



FINAL SUPPLEMENTAL WATERSHED PLAN NO. 1 & ENVIRONMENTAL ASSESSMENT

FOR REHABILITATION OF DAM FPC-2 OF THE FISHER PEAK CARBON ARROYOS WATERSHED

United States
Department of
Agriculture

Natural Resources
Conservation
Service

Las Animas County, Colorado

Sponsoring Local Organization: City of Trinidad

Lead Agency: NRCS

November 2023



Abstract

Title and Document Status: Final Supplemental Watershed Plan No. 1 and Environmental Assessment for the Fisher Peak Carbon Arroyo Watershed Dam FPC-2 Rehabilitation Project

Location: Las Animas County, Colorado

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

Cooperating Agencies: None

Authority: This plan is prepared under the authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566) as amended.

Abstract:

The Fisher Peak Carbon Arroyo Watershed Dam (FPC-2) currently provides flood protection for the City of Trinidad; however, the dam has a number of deficiencies and no longer meets federal or state standards. Local project sponsors have proposed to fully rehabilitate the dam to provide flood protection downstream most efficiently. The total project installation cost is estimated to be \$4,493,000.

Comments:

The NRCS has completed this Supplemental Plan-EA in accordance with the National Environmental Policy Act (NEPA) and NRCS guidelines and standards. Reviewers should have provided their comments to the NRCS during the allotted Draft Supplemental Plan-EA review period.

Further information may also be obtained for this project by contacting the following NRCS personnel:

Blongshia Cha – NRCS Colorado – Watershed Program Specialist
Denver Federal Center
Building 56
PO Box 25426
Denver, CO 80225
(719) 600-4710
blongshia.cha@usda.gov

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Watershed Agreement

Fishers Peak – Carbon Arroyos Watershed

Supplemental Watershed Plan Agreement No. 1

between the
City of Trinidad
(Referred to herein as Sponsor)

and the

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
Formerly the Soil Conservation Service (SCS)

(Referred to herein as NRCS)

Whereas, the original Watershed Plan Agreement for the Fishers Peak – Carbon Arroyos Watershed, State of Colorado, executed by the Sponsors named therein and NRCS, became effective on the 6th of June, 1960; and

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

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

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsors for assistance in preparing a plan for works of improvement for Floodwater Retarding Structure FPC-2 in the Fishers Peak – Carbon Arroyos 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, there has been developed through the cooperative efforts of the Sponsors and NRCS a watershed project plan and environmental assessment (Supplemental Watershed Plan No. 1 & Environmental Assessment for Rehabilitation of Dam FPC-2, Fisher Peak Carbon Arroyos Watershed), State of Colorado, hereinafter referred to as the Plan-EA 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 Sponsors 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 (102 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 Sponsors 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 CFR Part 24 and 7 CFR Part 21) when acquiring real property interests for this federally assisted project. If

the sponsors are 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.

Works of Improvement	NRCS	Sponsors	Total
Cost-Sharable Items ^{1/}			
Rehabilitation of dam FPC-2 (Construction Costs)	\$ 2,449,900	\$ 1,245,300	\$ 3,695,200
Relocation, Replacement in-kind	\$ NA	\$ 0	\$ 0
Relocation, Required Decent, Safe, Sanitary	\$ NA	\$ 0	\$ 0
Sponsors' Planning Costs	\$ NA	\$ 0	\$ 0
Sponsors' Engineering Costs	\$ NA	\$ 0	\$ 0
Sponsors' Project Administration Costs	\$ NA	\$ 73,900	\$ 0
Land Rights Acquisition Cost	\$ NA	\$ 0	\$ 0
Subtotal: Cost-Share Costs	\$ 2,449,900	\$ 1,319,200	\$ 3,769,100
Cost-Share Percentages	65.0%	35.0%	100.0%
Non Cost-Sharable Items ^{2/}			
NRCS Engineering Cost	\$ 591,200	\$ NA	\$ 591,200
Project Administration ^{3/}	\$ 128,600	\$ 0	\$ 202,500
Water, Mineral and Other Resource Rights ^{4/}	\$ NA	\$ 0	\$ 0
Federal, State and Local Permits	\$ NA	\$ 5,000	\$ 5,000
Real Property Rights ^{4/}	\$ NA	\$ 0	\$ 0
Relocation, Beyond Required Decent, Safe, Sanitary	\$ NA	\$ 0	\$ 0
Subtotal: Non Cost-Share Costs	\$ 719,800	\$ 5,000	\$ 724,800
TOTAL:	\$ 3,169,700	\$ 1,324,200	\$ 4,493,900

^{1/} Maximum NRCS cost-share is 65% of Cost-Sharable Items not to exceed 100% of construction cost (including relocation and flood proofing of downstream properties).

^{2/} If actual non-cost-sharable item expenditures vary from these figures, the responsible party will bear the change.

^{3/} The sponsors and NRCS will each bear the costs of Non Cost-Sharable project administration costs that each incurs. Sponsor costs for project administration include relocation assistance advisory service.

^{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.

6. **Land treatment agreements.** The Sponsors will encourage landowners and operators to continue to operate and maintain needed land treatment conservation measures for the protection and improvement of the watershed upstream of the dam.
7. **Floodplain Management.** Before construction of any project for flood prevention, the sponsors must agree to participate in and comply with applicable Federal floodplain management and flood insurance programs.
8. **Water and mineral rights.** The sponsors will acquire or provide assurance that landowners or resource users have acquired such water, mineral, or other natural resources rights pursuant to State law as may be needed in the installation and operation of the works of improvement. Any costs incurred must be borne by the sponsors and these costs are not eligible as part of the sponsor's cost-share.
9. **Permits.** The sponsors 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. These costs are not eligible as part of the sponsors' cost-share.

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.** A separate agreement will be entered into between NRCS and the sponsors 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 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 sponsors have failed to comply with the conditions of this agreement or when the program funding or authority expires. In this case, NRCS must promptly notify the sponsors in writing of the determination and the reasons for the deauthorization of project funding, together with the effective date. Payments made to the sponsors 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 sponsors 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, 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 sponsors 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 (100 years). Although the sponsors' responsibility to the Federal Government for O&M ends when the O&M agreement expires upon completion of the evaluated life of measures covered by the agreement, the sponsors acknowledge that continued liabilities and responsibilities associated with works of improvement may exist beyond the evaluated life.
15. **Emergency Action Plan.** Prior to construction, the sponsors 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 (NOMM), 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, 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, audiotope, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

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

17. **Certification Regarding Drug-Free Workplace Requirements (7 CFR Part 3021).** By signing this Watershed Agreement, the sponsors are providing the certification set out below. If it is later determined that the sponsors 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 non-Federal 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 sponsors certify 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 sponsors 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 > \$100,000)

A. The sponsors certify 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, 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 sponsors 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 U.S. 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 sponsors certify 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 sponsors are 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 utilized in the performance of this proposed agreement is (____), **is not** (X) listed on the Environmental Protection Agency 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 which is proposed for use under this agreement is under consideration to be listed on the Environmental Protection Agency List of Violating Facilities.
- (3) To include substantially this certification, including this subparagraph, in every nonexempt sub-agreement.

B. The project sponsoring organizations signatory to this agreement agrees 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), respectively, 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 there under 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 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 which 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 which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency 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, location or site of operations, owned, leased, or supervised by a sponsor, to be utilized 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, Environmental Protection Agency, 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: OMB 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: OMB Circular Nos. A-110, A-122, A-129, and A-133; and 7 CFR Parts 3015, 3017, 3018, 3019, 3021 and 3052.

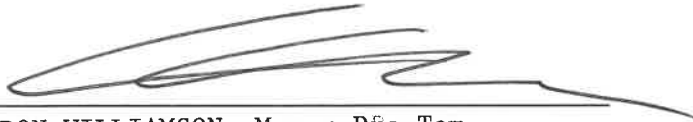
- 22. Examination of Records.** The sponsors must give the NRCS or the Comptroller General, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to this agreement, and retain all records related to this agreement for a period of three years after completion of the terms of this agreement in accordance with the applicable OMB Circular.
- 23. Signatures.** The signing of this Public Law 83-566 Watershed Agreement by an authorized representative of the Sponsors indicates that the Sponsors has reviewed this Agreement and the Kintz Creek Dam (PA-439) Supplemental Watershed Work Plan No. 6-Environmental Evaluation and concur with the intent and contents of each.

CITY OF TRINIDAD

The signing of this plan was authorized by a ^{motion} ~~resolution~~ by the Trinidad City Council and adopted at an official meeting held on

February 6, 2024 at Trinidad, Colorado.

By:



AARON WILLIAMSON, Mayor Pfo-Tem

Date: 20 Feb 2024

USDA-NATURAL RESOURCES CONSERVATION SERVICE

Approved by:

Date: _____

CLINTON EVANS, State Conservationist
Natural Resources Conservation Service
Denver Federal Center, Building 56, PO Box 25426, Denver, CO 80225-0426

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Appendix D. Investigation and Analysis Report
Appendix E. Other Supporting Information

Summary (Office of Management and Budget Fact Sheet)

Title of Proposed Action: Supplemental Watershed Plan and Environmental Assessment for the Fisher Peak Carbon Arroyo Watershed Dam FPC-2 Rehabilitation Project

Location: Las Animas County, Colorado

Congressional District: Colorado Congressional District 4

Sponsor: City of Trinidad

Authority: Public Law 83-566 Stat. 666 as amended (16 U.S.C. Section 1001 et. Seq.) 1954

Purpose and Need for Action: The Fisher Peak Carbon Arroyo Watershed Dam (FPC-2) currently provides flood protection for the City of Trinidad. Based on recent assessments, the dam has a number of deficiencies and no longer meets federal or state standards. The need is to bring the dam and spillway facilities into compliance with current standards. The purpose of the project is dam rehabilitation to provide flood protection downstream of FPC-2.

