for these two species occurs along the southwestern portion of the SWCD boundary area. Batch 1 Project-specific components (i.e., East By-pass Pump Station) are located approximately 0.35 mile north of the Colorado River and approximately 7.7 miles from designated critical habitat. However, the fish are unlikely to occur in the SWCD boundary area, and construction will take place outside of the irrigation season, when canals will be dry and fish will not be present.

Construction of Batch 1 Project-specific components will be limited to site ditches, canals, reservoirs, and tunnels; no construction is proposed along site streams or rivers. Construction of the Project could temporarily increase the potential for sediment entry into 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 (reduced salinity and selenium) and water availability for fish in the Upper Colorado River Basin.

Potential impacts on the four Colorado River endangered fishes will result from continued water depletions in the Colorado River Basin. Water depletions in the Colorado River Basin has the potential to diminish backwater spawning areas in downstream designated critical habitat in the basin. No new depletions are anticipated for the Proposed Action. Depletions originating from the entire SWCD were previously determined to fall under the Upper Colorado River PBO (USFWS 1999; TAILS FWS/R6 ES/GJ-6-CO-99-F-033).

Indirect impacts of the watershed improvements include improved water quality and availability in downstream waterways, beneficially impacting suitable habitats for federally listed fish. No new depletions are anticipated with the Proposed Action, and appropriate design criteria and best management practices (BMPs)/Conservation Measures (below) will be used. Therefore, implementation of the Proposed Action, in accordance with the Upper Colorado River PBO (USFWS 1999; TAILS FWS/R6 ES/GJ-6-CO-99-F-033), will have no effect on bonytail chub, Colorado pikeminnow, humpback chub, or razorback sucker.

Direct and Indirect Effects on Designated Critical Habitat for the Four Colorado River Endangered Fishes

Designated critical habitat for the bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker (Colorado River endangered fish) has been identified (Table 8). In combination with ongoing water quality improvement efforts in the Colorado River Basin (Colorado River Basin Salinity Control Program 2020), the watershed improvements are expected to result in positive benefits to water quality and availability in the Colorado River, thereby improving habitat quality for the Colorado River endangered fishes in the SWCD boundary area and downstream. The Proposed Action is not expected to reduce the effectiveness of critical habitat for the Colorado River endangered fishes, or negatively impact the physical and biological factors of designated critical habitat. In accordance with the Upper Colorado River PBO (USFWS 1999), the Proposed Action will not destroy or adversely modify critical habitat for the bonytail chub, Colorado pikeminnow, humpback chub, or razorback sucker. Furthermore, the reduction in selenium loading to the Colorado River Basin as a result of the cumulative efforts of the Colorado River Basin Salinity Control basin wide and Basin States Programs improves water quality in designated critical habitat for Colorado River endangered fish throughout the Colorado River Basin.

Table 9 presents effects determinations, or conditions for making effects determinations, for each type of watershed improvement that could be proposed in the future. Future watershed improvements resulting in depletions, changes in water quality, or sedimentation have potential to impact federally listed fish.

Table 9. Effects determinations by watershed improvement type for federally listed fish species.

Grass Valley Canal				Dry Elk Lateral	Harvey Gap Reservoir		Pump Canal
Flow Control Gate Reconstruction	**Tunnel End Shoring**	**Piping Projects**	**By-pass Rebuild**	**Canal Lining**	**Spillway Reconstruction**	**Reservoir Dredging**	**East By-pass Pipeline and East By-pass Pump Station**
No adverse effects on the bonytail chub, Colorado pikeminnow, humpback chub, or razorback sucker will occur. The Project will not destroy their designated critical habitat on the Colorado River. Adverse effects from historic depletions are mitigated by participation in the Recovery Program for Colorado River endangered fish (USFWS 1999).							

Cumulative Impacts

Actions with the potential to cumulatively affect federally listed fish species in the watershed include existing and future NRCS irrigation improvement projects, livestock grazing, recreation, agriculture, and residential and commercial development. Climate change, drought, and wildfire also could impact the region's vegetative resources and natural habitat in the future. Potential impacts on Colorado River endangered fishes will result from continued water depletions in the greater Colorado River Basin. Water depletions in the greater Colorado River Basin has the potential to diminish backwater spawning areas in downstream designated critical habitat in the Colorado River Basin. When added to past, present, and reasonably foreseeable activities, the Proposed Action will not result in significant cumulative impacts on federally listed species.

The Proposed Action will comply with all relevant federal, state, and local permits. In combination with other past, present, and reasonably foreseeable future actions, the Proposed Action is expected to contribute to improved water quality and availability, resulting in long-term beneficial impacts on federally listed fish and their habitats.

DeBeque Phacelia

DeBeque phacelia was listed as threatened in 2011 (75 Federal Register (FR) 45054-45075, July 27, 2011) due to its small geographic range, highly specific soil and germination requirements, limited seed dispersal, prolonged seed dormancy, potential seed bank depletion by prolonged drought, and fragmented habitat that is subject to human-caused (i.e., natural gas exploration and production and off-highway vehicles (OHV)) and livestock and wildlife disturbances (USFWS 2011). The USFWS designated critical habitat for DeBeque phacelia in 2012 (USFWS 2012). No designated critical habitat areas occur in the SWCD boundary area; the closest designated critical habitat area occurs approximately 20 miles to the southwest.

DeBeque phacelia is restricted to exposures of chocolate to purplish brown and dark charcoal gray alkaline clay soils derived from the Atwell Gulch and Shire members of the Wasatch Formation. These expansive clay soils often have high shrink-swell potential and are found on moderately steep slopes, benches, and ridgetops adjacent to the valley floors of the southern Piceance Basin in Mesa and Garfield Counties, Colorado. The species is adapted to grow in areas with sparse vegetation cover at elevations between 5,000 and 7,150 feet (Colorado Natural Heritage Program (CNHP) 2019; USFWS 2021b). The plant community surrounding the known population near DeBeque, Colorado is dominated by juniper, sagebrush, and greasewood. Associated species include pointed gumweed, shadscale saltbush, Gordon's buckwheat, and broom snakeweed, among others (CNHP 2019). Maintenance of a large seed bank is vital to the persistence of this species through unpredictable and long periods of drought (USFWS 2013).

Documented occurrences of DeBeque phacelia are limited to Mesa and Garfield Counties. The species' range lies within an approximate 12-mile radius from the town of DeBeque and occupies a total of 559 acres (Ladyman 2003; USFWS 2013). The USFWS's Section 7 modeled range for DeBeque phacelia is based on CNHP plant occurrence data (historic and recent), USFWS plant occurrence data (historic and recent), soils and geological formation mapping, and elevation modeling. The modeled range is conservative (spatially buffered) and therefore includes potentially unsuitable areas for DeBeque phacelia (Enclosure A – Figure 5).

Status in the Action Area

There are no documented occurrences of DeBeque phacelia in the SWCD boundary area (Clayton, pers. comm. 2021). According to C. Clayton (Supervisory Fish and Wildlife Biologist, USFWS), DeBeque phacelia is not likely to occur east of its designated critical habitat near DeBeque, Colorado and will likely be removed from the Section 7 modeled range near and in the SWCD boundary area in the future (Clayton, pers. comm. 2021). Currently, the USFWS's Section 7 modeled range extends to the southeast along the Grand Hogback and encompasses the southwestern portion of the SWCD boundary area (Enclosure A – Figure 5) (USFWS 2021b). The Pump Canal sites are located in the appropriate geological formation for the DeBeque phacelia (Wasatch Formation) (Enclosure A – Figures 4 and 5), but appropriate soils were not observed (exposures of chocolate to purplish brown and dark charcoal gray alkaline clay soils). Although potentially suitable habitat (Wasatch Formation on badland hillsides with sparse vegetation) exists in the SWCD boundary area, and although some of the USFWS Section 7 modeled range encompasses the southwestern portion of the SWCD boundary area, the SWCD boundary area lies outside the occurrence-based current known range of the species (Clayton, pers. comm. 2021). Field reviews focused on habitat identification within the Section 7 modeled range in the Project area and did not identify any potentially suitable habitat, including distinctive clay soils and associated species.

Direct and Indirect Effects

DeBeque phacelia has potential to be affected by future SWCD improvements projects in the USFWS Section 7 modeled range, though no suitable habitat was identified during field reviews (Enclosure A – Figure 5). No currently proposed Batch 1 Project-specific components will affect DeBeque phacelia due to a lack of suitable habitat.

Direct effects could include physical harm or crushing of plants or disturbance to the seed bank. Additional direct effects of surface disturbance and soil compaction at construction sites, access routes, and staging areas within the site could bury the seed bank and cause erosion. Moist compaction of soil can form an impenetrable barrier, preventing seed germination and reducing water infiltration (USFWS 2013). Indirect effects could include an increase in airborne dust during construction. High concentrations of dust accumulation on leaf surfaces increases tissue temperatures and reduces photosynthesis, thereby decreasing plant growth, vigor, and water use efficiency. Dust deposition on stigmatic surfaces can reduce seed production (Farmer 1993). Surface disturbances can accelerate the spread of invasive plant species or noxious weeds into areas of suitable habitat Conservation Measures (below) will minimize potential impacts of direct and indirect effects.

Future Batched SWCD Improvement Projects

For future SWCD improvement projects occurring outside of the USFWS Section 7 modeled range (DeBeque phacelia habitat) (Enclosure A – Figure 5) additional communication should take place once actual time, place, and other project specific components are identified to confirm that each future improvements fits within the parameters of this consultation and adverse effects are avoided.

When a future proposed action is within the USFWS Section 7 modeled range, NRCS will check with USFWS for clearance survey requirements during the planning phase of the proposed action. The USFWS Section 7 modeled range for Debeque phacelia is likely to be removed near and in the SWCD

boundary area in the future (Clayton, pers. comm. 2021), which could change clearance survey requirements for future projects. The determination of effect for future SWCD improvement projects will depend on the proximity of the potentially affected occurrence of DeBeque phacelia and the intensity, duration, and size of the proposed SWCD improvement project. Note that during the planning phase for future SWCD improvement projects (i.e. batches) being proposed, NRCS may need consultation on based on USFWS IPaC report and/or field surveys presented in Enclosure A – Figure 5.

Batch 1 Project-specific Components

ERO biologists reviewed Batch 1 Project-specific locations with USFWS biologists and during field surveys (July 27 and 28, 2021) for suitable DeBeque phacelia habitat. The Pump Canal projects are located on the appropriate geologic formation (Wasatch Formation) for this species. Because the habitat suitability evaluation surveys were conducted outside of the blooming season (late April to late June), no individuals were identified or surveyed for. No DeBeque phacelia suitable habitat was documented at the Pump Canal site or within a 100-foot buffer due to the lack of exposures of chocolate to purplish brown and dark charcoal gray alkaline clay soils. Habitat is not suitable at the other Batch 1 Project-specific component sites due to the lack of appropriate geologic formations; therefore, Batch 1 Project-specific components will have **"May Affect, Not Likely to Adversely Affect"** on DeBeque phacelia.

Cumulative Impacts

Present and future activities (in the next 50 years) in the SWCD boundary area affecting and expected to affect the DeBeque phacelia include ongoing and future irrigation projects, subdivision and residential development, infrastructure development and maintenance (including public and private roads and energy transmission corridors), weed management programs, livestock grazing, motorized and nonmotorized recreation, and continued oil and gas development. Climate change and drought are also anticipated to continue to affect the region's vegetation communities and habitat in the future, possibly with increasing intensity. Impacts from future SWCD improvements under the Project will be minimized by Conservation Measures (below). Therefore, the impacts from the proposed Project are not likely to result in measurable effects on DeBeque phacelia, and the Project is not anticipated to cumulatively add to the ongoing impacts that currently threaten the species.

Ute Ladies'-Tresses

Ute ladies'-tresses was listed as threatened in 1992 at 55 FR 2048-2054, due to reduced and fragmented habitat from urban development, riparian habitat modification, stream alterations, recreation, livestock grazing, and invasive plant species (CNHP 2019; USFWS 1992). The primary threat to Ute ladies'-tresses is hydrologic alteration. Road construction, recreation, loss of pollinators, drought, seed predation by voles, mowing, and burning can also be detrimental to this species (CNHP 2019; NatureServe 2021). No critical habitat has been designated for Ute ladies'-tresses.

Ute ladies'-tresses occurs in moist meadows associated with perennial stream terraces, floodplains, and oxbows as well as seasonally flooded river terraces, subirrigated or spring-fed abandoned stream channels and valleys, and lakeshores. They have also been discovered along irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, reservoirs, and other human-modified wetlands. Associated species include horsetail, milkweed, blue-eyed grass, and creeping bentgrass, among others. Typically, this species occurs where vegetation is not too dense or overgrown at elevations between 4,500 and 7,750 feet (CNHP 2019; USFWS 2021b). Ute ladies'-tresses generally blooms between July and September in Colorado, depending on the year (CNHP 2019).

Ute ladies'-tresses is known from British Columbia southward to Colorado. Utah has the largest number of extant element occurrences and the highest number of reported plants, followed by Colorado. In Colorado, the plant is known from Boulder, Eagle, El Paso, Garfield, Jefferson, Larimer, Moffat, and Weld Counties (CNHP 2019). Figure 6 (Enclosure A) shows Ute ladies'-tresses habitat (USFWS Section

7 modeled range) in the vicinity; the entire range has not been provided on this map. This modeled range is based on CNHP plant occurrence data (historic and recent), USFWS plant occurrence data (historic and recent) (USFWS 2021b), wetland mapping, and elevation modeling. The modeled range is conservative (spatially buffered) and, therefore, includes potentially unsuitable areas for Ute ladies'-tresses around its fringes.

Status in the Action Area

Currently, the USFWS's Section 7 modeled range is scattered throughout the southern and western portions of the SWCD boundary area (USFWS 2021b). There are no documented occurrences of Ute ladies'-tresses in the SWCD boundary area (Clayton, pers. comm. 2021). The closest known occurrence of Ute ladies'-tresses to the SWCD boundary area is in the Carbondale, Colorado area, approximately 25 miles to the southeast. The Batch 1 Project-specific component sites consist of highly developed areas, agricultural developments, and modified stream and riparian habitat. No Ute ladies'-tresses or suitable habitat was observed in the Action Area during the field surveys (July 27 and 28, 2021).

Direct and Indirect Effects

Ute ladies'-tresses has potential to be affected by future SWCD improvement projects in the USFWS Section 7 modeled range (Enclosure A – Figure 6). No currently proposed Batch 1 Project-specific components will affect Ute ladies'-tresses.

Direct effects could include physical harm or crushing of plants. Indirect effects could include surface disturbance and soil compaction at construction sites, staging areas, and access routes within the site, which could change local soil moisture regimes in the habitat of nearby plants. Additionally, indirect effects will include an increase in airborne dust during construction and potential disruption of pollinators should Project activities occur during the blooming season. High concentrations of dust have detrimental effects on gas exchange and water budgets in plants (Farmer 1993) and can clog stigmas, which may affect the ability of pollen grains to germinate, penetrate the stylar tissue, and fertilize ovules. Dust will be less of a concern during winter months when the plants are not pollinating. The spread of invasive plant species or noxious weeds into areas of suitable habitat could be hastened by construction activities. Design criteria (Project timing) and Conservation Measures (below) will minimize potential impacts of indirect effects.

Future SWCD Improvement Projects

For future SWCD improvement projects in the USFWS Section 7 modeled range, NRCS will check with the USFWS for clearance survey requirements during the planning phase of the future proposed action. The determination of effect for future SWCD improvement projects will depend on the proximity of the potentially affected occurrence of Ute ladies'-tresses and the intensity, duration, and size of the proposed SWCD improvement project. Note that during the planning phase for future SWCD improvement projects (i.e. batches) being proposed, NRCS may need consultation on based on USFWS IPaC report and/or field surveys presented in Enclosure A – Figure 6.

Batch 1 Project-specific Components

ERO biologists reviewed Batch 1 Project-specific locations with USFWS biologists and during field surveys (July 27 and 28, 2021) for suitable Ute ladies'-tresses habitat. Habitat suitability evaluation surveys were conducted during the blooming season (July through September); no individuals were identified during the surveys. No Ute ladies'-tresses suitable habitat was documented at any of the Batch 1 Project-specific component Action Areas or within a 100-foot buffer; therefore, Batch 1 Project-specific components will have "**May Affect, Not Likely to Adversely Affect"** on Ute ladies'-tresses.

Cumulative Impacts

Present and future activities (in the next 50 years) in the SWCD boundary area affecting and expected to affect this species include ongoing and future irrigation projects, subdivision and residential development, infrastructure development and maintenance (including public and private roads and energy transmission corridors), weed management programs, livestock grazing, motorized and nonmotorized recreation, and continued oil and gas development. Climate change and drought are also anticipated to continue to affect the region's vegetation communities and habitat in the future, possibly with increasing intensity. Impacts from future SWCD improvements under the Project will be minimized by Conservation Measures (below). Therefore, the impacts from the proposed Project are not likely to result in measurable effects on Ute ladies'-tresses, and the Project is not anticipated to cumulatively add to the ongoing impacts that currently threaten the species.

Summary – Determinations of Effect

Table 10 summarizes the effects determinations for Batch 1 Project-specific components for federally listed species and their critical habitats.

Canada lynx, Mexican spotted owl, and yellow-billed cuckoo have not been documented in the SWCD boundary area and are therefore dismissed from further analysis in this BA with a determination of "no effect" for Batch 1 Project-specific components. Batch 1 Project-specific components for critical habitat for Canada lynx, Mexican spotted owl, yellow-billed cuckoo, and DeBeque phacelia does not occur in the SWCD boundary area and, therefore, is dismissed from further analysis in this BA with a determination of "no effect."

Table 10. Summary of effects determination for Batch 1 Project-specific components.

Batch 1 Project-specific Component	Colorado River Endangered Fishes (Four Species)	Colorado River Endangered Fishes Critical Habitat	DeBeque Phacelia	Ute Ladies'-Tresses
Grass Valley Canal	No effect	No effect	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Dry Elk Lateral	No effect	No effect	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Harvey Gap Reservoir	No effect	No effect	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Pump Canal	No effect	No effect	May affect, not likely to adversely affect	May affect, not likely to adversely affect

Conservation Measures

Conservation measures will be applied during construction of the Batch 1 Proposed Project components to avoid and minimize impacts on species protected by the ESA, including Colorado River endangered fish and federally listed plant species, as described below. Future batches will need consultation based on USFWS IPaC report and/or field surveys.

DeBeque Phacelia and Ute Ladies'-Tresses

- Prior to construction of future SWCD improvement projects, habitat evaluation surveys

will be completed for DeBeque phacelia and Ute ladies'-tresses.

General Preconstruction

- Ground disturbances shall be limited to only those areas necessary to safely implement the Proposed Action.
- Work will be confined within existing rights-of-way whenever possible to preserve existing vegetation and private property. The right-of-way 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.

During Construction

- Vegetation and topsoil removal shall be confined to the smallest portion of the 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 vehicle bodies 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 binders 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.

Following Construction

- Reseeding shall occur at appropriate times with certified weed-free seed mixes per NRCS, 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 BA.

Coordination and Technical Consultation

The following agency experts were consulted during preparation of this BA:

- Krystal Phillips, Colorado State Biologist, NRCS
- Hilary Boyd, Wildlife Biologist, BLM, CRVFO
- Creed Clayton, Supervisory Fish and Wildlife Biologist, USFWS
- Kathleen Gissing, Fish and Wildlife Biologist, USFWS
- Brian Gray, Area District Wildlife Manager for Rifle North, Colorado Parks and Wildlife

NRCS is requesting USFWS concurrence with the determinations above for impacts that may be associated with the 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.