Preferred Alternative: The Preferred Alternative consists of full rehabilitation of the Fisher Peak Carbon Arroyo Watershed Dam (FPC-2). Rehabilitation includes replacement of components of the outlet system, replacement of drain systems, upgrade of the auxiliary spillway, and upgrade of the outlet channel.

Resource information:

- Latitude and Longitude: 37.158336°, -104.509887°
- Eight-Digit Hydrologic Unit Number: 11020010 (Purgatoire)
- Climate (U.S. Climate Data 2021): July average high/low: 89°F / 58°F; January average high/low: 47°F / 17°F
 - Annual precipitation / snowfall: 14 inches / 40 inches
- Topography: Rocky Mountain foothills and fluvial valley
- Watershed Plan size: 29,416 acres
- Land uses: Undeveloped, mining, public and private infrastructure, agriculture
- Land ownership – Private (91.9%); State (4.6%); Bureau of Land Management (BLM; 3.4%)
- Population (Watershed Area; EPA 2021a): 8,831
- Demographics (Watershed Area; EPA 2021a): White alone = 86%; Hispanic or Latino = 47%; Highschool graduate = 87%; Unemployment = 5%; Per capita income = \$27,792
- Relevant resource concerns that have been identified through scoping: Air quality, cultural resources, endangered and threatened species, fish and wildlife, floodplain management, invasive species, land use, migratory birds, prime farmlands, public health and safety, riparian areas, socioeconomic factors, soil resources, water quality, waters of the U.S., and wetlands.

Alternative plans considered: Alternatives that were analyzed in detail include the No Action Alternative, the Full Dam Rehabilitation Alternative, and Federal Decommissioning Alternative. The Full Dam Rehabilitation Alternative is the Preferred Alternative. No mitigation has been identified for implementation of the Preferred Alternative.

The No Action Alternative considered bringing the dam into compliance with Colorado Dam Safety requirements with no federal funding. Project measures would include replacing the low-level drawdown pipe, installing a headwall on the outlet pipe, and grading, armoring, and fencing the embankment.

The Federal Decommissioning Alternative included full removal of the dam embankment, low-level drawdown pipe, concrete riser, and concrete outlet pipe, removal of sediment and debris from the Jefferson Street culvert to restore conveyance capacity, grading of the downstream channel to improve conveyance capacity, and replacement of the existing First Street culvert.

Project costs by purpose and funding source: The project component breakdown of the estimated installation costs for the Preferred Alternative is summarized in Table S-1. NRCS design engineering, construction management, and NRCS-incurred administration costs are not cost-shared by the Sponsor. Any costs incurred for administration and permitting by the Sponsor would not be cost-shared by NRCS.

Table S-1. Estimated Installation Costs*

Project task	PL 83-566 funds	Other funds	Total
Construction	\$2,449,900	\$1,245,300	\$3,695,000
Engineering	\$591,200	\$0	\$591,200
Technical Assistance	\$0	\$0	\$0
Relocation	\$0	\$0	\$0
Real Property Rights	\$0	\$0	\$0
Project Administration/Permits	\$128,600	\$78,900	\$207,500
Total Costs	\$3,169,700	\$1,342,200	\$4,493,900
*Estimates are rounded to the nearest hundred; numbers may not sum correctly due to rounding.			

Project benefits: Project benefits are based on the average annual damages, average annual construction costs, and average annual operation and maintenance costs that would be avoided if project measures were constructed.

Number of direct beneficiaries: Direct beneficiaries consist of property owners and residents of four residential buildings, one apartment building, one hotel, and thirteen other non-residential buildings.

Beneficial effects: The Preferred Alternative would continue to provide reduced flood damage risk, resulting in beneficial impacts to public health and safety. It would also benefit water quality by continuing to capture approximately 0.21 acre-feet of sediment annually.

Net economic benefits: The estimated annual net economic benefit for the Preferred Alternative is summarized in Table S-2.

Table S-2. Estimated Annual Net Economic Benefits

Average Annual Benefit	Average Annual Cost	Annual Net Economic Benefits	Benefit/Cost Ratio
\$136,900	\$124,300	\$12,600	1.1

Notes: 2021 price level, 2023 base year, amortized using a 2.5 percent discount rate over a 102-year period of analysis.

Funding schedule: The estimated funding schedule for the Preferred Alternative is summarized in Table S-3.

Table S-3. Estimated Funding Schedule

Budget Year	PL-566 federal funds	Other (non-federal) funds	Total
2023-2024	\$655,500	\$5,000	\$660,500
2024-2025	\$2,514,200	\$1,319,200	\$3,833,400

Period of analysis: The Preferred Alternative was analyzed for a period of 102 years, and includes the implementation period.

Project life: The Preferred Alternative is anticipated to have a life span of 100 years.

Environmental impacts: Table S-3 lists the resources of concern and impacts associated with the Preferred Alternative. Resources that would not be impacted by the project are not listed in this table.

Table S-3. Summary of Resource Concerns and Impacts

Resource of Concern	Summary of Concern	Effects Summary for Preferred Alternative
Air quality	Emissions from construction activities	Construction activities are not expected to violate air quality standards based on the implementation of best management practices and the short and temporary duration of construction.
Cultural resources	Potential adverse impacts to NRHP-eligible sites	No historic properties would be affected.
Endangered and threatened species	Potential impacts to listed species or critical habitat	No effect to listed species or critical habitat.
Environmental justice and civil rights	Disproportionate impacts on minority or low-income populations	No disproportionate impacts to minority or low-income populations.
Fish and wildlife (including migratory birds)	Impacts to fish and wildlife species and habitat	No adverse impacts to populations of any species of concern. Species of concern include migratory birds, Colorado-listed threatened and endangered species, Colorado “special concern” species, and Colorado species of greatest conservation need as identified in the State Wildlife Action Plan. Disturbance to individuals of any species considered would be temporary. Habitat effectiveness for any species would not be affected permanently.

Resource of Concern	Summary of Concern	Effects Summary for Preferred Alternative
Floodplain management	Changes to floodplain function	No change in floodplain management or function.
Invasive species	Increased potential for spreading of invasive species	Disturbed areas are at increased risk of invasive weed establishment. Design features would reduce the risk of spread of invasive weed species.
Land use	Potential changes in land use	No impact to land use.
Prime and unique farmlands	Potential impacts to designated farmlands	No impact to designated farmlands.
Public health and safety	Risks to public health and safety from flooding	Benefits to public health and safety by reducing the risk of dam breach flooding.
Riparian areas	Impacts to riparian areas	Temporary loss of riparian vegetation along 1,000 feet of outlet channel.
Socioeconomic factors	Impacts to socioeconomic factors	No impact to socioeconomic factors.
Soil resources	Impacts to soils	Temporary disturbance of up to 11.6 acres; reclamation measures would stabilize soils long term.
Water quality	Impacts to water quality	Temporary increase in turbidity due to disturbance of up to 11.6 acres; capture of approximately 0.21 acre-feet of sediment annually; reclamation measures would stabilize soils and protect water quality long term.
Waters of the U.S.	Impacts to jurisdictional waters	Permanent installation of 250 feet of gabion basket bank stabilization.
Wetlands	Impacts to wetlands	Permanent loss of less than 0.1 acre of wetlands.

Major conclusions: The Full Dam Rehabilitation Alternative meets the purpose and need, is the locally preferred alternative, and best addresses the PR&G guiding principles and ecosystem services. This alternative is the Preferred Alternative.

Areas of controversy: There are no known areas of controversy for the implementation of the Preferred Alternative.

Issues to be resolved: The following issues would be resolved for the implementation of the Preferred Alternative:

- Acquisition of necessary federal, state, local, and utility encroachment permits
- Agency approval for dam design
- Sponsor's responsibility to develop and update Emergency Action Plan (EAP)

Evidence of unusual Congressional or local interest: There is no evidence of unusual congressional or local interest.

Compliance: Is this report in compliance with executive orders, public laws, and other statutes governing the formulation of water resource projects? X YES __NO

Chapter 1. Purpose and Need for Action

1.1 Changes Requiring Preparation of a Supplement

The Fishers Peak-Carbon Arroyos Watershed Work Plan was originally developed by the Soil Conservation Service (SCS, now Natural Resources Conservation Service [NRCS]) in 1960. FPC-2 is an earthen embankment dam that was designed and built in 1962 under the 1960 Plan to provide flood protection for properties downstream of the dam. FPC-2 is currently owned, operated, and maintained by the City of Trinidad Department of Public Works. An assessment in 2015 identified a number of deficiencies and determined that the dam was not in compliance with current NRCS and Colorado Dam Safety standards.

Since the completion of the 2015 study, there have been changes to the NRCS and Colorado Dam Safety criteria, including an updated version of the NRCS's Technical Release 210-60 (TR-60) and the completion of the CO-NM Regional Extreme Precipitation Study (REPS). The new REPS considered climate change; therefore, the proposed improvements that were designed using the study are considered more climate resilient. Based on these changes, the NRCS re-evaluated the adequacy of the existing dam and spillway capacity as part of this planning effort.

The U.S. Department of Agriculture NRCS, with the City of Trinidad as the sponsoring local organization (Sponsor), has initiated a Supplemental Watershed Plan and Environmental Assessment (Plan-EA) to evaluate environmental impacts associated with rehabilitation of the FPC-2 dam within the Hydrologic Unit Code (HUC) 8 watershed (Purgatoire; 11020010). The NRCS is the lead federal agency for this Supplemental Plan-EA and there are no cooperating agencies.

The Watershed Plan and Environmental Assessment for this project are combined into a single document. This Environmental Assessment was prepared under the authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566 (PL-566), as amended by Section 313 of Public Law 106-472, the Small Watershed Rehabilitation Amendments of 2000, and in accordance with Section 102(2)(c) of the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 USC 4321 et seq.).

This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and in compliance with all applicable regulations and laws passed subsequently, including the Council on Environmental Quality's (CEQ) regulations outlined in 40 CFR parts 1500 -1508, the NRCS procedures for implementing NEPA found at 7 CFR Part 650, NRCS General Manual Part 410, and the NRCS National Environment Compliance Handbook. As this is also a Supplemental Watershed Plan, the Supplemental Watershed Plan-Environmental Assessment (Plan-EA) will be developed in accordance with the NRCS National Watershed Program Manual (NWPM-390-500-M, 4th Ed., Apr 2014, as amended January 2015) and Guidance for Conducting Analyses Under the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies and Federal Water Resource Investments (PR&G; USDA 2017). Relevant PR&G analysis is addressed throughout the document.

The format of this Supplemental Plan-EA follows the plan format as outlined in the NRCS National Watershed Program Manual (NRCS 2015) Parts 501 through 505 and NRCS National Watershed Program Handbook (NRCS 2014) Parts 600 through 606.

The NRCS must decide if the selected alternative would or would not constitute a major federal action significantly affecting the quality of the human environment. If the NRCS State Conservationist (responsible federal official) determines that the selected alternative would not significantly affect the quality of the environment, then the NRCS State Conservationist will prepare and sign a Finding of No Significant Impact (FONSI), and the project may proceed. If the NRCS State Conservationist determines that the selected alternative would significantly affect the quality of the environment, then an EIS and a Record of Decision (ROD) would be prepared and signed before the project could proceed.

1.2 Purpose and Need for the Proposed Action

The Fisher Peak Carbon Arroyo Watershed Dam (FPC-2) currently provides flood protection for the City of Trinidad. Based on recent assessments, the dam has a number of deficiencies and no longer meets federal or state standards. The need is to bring the dam and spillway facilities into compliance with current standards. The purpose of the project is dam rehabilitation to provide flood protection downstream of FPC-2.

1.2.1 Background

According to the 1960 Plan, the impacts from flooding in Carbon Arroyo included streambank erosion, damage to bridge abutments, damage to exposed water mains across Carbon Arroyo at Second Street and Main Street, damage to business establishments on Main Street, and damage to the Colorado and Southern Railway Bridge between Main Street and the Purgatoire River. Initially, consideration was given to enlarging the channel capacities through Trinidad, including the closed conduits at First Street, in combination with floodwater-retarding structures. However, due to the extremely high cost for the channel and closed conduit improvements, the most economical project was the installation of floodwater-retarding structures. On Carbon Arroyo, for the proposed improvements, “the one percent chance flood of 1,150 cfs was reduced to 700 cfs, which is within the existing channel capacity” (SCS 1960). Additionally, land treatment measures were to be implemented throughout the watershed and sediment production would be reduced by an estimated 10 percent.

Recent assessments indicate that the dam has a number of deficiencies, including damage and corrosion to the toe and foundation drains, excessive observed seepage through and around the toe and foundation drains, an outdated seepage system (i.e., seepage collars), erosional features on the dam embankment and auxiliary spillway, degraded condition of auxiliary spillway cross section and flow line, damage to the low-level drawdown pipe, and excessive sediment build up at the inlet and outlet as well as within the conduit of the low-level drawdown/principal spillway. Due to the noted deficiencies, there is an increased risk of dam failure. Additional details about the existing conditions and deficiencies are provided in *TM001 – Existing Conditions Assessment*, *TM002 – Preliminary Field Investigation and Geotechnical Analyses*, *TM003 – Existing Hydrology Analysis*, and *TM004 – Spillway Stability and Integrity Analysis* in Appendix E.

1.3 PR&G Analysis

The purpose of the PR&G analysis is to ensure that alternatives contribute to the Federal Objective and Guiding Principles. The Federal Objectives “specifies that federal water resource investments shall reflect national priorities, encourage economic development, and protect the environment;” the Guiding Principles are Healthy and Resilient Ecosystems, Sustainable Economic Development, Floodplains, Public Safety, Environmental Justice, and Watershed Approach (USDA 2017).

The boundaries of the PR&G study area were determined to be the HUC 12 subwatershed that contains FPC-2; this area is large enough to identify cause and effect relationships among affected resources both upstream and downstream of the dam, particularly the downstream floodplain. Stakeholders were identified through the scoping process for this Plan-EA.

Chapter 2. Scope of the EA

The scope is the range of actions, alternatives, and impacts to be considered in this Supplemental Plan-EA.

2.1 Scoping

An initial scoping process was used to determine the relevant issues to be analyzed in detail, and to eliminate from detailed study the issues that are not relevant. Scoping efforts included public meetings, written requests for input from state, local, and federal agencies, and coordination with potential cooperating agencies.

2.2 Issues

Based on the results of the initial scoping process, issues relevant in defining the problems and formulating and evaluating alternative solutions were identified for further assessment in this EA. Table 2-1 indicates which resources of concern are present in the watershed and relevant to the Proposed Action, and are further analyzed in this document. Resources that are not present or not relevant are eliminated from further analysis.

Table 2-1. Summary of Resource Concerns and Issues Considered

Resource	Relevant to the Project? Yes/No	Rationale
Air quality	Yes	Air pollutant emissions are likely to result from construction activities.
Coastal zone management areas	No	Coastal zone management areas do not occur in Colorado, which is an inland state.
Coral reefs	No	Coral reefs do not occur in Colorado, which is an inland state.
Cultural resources	Yes	Project activities could impact archaeological and historic resources in the watershed.
Ecologically critical areas	No	Ecologically critical areas are not known to occur in the watershed.
Endangered and threatened species	Yes	An official species list was acquired from the USFWS IPaC System on September 13, 2021 (see Appendix E.1); endangered and threatened species may occur within the watershed.
Environmental justice and civil rights	Yes	Within the census blocks that overlap the watershed area, up to 27 percent of the population is below the poverty level and up to 68 percent is classified as a minority (EPA 2021a).
Essential fish habitat	No	Essential fish habitat does not occur in Colorado.
Fish and wildlife	Yes	State species of concern, including state-listed endangered and threatened species and State Wildlife Action Plan Tier 1 and 2 species, occur within the watershed (see Appendix E.2).

Resource	Relevant to the Project? Yes/No	Rationale
Floodplain management	Yes	Federal Emergency Management Agency (FEMA)-designated floodplains and functional floodplains occur throughout the watershed; floodplain management could be affected by flood control measures.
Forest resources	No	Forest resources such as timber occur in the higher elevations of the watershed area, but would not be impacted by flood control or dam rehabilitation actions.
Invasive species	Yes	Invasive species are known to occur in the watershed area, and could be spread by project activities.
Land use	Yes	Project activities could impact land uses within the watershed.
Migratory birds	Yes	Migratory birds are likely to occur within the watershed. The group will be addressed with "Wildlife."
Natural areas	No	Natural areas likely occur within the watershed, but would not be impacted by flood control or dam rehabilitation actions.
Parklands	No	Portions of Trinidad Lake State Park occur within the watershed; however, no state, county, or national park lands would be affected by the project.
Prime and unique farmland, and farmland of statewide significance	Yes	Units that are mapped as possible prime farmland occur throughout the lower elevations of the watershed.
Public health and safety	Yes	The purpose of the project is to protect public health and safety.
Recreation	No	The existing dam and appurtenances are not used for recreation.
Regional water resource plans	No	No relevant plans have been identified to date.
Riparian areas	Yes	Riparian areas occur in association with the channels in and out of the dam.
Scenic beauty	No	The existing facility does not have high scenic value.
Scientific resources	No	No scientific resources are known to occur within or near the watershed area.
Socioeconomic factors	Yes	Flood damage may affect socioeconomic factors.
Soil resources	Yes	Soil disturbance would occur as a result of the project.
Sole source aquifers	No	Sole source aquifers do not occur within the watershed area.

Resource	Relevant to the Project? Yes/No	Rationale
Water quality	Yes	Soil disturbance as a result of project activities could affect water quality.
Waters of the United States, including special aquatic sites	Yes	The channel in and out of the dam may be a jurisdictional water of the U.S.
Wetlands	Yes	Wetlands may occur in association with the channel.
Wild and scenic rivers	No	Wild and scenic rivers do not occur in Las Animas County (National Wild and Scenic Rivers System 2022). Nationwide Rivers Inventory (NRI) segments do not occur within 24 miles of the watershed area (NPS 2022).

Resources which could potentially be impacted to a level requiring further analysis are described in Chapter 3 and impacts on these resources are analyzed in Chapter 5.

2.2.1 PR&G Analysis

Ecosystem services that are likely to meaningfully change as a result of the project are:

- Floodplain management
- Water quality

Chapter 3. Affected Environment

3.1 Introduction and Project Setting

The “Affected Environment” section describes the current physical, biological, ecological, economic, and social environment for the watershed area. This provides the context for determining the effects of alternatives.

The analysis area is within the Raton Basin of the Great Plains physiographic province. More specifically, the watershed area is located within the Purgatoire River basin in southern Colorado. The elevation ranges between 5,900 feet above sea level in the valley bottom and 9,400 feet in the mountains.

3.2 Status of the Existing Dam

Additional detail regarding the existing condition of the dam and operations can be found in Appendix D.

3.2.1 Operation and Maintenance

Based on the observations from the November 2020 site inspection, the overall conditions at FPC-2 were noted as satisfactory. Regular maintenance appears to have been performed at the dam. The most important maintenance concerns were sediment buildup at the upstream end of the principal spillway conduit, sediment buildup within the principal spillway conduit downstream of the concrete riser, the condition of the upstream portion of the principal spillway conduit, and accumulation of debris at the downstream end of the principal spillway conduit that blocks the exit of the dam drains.

3.2.2 Sedimentation Rates

In the 1960 Plan (SCS 1960), the sedimentation rate was estimated to be 1.18 acre-feet annually per square mile of drainage area, which equates to 1.1 inches over the 0.34 square miles of the watershed area as delineated in the Plan, or approximately 20 acre-feet of sediment storage capacity for 50 years. The original stage-storage curve is shown on the as-built drawings. 2018 LiDAR data was used to develop the current stage storage-curve. The difference in available storage between the two curves is assumed to represent the volume of sediment accumulated up to the time of the 2018 survey.