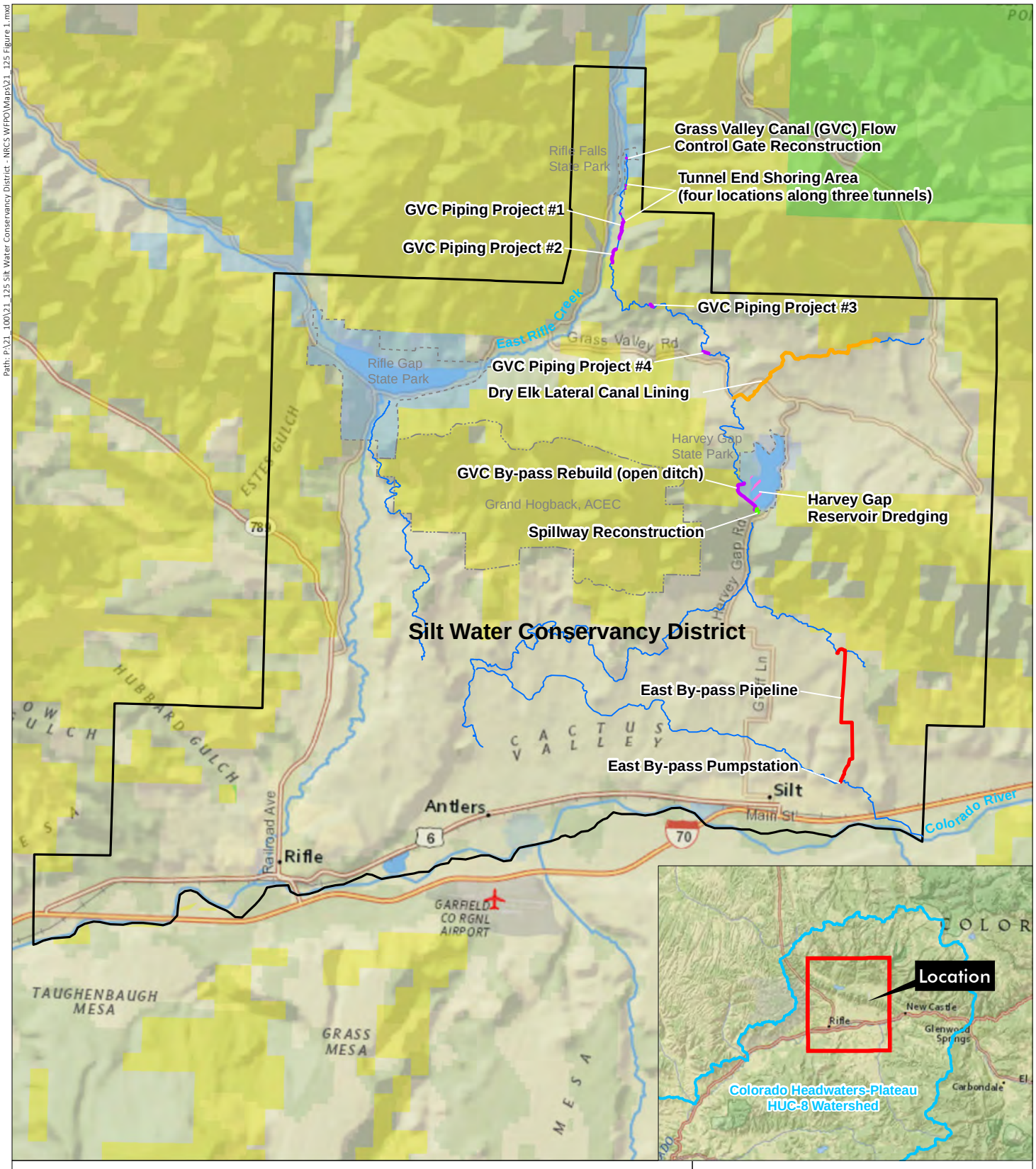
Sincerely,

Krystal Phillips, USDA-NRCS Colorado, State Biologist

Enclosures

- A – Maps (Figures 1 through 6)
    - Figure 1 – Vicinity Map
    - Figures 2a – 2i – Batch 1 Project-specific Components
        - Figures 2a – 2c – Grass Valley Canal
        - Figure 2d – Grass Valley Canal, Dry Elk Lateral System Improvement
        - Figures 2e, 2f – Dry Elk Lateral System Improvement
        - Figure 2g – Harvey Gap Reservoir, Grass Valley Canal
        - Figures 2h, 2i – Pump Canal
    - Figure 3 – Vegetation Communities of the SWCD Boundary Area
    - Figure 4 – Geological Formations in the SWCD Boundary Area
    - Figure 5 – DeBeque Phacelia Habitat
    - Figure 6 – Ute Ladies'-Tresses Habitat
- B – Photo Log
- C – USFWS IPaC Resource List
- D – Silt Water Conservancy District Boundary Area Soil Map Units
- E – References

cc: Eugene Backhaus, NRCS State Resources Conservationist; Heidi Ramsey, NRCS Watershed Programs; Kimberly Burr, Acting NRCS Area 1 Conservationist; Allison Hearne, Area 1 Biologist; Cassandra Shenk, ERO Assistant Project Manager; Wendy Huber (whuber@blm.gov), Field Supervisor for the CRVFO, BLM; and Brian Gray (brian.gray@stat.co.us), Area District Wildlife Manager for Rifle North, CPW



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Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Dry Elk Lateral System Improvement
- Pump Station Improvement - East By-pass
- Grass Valley Canal System Improvement
- Harvey Gap Reservoir Dredging
- Spillway Reconstruction
- SWCD Canal
- Silt Water Conservancy District Boundary
- BLM Land
- State Land
- USFS land

0 5,000 10,000 Feet

N

Figure 1
Vicinity Map

Prepared for: Silt Water Conservancy District
File: 21_125 Figure 1.mxd (GS)
October 7, 2021

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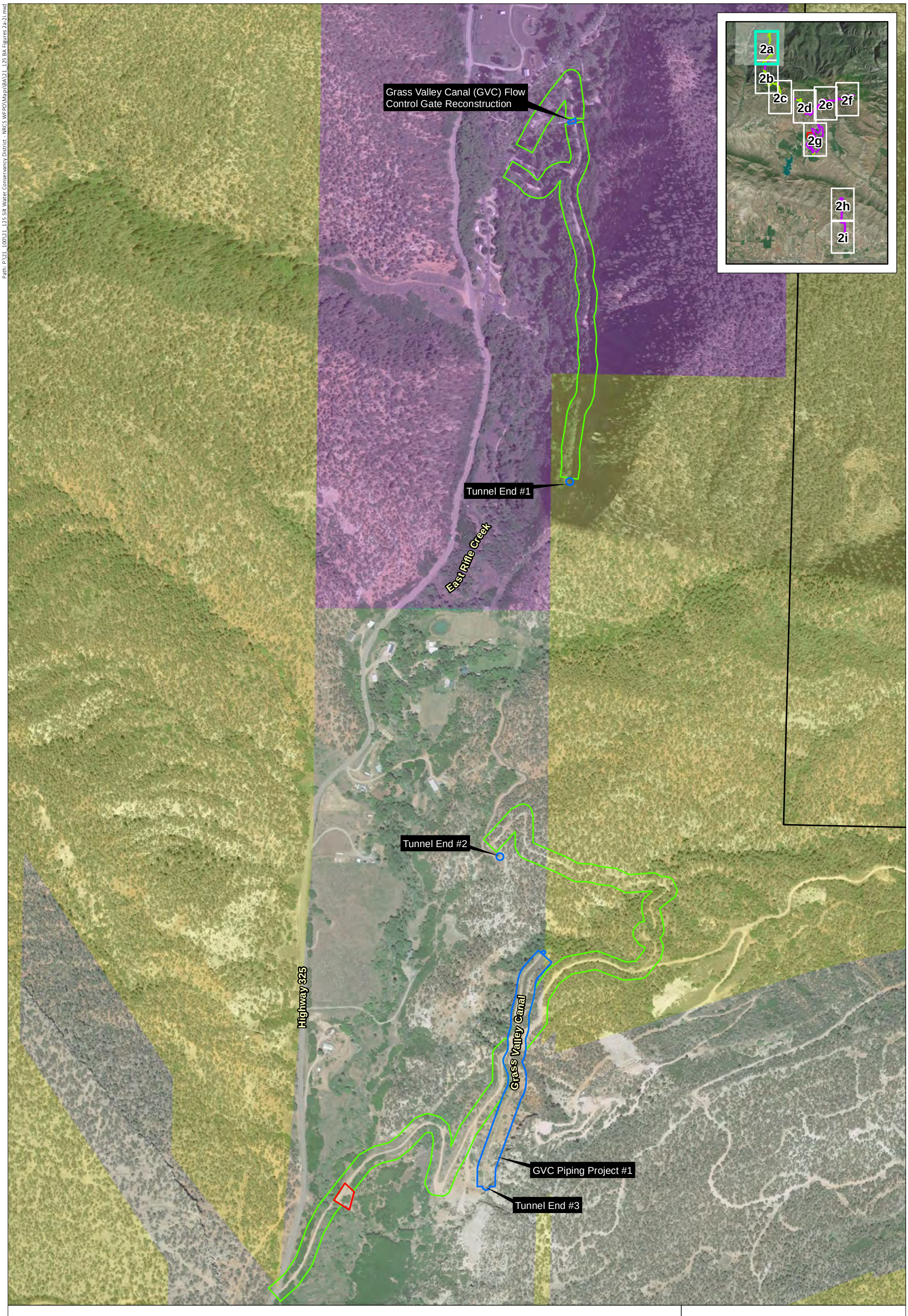

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Access Road
- Access Staging Area
- Project-Specific Component
- BLM Land
- Local Land
- Private Land
- State Land
- Silt Water Conservancy District Boundary

Image Source: Google Earth©, June 17, 2016

0 250 500 Feet

N

Figure 2a
Grass Valley Canal

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GVC Piping Project #1

Tunnel End #3

Tunnel End #4

GVC Piping Project #2

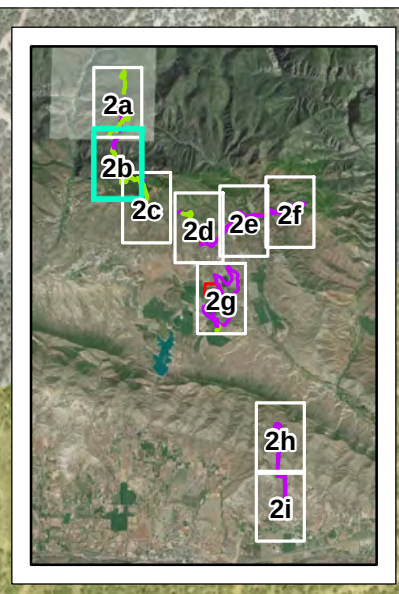

Image Source: Google Earth©, June 17, 2016

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Access Road
- Access Staging Area
- Project-Specific Component
- BLM Land
- Local Land
- Private Land
- State Land
- Silt Water Conservancy District Boundary

0 250 500 Feet

N

Figure 2b
Grass Valley Canal

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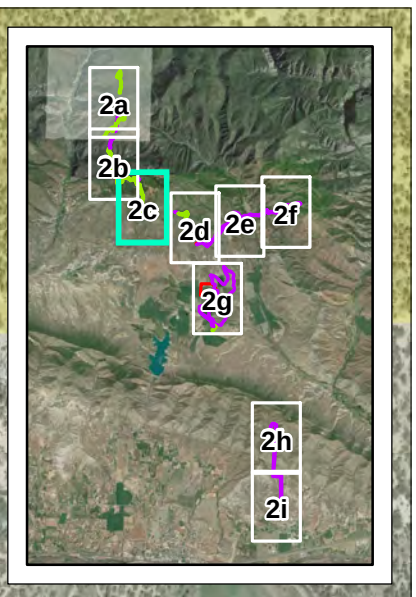
GVC Piping Project #3



Silt Water Conservancy District (SWCD) - Watershed Plan Projects

Access Road
Access Staging Area
Project-Specific Component

BLM Land
Local Land
Private Land
State Land

Silt Water Conservancy District Boundary

Image Source: Google Earth©, June 17, 2016

0 250 500 Feet

N

Figure 2c
Grass Valley Canal

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Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Access Road
- Access Staging Area
- Project-Specific Component
- BLM Land
- Local Land
- Private Land
- State Land
- Silt Water Conservancy District Boundary

Image Source: Google Earth©, June 17, 2016

0 250 500 Feet

N

Figure 2d
Grass Valley Canal,
Dry Elk Lateral System Improvement

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Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Access Road
- Access Staging Area
- Project-Specific Component
- BLM Land
- Local Land
- Private Land
- State Land
- Silt Water Conservancy District Boundary

Image Source: Google Earth©, June 17, 2016

0 250 500 Feet

N

Figure 2e
Dry Elk Lateral System Improvement

Prepared for: Silt Water Conservancy District
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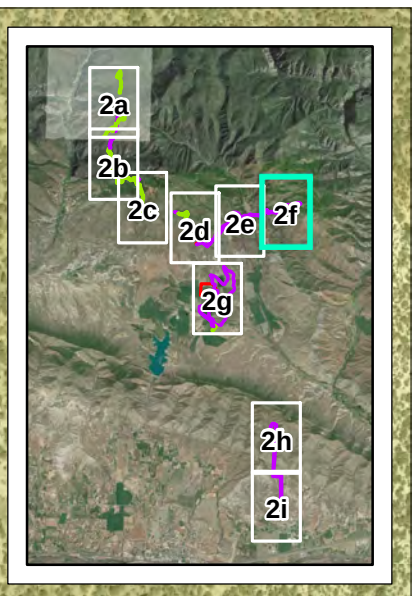

Dry Elk Lateral Canal Lining

North Cutoff Road

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

Access Road
Access Staging Area
Project-Specific Component

BLM Land
Local Land
Private Land
State Land

Silt Water Conservancy District Boundary

Image Source: Google Earth©, June 17, 2016

0 250 500 Feet

N

Figure 2f
Dry Elk Lateral System Improvement

Prepared for: Silt Water Conservancy District
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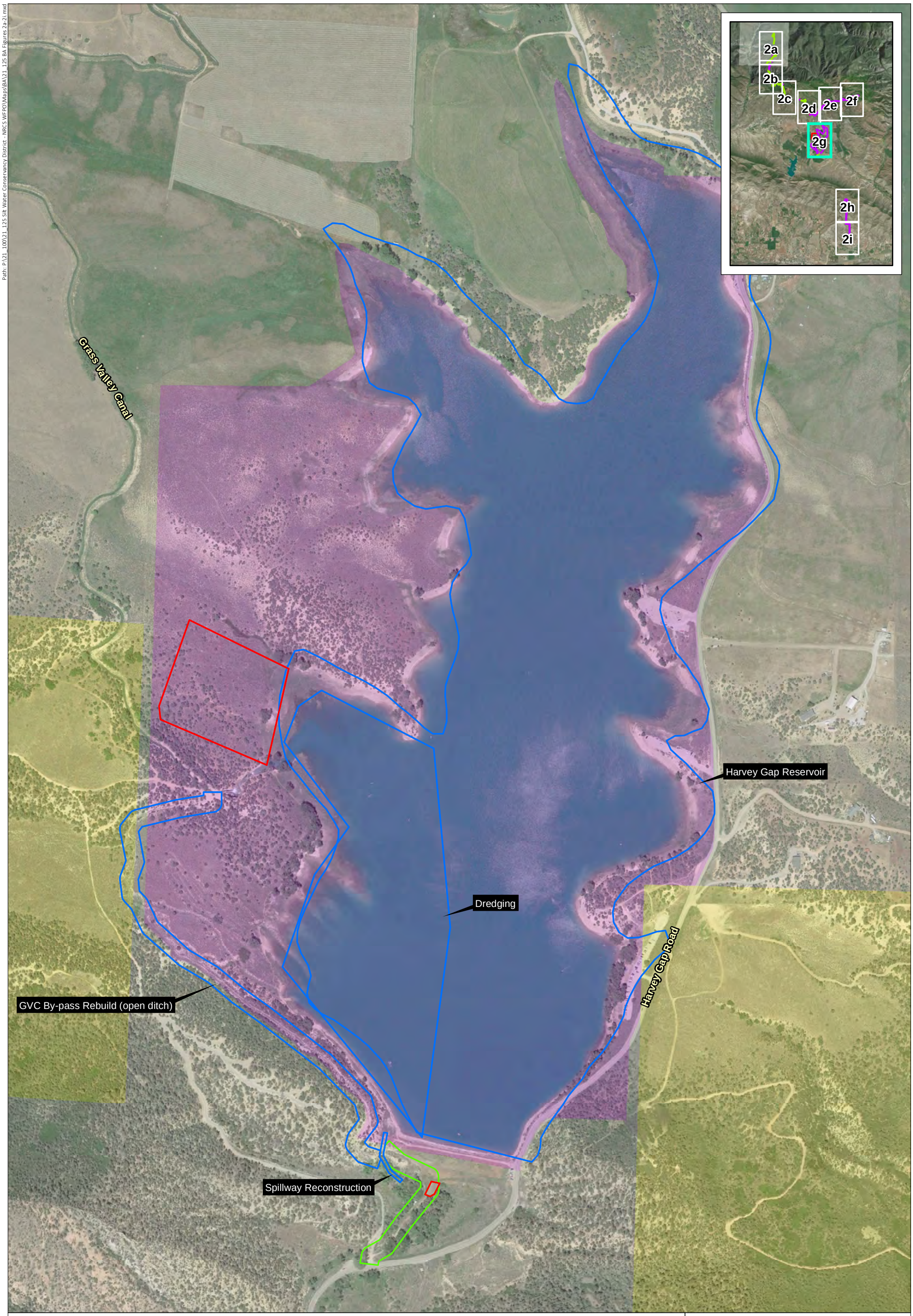

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Access Road
- Access Staging Area
- Project-Specific Component
- BLM Land
- Local Land
- Private Land
- State Land
- Silt Water Conservancy District Boundary

Image Source: Google Earth©, June 17, 2016

0 250 500 Feet

N

Figure 2g
Harvey Gap Reservoir
Grass Valley Canal

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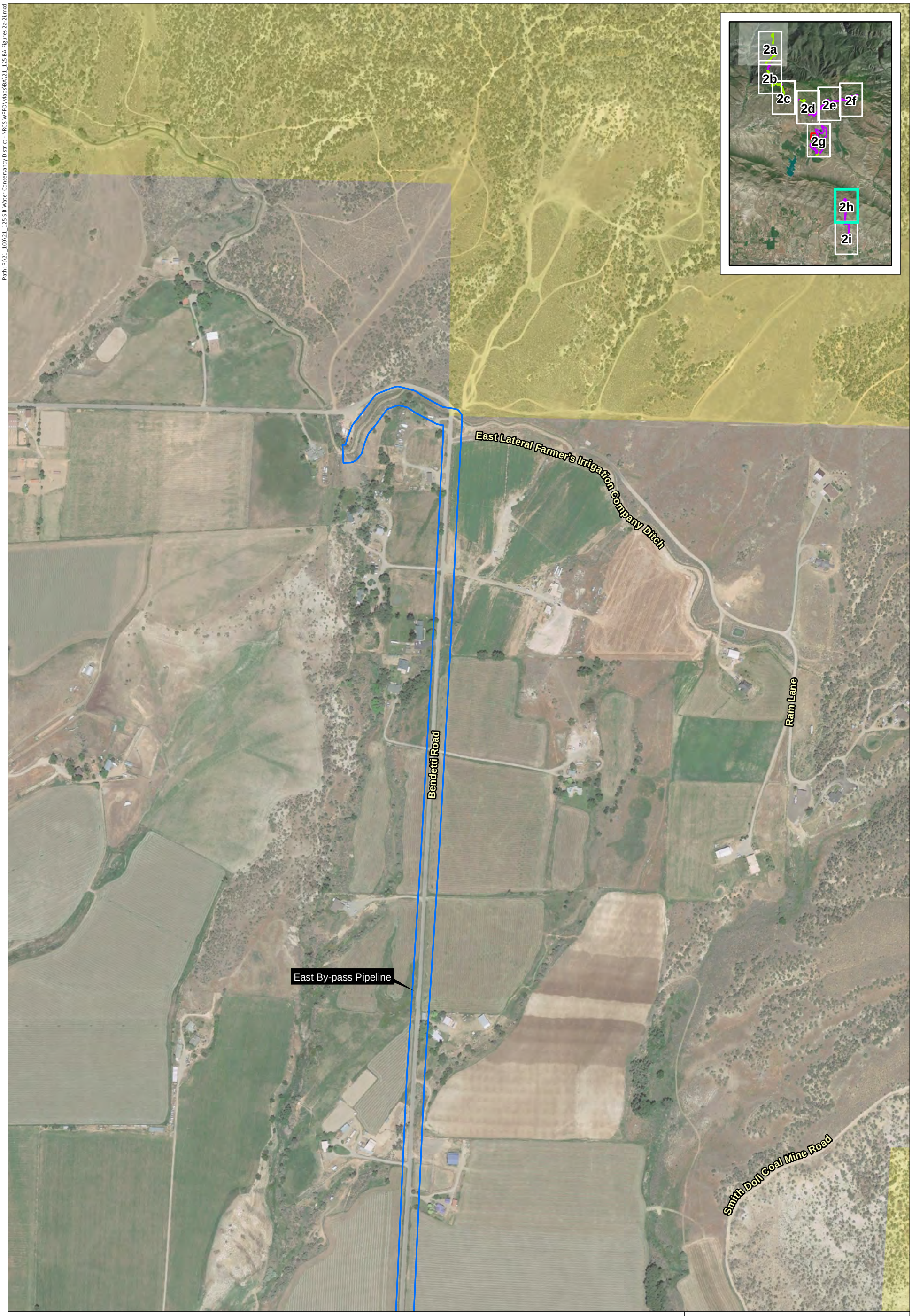

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Access Road
- Access Staging Area
- Project-Specific Component
- BLM Land
- Local Land
- Private Land
- State Land
- Silt Water Conservancy District Boundary

Image Source: Google Earth©, June 17, 2016

0 250 500 Feet

N

Figure 2h
Pump Canal

Prepared for: Silt Water Conservancy District
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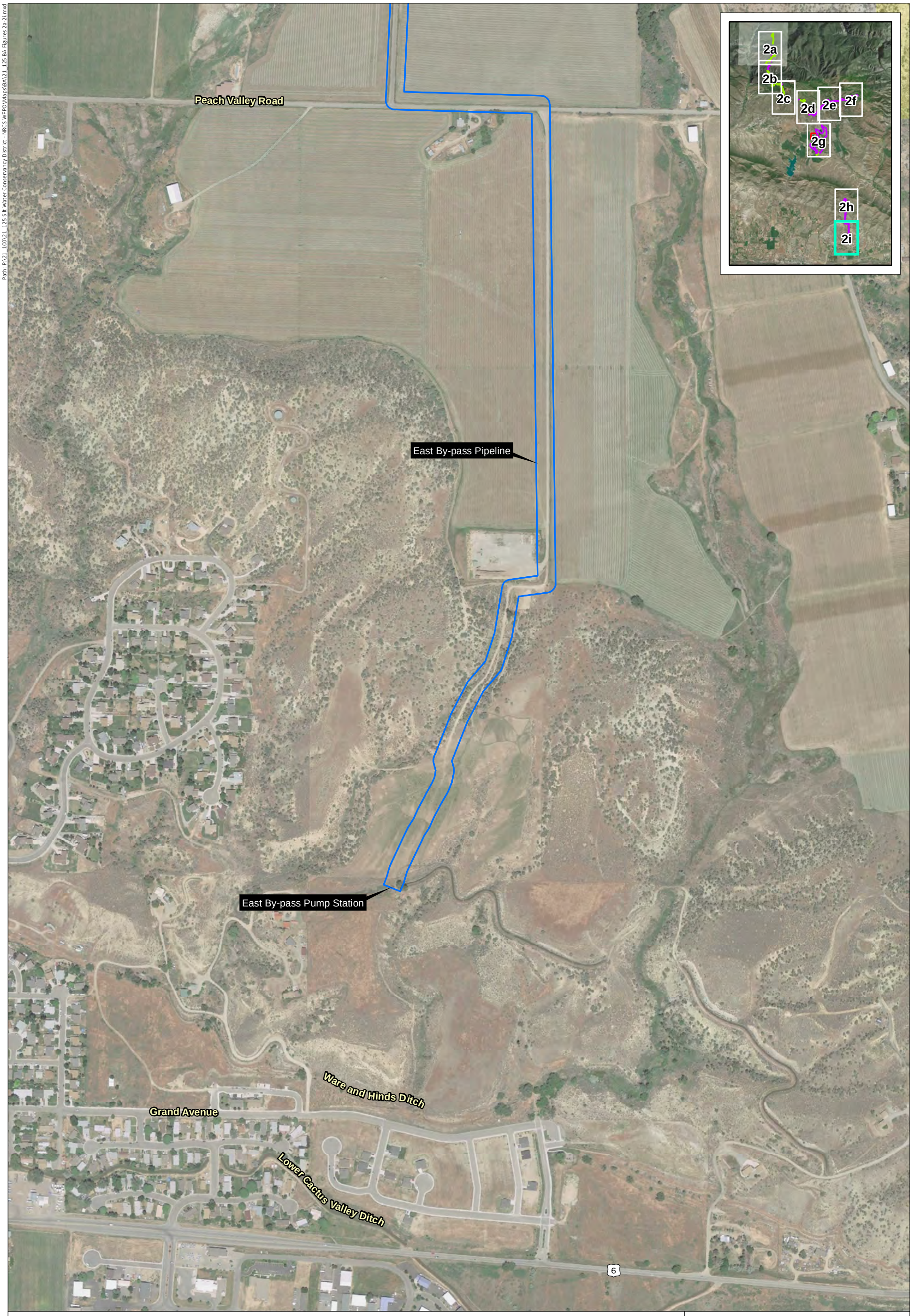

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Access Road
- Access Staging Area
- Project-Specific Component
- BLM Land
- Local Land
- Private Land
- State Land
- Silt Water Conservancy District Boundary

Image Source: Google Earth©, June 17, 2016

0 250 500 Feet

N

Figure 2i
Pump Canal

Prepared for: Silt Water Conservancy District
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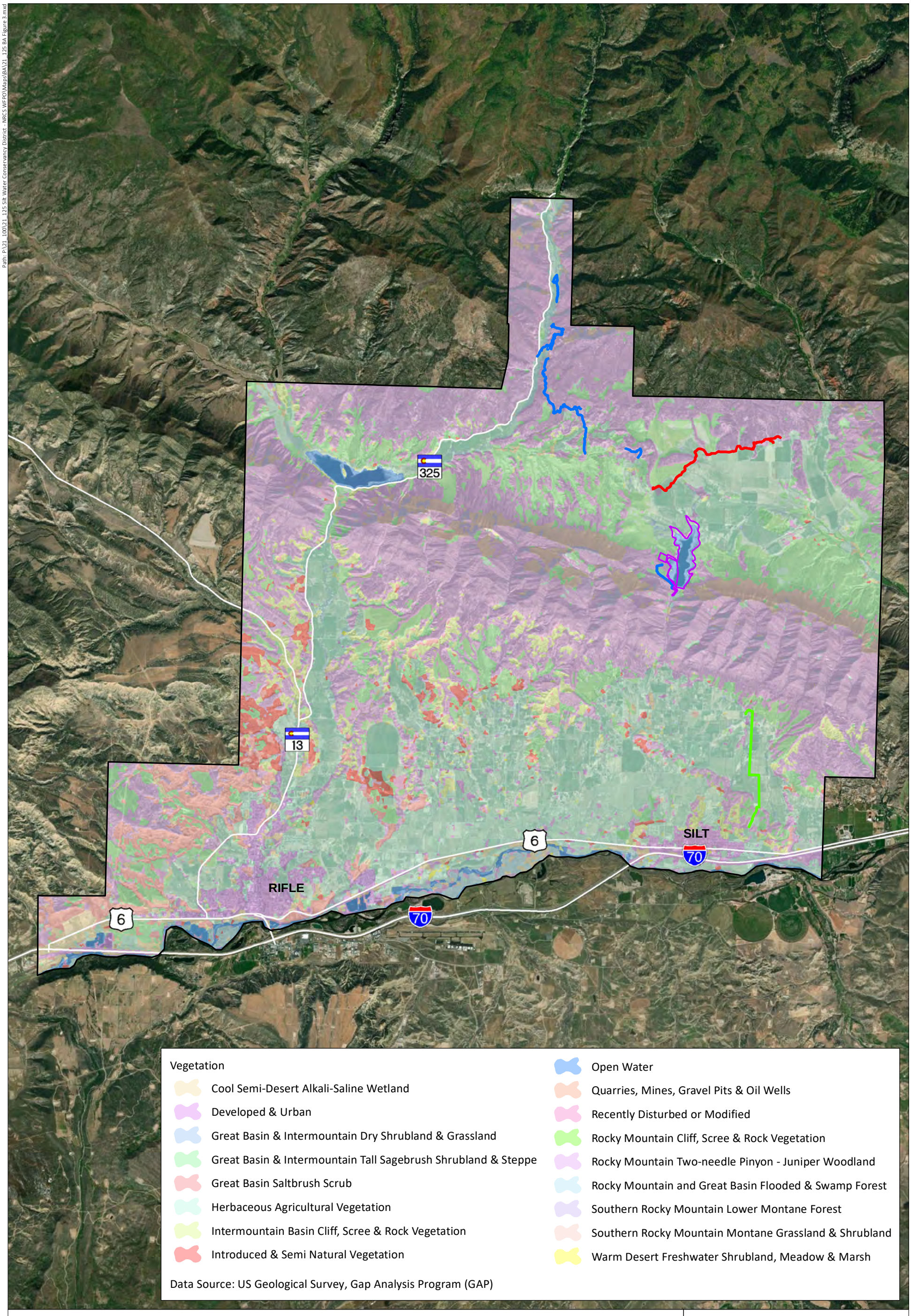

Vegetation

- Cool Semi-Desert Alkali-Saline Wetland
- Developed & Urban
- Great Basin & Intermountain Dry Shrubland & Grassland
- Great Basin & Intermountain Tall Sagebrush Shrubland & Steppe
- Great Basin Saltbrush Scrub
- Herbaceous Agricultural Vegetation
- Intermountain Basin Cliff, Scree & Rock Vegetation
- Introduced & Semi Natural Vegetation
- Open Water
- Quarries, Mines, Gravel Pits & Oil Wells
- Recently Disturbed or Modified
- Rocky Mountain Cliff, Scree & Rock Vegetation
- Rocky Mountain Two-needle Pinyon - Juniper Woodland
- Rocky Mountain and Great Basin Flooded & Swamp Forest
- Southern Rocky Mountain Lower Montane Forest
- Southern Rocky Mountain Montane Grassland & Shrubland
- Warm Desert Freshwater Shrubland, Meadow & Marsh

Data Source: US Geological Survey, Gap Analysis Program (GAP)

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Silt Water Conservancy District Boundary
- Dry Elk Lateral System Improvement
- Grass Valley Canal
- Harvey Gap Reservoir
- Pump Canal

Image Source: Maxar Vivid©, April 1, 2019

0 3,750 7,500 Feet

N

Figure 3
Vegetation Communities of the SWCD Boundary Area

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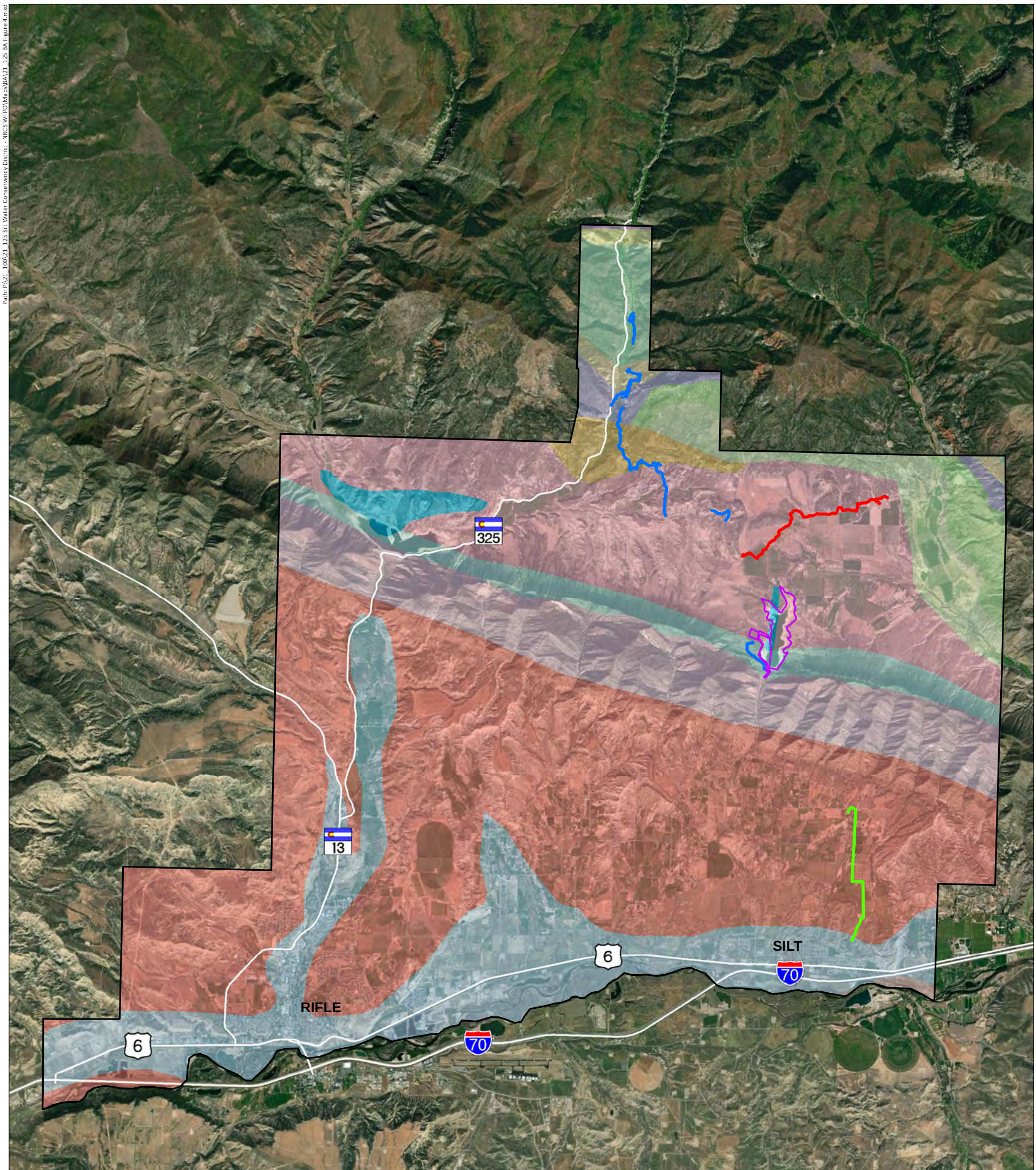

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Silt Water Conservancy District Boundary
- Dry Elk Lateral System Improvement
- Grass Valley Canal
- Harvey Gap Reservoir
- Pump Canal

Image Source: Maxar Vivid©, April 1, 2019

0 3,750 7,500 Feet

N

Figure 4
Geological Formations in the SWCD Boundary Area

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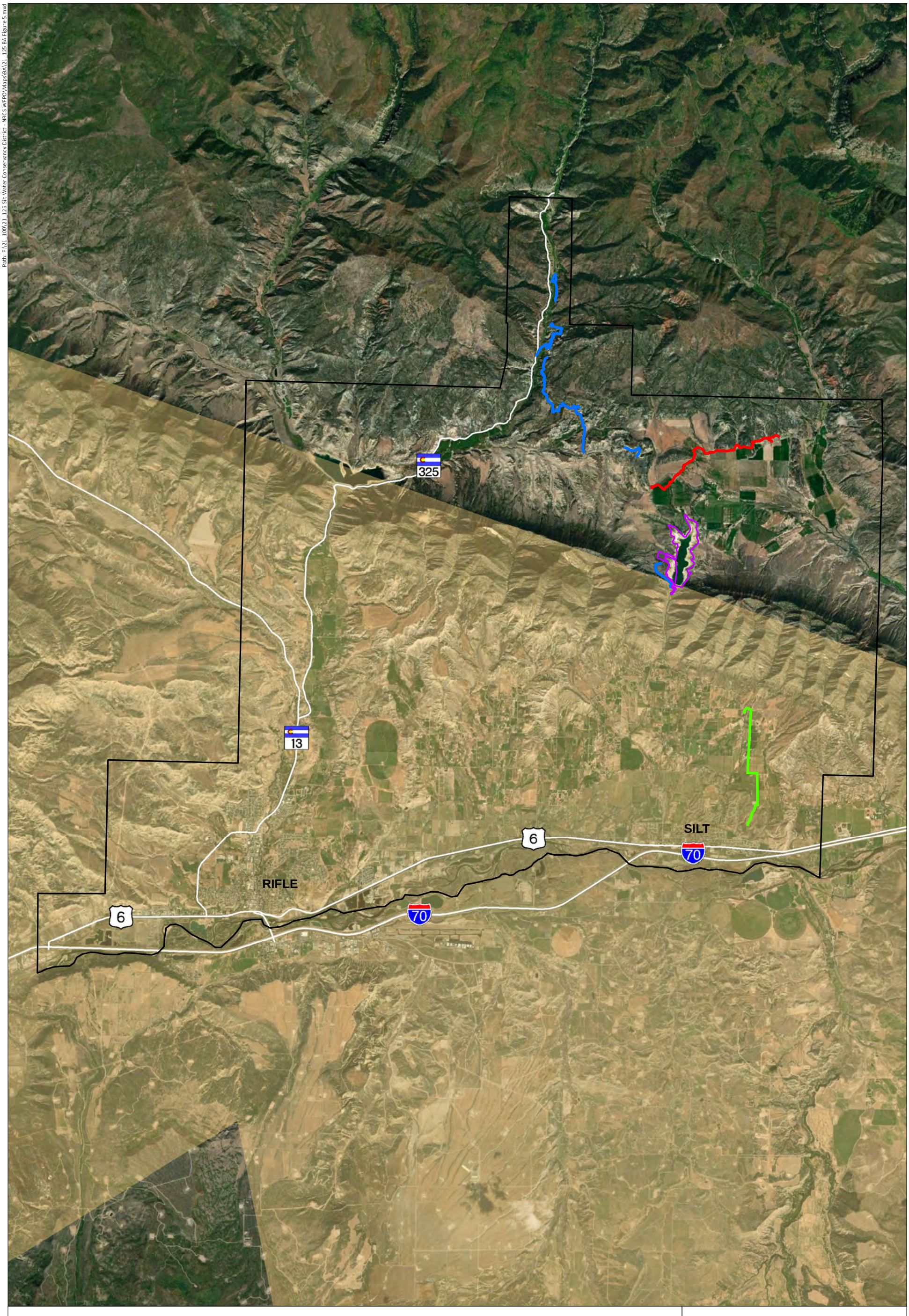

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Silt Water Conservancy District Boundary
- Dry Elk Lateral System Improvement
- Grass Valley Canal
- Harvey Gap Reservoir
- Pump Canal
- DeBeque Phacelia Habitat

Image Source: Maxar Vivid©, April 1, 2019

0 3,750 7,500 Feet

N

Figure 5
DeBeque Phacelia Habitat

Prepared for: Silt Water Conservancy District
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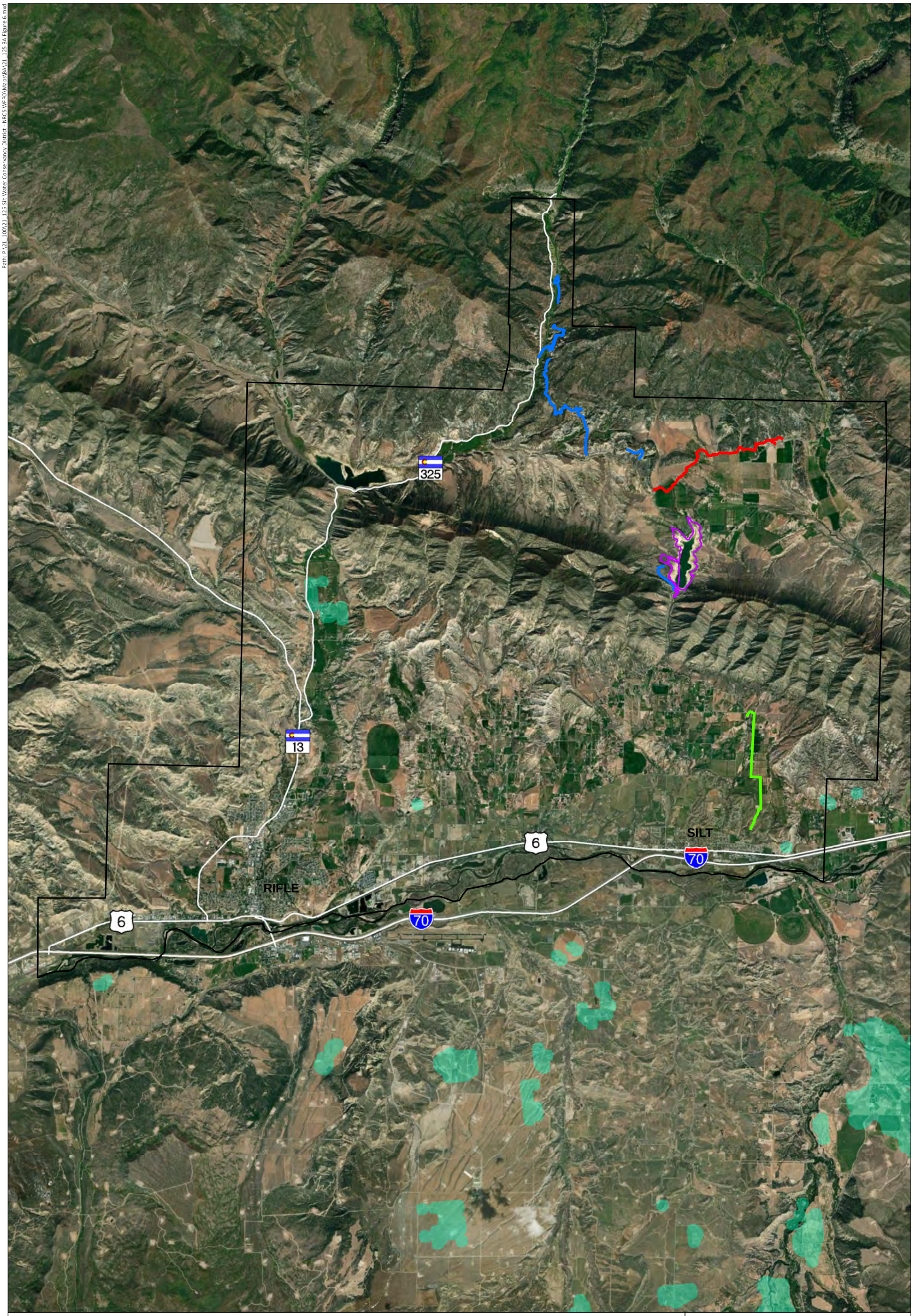

Silt Water Conservancy District (SWCD) - Watershed Plan Projects

- Silt Water Conservancy District Boundary
- Dry Elk Lateral System Improvement
- Grass Valley Canal
- Harvey Gap Reservoir
- Pump Canal
- Ute Ladies'-Tresses Habitat*

Image Source: Maxar Vivid©, April 1, 2019

* - Data Source: US Fish and Wildlife Service

0 3,750 7,500 Feet

N

Figure 6
Ute Ladies'-Tresses Habitat

Prepared for: Silt Water Conservancy District
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Photo Log
Silt Water Conservancy District Watershed Plan Project
Biological Assessment
Garfield County, Colorado
July 27 and 28, 2021

Photo 1 - Flow control gate proposed for reconstruction into Grass Valley Canal near East Rifle Creek. View is to the east.

Photo 2 - Tunnel site on the Grass Valley Canal that will be shored with concrete and anchors. View is to the south.