Approximately 11.98 acre-feet of sediment had accumulated up to the auxiliary spillway crest between 1962 and 2018 (56 years). This equates to an average annual rate of sediment deposition of 0.21 acre-feet per year. Only 55% of this sediment accumulated in the planned sediment storage pool (below the principal spillway crest). This rate does not account for any sediment that may have been removed by previous maintenance.

Community officials anticipate minimal future development in the watershed; therefore, the future sediment accumulation rate is assumed to be similar to the historic rate. The remaining sediment capacity up to the principal spillway crest is 13.84 acre-feet. Using a sediment deposition rate of 0.21 acre-feet per year, the remaining sediment storage life is approximately 65 years assuming 100% of sediment is deposited below the PS crest, and up to 120 years if the sediment is distributed over the entire reservoir pool in the same pattern as it has been in the past.

3.2.3 Breach Analysis

The Froehlich method was chosen for the dam breach analysis based on its reasonable parameters and its additional ability to analyze a piping failure mode, which would be typical for a sunny-day failure. The U.S. Army Corps of Engineers (USACE) Hydrologic Modeling System (HEC-HMS version 4.7.1) was used to develop the breach hydrograph. The chosen piping coefficient was 0.7, and the piping elevation

was chosen as the average of the breach bottom elevation and the water surface elevation, per Colorado Dam Safety's recommendations. The peak breach flow was determined to be approximately 16,360 cubic feet per second (cfs).

3.2.4 Hazard Classification

FPC-2 is currently classified as a High Hazard dam per NRCS and Colorado Dam Safety criteria. The results of the dam breach analysis agree with the current hazard classification for both agencies' criteria.

3.2.5 Potential Modes of Dam Failure

No fatal flaws were identified during pre-project assessments; however, persistent issues with sediment, seepage/drainage, and damage to the principal spillway conduit were noted. A discussion on potential failure modes is presented below.

Geotechnical analyses were performed to establish the seismic response spectrum and to evaluate the seismic response during loading (i.e., liquefaction), seepage, and slope stability of the existing embankment dam based on historical documentation. Hydrologic analyses were performed to assess the capacity of the principal and auxiliary spillways. Additional information can be found in Appendix D.

Seismic

Seismicity was established using the 975-year return period, which resulted in a PGA of 0.062g. FPC-2 is a flood control structure and the methods and mechanisms of cyclic and infrequent hydraulic loading during flood events are not anticipated to result in development of high excess pore water pressures nor development of large shear strains during undrained loading. Risk is relatively low during seismic events meaning a strength loss of the embankment dam materials following a seismic event is unlikely.

Seepage

Seepage analysis was performed to evaluate the progression of material saturation under a variable flood loading duration using a transient approach to quantify the general behavior of the structures during flood loading, including incorporation of a phreatic surface through the embankment dam and the pore water pressure distribution within these materials for use in slope stability analysis.

The estimated maximum saturation of the upstream slope materials of FPC-2 during (and following) the IDF occurs about 2.2 hours after the start of the IDF and progresses about 6.5 feet into the upstream slope. Therefore, the likelihood of a steady-state phreatic surface developing at FPC-2 is low.

Previous site inspections noted that the foundation drainpipes were partially clogged. The existing principal spillway conduit and seepage collection systems do not retain a filter diaphragm, as concrete anti-seep collars were constructed surrounding the conduit.

Stability

Slope stability evaluations at maximum cross section for FPC-2 were completed to meet Colorado Dam Safety and NRCS guidelines. The model evaluated the maximum embankment cross section as presented from the 1963 redline record drawings under the following loading conditions: (1) steady-state, (2) end-of-construction, (3) flood loading, (4) rapid-drawdown, and (5) pseudo-static.

The 2D limit-equilibrium computer program UTEXAS4 using Spencer's method of slices was used to identify critical shear failure surfaces. The factor of safety results exceeded all minimum guidelines for all loading conditions evaluated.

Subsurface investigations and geologic reconnaissance mapping conducted in 2020 do not indicate that the geologic conditions encountered would present a fatal flaw from a preliminary alternatives assessment

level with regards to rehabilitating the existing auxiliary spillway alignment. Geotechnical analyses performed on the existing embankment dam also do not indicate that the dam exhibits any structural or hydraulic deficiencies other than the observed erosional features and slump area proximate to the downstream toe.

Material Deterioration

The corrugated metal pipes on the toe/foundation drains are damaged and corroded, with rocks and other blockages preventing inspection of the entire length of pipe and causing water to flow out around the drainpipes. The low-level outlet pipe is in poor condition and has a defect or deflection approximately 28 feet from the upstream end. The concrete conduit and principal spillway riser are in good condition. There is some damage and spalling on the downstream end of the concrete conduit.

Hydrologic

A hydrologic analysis showed that FPC-2 meets all NRCS hydrologic criteria for a High Hazard dam. NRCS criterion requires the primary spillway route the Principal Spillway Hydrograph (PSH) without activating the auxiliary spillway and drain 85 percent of the flood retarding pool storage within 10 days.

The NRCS Freeboard Hydrograph (FBH) and Stability Design Hydrograph (SDH) storms were routed through the reservoir to determine the critical events. The 24-hour storm was the most critical event for both the FBH and SDH. The NRCS criterion requires the reservoir to route the FBH without overtopping the dam and route the SDH with sufficient freeboard. The FBH is the most restrictive design criteria for the auxiliary spillway size. The existing reservoir routes the IDF with 1.97 feet of freeboard.

Per Colorado Dam Safety criteria, the worst-case scenario is the 2-hour Local Storm AEP 10^{-7} with a peak inflow of 1750.0 cfs and a peak outflow of 1273.7 cfs. It should be noted that for all 26 design storms, the dam does not overtop and there appears to be residual freeboard.

Results of the stability analysis indicate the auxiliary spillway is stable during the 6-hour SDH. The TR-60 integrity criteria dictate that the auxiliary spillway should not breach during the SITES evaluation of the 6-hour and 24-hour FBH, and results of both runs indicates the current auxiliary spillway satisfies these criteria. The results of the stability and integrity analysis indicate that the soil overburden would erode both the 6-hour and 24-hour events; however, the underlying shale layer would remain intact.

Sedimentation

Sediment is accumulating in the reservoir as expected; however, the low-level drawdown pipe inlet is typically clogged, and the design does not prevent the introduction of sediment into the principal spillway conduit, which could negatively affect the capacity of the principal spillway. Clogging of the principal spillway conduit with sediment could result in the unnecessary activation of the auxiliary spillway. Additionally, there is deposition of sediment at the conduit outlet that prevents the effective discharge of water from the principal spillway and seepage from the toe/foundation drains.

3.2.6 Consequences of Dam Failure

In general, dam breach flows would be conveyed to the north and would inundate several roads and structures. The breach flows would converge with the Purgatoire River approximately 0.7 miles downstream from the dam and would then be contained within the natural floodplain; based on the modeling results, no infrastructure would be affected beyond the river. A total of 13 commercial buildings, 6 residential buildings, and 7 roadways within a commercial area in downtown Trinidad would be inundated. The total estimated population at risk is 767 people, with an estimated loss of life of up to 15 persons. Several structures within the dam breach inundation area meet the Colorado Dam Safety criteria for potential loss of life greater than 1 due to the velocity and depths of floodwater in those

locations. The likelihood of dam failure is remote per Colorado Dam Safety standards. The loss of the dam would result in sediment being transported to the Purgatoire River and affecting water quality. The damage to homes and businesses would result in economic impacts due to the loss in revenue and needed funds to repair damages.

3.3 Air Quality

The Environmental Protection Agency (EPA) designates areas in the U.S. for “attainment” or “non-attainment” of National Ambient Air Quality Standards (NAAQS). The criteria pollutants include nitrogen oxides, sulfur oxides, particulate matter, ozone, carbon monoxide, and lead. According to the EPA’s AirData Air Quality Monitors app (EPA 2021b), the watershed area is located outside of any NAAQS nonattainment area designated by the EPA; or in other words, Las Animas County is in attainment for air quality standards.

3.4 Cultural Resources

Cultural resources are defined as physical or other expressions of human activity or occupation that are over 50 years in age. Such resources include culturally significant landscapes, prehistoric and historic archaeological sites, isolated artifacts or features, traditional cultural properties, Native American and other sacred places, and artifacts and documents of cultural and historic significance.

Section 106 of the NHPA of 1966, as amended, mandates that federal agencies consider the potential effects of a proposed federal undertaking on historic properties. Historic properties are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for, inclusion in the National Register of Historic Places (NRHP).

Approximately 34.3 acres within the area of concern were identified as the study area for cultural resources. A cultural resource inventory was conducted for the project on October 29, 2021, by AECOM. A total of four historic sites were identified. In accordance with 36 CFR Section 800.4, the identified sites were evaluated for significance in terms of NRHP eligibility. The results are listed in Table 3-1.

Table 3-1. Summary of historic sites identified in association with FPC-2

Site Name	Site Number	NRHP Eligibility Recommendation	Landownership
FPC-2 dam and appurtenances (1962)	5LA.14391	Not Eligible	Private
Bridge over Carbon Arroyo (1960)	5LA.14392	Not Eligible	Private
Stone arch bridge over Carbon Arroyo (1920-1930)	5LA.14393	Not Eligible	Private
Storm drain for Carbon Arroyo	5LA.14403	Not Eligible	Private

3.5 Endangered and Threatened Species

Based on the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) System (accessed September 13, 2021), the following species federally listed as threatened or endangered under the Endangered Species Act could occur within or near the watershed area:

- Canada lynx (*Lynx canadensis*) – Threatened: The nearest critical habitat is over 450 miles away from the watershed area. Suitable remote forest habitat (Interagency Lynx Biology Team 2013) may occur at high elevations within the watershed, but does not occur within 1 mile of the existing dam.
- New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) – Endangered: The nearest critical habitat is over 280 miles away from the watershed area. Dense riparian herbaceous

vegetation (USFWS 2020a) that could provide habitat for the mouse may occur within the defined watershed boundary, likely in the riparian area associated with the Purgatoire River, which is 0.7 miles downstream of the dam. The channel through the dam is disconnected from the Purgatoire River as the last 800 feet of the channel flows through a culvert underneath developed urban properties. Due to its small drainage area, the channel flow regime immediately upstream and downstream of the dam is ephemeral. On-site observation confirmed that riparian mouse habitat does not occur in the immediate vicinity of the dam.