Photo 3 - Piping project at Grass Valley Canal, Section 2 near East Rifle Creek. The open canal will be piped. View is to the north.

Photo 4 - Grass Valley Canal By-pass Rebuild around Harvey Gap Reservoir. This is a historic alignment that has not been used since the 1950s. View is to the northwest.

Photo 5 - Dry Elk Lateral Canal lining project near Grass Valley Road. Agricultural lands are to the right and pinyon-juniper woodlands and sagebrush shrublands to the left of the canal. View is to the northeast.

Photo 6 - Concrete spillway at the southwest portion of Harvey Gap Reservoir that will be reconstructed. View is to the north.

Photo 7 - Concrete spillway from Harvey Gap Reservoir that will be reconstructed. View is to the southwest.

Photo 8 - Harvey Gap Reservoir. The staging and stockpiling area for dredging operations is in the center of the photo. View is to the north.

Photo 9 - Pump Canal, East By-pass Pipeline. View is to the south.

Photo 10 - Lower montane coniferous forests adjacent to mature pinyon-juniper woodlands along an access road to the Grass Valley Canal control gate. View is to the north.

Photo 11 - Forested riparian woodlands near East Rifle Creek along the Grass Valley Canal. View is to the south.

Photo 12 - Sagebrush shrublands and semi-desert shrublands along an access road for the Grass Valley Canal. View is to the southeast.

Photo 13 - Sagebrush shrubland adjacent to an access road at the southern portion of the Pump Canal. View is to the south.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Western Colorado Ecological Services Field Office
445 West Gunnison Avenue, Suite 240
Grand Junction, CO 81501-5711
Phone: (970) 628-7180 Fax: (970) 245-6933
http://GrandJunctionES@fws.gov
http://www.fws.gov/mountain-prairie/es/Colorado/

In Reply Refer To: October 18, 2021
Consultation Code: 06E24100-2022-SLI-0032
Event Code: 06E24100-2022-E-00084
Project Name: Silt Water Conservancy District Watershed Plan Biological Assessment

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Western Colorado Ecological Services Field Office
445 West Gunnison Avenue, Suite 240
Grand Junction, CO 81501-5711
(970) 628-7180

Project Summary

Consultation Code: 06E24100-2022-SLI-0032
Event Code: Some(06E24100-2022-E-00084)
Project Name: Silt Water Conservancy District Watershed Plan Biological Assessment
Project Type: WATER SUPPLY / DELIVERY
Project Description: The Proposed Action consists of a batch of projects (Batch 1) within the Silt Water Conservancy District boundary (SWCD boundary area). These projects have been selected by the SWCD board and determined to be priorities, with the goal of improving irrigation water control and mitigating potential flood damage and disruptions to water supplies serving recreation and irrigation in the SWCD boundary area. Several other benefits include improvements to water quality, agricultural productivity, and economic stability in the SWCD boundary area. Batch 1 Project-specific components being planned in the SWCD boundary area include:

• Reconstructing the Grass Valley Canal (GVC) Flow Control Gate; converting approximately 3,173 feet of GVC from open, earthen ditches to enclosed pipe in four sections to minimize risk of failure and off-farm delivery system losses; and installing concrete shoring at four locations to prevent failure and modernize the ends of three GVC tunnels;
• Rebuilding 2,827 feet of earthen ditch by-passing the Harvey Gap Reservoir to mitigate the risk of downstream water delivery loss should the reservoir outlet fail; reconstruction of the Harvey Gap Reservoir spillway to improve water storage and mitigate seepage and erosion hazards; and dredging Harvey Gap Reservoir to improve water storage capacity;
• Installing 14,527 feet of canal lining along the Dry Elk Lateral to minimize water seepage losses; and
• Installing the East By-pass Pump Station and 8,925 feet of piping (called the “East By-pass Pipeline) to connect the East Lateral to the Pump Canal, protect water storage rights, improve water storage in Harvey Gap and Rifle Gap Reservoirs, and increase flows in the Colorado River in low-flow years.

In summary, the Batch 1 projects are proposed to improve the systems managed by the SWCD in a number of ways: modernize the systems, prevent system failure, capitalize on opportunities to be more efficient with water, better manage water delivery, and protect areas from flooding (see Enclosure A – Figure 1). The watershed boundary consists of the SWCD boundary area and meets the definition of a watershed as outlined in the NRCS’s National Watershed Program Manual (NRCS 2015).
The Batch 1 projects will use existing access roads and disturbed areas for staging, with some exceptions: an approximately 5,500-foot section of an existing two-track road will need to be improved in Section 1 to access a

tunnel shoring site along the Grass Valley Canal (GVC), about 49.3 acres will be needed for sediment storage after dredging the Harvey Gap Reservoir, and an approximately 700-foot section of new access road will need to be constructed with grading and gravel to access the East By-pass Pump Station at Pump Canal.
The Project is located in the Colorado River Basin within the Colorado Headwaters – Plateau watershed (14010005) in Garfield County, Colorado.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.604638699999995,-107.69475335709933,14z

Counties: Garfield County, Colorado

Endangered Species Act Species

There is a total of 10 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Canada Lynx *Lynx canadensis* Population: Wherever Found in Contiguous U.S. There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3652	Threatened

Birds

NAME	STATUS
Mexican Spotted Owl *Strix occidentalis lucida* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/8196	Threatened
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Bonytail *Gila elegans* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/1377	Endangered
Colorado Pikeminnow (=squawfish) *Ptychocheilus lucius* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3531	Endangered
Humpback Chub *Gila cypha* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3930	Endangered
Razorback Sucker *Xyrauchen texanus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/530	Endangered

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Debeque Phacelia *Phacelia submutica* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/4639	Threatened
Ute Ladies'-tresses *Spiranthes diluvialis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2159	Threatened

Critical habitats

There are 2 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Colorado Pikeminnow (=squawfish) *Ptychocheilus lucius* https://ecos.fws.gov/ecp/species/3531#crithab	Final
Razorback Sucker *Xyrauchen texanus* https://ecos.fws.gov/ecp/species/530#crithab	Final

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Black Swift *Cypseloides niger* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8878	Breeds Jun 15 to Sep 10

NAME	BREEDING SEASON
Cassin's Finch *Carpodacus cassinii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9462	Breeds May 15 to Jul 15
Evening Grosbeak *Coccothraustes vespertinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Pinyon Jay *Gymnorhinus cyanocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9420	Breeds Feb 15 to Jul 15
Virginia's Warbler *Vermivora virginiae* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9441	Breeds May 1 to Jul 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12

(0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

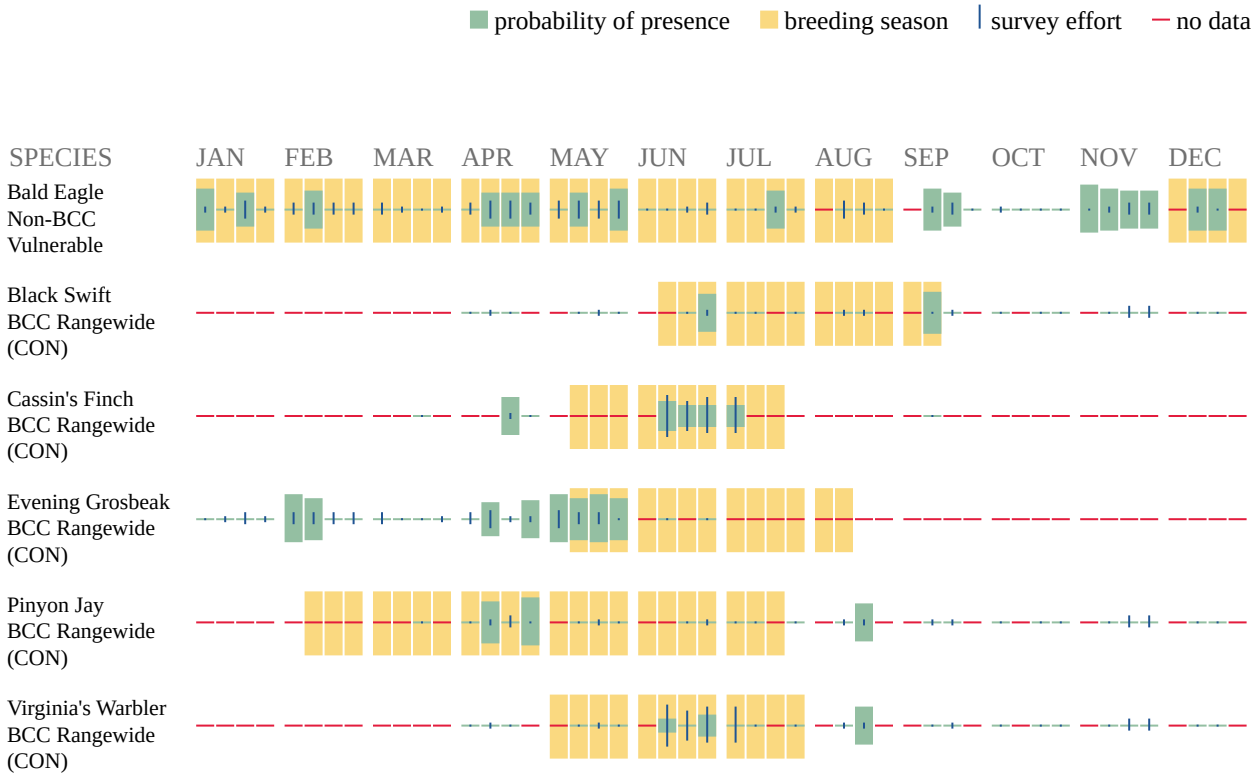
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

Due to your project's size, the list below may be incomplete, or the acreages reported may be inaccurate. For a full list, please contact the local U.S. Fish and Wildlife office or visit https://www.fws.gov/wetlands/data/mapper.HTML

LAKE

- L1UBHh
- L2ABGh
- L2USCh
- L2USAh

FRESHWATER POND

- PABF
- PABFh
- PABFx
- PABGx
- PUBFx
- PUBHh
- PUSAh
- PUSAx
- PUSCh
- PUSCx

FRESHWATER EMERGENT WETLAND

- PEM1A
- PEM1Ah
- PEM1B
- PEM1C
- PEM1Ch
- PEM1Cx
- PEM1F

- PEM1Fx
- PEM1D

FRESHWATER FORESTED/SHRUB WETLAND

- PFOA
- PFOAh
- PSS1A
- PSS1C
- PSS1Ch

RIVERINE

- R2UBFx
- R3UBF
- R3USA
- R3USC
- R4SBC
- R4SBCx
- R5UBFx
- R5UBH
- R3UBG
- R3UBH
- R4SBA

Enclosure D – Silt Water Conservancy District Boundary Area Soil Map Units

Rifle Area, Colorado, Parts of Garfield and Mesa Counties (CO683)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
1	Almy variant loam, 25 to 65 percent slopes	82.1	0.10%
2	Arle-Ansari-Rock outcrop complex, 12 to 65 percent slopes	39	0.10%
3	Arvada loam, 1 to 6 percent slopes	3,560.40	6.30%
4	Arvada loam, 6 to 20 percent slopes	858.8	1.50%
5	Ascalon fine sandy loam, 1 to 6 percent slopes	92.5	0.20%
6	Ascalon fine sandy loam, 6 to 12 percent slopes	280	0.50%
7	Ascalon-Pena complex, 6 to 25 percent slopes	886.2	1.60%
9	Badland	455	0.80%
10	Begay sandy loam, 1 to 6 percent slopes	105.7	0.20%
11	Begay sandy loam, 6 to 12 percent slopes	9.1	0.00%
12	Bucklon-Inchau complex, 25 to 50 percent slopes	122.9	0.20%
13	Chilton channery loam, 3 to 6 percent slopes	399.7	0.70%
14	Chilton channery loam, 6 to 12 percent slopes	28.4	0.10%
15	Chilton channery loam, 12 to 25 percent slopes	81.4	0.10%
21	Cushman-Lazear stony loams, 15 to 65 percent slopes	7,779.90	13.80%
24	Dollard-Rock outcrop, shale, complex, 25 to 65 percent slopes	1,503.60	2.70%
27	Halaquepts, nearly level	692.4	1.20%
28	Heldt clay loam, 1 to 3 percent slopes	564.1	1.00%
29	Heldt clay loam, 3 to 6 percent slopes	938	1.70%
30	Heldt clay loam, 6 to 12 percent slopes	714.6	1.30%
31	Heldt clay loam, 12 to 25 percent slopes	1,121.00	2.00%
32	Holderness variant clay loam, 6 to 25 percent slopes	80.8	0.10%
34	Ildefonso stony loam, 25 to 45 percent slopes	3,183.70	5.60%
35	Ildefonso-Lazear complex, 6 to 65 percent slopes	1,276.80	2.30%
40	Kim loam, 3 to 6 percent slopes	1,208.00	2.10%
41	Kim loam, 6 to 12 percent slopes	785.2	1.40%
43	Limon silty clay loam, 3 to 12 percent slopes	608.8	1.10%
44	Morval loam, 3 to 12 percent slopes	10.9	0.00%
47	Nihill channery loam, 6 to 25 percent slopes	158.1	0.30%
48	Northwater loam, 15 to 65 percent slopes	103.5	0.20%
49	Olney loam, 1 to 3 percent slopes	373.5	0.70%
50	Olney loam, 3 to 6 percent slopes	763.2	1.40%
51	Olney loam, 6 to 12 percent slopes	603.4	1.10%
54	Potts loam, 1 to 3 percent slopes	1,163.20	2.10%
55	Potts loam, 3 to 6 percent slopes	3,721.20	6.60%
56	Potts loam, 6 to 12 percent slopes	2,759.00	4.90%

57	Potts-Ildefonso complex, 3 to 12 percent slopes	1,448.00	2.60%
58	Potts-Ildefonso complex, 12 to 25 percent slopes	360.1	0.60%
59	Potts-Ildefonso complex, 25 to 45 percent slopes	129.6	0.20%
65	Torrifluvents, nearly level	1,066.30	1.90%
66	Torriorthents-Camborthids-Rock outcrop complex, steep	4,369.00	7.70%
67	Torriorthents-Rock outcrop complex, steep	8,924.20	15.80%
68	Vale silt loam, 3 to 6 percent slopes	83.1	0.10%
69	Vale silt loam, 6 to 12 percent slopes	1,267.80	2.20%
70	Vale silt loam, 12 to 25 percent slopes	77.2	0.10%
72	Wann sandy loam, 1 to 3 percent slopes	672.7	1.20%
73	Water	923.1	1.60%
Totals for Area of Interest		**56,435.30**	**100**

Survey Area Map Unit Symbols and Names

Report-Survey Area Map Unit Symbols and Names

Survey Area Map Unit Symbols and Names-Rifle Area, Colorado, Parts of Garfield and Mesa Counties		
National Map Symbol	**Published Map Symbol**	**Map Unit Name**
jnx4	1	Almy variant loam, 25 to 65 percent slopes
jnxh	2	Arle-Ansari-Rock outcrop complex, 12 to 65 percent slopes
jnxv	3	Arvada loam, 1 to 6 percent slopes
jny6	4	Arvada loam, 6 to 20 percent slopes
jnyk	5	Ascalon fine sandy loam, 1 to 6 percent slopes
jnyx	6	Ascalon fine sandy loam, 6 to 12 percent slopes
jnz8	7	Ascalon-Pena complex, 6 to 25 percent slopes
jnzf	9	Badland
jnx5	10	Begay sandy loam, 1 to 6 percent slopes
jnx6	11	Begay sandy loam, 6 to 12 percent slopes
2w4zj	12	Bucklon-Inchau complex, 25 to 50 percent slopes
jnx8	13	Chilton channery loam, 3 to 6 percent slopes
jnx9	14	Chilton channery loam, 6 to 12 percent slopes
jnxb	15	Chilton channery loam, 12 to 25 percent slopes
jnxk	21	Cushman-Lazear stony loams, 15 to 65 percent slopes
jnxn	24	Dollard-Rock outcrop, shale, complex, 25 to 65 percent slopes
jnxr	27	Halaquepts, nearly level
jnxs	28	Heldt clay loam, 1 to 3 percent slopes
jnxt	29	Heldt clay loam, 3 to 6 percent slopes
jnxw	30	Heldt clay loam, 6 to 12 percent slopes
jnxx	31	Heldt clay loam, 12 to 25 percent slopes
jnxy	32	Holderness variant clay loam, 6 to 25 percent slopes
jny0	34	Ildefonso stony loam, 25 to 45 percent slopes
jny1	35	Ildefonso-Lazear complex, 6 to 65 percent slopes
jny7	40	Kim loam, 3 to 6 percent slopes
jny8	41	Kim loam, 6 to 12 percent slopes
jnyb	43	Limon silty clay loam, 3 to 12 percent slopes
jnyc	44	Morval loam, 3 to 12 percent slopes
jnyg	47	Nihill channery loam, 6 to 25 percent slopes
jnyh	48	Northwater loam, 15 to 65 percent slopes
jnyj	49	Olney loam, 1 to 3 percent slopes
jnyl	50	Olney loam, 3 to 6 percent slopes

Survey Area Map Unit Symbols and Names-Rifle Area, Colorado, Parts of Garfield and Mesa Counties		
National Map Symbol	**Published Map Symbol**	**Map Unit Name**
jnym	51	Olney loam, 6 to 12 percent slopes
jnyq	54	Potts loam, 1 to 3 percent slopes
jnyr	55	Potts loam, 3 to 6 percent slopes
jnys	56	Potts loam, 6 to 12 percent slopes
jnyt	57	Potts-Ildefonso complex, 3 to 12 percent slopes
jnyv	58	Potts-Ildefonso complex, 12 to 25 percent slopes
jnyw	59	Potts-Ildefonso complex, 25 to 45 percent slopes
jnz3	65	Torrifluvents, nearly level
jnz4	66	Torriorthents-Camborthids-Rock outcrop complex, steep
jnz5	67	Torriorthents-Rock outcrop complex, steep
jnz6	68	Vale silt loam, 3 to 6 percent slopes
jnz7	69	Vale silt loam, 6 to 12 percent slopes
jnz9	70	Vale silt loam, 12 to 25 percent slopes
jnzc	72	Wann sandy loam, 1 to 3 percent slopes
jnzg	73	Water

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 13, Jun 5, 2020

Map Unit Description (Brief, Generated)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, provide information on the composition of map units and properties of their components.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report-Map Unit Description (Brief, Generated)

Rifle Area, Colorado, Parts of Garfield and Mesa Counties

Map Unit: 1-Almy variant loam, 25 to 65 percent slopes

Component: Almy variant (90%)

The Almy variant component makes up 90 percent of the map unit. Slopes are 25 to 65 percent. This component is on mountainsides. The parent material consists of residuum weathered from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY238CO Brushy Loam ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Rock outcrop (5%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop soil is a minor component.

Component: Detra (5%)

Generated brief soil descriptions are created for major soil components. The Detra soil is a minor component.

Map Unit: 2-Arle-Ansari-Rock outcrop complex, 12 to 65 percent slopes

Component: Arle (45%)

The Arle component makes up 45 percent of the map unit. Slopes are 12 to 65 percent. This component is on sloping alluvial fans, mountainsides. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. This component is in the R048AY303CO Loamy Slopes ecological site. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Ansari (35%)

The Ansari component makes up 35 percent of the map unit. Slopes are 12 to 65 percent. This component is on sloping alluvial fans, mountainsides. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. This component is in the R048AY300CO Loamy Breaks ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Rock outcrop (20%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Map Unit: 3-Arvada loam, 1 to 6 percent slopes

Component: Arvada (80%)

The Arvada component makes up 80 percent of the map unit. Slopes are 1 to 6 percent. This component is on high terraces, fans. The parent material consists of highly saline alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY261CO Salt Flats ecological site. Nonirrigated land capability classification is 7s. Irrigated land capability classification is 7s. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. The soil has a moderately saline horizon within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 20 within 30 inches of the soil surface.

Component: Wann (5%)

Generated brief soil descriptions are created for major soil components. The Wann soil is a minor component.

Map Unit: 4-Arvada loam, 6 to 20 percent slopes

Component: Arvada (85%)

The Arvada component makes up 85 percent of the map unit. Slopes are 6 to 20 percent. This component is on high terraces, fans. The parent material consists of highly saline alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 7s. Irrigated land capability classification is 7s. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. The soil has a moderately saline horizon within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 20 within 30 inches of the soil surface.

Map Unit: 5-Ascalon fine sandy loam, 1 to 6 percent slopes

Component: Ascalon (90%)

The Ascalon component makes up 90 percent of the map unit. Slopes are 1 to 6 percent. This component is on mesas, alluvial fans, terraces. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY292CO Deep Loam ecological site. Nonirrigated land capability classification is 3c. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 6 percent.

Map Unit: 6-Ascalon fine sandy loam, 6 to 12 percent slopes

Component: Ascalon (90%)

The Ascalon component makes up 90 percent of the map unit. Slopes are 6 to 12 percent. This component is on terraces, valley sides, alluvial fans, mesas. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY292CO Deep Loam ecological site. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 6 percent.

Map Unit: 7-Ascalon-Pena complex, 6 to 25 percent slopes

Component: Ascalon (65%)

The Ascalon component makes up 65 percent of the map unit. Slopes are 6 to 12 percent. This component is on alluvial fans, valley sides. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY292CO Deep Loam ecological site. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 6 percent.