- Mexican spotted owl (*Strix occidentalis lucida*) – Threatened: The nearest critical habitat is over 49 miles away from the project area. Suitable rocky canyon nesting habitat does not occur within the watershed. Mature forest stands that could provide nesting habitat (USFWS 2012) may occur at high elevations within the watershed, but do not occur within 1 mile of the existing dam.
- Monarch butterfly (*Danaus plexippus*) – Candidate: Monarchs require milkweed, nectar sources, overwintering habitat, and migration habitat (USFWS 2020b); the watershed may provide milkweed and nectar sources, but overwintering occurs along the Pacific Coast. Abundant nectar sources are available on and around the existing dam.

There are no critical habitats within the watershed.

3.6 Environmental Justice and Civil Rights

The “people of color population” in the analysis area is estimated to be 53 percent, with 47 percent identifying as Hispanic. Approximately 86 percent of the population identifies as White, and 86 percent speak only English (EPA 2021a). Within the census block that contains the dam, 72 percent of the population speaks only English, there are no persons who do not speak English, the “people of color population” is approximately 64 percent, and 53 percent identify as Hispanic. Up to 27 percent of the population in the census block is below the poverty level (EPA 2022).

3.7 Fish and Wildlife

Fish and wildlife species (including migratory birds) and habitats are managed on multiple federal and state levels. Species of concern that may occur in the watershed area were identified from the Colorado Parks and Wildlife threatened and endangered species list (CPW 2021a), the Colorado Parks and Wildlife species profiles (CPW 2021b), the Colorado Parks and Wildlife species maps (CPW 2021c), the Colorado Natural Heritage Program (2021), and the USFWS IPaC report (see Appendix E.1). Species of greatest conservation need are identified in the State Wildlife Action Plan (SWAP), and are grouped into Tiers 1 and 2 based on conservation priority. The species list and rationale for consideration in this document is provided in Appendix E.2.

Habitats in the area are predominantly pinyon-juniper woodland, with a very narrow strip of riparian habitat along the channel in and out of the dam. The species to be carried forward for further analysis based on likely presence in the area are:

- Bald eagle (*Haliaeetus leucocephalus*)
- Big brown bat (*Eptesicus fuscus*)
- Big free-tailed bat (*Tadarida brasiliensis*)
- Black bear (*Ursus americanus*)
- Botta's pocket gopher (*Thomomys bottae cultellus*)
- Brazilian free-tailed bat (*Tadarida brasiliensis*)
- Bullsnake (*Pituophis catenifer sayi*)
- Cassin's finch (*Carpodacus cassinii*)

- Coachwhip (*Masticophis flagellum*)
- Common lesser earless lizard (*Holbrookia maculata*)
- Dwarf shrew (*Sorex nanus*)
- Eastern collared lizard (*Crotaphytus collaris*)
- Evening grosbeak (*Coccothraustes vespertinus*)
- Ferruginous hawk (*Buteo regalis*)
- Fringed myotis (*Myotis thysanodes*)
- Green toad (*Anaxyrus debilis*)
- Hernandez's short-horned lizard (*Phrynosoma hernandesi*)
- Hoary bat (*Lasiurus cinereus*)
- Lewis's woodpecker (*Melanerpes lewis*)
- Little brown myotis (*Myotis lucifugus*)
- Long-eared myotis (*Myotis evotis*)
- Long-legged myotis (*Myotis volans*)
- Milksnake (*Lampropeltis triangulum*)
- Mountain lion (*Puma concolor*)
- Mule deer (*Odocoileus hemionus*)
- North American racer (*Coluber constrictor*)
- Osprey (*Pandion haliaetus*)
- Peregrine falcon (*Falco peregrinus anatum*)
- Pinyon jay (*Gymnorhinus cyanocephalus*)
- Plains hog-nosed snake (*Heterodon nasicus*)
- Prairie lizard (*Sceloporus consobrinus*) and plateau fence lizard (*Sceloporus tristichus*)
- Prairie rattlesnake (*Crotalus viridis*) and western rattlesnake (*Crotalus atrox*)
- Red bat (*Lasiurus borealis*)
- Ring-necked snake (*Diadophis punctatus*)
- Rocky Mountain elk (*Cervus elaphus nelsoni*)
- Silver-haired bat (*Lasionycteris noctivagans*)
- Six-lined racerunner (*Aspidoscelis sexlineata*)
- Smooth greensnake (*Opheodrys vernalis*)
- Southern red-backed vole (*Myodes gapperi*)
- Garter snake (*Thamnophis elegans*)
- Townsend's big-eared bat (*Corynorhinus townsendii*)
- Variable skink/many-lined skink (*Plestiodon multivirgatus*)
- Western small-footed myotis (*Myotis ciliolabrum*)
- White-tailed deer (*Odocoileus virginianus*)
- Wild turkey (*Meleagris gallopavo merriami*)

3.8 Floodplain Management

The Federal Emergency Management Agency (FEMA) has designated floodplains within the watershed, mainly in association with the Purgatoire River. The floodplain is designated as Zone AE with a regulatory floodway as shown on FIRM Panel 08071C1767C with an effective date of August 28, 2019

(see Map C-1 in Appendix C). There are no mapped floodplains associated with the channels into or out of the dam.

3.9 Invasive Species

Invasive species including Siberian elm (*Ulmus pumila*), sunflower (*Helianthus spp.*), kochia (*Kochia scoparia*), and bindweed (*Convolvulus arvensis*) were abundant on and around the dam site in July of 2021. Other invasive species may occur within the watershed but are not prevalent.

3.10 Land Use

Landownership within the watershed includes private land, public lands administered by the Bureau of Land Management (BLM), and various state designations. The area of each landownership type is summarized in Table 3-2.

Table 3-2. Landownership within the watershed area

Landownership	Area (acres)	Percentage
Private	27,048	91.9%
State	1,329	4.5%
Bureau of Land Management (BLM)	1,010	3.4%
State Park (Trinidad Lake)	28	0.1%
State Wildlife Area (James M. John)	1	0.0%
Total	29,416	100.0%

Land uses include undeveloped open range and mining at the higher elevations, while the valley bottom is developed for residential, municipal, industrial, and agricultural uses.

3.11 Prime and Unique Farmlands

Approximately 3,949 acres within the watershed area are designated as “prime farmland if irrigated.” There are no classified farmlands or irrigated lands in the immediate vicinity of the dam.

3.12 Public Health and Safety

The dam is currently classified as high hazard per Colorado Dam Safety and NRCS. The noted deficiencies increase the risk of dam breach; a breach analysis indicates that several structures could be impacted by breach flooding (see Map C-2 in Appendix C). Approximately 19 buildings, consisting of 4 residential buildings, 1 apartment building, 1 hotel, and 13 other non-residential buildings, have the potential to be inundated by breach flooding.

3.13 Riparian Areas

Riparian areas occur in association with the Purgatoire River and its tributaries, including the channel that conveys flows to and from the dam. The dam does not appear to create additional riparian areas upstream due to inundation.

3.14 Socioeconomic Factors

Socioeconomic factors such as education, employment, income, crime rate, and health could be affected by disasters such as flooding within a community. Comparable relevant data for the watershed area, Las Animas County, and the State of Colorado are provided in Table 3-3.

Table 3-3. Demographic and socioeconomic factor data for Watershed Area, Las Animas County, and Colorado

Factor	Watershed Area ¹	Las Animas County	Colorado
Total Population Estimate ^{1,2}	8,831	14,506	5,758,736
Percent Female ^{1,2}	48%	47.8%	49.6%
Race – percent white alone ^{1,2}	86%	90.0%	86.9%
Race – percent Black or African American alone ^{1,2}	1%	2.2%	4.6%
Race – percent American Indian alone ^{1,2}	4%	3.8%	1.6%
Race – percent Asian alone ^{1,2}	1%	1.3%	3.5%
Race – percent Pacific Islander alone ^{1,2}	0%	0.1%	0.2%
Race – percent two or more races ^{1,2}	5%	2.5%	3.1%
Race – percent Hispanic ^{1,2}	47%	40.4%	21.8%
Race – percent white alone, not Hispanic or Latino ^{1,2}	47%	54.0%	67.7%
Race – percent minority ^{1,2}	53%	46.0%	32.3%
Owner-occupied housing unit rate – percent ^{1,2}	62%	67.4%	65.2%
Persons per household ^{1,2}	Not Available	2.01	2.56
Highschool graduate – percent ^{1,2}	87%	87.9%	91.7%
Unemployment – percent ³	5%	3.9%	2.8%
Life expectancy – years ³	Not Available	75.8	80.6
Violent crime rate – per 100,000 ³	Not Available	147	326
Per capita income ^{1,2}	\$27,792	\$25,813	\$38,226

¹ EPA 2021a

² U.S. Census Bureau 2021b

³ County Health Rankings 2021

3.15 Soil Resources

The watershed area is located within the rugged foothills of the Rocky Mountains. Fisher Peak is a point that projects off of the Raton Mesa, which is formed by a layer of Pierre shale overlain by Trinidad sandstone and a thick layer of basalt (USGS 1915). Soils are predominantly of the Lorencito-Rombo-Sarcillo-Trujillo complexes; these soils are typically less than 16 inches deep before reaching bedrock, and are well-drained and of high runoff class (NRCS 2021).

3.16 Water Quality

The Purgatoire River is the downstream waterbody in the watershed. Based on an assessment in 2020, the Purgatoire River is in good condition and has “no probable sources of impairment” (EPA 2021c). The Colorado Department of Public Health & Environment (CDPHE) has categorized the segment of the river downstream of the dam as on the Monitoring and Evaluation List, which indicates that “there may be an impairment, but there is not enough data to put it on the 303(d) list.” Potential impairments to be analyzed

are sediment and *E. coli* (CDPHE 2022). The dam currently captures approximately 0.21 acre-feet of sediment per year.

3.17 Waters of the U.S.

Waters of the U.S. in the watershed area include the Purgatoire River and its tributaries. The existing dam is on an ephemeral channel that is an unnamed tributary of the Purgatoire River and is likely a water of the U.S. A jurisdictional determination has not been requested as of publication of this document.

3.18 Wetlands

Wetlands may occur in association with the Purgatoire River and its tributaries, including the ephemeral channel below the dam. Based on a site visit in July of 2021, approximately 100 square feet of fringe intermittent riverine wetlands may occur along the margins of the channel below the dam. A jurisdictional determination has not been requested as of publication of this document.

Chapter 4. Alternatives

This section describes the range of alternatives to be addressed in the environmental analysis. A range of alternatives were considered and objectively evaluated. Alternatives that were determined to be infeasible or did not meet the purpose and need were eliminated from further analysis. The No Action Alternative is considered and analyzed to provide a baseline for comparison of the impacts of the proposed alternatives.

4.1 Formulation Process

The formulation process is the basis for selecting combinations of measures to include as alternatives.

The process for this project followed procedures outlined in the National Watershed Program Manual (NRCS 2015) Parts 500 through 506, and National Watershed Program Handbook (NRCS 2014) Parts 600 through 606, Guidance for Conducting Analyses Under the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies and Federal Water Resource Investments (USDA 2017), and other NRCS watershed planning policy.

No alternatives were identified in response to issues raised during project scoping. Four possible alternatives were developed by the project team based on the ability to address the purpose and need of the project, and were formulated in consideration of four criteria: completeness, effectiveness, efficiency, and acceptability. In accordance with NEPA (40 CFR 1502.14), one of these alternatives was eliminated from further analysis; the rationale is detailed below. The project team analyzed the Full Dam Rehabilitation Alternative, the Federal Decommissioning Alternative, and the No Action Alternative. Details about the development of alternatives are provided in *TM005 – Frequency Flood Routing*, *TM006 – Hazard Classification*, *TM007 – Hydraulic Design*, *TM008 – Economic Analysis*, *TM009 – Conceptual Drawings*, and *TM010 – Probable Costs* in Appendix E.

The purpose of the project is dam rehabilitation to provide flood protection downstream of FPC-2.

4.2 Alternatives considered but eliminated from detailed study

The following alternative was considered but eliminated from detailed study:

4.2.1 Non-structural Alternative

The Non-structural Alternative considered improvements that do not require rehabilitation of the existing structure. Due to the condition of the dam and the risk of a breach failure, this alternative consists of relocating approximately 19 buildings from the dam breach inundation area, and would also require modifying the zoning ordinances to prevent development in the dam breach inundation area. This alternative would provide the same level of protection as the existing dam; a dam breach would result in a flood inundation area exceeding the 100-year flood. The Non-structural Alternative would cost approximately \$6,558,000. Based on the high implementation cost and the social impacts associated with relocation, this alternative was determined to be inefficient and unacceptable and was eliminated from further study. The effects of climate change on the study area have been accounted for by the use of the updated REPS, which includes considerations for climate change in the precipitation depths and distributions.

4.3 Reasonable Alternatives Studied in Detail

4.3.1 No Action (Limited Rehabilitation)

The No Action Alternative would deny technical and financial assistance through the Watershed Protection and Flood Prevention Program for implementation of any part of the proposed project; there would be no federally funded project measures implemented.

The Sponsor's course of action would be to bring the dam into compliance with Colorado Dam Safety requirements, but not necessarily NRCS standards. In general, Colorado Dam Safety regulates existing dams based on observed (or latent) defects discovered during periodic inspection and file review processes. Based on the most recent inspections that occurred as a part of this project, there are deficiencies that Colorado Dam Safety has identified that should be addressed to allow for continued operation of the dam. The conditions after limited rehabilitation would not be adequate for the intended minimum 100-year design life of the rehabilitation, but would help extend the life until more significant rehabilitation measures could be undertaken. For example, the toe/foundation drainpipes are still functional, but due to the corrosion and damage observed, it is highly likely the pipes will fail in less than 50 years if no action is taken. All items not currently meeting state standards would be addressed; the measures to be completed would be:

1. Cleaning of the existing toe and foundation drains and performance monitoring.
2. Excavate and replace the low-level drawdown pipe.
3. Install a concrete headwall on the outlet pipe.
4. Grading and riprap armoring of erosion features on the embankment.
5. Installation of a 6-foot-tall chain-link fence around the embankment.

The No Action Alternative would disturb up to 3.3 acres (see Map C-3 in Appendix C). Approximately 0.21 acre-feet of sediment would continue to be captured behind the dam each year.

Maintenance for No Action Alternative

Maintenance would generally consist of the following items:

- The dam and appurtenances would be inspected annually and after critical events (e.g., severe rain, earthquakes, high-storage periods).
- A Periodic Engineer Inspection would be conducted every 5 years.
- Deep-rooted vegetation (trees and shrubs) would be removed from the embankment and abutments annually.
- Erosional channels would be repaired annually through grading, seeding, or riprap placement.
- Sediment would be removed from intake structures and conduit outlets as needed based on inspection.
- Seepage and drain lines would be monitored at least annually and after critical events.

4.3.2 Full Dam Rehabilitation Alternative

The Proposed Action defines the Watershed Plan area as the Powell Arroyo-Purgatoire River HUC 12 subwatershed (110200100601) within the Purgatoire watershed. The Watershed Plan area is shown on the project map in Appendix B. The Watershed Plan area is 29,416 acres.

The FPC-2 dam would be rehabilitated to provide flood prevention below the dam. The proposed measures are the minimum necessary for the alternative to meet the purpose and need and are integral to the proposal, as improvements to the downstream channel are critical for the dam outlet structure and drain system to function. The proposed measures would address deficiencies such as seepage,

sedimentation, and erosion to bring the dam into compliance with NRCS and Colorado Dam Safety standards for a 100-year design life; rehabilitation would consist of replacement of components of the outlet system, replacement of drain systems, upgrade of the auxiliary spillway, and upgrade of the outlet channel. Where required, only the embankment over the components would be excavated to allow for replacement of the system components (i.e., the entire dam embankment would not be excavated). Rehabilitation includes the following specific measures:

1. Outlet system component replacement: Excavate and replace the low-level drawdown pipe and install a new multi-level intake structure on the low-level drawdown pipe to prevent passage of sediment into the conduit.
2. Drain system replacement: The existing toe and foundation drain outlet pipes would be replaced. Seepage collars would be supplemented with a new seepage diaphragm and the reconstructed embankment at the contact with the left and right abutment areas on the upstream and downstream faces would be armored with riprap. A monitoring well would be installed at the dam crest and downstream toe to better observe seepage patterns in order to gauge whether there is a gradient along the dam and compare to the drainpipe discharges. Fencing would be installed around the dam to prevent vehicular access on the embankment.
3. Auxiliary spillway upgrades: The auxiliary spillway would be graded to restore a uniform bottom width of 45 feet and side slopes of 2.22:1 and to have positive drainage. Within the spillway, 6 inches of compost or soil amendment would be incorporated into the surface material to facilitate revegetation and reduce erosion long term. A water gap fence would be installed near the top of the spillway to prevent vehicular access.
4. Outlet channel upgrades: A concrete stilling basin and concrete headwall would be installed on the outlet pipe. Gabion baskets would be installed for approximately 250 feet along the west side of the channel from the outlet to stabilize the streambank and prevent erosion and accumulation of sediment. Approximately 1,000 feet of the outlet channel from outlet pipe to Jefferson Street would be graded to prevent sediment accumulation at the outlet and drainpipes.

The Action Alternative would disturb up to approximately 11.6 acres (see Map C-4 in Appendix C). Approximately 0.21 acre-feet of sediment would continue to be captured behind the dam each year.

Rehabilitating the structure would not modify the dam's high hazard potential classification, since the risk to property, residents, and infrastructure would not change downstream.

Project Design Features

Project design features are listed in Table 4-1. These features were developed to avoid or eliminate adverse impacts from project activities and are incorporated as an integrated part of the Proposed Action. Project design features are based upon best management practices (BMPs) and standard operating procedures that have been employed and proven effective in similar circumstances and conditions.

Table 4-1. Project Design Features

Resource Area	Project Design Feature
Air Quality 1	Soil within the project area will be sprayed with water or another approved dust suppressant/soil binder. The quantity of water used for dust control will be minimized to prevent water from leaving the site.
Air Quality 2	Procedures to reduce emissions during material transportation or handling may include wetting materials hauled in trucks, providing adequate freeboard (space from the top of the material to the top of the truck), or covering loads.
Air Quality 3	Stabilized construction exits will be established at appropriate locations to reduce soil track-out onto the adjacent roadway network. Procedures may include wheel washing or rattle plates to remove sediment prior to vehicle exit from the site.