Component: Pena (25%)

The Pena component makes up 25 percent of the map unit. Slopes are 6 to 25 percent. This component is on alluvial fans, valley sides. The parent material consists of calcareous alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY303CO Loamy Slopes ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 25 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 9-Badland

Component: Badland (85%)

Generated brief soil descriptions are created for major soil components. The Badland is a miscellaneous area.

Map Unit: 10-Begay sandy loam, 1 to 6 percent slopes

Component: Begay (90%)

The Begay component makes up 90 percent of the map unit. Slopes are 1 to 6 percent. This component is on alluvial fans, valley sides. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 11-Begay sandy loam, 6 to 12 percent slopes

Component: Begay (90%)

The Begay component makes up 90 percent of the map unit. Slopes are 6 to 12 percent. This component is on valley sides, alluvial fans. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 12-Bucklon-Inchau complex, 25 to 50 percent slopes

Component: Bucklon (55%)

The Bucklon component makes up 55 percent of the map unit. Slopes are 25 to 50 percent. This component is on mountain slopes. The parent material consists of colluvium over residuum weathered from sandstone and shale. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. This component is in the R048AY238CO Brushy Loam ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Component: Inchau (35%)

The Inchau component makes up 35 percent of the map unit. Slopes are 25 to 40 percent. This component is on mountain slopes. The parent material consists of colluvium over residuum weathered from sandstone and shale. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. This component is in the R048AY238CO Brushy Loam ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Component: Jerry (10%)

Generated brief soil descriptions are created for major soil components. The Jerry soil is a minor component.

Map Unit: 13-Chilton channery loam, 3 to 6 percent slopes

Component: Chilton (85%)

The Chilton component makes up 85 percent of the map unit. Slopes are 3 to 6 percent. This component is on alluvial fans, valley sides. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 4s. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

Map Unit: 14-Chilton channery loam, 6 to 12 percent slopes

Component: Chilton (85%)

The Chilton component makes up 85 percent of the map unit. Slopes are 6 to 12 percent. This component is on alluvial fans, valley sides. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

Map Unit: 15-Chilton channery loam, 12 to 25 percent slopes

Component: Chilton (85%)

The Chilton component makes up 85 percent of the map unit. Slopes are 12 to 25 percent. This component is on valley sides, alluvial fans. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

Map Unit: 21-Cushman-Lazear stony loams, 15 to 65 percent slopes

Component: Cushman (45%)

The Cushman component makes up 45 percent of the map unit. Slopes are 15 to 30 percent. This component is on mesa breaks, mountainsides. The parent material consists of residuum weathered from sandstone and shale. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Lazear (40%)

The Lazear component makes up 40 percent of the map unit. Slopes are 15 to 65 percent. This component is on mountainsides. The parent material consists of residuum weathered from sandstone and shale. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 6 percent.

Component: Idlefonso (10%)

Generated brief soil descriptions are created for major soil components. The Idlefonso soil is a minor component.

Component: Rock outcrop (5%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop soil is a minor component.

Map Unit: 24-Dollard-Rock outcrop, shale, complex, 25 to 65 percent slopes

Component: Dollard (60%)

The Dollard component makes up 60 percent of the map unit. Slopes are 25 to 50 percent. This component is on hills, mountainsides. The parent material consists of residuum weathered from shale. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY244CO Mountain Shale ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 25 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Rock outcrop (20%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Map Unit: 27-Halaquepts, nearly level

Component: Halaquepts, nearly level (85%)

The Halaquepts, nearly level component makes up 85 percent of the map unit. Slopes are 0 to 6 percent. This component is on fans, narrow foothill valleys, low terraces. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is occasionally flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during March, April, May. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 6w. This soil meets hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. The soil has a moderately saline horizon within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 23 within 30 inches of the soil surface.

Map Unit: 28-Heldt clay loam, 1 to 3 percent slopes

Component: Heldt (90%)

The Heldt component makes up 90 percent of the map unit. Slopes are 1 to 3 percent. This component is on alluvial fans, valley sides. The parent material consists of fine-textured alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY289CO Clayey Foothills ecological site. Nonirrigated land capability classification is 3c. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. There are no saline horizons within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 3 within 30 inches of the soil surface.

Map Unit: 29-Heldt clay loam, 3 to 6 percent slopes

Component: Heldt (90%)

The Heldt component makes up 90 percent of the map unit. Slopes are 3 to 6 percent. This component is on alluvial fans, valley sides. The parent material consists of fine-textured alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY289CO Clayey Foothills ecological site. Nonirrigated land capability classification is 3c. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. There are no saline horizons within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 3 within 30 inches of the soil surface.

Map Unit: 30-Heldt clay loam, 6 to 12 percent slopes

Component: Heldt (90%)

The Heldt component makes up 90 percent of the map unit. Slopes are 6 to 12 percent. This component is on valley sides, alluvial fans. The parent material consists of fine-textured alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY289CO Clayey Foothills ecological site. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. There are no saline horizons within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 3 within 30 inches of the soil surface.

Map Unit: 31-Heldt clay loam, 12 to 25 percent slopes

Component: Heldt (90%)

The Heldt component makes up 90 percent of the map unit. Slopes are 12 to 25 percent. This component is on valley sides, alluvial fans. The parent material consists of fine-textured alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY289CO Clayey Foothills ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. There are no saline horizons within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 3 within 30 inches of the soil surface.

Map Unit: 32-Holderness variant clay loam, 6 to 25 percent slopes

Component: Holderness variant (90%)

The Holderness variant component makes up 90 percent of the map unit. Slopes are 6 to 25 percent. This component is on alluvial fans, valley sides. The parent material consists of fine-textured sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. This component is in the R048AY247CO Deep Clay Loam ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Dollard (5%)

Generated brief soil descriptions are created for major soil components. The Dollard soil is a minor component.

Component: Tanna (5%)

Generated brief soil descriptions are created for major soil components. The Tanna soil is a minor component.

Map Unit: 34-Ildefonso stony loam, 25 to 45 percent slopes

Component: Ildefonso (90%)

The Ildefonso component makes up 90 percent of the map unit. Slopes are 25 to 45 percent. This component is on mesa breaks, alluvial fans, valley sides. The parent material consists of mixed alluvium derived from basalt. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 25 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Ascalon (5%)

Generated brief soil descriptions are created for major soil components. The Ascalon soil is a minor component.

Component: Potts (5%)

Generated brief soil descriptions are created for major soil components. The Potts soil is a minor component.

Map Unit: 35-Ildefonso-Lazear complex, 6 to 65 percent slopes

Component: Ildefonso (50%)

The Ildefonso component makes up 50 percent of the map unit. Slopes are 6 to 45 percent. This component is on hillsides, mesa breaks. The parent material consists of very calcareous, mixed, stony alluvium derived from basalt. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 25 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Lazear (30%)

The Lazear component makes up 30 percent of the map unit. Slopes are 6 to 65 percent. This component is on hillsides, mesa breaks. The parent material consists of very calcareous, mixed, stony alluvium derived from basalt. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 6 percent.

Component: Rock outcrop (5%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop soil is a minor component.

Map Unit: 40-Kim loam, 3 to 6 percent slopes

Component: Kim (85%)

The Kim component makes up 85 percent of the map unit. Slopes are 3 to 6 percent. This component is on benches, alluvial fans. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 3c. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

Map Unit: 41-Kim loam, 6 to 12 percent slopes

Component: Kim (85%)

The Kim component makes up 85 percent of the map unit. Slopes are 6 to 12 percent. This component is on benches, alluvial fans. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent.

Map Unit: 43-Limon silty clay loam, 3 to 12 percent slopes

Component: Limon (85%)

The Limon component makes up 85 percent of the map unit. Slopes are 3 to 12 percent. This component is on valley sides, alluvial fans. The parent material consists of fine-textured, calcareous sediment shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY289CO Clayey Foothills ecological site. Nonirrigated land capability classification is 6e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent. The soil has a slightly saline horizon within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 23 within 30 inches of the soil surface.

Map Unit: 44-Morval loam, 3 to 12 percent slopes

Component: Morval (85%)

The Morval component makes up 85 percent of the map unit. Slopes are 3 to 12 percent. This component is on valley sides, mesas. The parent material consists of reworked alluvium derived from sandstone and/or reworked alluvium derived from basalt. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY292CO Deep Loam ecological site. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 20 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 47-Nihill channery loam, 6 to 25 percent slopes

Component: Nihill (85%)

The Nihill component makes up 85 percent of the map unit. Slopes are 6 to 25 percent. This component is on valley sides, alluvial fans. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 48-Northwater loam, 15 to 65 percent slopes

Component: Northwater (85%)

The Northwater component makes up 85 percent of the map unit. Slopes are 15 to 65 percent. This component is on mountainsides. The parent material consists of residuum weathered from sedimentary rock. Depth to a root restrictive layer, bedrock, lithic, is 40 to 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 5 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria.

Map Unit: 49-Olney loam, 1 to 3 percent slopes

Component: Olney (85%)

The Olney component makes up 85 percent of the map unit. Slopes are 1 to 3 percent. This component is on valley sides, alluvial fans. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 3c. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 13 percent.

Map Unit: 50-Olney loam, 3 to 6 percent slopes

Component: Olney (85%)

The Olney component makes up 85 percent of the map unit. Slopes are 3 to 6 percent. This component is on alluvial fans, valley sides. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 3c. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 13 percent.

Map Unit: 51-Olney loam, 6 to 12 percent slopes

Component: Olney (85%)

The Olney component makes up 85 percent of the map unit. Slopes are 6 to 12 percent. This component is on alluvial fans, valley sides. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 13 percent.

Map Unit: 54-Potts loam, 1 to 3 percent slopes

Component: Potts (85%)

The Potts component makes up 85 percent of the map unit. Slopes are 1 to 3 percent. This component is on valley sides, mesas, benches. The parent material consists of alluvium derived from basalt and/or alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 3c. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 55-Potts loam, 3 to 6 percent slopes

Component: Potts (85%)

The Potts component makes up 85 percent of the map unit. Slopes are 3 to 6 percent. This component is on mesas, valley sides, benches. The parent material consists of alluvium derived from basalt and/or alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 3c. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 56-Potts loam, 6 to 12 percent slopes

Component: Potts (85%)

The Potts component makes up 85 percent of the map unit. Slopes are 6 to 12 percent. This component is on mesas, benches, valley sides. The parent material consists of alluvium derived from basalt and/or alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 57-Potts-Ildefonso complex, 3 to 12 percent slopes

Component: Potts (60%)

The Potts component makes up 60 percent of the map unit. Slopes are 3 to 12 percent. This component is on mesas, valley sides. The parent material consists of alluvium derived from basalt and/or alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Ildefonso (30%)

The Ildefonso component makes up 30 percent of the map unit. Slopes are 6 to 12 percent. This component is on valley sides, mesas. The parent material consists of alluvium derived from basalt and/or alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 25 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 58-Potts-Ildefonso complex, 12 to 25 percent slopes

Component: Potts (60%)

The Potts component makes up 60 percent of the map unit. Slopes are 12 to 25 percent. This component is on valley sides, mesas, alluvial fans. The parent material consists of alluvium derived from basalt and/or alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Ildefonso (30%)

The Ildefonso component makes up 30 percent of the map unit. Slopes are 12 to 25 percent. This component is on alluvial fans, valley sides, mesas. The parent material consists of alluvium derived from basalt and/or alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 25 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 59-Potts-Ildefonso complex, 25 to 45 percent slopes

Component: Potts (60%)

The Potts component makes up 60 percent of the map unit. Slopes are 25 to 40 percent. This component is on valley sides, alluvial fans. The parent material consists of alluvium derived from basalt and/or alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R048AY298CO Rolling Loam ecological site. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Ildefonso (30%)

The Ildefonso component makes up 30 percent of the map unit. Slopes are 25 to 45 percent. This component is on valley sides, alluvial fans. The parent material consists of alluvium derived from basalt and/or alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 25 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 65-Torrifluvents, nearly level

Component: Torrifluvents (85%)

The Torrifluvents component makes up 85 percent of the map unit. Slopes are 0 to 6 percent. This component is on flood plains, Colorado & Roaring Fork rivers, major distributaries. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is occasionally flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during April, May, June, July, August, September. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 7w. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent. The soil has a slightly saline horizon within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 1 within 30 inches of the soil surface.

Component: Wann (10%)

Generated brief soil descriptions are created for major soil components. The Wann soil is a minor component.

Component: Fluvaquents (5%)

Generated brief soil descriptions are created for major soil components. The Fluvaquents soil is a minor component.

Map Unit: 66-Torriorthents-Camborthids-Rock outcrop complex, steep

Component: Torriorthents, steep (45%)

The Torriorthents, steep component makes up 45 percent of the map unit. Slopes are 15 to 70 percent. This component is on foothills, mountainsides. The parent material consists of stony, basaltic alluvium derived from sandstone and shale. Depth to a root restrictive layer, bedrock, lithic, is 4 to 30 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Camborthids, steep (20%)

The Camborthids, steep component makes up 20 percent of the map unit. Slopes are 15 to 65 percent. This component is on foothills, mountainsides. The parent material consists of stony, basaltic alluvium derived from sandstone and shale. Depth to a root restrictive layer, bedrock, lithic, is 15 to 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Rock outcrop, steep (15%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Map Unit: 67-Torriorthents-Rock outcrop complex, steep

Component: Torriorthents, steep (60%)

The Torriorthents, steep component makes up 60 percent of the map unit. Slopes are 15 to 70 percent. This component is on mountainsides, foothills. The parent material consists of stony, basaltic alluvium derived from sandstone and shale. Depth to a root restrictive layer, bedrock, lithic, is 4 to 30 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Rock outcrop, steep (25%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Map Unit: 68-Vale silt loam, 3 to 6 percent slopes

Component: Vale (90%)

The Vale component makes up 90 percent of the map unit. Slopes are 3 to 6 percent. This component is on alluvial fans, terraces, mesas. The parent material consists of calcareous eolian deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. This component is in the R048AY292CO Deep Loam ecological site. Nonirrigated land capability classification is 3e. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Morval (10%)

Generated brief soil descriptions are created for major soil components. The Morval soil is a minor component.

Map Unit: 69-Vale silt loam, 6 to 12 percent slopes

Component: Vale (90%)

The Vale component makes up 90 percent of the map unit. Slopes are 6 to 12 percent. This component is on benches, alluvial fans, mesas. The parent material consists of calcareous eolian deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. This component is in the R048AY292CO Deep Loam ecological site. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Morval (10%)

Generated brief soil descriptions are created for major soil components. The Morval soil is a minor component.

Map Unit: 70-Vale silt loam, 12 to 25 percent slopes

Component: Vale (90%)

The Vale component makes up 90 percent of the map unit. Slopes are 12 to 25 percent. This component is on alluvial fans, mesas. The parent material consists of calcareous eolian deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. This component is in the R048AY292CO Deep Loam ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Morval (10%)

Generated brief soil descriptions are created for major soil components. The Morval soil is a minor component.

Map Unit: 72-Wann sandy loam, 1 to 3 percent slopes

Component: Wann (85%)

The Wann component makes up 85 percent of the map unit. Slopes are 1 to 3 percent. This component is on valley floors, terraces. The parent material consists of alluvium derived from sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is occasionally flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during March, April, May. Organic matter content in the surface horizon is about 5 percent. This component is in the R048AY265CO Salt Meadow ecological site. Nonirrigated land capability classification is 6w. Irrigated land capability classification is 4w. This soil meets hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Torrifluvents (5%)

Generated brief soil descriptions are created for major soil components. The Torrifluvents soil is a minor component.

Component: Kim (5%)

Generated brief soil descriptions are created for major soil components. The Kim soil is a minor component.

Component: Arvada (5%)

Generated brief soil descriptions are created for major soil components. The Arvada soil is a minor component.

Map Unit: 73-Water

Component: Water (100%)

Generated brief soil descriptions are created for major soil components. The Water is a miscellaneous area.

Data Source Information

Soil Survey Area: Rifle Area, Colorado, Parts of Garfield and Mesa Counties
Survey Area Data: Version 13, Jun 5, 2020

Enclosure E – References

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Supporting Information for Cultural Resources

This section contains a table of cultural surveys previously conducted in the Watershed Plan Area (TABLE E-8) and a table of cultural resources previously recorded in the Watershed Plan Area (TABLE E-9).

TABLE E-8. Previous Cultural Resource Inventories in the Watershed Plan Area

State Project No.	Report Title	Institution
GF.CH.NR12	An Intensive Archaeological Resource Inventory of U.S. Highway 6 East of Rifle, Garfield County, Colorado	Colorado Department of Transportation (CDOT)
GF.CH.NR13	Paleontological Technical Report: CDOT Project C 0701-209, I-70 Game Fence, Garfield County	CDOT
GF.CH.NR4	Archeology Survey of the Proposed Rifle Rest Area, Garfield County, Colorado	Colorado Department of Highways
GF.CH.NR6	An Intensive Cultural Resource Survey of the Rifle Creek Bicycle/Pedestrian Trail in Rifle, Garfield County, Colorado	CDOT
GF.CH.NR7	An Intensive Cultural Resources Inventory of a Segment of a Bicycle and Pedestrian Trail East of State Highway 13 in Rifle, Garfield County, Colorado (Original and Addendum)	CDOT
GF.CH.R14	City of Rifle Boat Ramp Development: A Class III Cultural Resources Inventory, Garfield County, Colorado	Metcalf Archaeological Consultants
GF.CH.R3	Archaeological Survey of the Rifle Maintenance Facility, Garfield County, Colorado	Colorado Department of Highways
GF.CH.R9	North of Rifle - 1983 Historic Survey	Colorado Department of Highways
GF.E.NR11	Class III Cultural Resource Inventory for the Proposed MBC Broadcasting, AM Broadcast Station, Permit Bnp-20070926aon in Garfield County, Colorado for MBC Grand Broadcasting, Inc. (GRI No. 2900)	Grand River Institute (GRI)
GF.E.NR7	Silt Substation and Tap Line, Garfield County, Colorado (04patr429)	Alpine Archaeological Consultants
GF.E.R13	Class III Cultural Resource Inventory Harvey Gap 50kw and 400kw Federal Energy Regulatory Commission Application Areas, Garfield County (ERO Project 4951)	ERO
GF.E.R6	Cultural Resource Inventory Proposed Ground Water Monitoring Area Rifle UMTRA Project Garfield, County, Colorado	Complete Archaeological Service Assoc.
GF.E.R9	Questar Pipeline's Proposed KN Interconnect Line, Cultural Resource Inventory, in Garfield County	Metcalf Archaeological Consultants
GF.FC.NR9	Cultural Resource Inventory of the Highway 13 and Rifle Gap Cell Tower (Cou4158), Garfield County, Colorado	Terracon Consultants, Inc.
GF.FC.R1	Class III Inventory of the Proposed Silt Cou4159 Cell Tower Site, Garfield County	PaleoWest, LLC
GF.FS.R7	Rifle Correctional Facility, Cultural Resource Inventory, Garfield County	Metcalf Archaeological Consultants
GF.LG.NR1	Cultural Survey of the City of Rifle Facilities Plan	Historical Museum and Institute of Western Colorado
GF.LG.R1	Cultural Resource Inventory Report, Proposed Rifle Creek Interceptor Sewer Line, Rifle, Colorado Requested by Arix P.C. Grand Junction Colorado	Gordon and Kranzush Archaeological Consultants
GF.LG.R2	Rifle Water Distribution System	Gordon and Kranzush Archaeological Consultants
GF.LM.NR1002	Limited Results Report for Section 110 Survey in North Rifle, Garfield County (BLM CRIR# 1012-37)	CRVFO