Resource Area	Project Design Feature
Air Quality 4	If sediment is tracked off-site onto adjacent roadways, the sediment will be collected by sweeping, shoveling, or vacuuming, and disposed of in a stable location.
Air Quality 5	Material stockpiles will be wetted to prevent wind-blown emissions.
Air Quality 6	Vegetative cover will be established on bare ground as soon as possible after grading to reduce wind-blown dust.
Air Quality 7	Appropriate emission-control devices will be required on all construction equipment.
Air Quality 8	The use of cleaner burning fuels will be required.
Air Quality 9	Only properly operating, well-maintained construction equipment will be used.
Cultural 1	For post-review discoveries, the Unanticipated Discoveries procedures (see Appendix E) shall be followed. If any human remains are discovered under any circumstance, the Unanticipated Discoveries procedures shall be followed.
Noxious Weeds 1	Equipment will be washed and inspected prior to entering the project area to remove any soil and debris that may contribute to the spread of noxious weeds.
Noxious Weeds 2	Any materials used in implementation of the project must be certified weed free.
Reclamation 1	Topsoil will be salvaged, stockpiled, and placed on the downstream embankment of the dam after construction is complete.
Reclamation 2	The embankment and other disturbed areas will be seeded with an appropriate seed mix per NRCS Practice Standard 402.
Vegetation 1	Vegetation removal would be limited as much as practicable.
Water Quality 1	Equipment servicing and refueling areas will be located at least 300 feet away from any stream channels. To ensure that accidental spills do not enter waters, the storage of petroleum-based fuels and the refueling of construction machinery will not occur outside of approved designated staging areas. The project will comply with state and federal water quality standards and toxic effluent standards to minimize any potential adverse impacts from discharges to waters of the U.S.
Water Quality 2	A stormwater pollution prevention plan (SWPPP) will be prepared by the construction contractor prior to initiation of ground disturbance. The SWPPP will detail the best management practices and site-specific control features to prevent sediment and other pollutants from discharging off the site during construction. BMPs may include silt fence, fiber wattles, and earthen berms.
Water Quality 3	No construction materials would be stockpiled or wasted in any water bodies.
Wildlife 1	Where practicable, vegetation would be removed during the fall and winter to avoid impacts during the breeding bird season (March 1 – August 31). If vegetation removal activities must occur between March 1 and August 31, clearance surveys for migratory birds within 10 days prior by a qualified biologist will be required. Appropriate spatial and temporal buffers will be applied if nesting birds are located.
Wildlife 2	Where practicable, disturbed areas would be reseeded after project activities per design feature Reclamation 2; reseeded areas would be expected to provide suitable cover and forage as soon as the next growing season.

Maintenance for Full Dam Rehabilitation Alternative

Maintenance would generally consist of the following items:

- The dam and appurtenances would be inspected annually and after critical events.
- A Periodic Engineer Inspection would be conducted every 5 years.

- Deep-rooted vegetation (trees and shrubs) would be removed from the embankment and abutments annually.
- Erosional channels would be repaired annually through grading, seeding, or riprap placement.

4.3.3 Federal Decommissioning

The Federal Decommissioning Alternative considers decommissioning and removal of the dam with upgrades to the downstream channel to provide the same level of flood protection that the dam currently provides. Decommissioning would provide flood protection for the 100-year flood event, which is also the minimum applicable design standard for the downstream channel improvements. The proposed measures are the minimum necessary for the alternative to meet the purpose and need, and are integral to the proposal.

The following measures would be implemented:

1. Removal of a section of the dam embankment so that water would not be impounded, and removal of the low-level drawdown pipe, the concrete riser, and the concrete outlet pipe. The disturbed area would be seeded to stabilize the disturbed soils.
2. Removal of sediment and debris from the Jefferson Street culvert to restore conveyance capacity.
3. Grading of approximately 300 feet of channel downstream of the dam to improve conveyance capacity; the channel would be graded to a 3.5% slope and the current channel cross section would be maintained. Riprap would be installed along this 300-foot section as needed to reinforce banks and prevent erosion.
4. Replacement of the existing First Street culvert with approximately 900 feet of a 7-foot-wide by 8-foot-high box culvert at a minimum 2% slope. Existing utilities would be relocated, and asphalt and concrete would be replaced as needed.

The Federal Decommissioning Alternative would disturb up to approximately 9.7 acres (see Map C-5 in Appendix C).

The same Watershed Plan area and project design features as those described for the Full Rehabilitation Alternative would also be applied (see Table 4-1) with the following modifications:

Table 4-2. Project Design Features specific to Federal Decommissioning

Resource Area	Project Design Feature
Reclamation D-1	Topsoil will be salvaged, stockpiled, and placed on the surface of disturbed areas after decommissioning is complete.
Reclamation D-2	Where appropriate and practicable, disturbed areas will be seeded with an appropriate seed mix per NRCS Practice Standard 402.

Maintenance for Federal Decommissioning Alternative

Maintenance after decommissioning would generally consist of the following items:

- Removal of debris from culverts.

4.4 **PR&G Analysis**

Alternatives trade-offs and ecosystem services are summarized in Table 4-3.

Table 4-3. PR&G Analysis Summary

Alternatives	Alternative 1 (No Federal Action/FWOFI)	Alternative 2 (Full Dam Rehabilitation)	Alternative 3 (Federal Decommissioning)
Optimizing Criteria			
Locally Preferred	-	Sponsor's preferred alternative	-
Environmentally Preferable	Less construction disturbance but more maintenance disturbance; greatest risk of flood damage; continued sediment capture of 0.21 acre-feet per year	Less frequent maintenance disturbance than Alt 1; continued sediment capture of 0.21 acre-feet per year	Greatest area of disturbance within the active channel below the dam; no sediment capture
Non-structural	-	-	Non-structural
National Economic Efficiency	-	-	Net average annual benefits are \$18,900 more than alternative 1 and \$6,300 more than alternative 2
Socially Preferred	-	This plan results in the greatest flood risk reduction, more breach risk reduction than alternative 1, and the highest level of environmental protection	-
Guiding Principles			
Healthy and Resilient Ecosystems	Limited rehabilitation would protect the functions of natural systems by reducing turbidity in the Purgatoire River	Full rehabilitation would protect the functions of natural systems by reducing turbidity in the Purgatoire River	Decommissioning would not protect the functions of natural systems by reducing turbidity in the Purgatoire River
Sustainable Economic Development	Limited rehabilitation would not improve the economic well-being of the Nation for present and future generations	Full rehabilitation would improve the economic well-being of the Nation for present and future generations by providing flood protection	Decommissioning would improve the economic well-being of the Nation for present and future generations by providing flood protection
Floodplains	Limited rehabilitation would not adversely affect floodplain function	Full rehabilitation would not adversely affect floodplain function	Decommissioning would not adversely affect floodplain function
Public Safety	Limited rehabilitation would provide the least risk reduction	Full rehabilitation would provide flood protection	Decommissioning would provide flood protection
Environmental Justice	Limited rehabilitation would not disproportionately impact minority, Tribal, or low-income populations.	Full rehabilitation would not disproportionately impact minority, Tribal, or low-income populations.	Decommissioning would not disproportionately impact minority, Tribal, or low-income populations.

Alternatives	Alternative 1 (No Federal Action/FWOFI)	Alternative 2 (Full Dam Rehabilitation)	Alternative 3 (Federal Decommissioning)
Watershed Approach	Limited rehabilitation considers a watershed approach	Full rehabilitation considers a watershed approach	Decommissioning considers a watershed approach
Evaluation Framework (Ecosystem Services)			
Provisioning Services – tangible goods provided for direct human use and consumption, such as food, fiber, water, timber, or biomass.			
Water quality	Continued sediment capture of 0.21 acre-feet per year until breach	Continued sediment capture of 0.21 acre-feet per year	No sediment capture
Regulating Services - maintain a world in which it is possible for people to live, providing critical benefits that buffer against environmental catastrophe – examples include flood and disease control, water filtration, climate stabilization, or crop pollination.			
Flood control	Breach risk and associated flood damage risk remains	Reduced risk of dam breach and associated flood damage with \$12,600 more average annual net benefits than alternative 1	No risk of dam breach and associated flood damage with \$18,900 more average annual net benefits than alternative 1
Supporting Services - underlying processes maintaining conditions for life on Earth, including nutrient cycling, soil formation, and primary production.			
NA – supporting services were not identified for any alternative			
Cultural Services – make the world a place people want to live (recreational use, spiritual, aesthetic viewshed, or tribal values)			
NA – cultural services were not identified for any alternative			

4.4.1 Risk and Uncertainty

Risk and uncertainty arise from measurement errors and from the underlying variability of complex natural, economic, and social situations. Risk represents variability that can be quantified based on probabilistic analysis using well known and accepted methods. Uncertainty represents variability that cannot be quantified in the numerical sense and is evaluated subjectively in relative terms. This section discusses the risk and uncertainty associated with the prediction of consequences for the alternatives studied in detail.

Multiple independent assessments of the current condition of the FPC-2 dam are available in the technical memoranda in Appendix E. Detailed topographic survey data were collected, and geotechnical sampling and analyses were performed to further inform the evaluation of the current condition of the dam. Although it is possible that latent defects in the embankment, foundation, or structures exist, none have been revealed during the 61 years the current dam has been in place. The assessment findings and basic data are summarized in this report and in Appendix D. The condition assessment was prepared and reviewed by Professional Engineers licensed in Colorado following the accepted standard of practice. There is no unusual risk or uncertainty associated with the assumption that the current condition of the dam will continue to deteriorate without intervention, or that the rehabilitated dam will provide the intended benefits for its planned life of 100 years.

The risk associated with hydrologic events used to form and evaluate alternatives has been calculated and is described in this report, in Appendix D, and in technical memoranda in Appendix E. The probability of a rainfall event that will fill the reservoir and cause flow through the auxiliary spillway or overtop the

dam is very low. The hydraulic capacity of both the current dam and the proposed rehabilitated dam alternative satisfies the State of Colorado's and NRCS's safety criteria. Continued deterioration of the existing drawdown pipe will reduce the hydraulic capacity of the dam. The 100-year storm (1 percent chance of occurrence) and two-dimensional hydraulic modeling using current topographic information were used to evaluate flood effects. This process results in a reasonable level of certainty in defining the area affected by floods used to forecast storm damage estimates. The effects of actual storms could realistically result in slightly higher or significantly lower impacts than predicted, depending on soil moisture conditions at the time of a given event, future development, and the effects of climate change.