State Project No.	Report Title	Institution
GF.LM.NR133	A Cultural Resource Survey for Northwest Exploration, 157 Federal Rulison, Well Pad and Access, Garfield County, Bureau of Land Management Grand Junction District Office, Glenwood Springs Resource Area, Colorado	Powers Elevation Co., Inc.
GF.LM.NR166	Additional Cultural Resource Inventory of the West Rifle Brush Beating (S#881)	CRVFO
GF.LM.NR167	Cultural Resources Survey for Rifle Golf Course Land Sale (S#855)	CRVFO
GF.LM.NR168	A Cultural Resource Inventory for Three Drill Holes and Access for Mining Assessment Work (S#866)	CRVFO
GF.LM.NR177	Cultural Resource Inventory Report on the Proposed Buried Telephone Cable Alignment on the Rifle Exchange Rural Line No 38 (S#2295-1b)	Pioneer Archaeological Consultants Inc.
GF.LM.NR202	Elk Park Fence--Construction of 1/2 Mile of Barbed Wire Fence	CRVFO
GF.LM.NR207	Construction of Spring Development (S#943)	CRVFO
GF.LM.NR212	Helicopter Landing Zone and Powder Magazine Site for Northern Geophysical Seismic Line 87-7 (S#970)	CRVFO
GF.LM.NR219	A Negative Cultural Resource Inventory of the Elk Park Road Improvement in Garfield County, Colorado (G#1011)	CRVFO
GF.LM.NR220	A Negative Cultural Resource Inventory of the Silt Mesa Firewood Sale Area in Garfield County, Colorado (S#1012)	CRVFO
GF.LM.NR222	Cultural Resources Inventory of the Proposed Mobil Oil Corporation, Ryden Well Access Road, Garfield County, Colorado	Powers Elevation Co., Inc.
GF.LM.NR304	Silt Mesa No. 2 Commercial Fuelwood Sale (S#1071)	CRVFO
GF.LM.NR312	Burning Mountain Pond 1 & 2 and Coal Mine Pond 1 & 2 (S#1086)	CRVFO
GF.LM.NR343	West Elk Ridge No. 2 Commercial Firewood Sale (S#1118)	CRVFO
GF.LM.NR4	Proposed Reservoir Construction Government Creek Reservoir	CRVFO
GF.LM.NR442	Land Exchange at Rifle Gap Reservoir (Nr Gjpo-80-12)	US Water & Power Resource Services
GF.LM.NR473	Ryden Access Road, Class III Cultural Resource Inventory, Garfield County, Colorado (S#5497-19)	Metcalf Archaeological Consultants
GF.LM.NR489	Ryden Access Road Private Land Class III Cultural Resource Inventory, Garfield County, Colorado BLM (S# 1098-12)	CRVFO
GF.LM.NR522	Private Landowner Fence Along Northern Edge of BLM Land (S#551)	CRVFO
GF.LM.NR540	Community Use Firewood Sale, Rifle Gap Reservoir Area (S#720)	CRVFO
GF.LM.NR557	A Cultural Resource Inventory of 5 Estes Gulch Pit Reservoirs (S#1194)	CRVFO
GF.LM.NR625	Cattle Guard Installation (S#167)	CRVFO
GF.LM.NR629	Forest Service Withdrawal (S#307)	CRVFO
GF.LM.NR633	Construction of Five Pit Reservoirs, Garfield County, Colorado (S#1128)	CRVFO
GF.LM.NR647	Cultural Resource Inventory for the Qwest Slaughter Road Row (C-66424), Garfield County (GSFO #1003-1)	CRVFO
GF.LM.NR673	Cultural Resource Inventory Report for a Trespass Road in Garfield County, Colorado (GSFO 1003-26)	CRVFO
GF.LM.NR7	Archaeological Survey of the Silt Conservancy/Farmers Irrigation Access Road (S#776)	CRVFO
GF.LM.NR911	Class III Cultural Resources Inventory of the Scutter Gulch Pond Location in Garfield County, Colorado (BLM/GSFO 15810-1)	Dominguez Archaeological Research Group

State Project No.	Report Title	Institution
GF.LM.NR966	Class III Cultural Resources Inventory for the Proposed Pipeline to the NR 23-3 Well Location in Garfield County, Colorado for Williams Field Services (BLM # 1112-4) (GRI # 2011-101)	CRVFO
GF.LM.NR984	Class III Cultural Resources Inventory for the Proposed Harvey Gap Communications Tower in Garfield County, Colorado for Grand River Gathering LLC (BLM # 1112-18)	CRVFO
GF.LM.R11	A Cultural Resource Inventory of the Weaver Allotment Road in Garfield County, Colorado (S#956)	BLM Grand Junction Field Office
GF.LM.R117	Archaeological Survey of Proposed Pipeline Route for Western Slope Gas (S#760)	CRVFO
GF.LM.R12	A Cultural Resource Class III Inventory of the Elk Park Fuelwood Sale in Garfield County, Colorado (S#992)	CRVFO
GF.LM.R121	Cultural Resources Report for Fravert Reservoir (S#546)	Philip L. Born
GF.LM.R14	Cedar Mountain Firewood Cutting Area of 180 Acres (S#910)	CRVFO
GF.LM.R159	Paleontological Report for the Western Geophysical Corporation Rulison Extension 3-D Seismic Survey, Garfield County, Colorado	Uinta Paleontological Associates, Inc.
GF.LM.R163	A Class III Cultural Resource Inventory of the Western Geophysical Rulison 3-D Seismic Grid in Garfield County, Colorado (North Platte Project 2001-2) (Original and Addendum)	North Platte Archaeological Services
GF.LM.R174	Hubbard Gulch Class III Cultural Resources Inventory, Garfield County, Colorado	James Enterprises, Inc.
GF.LM.R191	Archaeological Survey for Northwest Exploration Co. Proposed #4 Federal Well Pad Location and Access, and Clough 15 Well Pad and Access Route, Garfield County, Colorado	Powers Elevation Co., Inc.
GF.LM.R202	Firewood Sale (S# 169 & 170)	CRVFO
GF.LM.R203	Cultural Resource Inventory Survey of Parcel#32 (S#845)	CRVFO
GF.LM.R217	Class III Cultural Resource Inventory of 1030 Acres and Limited Testing of Need Data Sites for the Webster Mesa/Williams Geographical Area Proposal (Gap) in Garfield County, Colorado (GRI No. 2227)	GRI
GF.LM.R240	An Archaeological Inventory for Texaco in the Rifle Falls Area, Garfield County, Colorado (S#933)	Metcalf Archaeological Consultants
GF.LM.R241	Cultural Resources Inventory of Norpac Exploration Services, Inc. Seismographic Lines 1 and 2: Rifle Prospect, Garfield County, Colorado (S#854)	Abajo Archaeology
GF.LM.R244	Archaeological Survey of the Ward Gulch Firewood Sale (S#749)	CRVFO
GF.LM.R249	A Report of the Class III Inventory of the Encana 24 Inch Gathering Pipeline and Associated Staging Areas, Garfield County, Colorado (UAC #2003-3)	Uncompahgre Archaeological Consultants
GF.LM.R261	A Class III Cultural Resource Survey of the Dawson Geophysical Hubbard 2-D Seismic Project, Garfield County, Colorado	TRC Mariah Associates, Inc.
GF.LM.R291	Ward Gulch, Dry Rifle Creek and Silt Mesa Trails Project A Class III Cultural Resource Inventory in Garfield County, Colorado	Elizabeth Kae McDonald, Consulting Archaeologist
GF.LM.R336	Class III Cultural Resource Inventory Report for the Proposed Hm #32-33 Well Location/Staging Area and 2.3 Mile Long Pipeline Route to the Existing Federal Rulison #161 Well in Garfield County, Colorado for Williams Production RMT (Original and Addendum) (GRI No. 2505, 2510)	GRI
GF.LM.R371	Class III Cultural Resource Inventory of the Rifle Creeks Habitat Projects in Garfield County, Colorado for the Colorado Division of Wildlife and then Bureau of Land Management Glenwood Springs Field Office	GRI

State Project No.	Report Title	Institution
GF.LM.R412	Class III Cultural Resource Inventory Report for the Rifle Mine Ponds 1 and 2 - Weaver Allotment in Garfield County, Colorado; Bureau of Land Management Glenwood Springs Field Office (BLM-GSFO# 15807-4) (GRI No. 158074)	GRI
GF.LM.R429	El Paso Corporation Proposed Great Divide Purchase: Class III Cultural Resources Inventory, Garfield County, Colorado	Metcalf Archaeological Consultants
GF.LM.R470	Class III Inventory of the Haas Canyon Road, Garfield County, Colorado (BLM CRIR 18310-1)	Mountain States Historical
GF.LM.R494	Class III Cultural Resource Inventory Report for Five Proposed Well Locations (A, B, C, D and E) and Related Linear Routes in Garfield County, Colorado for Antero Resources Corporation (BLM CRVFO # 1111-20)	GRI
GF.LM.R516	Class III Cultural Resource Inventory for the Proposed Encana Oil and Gas Pumba Gas and Water Pipelines, in Garfield County, Colorado (BLM # 16912-1) (AAC # AAC-2011-053)	CRVFO
GF.LM.R55	Northwest Pipeline Corporation Porcupine Gathering System Cultural Resources Inventory, Garfield County, Colorado (S#1174)	Powers Elevation Co., Inc.
GF.LM.R600	A Cultural Resource Inventory for Two Emergency Pole Replacement Locations and One Access Road for Tri-State on the Meeker-Rifle 138kv Transmission Line (BLM # 16914-2)	Aztec Archaeological Consultants
GF.LM.R72	UMTRA Wildlife Mitigation, A Cultural Resource Inventory in Garfield County (S#9461)	Metcalf Archaeological Consultants
GF.LM.R85	Class III Cultural Resource Inventory for a Proposed US West Telecommunications Lines New Castle Exchange, Garfield County, Colorado (S#2295)	TRC Mariah Associates, Inc.
GF.LM.R86	Class III Cultural Resource Inventory for Proposed US West Telecommunication Lines, Rifle Exchange, Garfield County, Colorado (Original Report and Addendum)	TRC Mariah Associates, Inc.
GF.R.NR1	A Cultural Resources Clearance Survey of SMC Work Areas at Rifle Gap Reservoir, Silt Project, Garfield County Colorado	Reclamation - Western Colorado Grand Junction
GF.R.NR2	Report of Cultural Resources Clearance Survey, Silt Pump Canal	Reclamation - Upper Colorado Salt Lake
GF.R.NR3	Cultural Resource Management Report, US Bureau of Reclamation Silt-Rifle Gap Reservoir Project, Garfield County, Colorado	Powers Elevation Co., Inc.
GF.R.NR6	Class III Cultural Resources Inventory for the Proposed 51.5 Acre Eagle's View Subdivision, Town of Silt, Garfield County, Colorado for Prince Creek Construction (9702)	GRI
GF.R.NR8	Class III Cultural Resource Inventory of a Parking Area on Bureau of Reclamation Managed Lands East of Rifle Gap Reservoir in Garfield County, Colorado for the Division of Wildlife (GRI No. 2643)	GRI
GF.R.R1	Report of an Intensive Cultural Resources Inventory of One Acre Near Rifle Gap Reservoir, Garfield County, Colorado	Reclamation - Western Colorado Grand Junction
GF.R.R2	Report of an Intensive Cultural Resources Inventory of One Acre Near Rifle Gap Reservoir, Garfield County, Colorado	GRI
GF.R.R3	Class III Cultural Resource Inventory for Silt Pump Canal Interconnect Project in Garfield County, Colorado for the West Divide Water Conservation District (GRI No. 2569)	GRI
GF.R.R5	Class III Cultural Resource Inventory Report of a 160 Acre Block Area as Part of the Rehabilitation Planning for Recreational Facilities at Rifle Gap Reservoir in Garfield County, Colorado, for the Bureau of Reclamation- GJDEL (GRI 9938)	GRI
GF.R.R6	A Class III Cultural Resource Survey for Replacement of the Grass Valley Canal Siphon (5GF3405.3), Garfield County, Colorado (Four Corners Research Report Number 06-279)	Four Corners Research

State Project No.	Report Title	Institution
GF.R.R8	Results of a Class III Cultural Resources Inventory of Three Proposed Water Well Locations for the Town of Silt, Garfield County, Colorado	Metcalf Archaeological Consultants
GF.R.R9	Results of a Class III Cultural Resources Inventory of 23 Acres for the Silt Water Wells Project (Expanded Project Area) for the Town of Silt, Garfield County, Colorado	Metcalf Archaeological Consultants
GF.RN.R3	U.S. Bureau of Reclamation Silt-Rifle Gap Reservoir Project Garfield County, Colorado	Powers Elevation Co., Inc.
GF.SC.NR1	Garfield Limited Results Cultural Resources Survey Report on Private Land-Bair Ranch	Natural Resources Conservation Service (NRCS)
GF.SC.NR11	Garfield Limited Results Cultural Resources Survey Report-Lyman Fogel	NRCS
GF.SC.NR12	Garfield Limited Results Cultural Resources Survey Report-Ty-Bar Ranch/Emma Dancinger	NRCS
GF.SC.NR13	Garfield Limited Results Cultural Resources Survey Report-Dale Bingham	NRCS
GF.SC.NR15	Garfield Limited Results Cultural Resources Survey Report-Leonard Hedburg	NRCS
GF.SC.NR17	Garfield Limited Results Cultural Resources Survey Report-Alvin Hansen	NRCS
GF.SC.NR19	Garfield Limited Results Cultural Resources Survey Report-Luther Lewis	NRCS
GF.SC.NR21	Garfield Limited Results Cultural Resources Survey Report-West Elk Ranch	NRCS
GF.SC.NR24	Garfield Limited Results Cultural Resources Survey Report-Nina Sonnier	NRCS
GF.SC.NR25	Garfield Limited Results Cultural Resources Survey Report-Jerry Rusch	NRCS
GF.SC.NR26	Garfield Limited Results Cultural Resources Survey Report-Robert Holmes	NRCS
GF.SC.NR27	Garfield Limited Results Cultural Resources Survey Report-Kyle Costanzo	NRCS
GF.SC.NR29	Garfield Limited Results Cultural Resources Survey Report-Wayne Pollard	NRCS
GF.SC.NR32	Garfield Limited Results Cultural Resources Survey Report-Sara Dunn	NRCS
GF.SC.NR33	Garfield Limited Results Cultural Resources Survey Report-Scott Coulter	NRCS
GF.SC.NR36	Garfield Limited-Results Cultural Resource Survey Form on Private Lands - Wade Patton	NRCS
GF.SC.NR37	Garfield Limited-Results Cultural Resource Survey Form on Private Lands - Open Heart LIIP	NRCS
GF.SC.NR38	Garfield Limited-Results Cultural Resource Survey Form on Private Lands - Warren Roberts Trust	NRCS
GF.SC.NR39	Garfield Limited-Results Cultural Resource Survey Form on Private Lands - Raymond Langstaff	NRCS
GF.SC.NR40	Garfield Limited-Results Cultural Resource Survey on Form on Private Lands - Raymond Langstaff (2)	NRCS
GF.SC.NR41	Garfield Limited-Results Cultural Resource Survey Form on Private Lands - Charles Terrell	NRCS
GF.SC.NR42	Garfield Limited-Results Cultural Resource Survey Form on Private Lands - Arlen & Amber Jackson	NRCS
GF.SC.NR43	Garfield Limited-Results Cultural Resource Survey Form on Private Lands - Cheri A. Brown	NRCS
GF.SC.NR44	Garfield Limited-Results Cultural Resource Survey Form on Private Lands - Cody Smith	NRCS
GF.SC.NR45	Garfield County Limited Results Cultural Resources Survey Report on Private Lands - H. John Bellio (NRCS GLSP11-006)	NRCS
GF.SC.NR50	Garfield County Limited-Results Cultural Resource Survey on Private Lands - T. & V. Davis (GLSP10-019)	NRCS
GF.SC.NR53	Garfield County Limited Results Cultural Resources Survey Report on Private Lands (Calvin Roberts) (GLSP11-008)	NRCS
GF.SC.NR54	Garfield County Limited Results Cultural Resources Survey Report on Private Lands - Tom and Vickie Schauster	NRCS
GF.SC.NR55	Garfield County Limited Results Cultural Resource Survey Report on Private Land (Garfield)	NRCS

State Project No.	Report Title	Institution
GF.SC.NR56	Garfield County Limited Results Cultural Resource Survey Report on Private Lands (Peach Valley CSA)	NRCS
GF.SC.NR57	Garfield County Limited Results Cultural Resource Survey Report on Private Land (Hegwer)	NRCS
GF.SC.NR61	Garfield County Limited Results Cultural Resource Survey Report on Private Lands (Dry Elk Valley Land)	NRCS
GF.SC.NR62	Garfield County Limited Results Cultural Resources Survey Report on Private Lands (Chavez)	NRCS
GF.SC.NR63	Garfield County Limited Results Cultural Resources Survey Report on Private Lands (Powers)	NRCS
GF.SC.NR66	Garfield County Limited Results Cultural Resource Survey Report on Private Land (Smith)	NRCS
GF.SC.NR67	Garfield County Limited Results Cultural Resources Survey Report on Private Lands (Bennett)	NRCS
GF.SC.NR68	Garfield County Limited Results Cultural Resource Survey Report on Private Lands (Graham Mesa Development)	NRCS
GF.SC.NR7	Garfield Limited Results Cultural Resources Survey Report - Freddie Fazzi	NRCS
GF.SC.NR71	Garfield County Limited-Results Cultural Resource Survey Report on Private Lands - Zang Family Trust	NRCS
GF.SC.NR74	Garfield County Limited-Results Cultural Resource Survey Report on Private Lands - West Elk Ranch	NRCS
GF.SC.NR75	Garfield County Limited-Results Cultural Resource Survey Report on Private Lands	NRCS
GF.SC.NR76	Garfield County Limited-Results Cultural Resource Survey Report on Private Lands	NRCS
MC.CH.NR19	A Class III Archaeological Survey of Five Section Wide 3600 Fence Upgrade Locations in Garfield, Grand, Jackson & Moffat Counties, Colorado (Mc R300-039) (15-1-97)	Centennial Archaeology, Inc.
MC.CH.R96	A Cultural Resource Survey of Interstates 25, 70, 225, and 270, U.S. Highways 34 and 160, and State Highways 13 and 470, for the Proposed Adesta Communications Fiber Optic System, Colorado (C Sw00-102)	Centennial Archaeology, Inc.
MC.E.R54	Class III Cultural Resource Inventories of Five Alternate Mill Tailings Disposal Sites in West-Central Colorado, Mesa and Garfield Counties, Conducted in Support of the US Department of Energy's UMTRA Project (ASD-34-6703-S-85-0011)	GRI
MC.E.R58	A Class II Cultural Resource Investigation of the Proposed Craig to Rifle 230-Kv to 345-Kv Transmission Line Uprate, Northwest Colorado (18-00-81)	Gilbert/Commonwealth, Inc.
MC.E.R59	Volumes I and II; Class III Cultural Resource Investigations, Craig-Rifle 230 to 345-Kv Transmission Line Uprate, Northwest Colorado (R-2407)	Gilbert/Commonwealth, Inc.
MC.LM.R139	Cultural Resource Inventory of Access Roads, Centerline Realignments, and Pipeyards Associated with the Planned Transcolorado Gas Transmission Project Western Colorado and Northwestern New Mexico | Addendum Report #1 Cultural Resource Inventory of Pipeyards, Contractors Yards and Railroad Sidings Associated with the Planned Transcolorado Natural Gas Pipeline Western Colorado and Northwestern New Mexico	Alpine Archaeological Consultants
MC.LM.R16	A Cultural Resource Inventory of Northern Geophysical Seismic Explorations Near Battlement Mesa, Mesa and Garfield Counties, Colorado (S#1092)	Metcalf Archaeological Consultants
MC.LM.R167	Estes Project Stony Ridge Mine Projects (BLM GSRA 925)	Mr. William H. Knight, Jr.

State Project No.	Report Title	Institution
MC.LM.R223	Class III Cultural Resources Inventory of 1764 Acres and Site Grazing Evaluations for the Bureau of Land Management, Glenwood Springs Resource Area (GRI 2138) | Results of Limited Archaeological Testing at Prehistoric Sites 5EA1757, 5EA1762 and 5RT1594 in Eagle and Routt Counties, Colorado	GRI
MC.LM.R415	Cultural Resource Inventory Report on the Hogback Truck Trail Cattle Guard, Greenhorn Cattle Guard and Cottonwood Gate and Fence, in Eagle and Garfield Counties, Colorado (GSFO#15805-4)	CRVFO
MC.LM.R427	An Archaeological Reconnaissance of Fifteen Miles of Seismograph Line in Garfield and Rio Blanco Counties, Colorado	Colorado State University Anthropology
MC.LM.R480	Class III Cultural Resource Inventory of the Colorado Segments of the Planned Entrega Gas Pipeline Rio Blanco, Moffat, Larimer, and Weld Counties, Colorado; Class III Cultural Resource Inventory of the Colorado Segments of the Planned Entrega Gas Pipeline Rio Blanco, Moffat, Larimer, and Weld Counties; Colorado Map, Appendices, Addendum 1 to Class III Cultural Resource Inventory of the Colorado Segments of the Planned Entrega Gas Pipeline Rio Blanco, Moffat, Larimer, and Weld Counties, Colorado; Addendum 3 to Class III Cultural Resource Inventory of the Colorado Segments of the Planned Entrega Gas Pipeline Rio Blanco, Moffat, Larimer, and Weld Counties, Colorado	Alpine Archaeological Consultants
MC.LM.R5	Cultural Resource Management Report, Grant-Norpac, Inc., Central Piceance Basin Prospect Seismic Line #1, Rio Blanco, Garfield, and Mesa Counties, Colorado	Powers Elevation Co., Inc.
MC.LM.R639	Class III Cultural Resource Inventory Public Service Company of Colorado, Palisade to Shoshone Transmission Line, Garfield and Mesa Counties, Colorado (BLM # CRIR 15911-04)	BLM Grand Junction Field Office
MC.LM.R670	A Class III Cultural Resource Inventory for Range Projects 2012: Livestock Trailing and Range Improvements Garfield and Eagle Counties, Colorado (BLM # 1012-32)	CRVFO
MC.LM.R71	Colorado Interstate Gas Company Uinta Basin Lateral 20 Inch Pipeline: Class III Cultural Resource Final Report Utah, Colorado and Wyoming (Including Volume 2: Interim Report, Amendment, Addendum, and Two Appendices) (54-00-91 and 54-00-93)	Metcalf Archaeological Consultants
MC.PA.R66	Archaeological Reconnaissance of the Craig-Rifle 345 kV Electrical Transmission Line, Moffat County, Colorado (3-00-77)	Colorado State University Anthropology

TABLE E-9. Cultural Resources in the Watershed Plan Area

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)
5GF.374	MC.LM.R335	Historical barn	Field eligible (1977)
5GF.3114	-	Open lithic scatter	Field not eligible (2003)
5GF.5552	-	Unnamed fenceline	Officially not eligible (no date)
5GF.2951	MC.LM.R335	James Gordon House	Officially not eligible (1983)
5GF.2952	-	Raley Residence	Officially not eligible (1983)
5GF.2953	-	Jennie Carter Residence	Officially not eligible (1983)
5GF.2954	-	John Cozza House	Officially not eligible (1983)
5GF.2955	-	Elsie Jackett House	Officially not eligible (1983)
5GF.2956	-	Roma Bugni House	Officially not eligible (1983)
5GF.2957	-	Mary Malano House	Officially not eligible (1983)
5GF.1454	MC.CH.R163; MC.CH.R4	Railroad Avenue Bridge	Field not eligible (1987)
5GF.1873	GF.SHF.R1	Herman Heinze Property - Heinze Park	Field not eligible (1994)
5GF.1928	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1981	GF.SHF.R1	Rose Hill Cemetery	Field not eligible (1992)
5GF.1453	MC.CH.R4; MC.CH.R100; MC.CH.R163	Third Street Bridge	Field not eligible (1987)
5GF.1827	GF.SHF.R1	New Rifle Creek Bridge - Third Street Bridge	Field not eligible (1994)
5GF.1987	GF.SHF.R1	Gregor House	Field eligible (1994)
5GF.2105	GF.SHF.R1	Chamber of Commerce Railroad Car - Denver and Rio Grande Coach Car	Field not eligible (1994)
5GF.1	MC.LM.R281; GF.CU.R1	Open lithic scatter	Field not eligible (1963)
5GF.178	MC.LM.R315; MC.PA.R66	Open camp	Field not eligible (1976)
5GF.179	GF.LM.R174; MC.PA.R66	Open camp	Officially not eligible (2001)
5GF.181	MC.LM.R335; GF.LM.R86	Historical potato cellar	Officially not eligible (1995)
5GF.186	-	Open camp	Field needs data (1976)
5GF.213	MC.LM.R427; GF.LM.R217	Open camp and trash dump	Officially not eligible (2002)
5GF.214	MC.LM.R427; GF.LM.R217	Sheltered camp	Officially not eligible (2002)
5GF.219	MC.E.R59	Paleontological	Field needs data (1981)
5GF.273	-	Mining complex	Field needs data (1977)
5GF.281	XX.MPS.28; GF.SHF.R1	Rifle Post Office - Rifle Main Post Office	Listed in the National Register of Historic Places (NRHP) (1986)
5GF.308	MC.HE.R6; MC.CPA.R2; GF.LM.R239; MC.SHF.R128; GF.SHF.R10	Rifle Wickiup Village	Field eligible (2004)
5GF.311	MC.LM.R320; MC.LM.R95	Harvey Gap Petroglyph	Field not eligible (1972)
5GF.336	-	Open camp	No assessment given on form (1977)
5GF.337	-	Open lithic scatter	No assessment given on form (1977)

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)
5GF.340	-	Open camp	Field not eligible (1978)
5GF.344	-	Burial	Field not eligible (2000)
5GF.383	MC.LM.R335	Historical residence	Field not eligible (1977)
5GF.405	MC.LM.R335	Historical residence	No assessment given on form (1977)
5GF.406	MC.LM.R335	Historical silo	No assessment given on form (1977)
5GF.416	MC.LM.R335	Historical lumbermill	No assessment given on form (1977)
5GF.417	MC.LM.R335	Historical mill	Officially needs data (1985)
5GF.434	MC.LM.R335; GF.LM.R240	Rifle Falls Hydroelectric Plant	Field not eligible (1985)
5GF.457	XX.MPS.29; XX.MPS.32; MC.CH.R100; MC.CH.R163; GF.SHF.R1	Rifle Bridge - Grand River Bridge - Old Colorado River Bridge	Listed in the NRHP (1985)
5GF.493	MC.LM.R335; GF.CH.R3; GF.LM.R121	Fravert Reservoir Dam	Field not eligible (1979)
5GF.522	MC.LM.R280; GF.LM.R174	Open camp	Officially not eligible (2001)
5GF.523	MC.LM.R280; GF.LM.R174	Open lithic scatter	Officially not eligible (2001)
5GF.559	-	Precontact isolated find	Field not eligible (1979)
5GF.560	-	Precontact isolated find	Field not eligible (1979)
5GF.595	GF.LG.R1; GF.SHF.R1	Railroad Loading Spur - Brake & Wheel Service	Field eligible (1994)
5GF.596	GF.LG.R1	Historical structure	Officially not eligible (2004)
5GF.616	GF.LM.R191	Isolated find	Field not eligible (1980)
5GF.771	-	Isolated find	Field not eligible (1981)
5GF.779	GF.LM.R244; GF.LM.R291	Rifle Gap Site, Open camp	Officially not eligible (2004)
5GF.780	GF.LM.R244	Open camp	Field needs data (1981)
5GF.781	GF.LM.R244	Open camp	Field needs data (1981)
5GF.782	GF.LM.R244	Precontact isolated find	Field not eligible (1981)
5GF.823	MC.LM.R315; GF.LM.R117	Open camp	Field needs data (1981)
5GF.824	GF.LM.R244	Open camp	Field needs data (1981)
5GF.844	MC.E.R58; MC.E.R59	Agricultural complex	Field not eligible (1981)
5GF.933	MC.E.R59	Open camp	Field eligible (1981)
5GF.934	MC.E.R59	Trash scatter and open lithic scatter	Field needs data (1981)
5GF.935	MC.E.R59	Open lithic scatter	Field not eligible (1981)
5GF.958	GF.LM.R272	Open camp	Field needs data (1978)
5GF.1000.1	MC.CH.R96; MC.CH.R97	Denver and Rio Grande - Rio Grande Junction Railroad - Union Pacific Railroad	Officially eligible (2000)
5GF.1000.5	MC.CH.R96	Denver and Rio Grande Western Railroad segment	Field eligible (1999)
5GF.1000.8	-	Denver and Rio Grande Western Railroad segment	Supports eligibility of entire linear resource (2014)
5GF.1000.11	-	Denver and Rio Grande Western Railroad segment	Supports eligibility of entire linear resource (2014)

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)
5GF.1002	GF.CPO.R1; MC.CPO.R31; MC.E.R15; GF.SHF.R1; MC.PA.R73	Mclearn Building - Mclearn Mercantile Company	Field not eligible (1994)
5GF.1003	MC.CPO.R31; GF.SHF.R1	Stauffer's Pharmacy - Timberline Sporting Goods - All Star Sports	Field eligible (1994)
5GF.1004	MC.CPO.R31; GF.SHF.R1	Glover Jewelry - Four Seasons Real Estate - Landstrom's	Field eligible (1994)
5GF.1005	GF.CPO.R1; MC.CPO.R31; MC.E.R15; GF.SHF.R1; MC.PA.R73	Rifle Sanitarium - Midland Hotel	Field eligible (1994)
5GF.1006	MC.CPO.R31; MC.E.R15; GF.SHF.R1; MC.PA.R73	Munro Mercantile Building - Henry's Department Store	Field eligible (1994)
5GF.1007	MC.CPO.R31; GF.SHF.R1	Hoffmeister Bakery - Reynard's Hotel - Miller's Department Store	Field not eligible (1994)
5GF.1008	MC.CPO.R31; MC.E.R15; MC.PA.R73	Rifle Creek Mercantile Company Building, Wall and House Building	Unspecified (1981)
5GF.1009	MC.CPO.R31; GF.SHF.R1	Rifle Plumbing Company - Rifle Flour Mills	Field eligible (1994)
5GF.1010	MC.CPO.R31; GF.SHF.R1; GF.CPO.R1	Chevrolet Building	Field not eligible (1994)
5GF.1011	MC.CPO.R31; GF.SHF.R1; GF.CPO.R1	Rifle House - John Savage Law Office	Field not eligible (1994)
5GF.1012	MC.CPO.R31; GF.SHF.R1; GF.CPO.R1	Rifle City Hall - Halimeh's Restaurant	Field not eligible (1994)
5GF.1013	MC.CPO.R31; GF.SHF.R1	Loof Building - Loof Lodge	Field not eligible (1994)
5GF.1014	MC.CPO.R31; GF.SHF.R1	Rifle Lodge No. 129, A.F & A.M.	Field not eligible (1994)
5GF.1054	MC.CH.R163; GF.PA.R4	Silt Bridge	Field not eligible (1982)
5GF.1072	-	Open camp	Unspecified (1978)
5GF.1148	-	Sheltered camp	Field needs data (1982)
5GF.1163	MC.CN.R3	Rifle Gap Mine	Field not eligible (1978)
5GF.1164	MC.CN.R3	Harvey Gap No 2 Mine	Field needs data (1978)
5GF.1211	GF.CH.R9	Cook Place	Officially not eligible (1983)
5GF.1219	GF.LM.R241	Open lithic scatter	Field eligible (1983)
5GF.1263	MC.E.R15; GF.SHF.R1; MC.PA.R73	Rifle Methodist Episcopal Church - United Methodist Presbyterian Church (Rifle)	Field not eligible (1994)
5GF.1264	GF.SHF.R1; MC.PA.R73	Presbyterian Church (Rifle) - Christian Church-Rifle	Unspecified (1975)
5GF.1265	MC.E.R15; GF.SHF.R1; MC.PA.R73	St. Mary's Catholic Church (Rifle) - St. Mary's Rectory	Field not eligible (1994)
5GF.1266	MC.E.R15; GF.SHF.R1; MC.PA.R73; GF.CPO.R1	Le Rossignol House	Field eligible (1994)

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)
5GF.1267	MC.E.R15; GF.SHF.R1; MC.PA.R73	Seventh Day Adventist Church (Rifle) - Dr. Christensen Office	Field not eligible (1994)
5GF.1268	MC.E.R15; MC.PA.R73	Rex Theater	Unspecified (1975)
5GF.1269	MC.PA.R73	9th Street Highschool	Unspecified (1975)
5GF.1271	MC.LM.R315; MC.E.R15; GF.E.R8; MC.PA.R73	JQS Cattle Trail	Officially eligible (1995)
5GF.1271.2	MC.CH.R96; GF.LM.R174	JQS Cattle Trail	Field not eligible (2001)
5GF.1271.5	GF.LM.R174	JQS Cattle Trail	Field not eligible (2001)
5GF.1271.6	GF.LM.R261	JQS Cattle Trail	Field eligible (2003)
5GF.1271.9	-	JQS Cattle Trail	Supporting (2014)
5GF.1411	MC.LM.R167	Harvey Gap	Officially not eligible (1986)
5GF.1428	GF.LM.R11	Historical foundation	Field not eligible (1986)
5GF.1437	GF.LM.R11	Precontact isolated find	Field not eligible (1986)
5GF.1450	MC.HE.R6; GF.LM.R12	Open architectural	Officially not eligible (2008)
5GF.1451	GF.LM.R12	Open camp	Officially needs data (1988)
5GF.1452	GF.LM.R12	Precontact isolated find	Field not eligible (1987)
5GF.1458	GF.LM.R14	Precontact isolated find	Field not eligible (1985)
5GF.1469	GF.CH.R3	Precontact isolated find	Field not eligible (1988)
5GF.1495	MC.LM.R16	Precontact isolated find	Field not eligible (1989)
5GF.1500	MC.LM.R16	Precontact isolated find	Field not eligible (1989)
5GF.1512	GF.LG.R2	Precontact isolated find	Unspecified
5GF.1614	GF.R.R2	Open camp	Officially eligible (2001)
5GF.1615	GF.R.R2	Open camp	Officially eligible (2001)
5GF.1616	GF.R.R2	Precontact isolated find	Field not eligible (1992)
5GF.1617	GF.R.R2	Precontact isolated find	Field not eligible (1992)
5GF.1618	GF.R.R2	Precontact isolated find	Field not eligible (1992)
5GF.1619	GF.R.R2	Precontact isolated find	Field not eligible (1992)
5GF.1620	GF.R.R2	Precontact isolated find	Field not eligible (1992)
5GF.1638	-	Harvey Gap #3	Officially not eligible (1993)
5GF.1819	GF.SHF.R1	Hollenbeck Building	Field not eligible (1994)
5GF.1820	GF.SHF.R1	Historical structure	Field not eligible (1994)
5GF.1821	GF.SHF.R1	Ed Mclearn Home	Field not eligible (1994)
5GF.1822	GF.SHF.R1	Wykes House	Field not eligible (1994)
5GF.1823	GF.SHF.R1	Sayer House	Field not eligible (1994)
5GF.1824	GF.SHF.R1	Historical building	Field eligible (1994)
5GF.1825	GF.SHF.R1	Historical building	Field not eligible (1994)
5GF.1826	GF.SHF.R1	Sowder Funeral Home	Field not eligible (1994)
5GF.1828	GF.SHF.R1	Commercial building	Field not eligible (1994)

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)
5GF.1829	GF.SHF.R1	The New Donnell Garage - Fulton Garage	Field not eligible (1994)
5GF.1830	GF.SHF.R1	Historical building	Field not eligible (1994)
5GF.1831	GF.SHF.R1	Maxfield Home	Field not eligible (1994)
5GF.1832	GF.SHF.R1	Stone Meat Market	Field not eligible (1994)
5GF.1833	GF.SHF.R1	Leyner Residence - Stuver & George Law Office	Field not eligible (1994)
5GF.1834	GF.SHF.R1	Sears Building A-1 Heating and Cooling	Field not eligible (1994)
5GF.1835	GF.SHF.R1	Moylle Building - Harris Building	Field eligible (1994)
5GF.1836	GF.SHF.R1	Hugus Store - PCA Building	Field not eligible (1994)
5GF.1837	GF.SHF.R1	Walgreen Pharmacy- Rifle - For You Shoppe - Aid Pawn	Field not eligible (1994)
5GF.1839	GF.SHF.R1	Ute Theater - Senior Pro Rodeo Museum	Field not eligible (1994)
5GF.1840	GF.SHF.R1	Ziesness & Todd Mercantile - Hoffmeister Bakery/Hampson & Valdez - City Drug/ Ben Franklin - Tradesmen/Bex Rex	Field not eligible (1994)
5GF.1841	GF.SHF.R1	Daylight Country Donuts/The Texan Bar	Field not eligible (1994)
5GF.1842	GF.SHF.R1	Yarberry's Secondhand Store - Gambles - O'leary's Saloon	Field not eligible (1994)
5GF.1843	GF.SHF.R1	Enterprise Building - Rifle Hardware - Citizen Telegram Building - Bel's Resale Outlet	Field not eligible (1994)
5GF.1844	GF.SHF.R1	Moose Lodge - Rifle Food Market	Field not eligible (1994)
5GF.1845	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1846	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1847	GF.SHF.R1	The Wooden Bucket	Field not eligible (1994)
5GF.1848	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1849	GF.SHF.R1; GF.SHF.R14	Ute Theater - Rifle Creek Theater	Field eligible (1994)
5GF.1851	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1852	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1853	GF.SHF.R1	Munro Duplex	Field eligible (1994)
5GF.1854	GF.SHF.R1	Horace Mann Home	Field eligible (1994)
5GF.1855	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1856	GF.SHF.R1	R.O. Smith Home	Field not eligible (1994)
5GF.1857	GF.SHF.R1	Roy O. Smith Residence	Field eligible (1994)
5GF.1858	GF.SHF.R1	Fred Munro Home	Field not eligible (1994)
5GF.1859	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1860	GF.SHF.R1	TCI Cablevision of Central Colorado, Inc.	Field not eligible (1994)
5GF.1861	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1862	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1863	GF.SHF.R1	Caton's - Karylett Kollectibles	Field eligible (1994)
5GF.1864	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1865	GF.SHF.R1	Andy Gump Apartments	Field not eligible (1994)

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)
5GF.1866	GF.SHF.R1; GF.SHF.R13	Rifle City Hall - Rifle Creek Museum	Field not eligible (1994)
5GF.1867	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1868	GF.SHF.R1	Main Highway Wall	Field not eligible (1994)
5GF.1869	GF.SHF.R1	Densmore House	Field not eligible (1994)
5GF.1870	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1871	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1872	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1874	GF.SHF.R1	Graham House	Field not eligible (1994)
5GF.1875	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1876	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1877	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1878	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1879	GF.SHF.R1	Howard House	Field eligible (1994)
5GF.1880	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1881	GF.SHF.R1	Lyman Auston Home	Field not eligible (1994)
5GF.1882	GF.SHF.R1	Harp House	Field not eligible (1994)
5GF.1883	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1884	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1885	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1886	GF.SHF.R1	Garfield County Fairgrounds	Field eligible (1994)
5GF.1887	GF.SHF.R1	C.M. Pike Donnell House	Field eligible (1994)
5GF.1888	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1889	GF.SHF.R1	Conger/Moore House	Field eligible (1994)
5GF.1890	GF.SHF.R1	Munro House	Field not eligible (1994)
5GF.1891	GF.SHF.R1	Hamp Haley House	Field eligible (1994)
5GF.1892	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1893	GF.SHF.R1	Richard Magor House	Field eligible (1994)
5GF.1894	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1895	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1896	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1897	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1898	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1899	GF.SHF.R1	Dr. Sands House	Field not eligible (1994)
5GF.1900	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1901	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1902	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1903	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1904	GF.SHF.R1	Wigington House	Field not eligible (1994)

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)
5GF.1905	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1906	GF.SHF.R1	Fothergill House	Field not eligible (1994)
5GF.1907	GF.SHF.R1	Toft House - Barley House - Suzie Barley House	Field not eligible (1994)
5GF.1908	GF.SHF.R1	Callen House	Field not eligible (1994)
5GF.1909	GF.SHF.R1	Sizer House/Prefountaine House	Field not eligible (1994)
5GF.1910	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1911	GF.SHF.R1	Englebright Home	Field eligible (1994)
5GF.1912	GF.SHF.R1	Miller House	Field not eligible (1994)
5GF.1914	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1915	GF.SHF.R1	Stanley Harp House	Field eligible (1994)
5GF.1916	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1917	GF.SHF.R1	L.L. Creamery	Field not eligible (1994)
5GF.1918	GF.SHF.R1	Frank Kurt House	Field not eligible (1994)
5GF.1919	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1920	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1921	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1922	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1923	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1924	GF.SHF.R1	Porter House	Field eligible (1994)
5GF.1925	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1926	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1927	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1929	GF.SHF.R1	Marker House	Field not eligible (1994)
5GF.1930	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1931	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1932	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1933	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1934	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1935	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1937	GF.SHF.R1	Residence	Field eligible (1994)
5GF.1938	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1939	GF.SHF.R1	Stauffer Home	Field eligible (1994)
5GF.1940	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1941	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1942	GF.SHF.R1	Warmbrodt/Hutchings Home	Field not eligible (1994)
5GF.1943	GF.SHF.R1	St. Mary's Parish Office	Field not eligible (1994)
5GF.1944	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1945	GF.SHF.R1	Residence	Field not eligible (1994)

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)
5GF.1946	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1947	GF.SHF.R1	McCormick House	Field not eligible (1994)
5GF.1948	GF.SHF.R1	Richardson Home	Field not eligible (1994)
5GF.1949	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1951	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1952	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1953	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1954	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1955	GF.SHF.R1	Ennis House	Field not eligible (1994)
5GF.1956	GF.SHF.R1	Jack Power Residence	Field not eligible (1994)
5GF.1957	GF.SHF.R1	Leon Thompson House	Field not eligible (1994)
5GF.1958	GF.SHF.R1	Stanley Brooks Home	Field not eligible (1994)
5GF.1959	GF.SHF.R1	Ed Rogers House	Field not eligible (1994)
5GF.1960	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1961	GF.SHF.R1	Morrow House	Field not eligible (1994)
5GF.1962	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1963	GF.SHF.R1	Mabel Franklin House	Field not eligible (1994)
5GF.1964	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1965	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1966	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1967	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1968	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1969	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1970	GF.SHF.R1	Wilson Residence - Schimerhorn House	Field not eligible (1994)
5GF.1971	GF.SHF.R1	Bilyeu House	Field not eligible (1994)
5GF.1972	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1973	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1974	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1975	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1976	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1977	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1978	GF.SHF.R1	Residence	Field not eligible (1994)
5GF.1979	GF.SHF.R1	Charlotte Kline Home - Gable Home	Field not eligible (1994)
5GF.1983	GF.SHF.R1	Colorado Mountain College - Old High School- Rifle - Rifle Union High School - Rifle Community Education Center	Officially not eligible (1984)
5GF.1984	GF.SHF.R1	Zastrow Home - Sinele House	Unspecified (1994)
5GF.1985	GF.SHF.R1	Kiggins House	Unspecified (1994)
5GF.1986	GF.SHF.R1	Ellis House	Field eligible (1994)

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5GF.1988	GF.SHF.R1	Miller House	Field eligible (1994)
5GF.1989	GF.SHF.R1	Holder's Rooming House - Thomas Maternity Home	Field eligible (1994)
5GF.1990	GF.SHF.R1	Residence	Unspecified (1994)
5GF.1991	GF.SHF.R1	Residence	Unspecified (1994)
5GF.2016	GF.LM.R72	Open camp	Officially eligible (1994)
5GF.2017	GF.LM.R72	Open camp	Officially not eligible (1994)
5GF.2018	GF.LM.R72	Open camp	Officially needs data (1994)
5GF.2019	GF.LM.R72	Open camp	Officially eligible (1994)
5GF.2020	GF.LM.R72	Open camp	Officially needs data (1994)
5GF.2021	GF.LM.R72	Historical trash dump and prehistoric open camp	Officially eligible (1994)
5GF.2022	GF.LM.R72	Open lithic scatter	Officially eligible (1994)
5GF.2023	GF.LM.R72	Open camp	Officially eligible (1994)
5GF.2025	GF.LM.R72	Historical trash dump and prehistoric open lithic scatter	Officially not eligible (1994)
5GF.2026	GF.LM.R72	Open lithic scatter	Officially needs data (1994)
5GF.2027	GF.LM.R72	Trash dump	Officially not eligible (1994)
5GF.2028	GF.LM.R72	Historical trash dump and prehistoric open lithic scatter	Officially not eligible (1994)
5GF.2029	GF.LM.R72	Open camp	Officially eligible (1994)
5GF.2030	GF.LM.R72	Open camp	Officially eligible (1994)
5GF.2031	GF.LM.R72	Trash dump	Officially not eligible (1994)
5GF.2032	GF.LM.R72	Open camp	Officially needs data (1994)
5GF.2033	GF.LM.R72	Open camp	Officially needs data (1994)
5GF.2034	GF.LM.R72	Open camp	Officially needs data (1994)
5GF.2035	GF.LM.R72	Historical trash dump and prehistoric open camp	Officially needs data (1994)
5GF.2036	GF.LM.R72	Historical trash dump and prehistoric open lithic scatter	Officially needs data (1994)
5GF.2037	GF.LM.R72	Open lithic scatter	Officially not eligible (1994)
5GF.2038	GF.LM.R72	Open camp	Officially eligible (1994)
5GF.2039	GF.LM.R72	Historical trash dump and prehistoric open camp	Officially not eligible (1994)
5GF.2040	GF.LM.R72	Open lithic scatter	Officially needs data (1994)
5GF.2041	GF.LM.R72	Trash dump	Officially not eligible (1994)
5GF.2042	GF.LM.R72	Open camp	Officially eligible (1994)
5GF.2043	GF.LM.R72	Prehistoric isolated find	Field not eligible (1994)
5GF.2044	GF.LM.R72	Prehistoric isolated find	Field not eligible (1994)
5GF.2047	GF.LM.R72	Prehistoric isolated find	Field not eligible (1994)
5GF.2048	GF.LM.R72	Historical isolated find	Field not eligible (1994)
5GF.2049	GF.LM.R72	Historical grave	Field needs data (2000)
5GF.2050	GF.LM.R72	Prehistoric isolated find	Field not eligible (1994)
5GF.2051	GF.LM.R72	Prehistoric isolated find	Field not eligible (1994)
5GF.2052	GF.LM.R72	Prehistoric isolated find	Field not eligible (1994)

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)
5GF.2053	GF.LM.R72	Prehistoric isolated find	Field not eligible (1994)
5GF.2054	GF.LM.R72	Open camp	Field needs data (2000)
5GF.2055	GF.LM.R72	Prehistoric isolated find	Field not eligible (1994)
5GF.2056	GF.LM.R72	Prehistoric isolated find	Field not eligible (1994)
5GF.2057	GF.LM.R72	Prehistoric isolated find	Field not eligible (1994)
5GF.2068	GF.SHF.R1	Residence	Unspecified (1994)
5GF.2069	GF.SHF.R1	Residence	Unspecified (1994)
5GF.2070	GF.SHF.R1	Residence	Field eligible (1994)
5GF.2071	GF.SHF.R1	Conch Filling Station - Pat Maes Storage Shed	Field eligible (1994)
5GF.2072	GF.SHF.R1	Residence	Field eligible (1994)
5GF.2073	GF.SHF.R1	Residence	Unspecified (1994)
5GF.2074	GF.SHF.R1	Residence	Unspecified (1994)
5GF.2075	GF.SHF.R1	Residence	Unspecified (1994)
5GF.2076	GF.SHF.R1	Residence	Unspecified (1994)
5GF.2077	GF.SHF.R1	Gately House	Unspecified (1994)
5GF.2078	GF.SHF.R1	Residence	Unspecified (1994)
5GF.2079	GF.SHF.R1	Sinele Terrace	Field eligible (1994)
5GF.2080	GF.SHF.R1	Residence	Unspecified (1994)
5GF.2081	GF.SHF.R1	Residence	Unspecified (1994)
5GF.2082	GF.SHF.R1	Residence	Field eligible (1994)
5GF.2083	GF.SHF.R1	Residence	Unspecified (1994)
5GF.2084	GF.SHF.R1	Residence	Unspecified (1994)
5GF.2085	GF.SHF.R1	Oglesby House - Edward House	Officially not eligible (2008)
5GF.2086	GF.SHF.R1	Gene Hill (Coley's)Station - Oglesby's	Officially not eligible (2008)
5GF.2087	GF.SHF.R1	Fremont Dixon Home	Field eligible (1994)
5GF.2088	GF.SHF.R1	Crann House - Crann Building	Field eligible (1994)
5GF.2089	GF.SHF.R1	Kendall & Mochs House	Unspecified (1994)
5GF.2090	GF.SHF.R1	Residence	Unspecified (1994)
5GF.2091	GF.SHF.R1	Frank Cook House - Morelock House	Field eligible (1994)
5GF.2092	GF.SHF.R1	Hallenbeck's Garage	Field not eligible (1994)
5GF.2093	GF.SHF.R1	R & W Therapy	Field not eligible (1994)
5GF.2094	GF.SHF.R1	Todd House	Field eligible (1994)
5GF.2095	GF.SHF.R1	Clagett House	Field eligible (1994)
5GF.2096	GF.SHF.R1	First Christian Church (Rifle)	Field not eligible (1994)
5GF.2097	GF.SHF.R1	Christian Church Parsonage	Unspecified (1994)
5GF.2098	GF.SHF.R1	Harry Smith House	Unspecified (1994)
5GF.2099	GF.SHF.R1	Jim Mclearn House	Field eligible (1994)
5GF.2100	GF.SHF.R1	Duckett Home	Unspecified (1994)

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)
5GF.2101	GF.SHF.R1	Residence	Field eligible (1994)
5GF.2102	GF.SHF.R1	Road	Field not eligible (1994)
5GF.2103	GF.SHF.R1	Cave House	Unspecified (1994)
5GF.2104	GF.SHF.R1	Residence	Unspecified (1994)
5GF.2106	GF.E.R6	Habitation	Field eligible (1994)
5GF.2147	GF.LM.R86	Milk House	Officially not eligible (1995)
5GF.2148	GF.LM.R86	Trash scatter	Officially needs data (1995)
5GF.2149	GF.LM.R86	Mine	Officially not eligible (1995)
5GF.2150	GF.LM.R86	Habitation	Officially needs data (1995)
5GF.2151	GF.LM.R86	Habitation	Officially needs data (1995)
5GF.2152	GF.LM.R86	Habitation	Officially needs data (1995)
5GF.2155	GF.LM.R86	Ranch complex	Officially needs data (1995)
5GF.2156.3	GF.LM.R86; MC.CH.R96	Government Road/State Route 13	Officially not eligible (1995)
5GF.2156.4	GF.LM.R86; MC.CH.R96	Government Road/State Route 13	Officially not eligible (1995)
5GF.2158	GF.LM.R86; GF.SHF.R13	Christos' Valley Curtain	Officially eligible (1995)
5GF.2159	GF.LM.R86	Historical isolated find	Field not eligible (1995)
5GF.2161	GF.LM.R86	Prehistoric isolated find	Field not eligible (1995)
5GF.2162	GF.LM.R86	Prehistoric isolated find	Field not eligible (1995)
5GF.2163	GF.LM.R86	Prehistoric isolated find	Field not eligible (1995)
5GF.2164	GF.LM.R86	Prehistoric isolated find	Field not eligible (1995)
5GF.2166	GF.LM.R85	Open lithic scatter	Officially not eligible (1995)
5GF.2167	GF.LM.R85	Open camp	Officially needs data (1995)
5GF.2284	GF.E.R9	Historical grave	Officially not eligible (1995)
5GF.2426	-	Old Harvey Gap	Officially not eligible (1997)
5GF.2482	MC.LM.R139	Habitation	Officially not eligible (1998)
5GF.2483	MC.LM.R139	Homestead	Officially not eligible (1998)
5GF.2484.1	-	Pioneer Ditch segment	Field not eligible (1998)
5GF.2484.2	MC.LM.R639	Pioneer Ditch segment	Supporting, eligible (2012)
5GF.2515	-	Isolated find	Field not eligible
5GF.2516	-	Isolated find	Field not eligible
5GF.2517	-	Isolated find	Unspecified
5GF.2518	-	Paleontological	Unspecified
5GF.2526	-	Paleontological	Unspecified
5GF.2527	-	Paleontological	Unspecified
5GF.2551	-	Paleontological	Unspecified
5GF.2552	-	Paleontological	Unspecified
5GF.2554	-	Paleontological	Unspecified
5GF.2555	-	Hubbard Gulch, Paleontological	Unspecified

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)
5GF.2570	-	Paleontological	Unspecified
5GF.2580	MC.LM.R427	Isolated find	Field not eligible (1998)
5GF.2581	MC.LM.R427	Isolated find	Field not eligible (1998)
5GF.2714	MC.CH.R100	Rifle Creek Bridge - F-05-C	Officially not eligible (2002)
5GF.2725	MC.CH.R100	Elk Creek Bridge - Gar245-08.41-A	Officially not eligible (2002)
5GF.2728	MC.CH.R100	Third Street Bridge	Field not eligible (2002)
5GF.2756.1	MC.CH.R96; MC.CH.R97	Campbell Ditch segment	Officially not eligible (2000)
5GF.2757.1	MC.CH.R96; MC.CH.R97	Lower Cactus Valley Ditch segment	Officially not eligible (2000)
5GF.2762	GF.R.R5	Open camp	Officially eligible (2001)
5GF.2763	GF.R.R5	Open camp	Officially not eligible (2001)
5GF.2764	GF.R.R5	Open camp	Officially needs data (2001)
5GF.2765	GF.R.R5	Sheltered camp	Officially eligible (2001)
5GF.2766	GF.R.R5	Open camp	Officially not eligible (2001)
5GF.2767	GF.R.R5	Prehistoric isolated find	Field not eligible (1999)
5GF.2768	GF.R.R5	Prehistoric isolated find	Field not eligible (1999)
5GF.2769	GF.R.R5	Isolated find	Field not eligible (1999)
5GF.2770	GF.R.R5	Prehistoric isolated find	Field not eligible (1999)
5GF.2772	GF.R.R5	Prehistoric isolated find	Field not eligible (1999)
5GF.2793	GF.LM.R203	Open lithic scatter	Field needs data (1983)
5GF.2794	-	Historical isolated find	Field not eligible (2000)
5GF.2890	GF.LM.R174	Unspecified	Officially not eligible (2001)
5GF.2892	GF.LM.R174	Prehistoric isolated find	Field not eligible (2001)
5GF.2893	GF.LM.R174	Prehistoric isolated find	Field not eligible (2001)
5GF.2895	GF.LM.R174	Open camp	Officially not eligible (2001)
5GF.2897	GF.LM.R174	Ditch	Field not eligible (2001)
5GF.2906	MC.LM.R223	Historical ranch and prehistoric open camp	Officially needs data (2001)
5GF.2909	MC.LM.R223	Isolated find	Field not eligible (2001)
5GF.2913.1	MC.LM.R315	Grand Tunnel Ditch	Officially eligible (2001)
5GF.2913.2	-	Grand Tunnel Ditch segment	Supports eligibility of entire linear resource (2014)
5GF.2935.4	MC.LM.R639	U.S. Highway 6 segment	Supports eligibility of entire linear resource (2012)
5GF.2935.8	-	State Highway 6 segment	Supports eligibility of entire linear resource (2014)
5GF.2949	MC.SHF.R85	State Highway 13	Field eligible (2002)
5GF.2949.3	GF.LM.R261	State Highway 13	Field not eligible (2003)
5GF.2949.4	GF.LM.R261	State Highway 13	Field not eligible (2003)
5GF.2949.8	-	Old Highway 13 segment	Supports eligibility of entire linear resource (2014)
5GF.2949.9	-	State Highway 13 segment	Does not support eligibility of entire linear resource (2014)
5GF.3017	GF.LM.R217	Open camp	Officially not eligible (2002)
5GF.3030	GF.LM.R217	Isolated find	Field not eligible (2002)

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)
5GF.3100	GF.R.R1	Prehistoric isolated find	Field not eligible (2002)
5GF.3115	-	Rifle Mine	Officially not eligible (2004)
5GF.3152	-	Prehistoric isolated find	Field not eligible (2000)
5GF.3175	GF.LM.R261	Open camp	Officially not eligible (2003)
5GF.3176	GF.LM.R261	Sheltered camp	Officially eligible (2003)
5GF.3177	MC.FS.R449; GF.LM.R261	Open camp	Officially not eligible (2003)
5GF.3179	GF.LM.R261	Prehistoric isolated find	Field not eligible (2003)
5GF.3201	GF.LM.R261	Prehistoric isolated find	Field not eligible (2003)
5GF.3202	GF.LM.R261	Prehistoric isolated find	Field not eligible (2003)
5GF.3370	-	Historical isolated feature	Field not eligible (2004)
5GF.3371	GF.LM.R470	IHI Number 1 Mine	Officially not eligible (2010)
5GF.3372	-	D & H Mine	Field not eligible (2004)
5GF.3379	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3380	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3381	GF.LM.R291	Isolated find	Field not eligible (2004)
5GF.3382	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3383	GF.LM.R291	Historical isolated find	Field not eligible (2004)
5GF.3384	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3385	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3386	GF.LM.R291	Open lithic scatter	Officially not eligible (2004)
5GF.3388	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3389	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3390	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3391	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3392	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3393	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3394	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3395	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3396	GF.LM.R291	Isolated feature	Field not eligible (2004)
5GF.3397	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3399	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3400	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3401	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3403	GF.LM.R291	Prehistoric isolated find	Field not eligible (2004)
5GF.3405.1	GF.LM.R291	East Lateral Farmer's Irrigation Ditch segment	Officially not eligible (2004)
5GF.3405.2	GF.LM.R291	East Lateral Farmer’s Irrigation Ditch segment	Officially not eligible (2004)
5GF.3620	-	Gulino Residence	Unspecified (1994)
5GF.3627	-	Stuver Site, Historical habitation and sheltered camp	Field needs data (2005)

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)
5GF.3632	-	Hattie's Site, Open architectural	Field not eligible (2005)
5GF.3641	GF.LM.R371	Open camp and historical isolated find	Officially eligible (2005)
5GF.3642	GF.LM.R371	Open camp	Officially eligible (2005)
5GF.3643	GF.LM.R371	Open architectural	Officially eligible (2005)
5GF.3649	GF.LM.R371	Prehistoric isolated find	Field not eligible (2005)
5GF.3651	GF.LM.R371	Prehistoric isolated find	Field not eligible (2005)
5GF.3652	GF.LM.R371	Prehistoric isolated find	Field not eligible (2005)
5GF.3653	GF.LM.R371	Prehistoric isolated find	Field not eligible (2005)
5GF.3654	GF.LM.R371	Prehistoric isolated find	Field not eligible (2005)
5GF.3655	GF.LM.R371	Prehistoric isolated find	Field not eligible (2005)
5GF.3656	GF.LM.R371	Prehistoric isolated find	Field not eligible (2005)
5GF.3657	GF.LM.R371	Prehistoric isolated find	Field not eligible (2005)
5GF.3658	GF.LM.R371	Prehistoric isolated find	Field not eligible (2005)
5GF.3660	GF.LM.R371	Prehistoric isolated find	Field not eligible (2005)
5GF.3661	GF.LM.R371	Prehistoric isolated find	Field not eligible (2005)
5GF.3662	GF.LM.R371	Prehistoric isolated find	Field not eligible (2005)
5GF.3663	GF.LM.R371	Prehistoric isolated find	Field not eligible (2005)
5GF.3664	GF.LM.R371	Prehistoric isolated find	Field not eligible (2005)
5GF.3738.1	-	West Lateral Ditch segment	Officially not eligible (2006)
5GF.3739.1	GF.R.R3	Silt Pump Canal segment	Officially not eligible (2005)
5GF.3897	-	Don's-Faye's Cafe and Bar - Silt Cafe and Bar	Officially not eligible (2006)
5GF.3935	-	Residence	Officially not eligible (2006)
5GF.3946.1	GF.R.R6	GVC Siphon segment	Officially eligible (2007)
5GF.3946.2	GF.E.R13	GVC	Supports eligibility of entire linear resource (2011)
5GF.3946.3	GF.E.R13	GVC	Supports eligibility of entire linear resource (2011)
5GF.4008	GF.LM.R203	Open lithic scatter	Field eligible (1983)
5GF.4009	GF.LM.R203	Sheltered camp	Field eligible (1983)
5GF.4010	GF.LM.R203	Historical foundation	Field eligible (1983)
5GF.4059	-	Residence	Officially eligible (2007)
5GF.4314	GF.R.R8; GF.R.R9	Divide Creek Homestead	Officially not eligible (2009)
5GF.4424	-	Sunny Ridge Coal Mine	Officially not eligible (2010)
5GF.4431.1	GF.LM.R470	Haas Canyon Road segment	Does not support eligibility of entire linear resource (2010)
5GF.4432	GF.LM.R470	Dutton & Hasley Mine	Officially not eligible (2010)
5GF.4433	GF.LM.R470	Black Raven Mine	Officially not eligible (2010)
5GF.4434	GF.LM.R470	Coal dump	Officially not eligible (2010)
5GF.4435	GF.LM.R470	Historical isolated feature	Field not eligible (2010)
5GF.4460	GF.CH.R14	Trash dump	Officially not eligible (2011)
5GF.4486	GF.LM.R494	Open camp	Officially needs data (2010)

Smithsonian Site No.	Associated Report Nos.	Resource Type	NRHP Eligibility Status (Date)
5GF.4487	GF.LM.R494	Open camp	Officially not eligible (2010)
5GF.4488	GF.LM.R494	Trash dump	Officially not eligible (2010)
5GF.4489	GF.LM.R494	Trash dump	Officially not eligible (2010)
5GF.4490	GF.LM.R494	Open camp	Officially needs data (2010)
5GF.4491	GF.LM.R494	Open camp	Officially needs data (2010)
5GF.4492	GF.LM.R494	Open camp	Officially needs data (2010)
5GF.4493	GF.LM.R494	Prehistoric isolated find	Field not eligible (2010)
5GF.4494	GF.LM.R494	Prehistoric isolated find	Field not eligible (2010)
5GF.4495	GF.LM.R494	Prehistoric isolated find	Field not eligible (2010)
5GF.4496	GF.LM.R494	Historical isolated find	Field not eligible (2010)
5GF.4497	GF.LM.R494	Historical isolated find	Field not eligible (2010)
5GF.4498	GF.LM.R494	Historical isolated find	Field not eligible (2010)
5GF.4554.7	MC.LM.R639	Shoshone - Palisade Transmission Line segment	Supports eligibility of entire linear resource (2012)
5GF.4554.8	MC.LM.R639	Shoshone - Palisade Transmission Line segment	Supports eligibility of entire linear resource (2012)
5GF.4638	GF.E.R13	Grass Valley Dam	Officially not eligible (2011)
5GF.4864	-	John H Nunns Residence - Classen Residence	Listed in the NRHP (2013)
5GF.4873	MC.LM.R670	Historical isolated find	Field not eligible (2012)
5GF.5078.1	-	Highway segment	Officially needs data (2014)
5GF.5079.1	-	Tri-State 138kv power line segment	Does not support eligibility of entire linear resource (2014)
5GF.5079.2	-	Tri-State 138kv power line segment	Does not support eligibility of entire linear resource (2014)
5GF.5079.3	-	Tri-State 138kv Power line segment	Does not support eligibility of entire linear resource (2014)
5GF.5083	-	Prehistoric isolated find	Officially not eligible (2014)

Other Supporting Documents: Silt Water Conservancy District – Existing Reports

Studies have been conducted for the GVC in the recent past. The following is a list of reports that have been referenced in the EA with the full report being provided here as an attachment:

1. Bell Consulting (2024) SWCD Measures Cost Analysis
    a. Detailed cost breakdown
2. Bell Consulting (2023) Grass Valley Canal Structural Review and Evaluation.
    a. Summary of previous reports and past damage events along the GVC
3. Colorado River Engineering (2021) Grass Valley Canal – Preliminary Engineering – Letter Report System Improvements –Technical Assistance for Federal Cost Share (TAFC)
    a. GVC design for piping sections
    b. Outlines problem prone areas with descriptions
4. Colorado River Engineering (2021) Grass Valley Canal – Preliminary Engineering Hydraulic Model, Technical Assistance for Federal Cost Share (TAFC) Hydraulic evaluation of the entire GVC- *Memo only included-additional data available upon request*
    a. Noted problem areas along canal
5. SWCD (2019) Silt Water Conservancy District Updated Water Management Plan
    a. Includes a list of priorities projects (measures) delineated at the time by staff and consultants
    b. Provides context for continuing concerning measures in the SWCD
    c. Notes 2007 GVC breach and repair
6. Colorado River Engineering (2019) Canal Inventory: Grass Valley Canal
    a. Notes problem areas for Piping Sections #1 and #2