During the planning process, decisions are made with information that is uncertain, including assumptions of project costs and with the estimation of economic benefits from alternative measures. These uncertainties are identified in *TM008 – Economic Analysis* in Appendix E. The benefits and costs were evaluated using a 2021 price level, 2023 base year, and amortized over a 100-year period using a discount rate of 2.5 percent. Associated monetary flooding impacts on downstream houses and businesses and the value of potential damages were based on the national averages using data sources identified in detail in *TM008 – Economic Analysis*. As noted above, actual damages occurring from a specific storm event could realistically be slightly higher or significantly lower, depending on watershed conditions and land use at the time of the event, and other factors. The prevailing belief is that climate change will result in more frequent and intense flood events.

The Sponsor currently owns the property affected by construction of proposed alternatives. There is no uncertainty related to land rights availability. There is no uncertainty with the Sponsor's ability to acquire the permits needed to implement any of the alternatives.

There is uncertainty in estimating environmental and social costs associated with each alternative because the values, judgments, and opinions held by interested and affected parties and the community in general may shift over time. Best estimates of these effects were based on observation of past trends, the city's and other current master planning assumptions, and the limited input received during project scoping opportunities.

Chapter 5. Environmental Consequences

The NRCS has the responsibility under the NEPA to identify and address effects on the environment that may result from the alternative plans. These alternatives include the No Action Alternative, the Action Alternative (full dam rehabilitation), and the Federal Decommissioning Alternative. This chapter describes the potential effects of the alternatives within each resource category, as defined in Chapter 3 - Affected Environment.

The potential consequences or effects of each alternative are discussed in this chapter. Impacts may be temporary or permanent. Temporary impacts are those that are not lasting, and the affected resource would be expected to return or be restored to its pre-project state. Permanent impacts are those in which the affected resource would not return to its pre-project state, but would remain in the affected condition indefinitely.

Impacts to a resource can be beneficial or adverse over the short or long term. For this evaluation, short-term impacts are those that last for the duration of construction and shortly thereafter; this is estimated to be 2 years based on the time for vegetation to establish on reseeded areas. Long-term impacts are those that last for an extended duration of time. For this evaluation, long-term impacts are considered to be up to 100 years, based on the design life of the project features.

Environmental impacts that could result from implementation of any alternative are quantified where possible. In the absence of quantifiable data, the professional judgment of knowledgeable sources was used. Impacts may be described using ranges of potential impacts or in qualitative terms, if appropriate. Existing conditions for each resource are disclosed in Chapter 3 - Affected Environment. Unless otherwise stated, the existing conditions would be assumed to continue under the No Action Alternative.

5.1 Air Quality

5.1.1 No Action Alternative

Implementation of the No Action Alternative would require operation of heavy equipment for limited rehabilitation of the dam; such operations would result in mobile equipment emissions and particulate emissions resulting from ground-disturbing activities. PM₁₀ emissions would be associated with the fugitive dust created by excavation and access activities. All other pollutants (PM_{2.5}, CO, sulfur oxides [SO_x], nitrous oxides [NO_x], mobile air source toxins [MSATs], and greenhouse gases [GHGs]) would be generated by the heavy-duty diesel engines used in construction equipment. Equipment operation emissions and fugitive dust emissions would be localized to the project area, and would be temporary and short-term. Fugitive dust emissions would reduce as vegetation naturally re-established on disturbed areas. Due to the temporary and localized nature of project activities, emissions from such activities are not expected to violate air quality standards.

5.1.2 Action Alternative

Implementation of the Action Alternative would require operation of heavy equipment for completion of the project measures; such operations would result in mobile equipment emissions and particulate emissions resulting from ground-disturbing activities, similar to those conditions created under the No Action Alternative.

Emissions associated with construction of the Action Alternative would be minimized by implementation of design features Air Quality 1-9, and Reclamation 1-2. These measures would stabilize disturbed soils in the short and long term, which would reduce the suspension of dust particles. Equipment operation emissions would be localized to the project area and would only occur during construction. Fugitive dust

emissions would be localized to the project area and would be temporary and short-term; dust emissions would reduce as vegetation established on disturbed areas.

Based on the implementation of the design features and the temporary nature of construction, emissions from construction activities would not be expected to violate air quality standards.

Operation and maintenance activities would create the same type of emissions as construction activities. Such activities would occur on an as-needed basis; the associated increase in emissions would be temporary and localized to the immediate work area. Based on the anticipated short duration of equipment operation to complete the work, operation and maintenance activities are not expected to violate air quality standards; there would be no long-term or permanent emissions as a result of implementation of the Action Alternative.

5.1.3 Federal Decommissioning

Implementation of the Federal Decommissioning Alternative would require operation of heavy equipment for decommissioning of the dam and upgrading of the channel, and would result in similar mobile equipment emissions and particulate emissions resulting from ground-disturbing activities. Equipment operation emissions and fugitive dust emissions would be localized to the project area, and would be temporary and short-term. Due to the temporary and localized nature of project activities, emissions from such activities are not expected to violate air quality standards.

5.2 Cultural Resources

The cultural area of potential effect (APE) is defined as the area that may be disturbed by project activities for each alternative; the respective APE for each alternative is shown on Maps C-3, C-4 and C-5 in Appendix C.

The sites are listed in Table 5-1.

Table 5-1. Summary of historic sites identified within the APE

Site Name	Potential Impacts	NRHP Eligibility Determination	Adverse/Significant
FPC-2 dam and appurtenances (1962)	Modified for all alternatives	Not Eligible	No adverse effect/Not significant
Bridge over Carbon Arroyo (1960)	No impact for any alternative	Not Eligible	No effect
Stone arch bridge over Carbon Arroyo (1920-1930)	No impact for any alternative	Not Eligible	No effect
Storm drain for Carbon Arroyo	Modified for decommissioning	Not Eligible	No adverse effect/Not significant

Based on the survey results and in consideration of Tribal consultation responses, the NRCS determined that all four sites are not eligible for listing on the NRHP. The Colorado State Historic Preservation Office provided concurrence for these determinations in a letter signed on April 29, 2022. Implementation of any alternative would have no adverse effect to historic properties.

The historic viewshed was not a concern given the lack of modern additions to the landscape from any alternative and the use of local earthen materials for the reconstruction of the dam.

5.3 Endangered and Threatened Species

5.3.1 Canada lynx

Suitable remote forest habitat (Interagency Lynx Biology Team 2013) does not occur within or near the area of potential effect for any alternative. Implementation of any alternative would have no effect on Canada lynx.

5.3.2 New Mexico meadow jumping mouse

Suitable habitat consisting of dense riparian herbaceous vegetation (USFWS 2020a) does not occur within the area of potential effect for any alternative. Implementation of any alternative would have no effect on New Mexico meadow jumping mouse.

5.3.3 Mexican spotted owl

Suitable nesting habitat (USFWS 2012) does not occur within or near the area of potential effect for any alternative. Implementation of any alternative would have no effect on Mexican spotted owl.

5.3.4 Monarch butterfly

Milkweed was not observed in the area of potential effect during a site visit on July 22, 2021; however, other flowering plants within the area could provide nectar during migration. Sunflowers are abundant on the embankment, along the outlet channel, and within the inundation area of the dam.

Under any alternative, flowering plants would be removed from the dam embankment during project activities. Flowering plants would also be removed along segments of the channel under the Action Alternative and Federal Decommissioning Alternative. Flowering species would remain undisturbed adjacent to the project, and would likely re-establish in most disturbed areas upon project completion. Due to the localized disturbance area, the abundance of alternate nectar sources within the immediate area, and the temporary timeframe of disturbance, implementation of any alternative would not adversely affect monarch butterfly.

5.4 Environmental Justice and Civil Rights

Although minority and low-income populations may be present within the area, none of the alternatives would disproportionately adversely impact any population. Implementation of any alternative would result in temporary increases in noise, vibration, mobile equipment emissions, and particulate emissions associated with heavy equipment operation; however, these impacts would be localized and temporary. Many residents in the immediate area of the dam and channel would also be shielded from such impacts to varying degrees by topography and distance. Additionally, implementation of any alternative would provide flood protection for populations downstream of FPC-2, regardless of minority or income status.

5.5 Fish and Wildlife

Because the project measures associated with each alternative would be constructed within the same general area and with similar methods, potential impacts to fish and wildlife species (including migratory birds) from any alternative are addressed together. Species were further grouped based on similar habitat characteristics and behaviors, as potential impacts are more likely to be similar for those species that share habitats and behaviors.

5.5.1 Bald eagle and Osprey

Bald eagles and osprey may fish in the Purgatoire River; project activities for any alternative would occur within 1 mile of the river. Suitable nest or roost sites nearby are limited due to the extent of development surrounding the project area. Because project activities would be localized to the upland channel, fishing birds could avoid the immediate area of project disturbance and continue to fish in the river during project activities. Because the impacts to habitat would be localized and similar available habitat is abundant in the area, there would be no adverse effect to bald eagle or osprey from implementation of any alternative.

5.5.2 Bats

Bats that could occur within the area of potential effect include big brown bat, big free-tailed bat, Brazilian free-tailed bat, fringed myotis, hoary bat, little brown myotis, long-eared myotis, long-legged myotis, red bat, silver-haired bat, Townsend's big-eared bat, and western small-footed myotis. Bats could roost in the trees and forage within the project area. Tree removal would be minimized as much as practicable by implementation of design feature Vegetation 1, and would occur outside of roosting season with implementation of Wildlife 1 (see Table 4-1). Bats could continue to forage within the project area; there would be little risk of disturbance as the nocturnal bats would be roosting during daytime activities, and prey insects would be available in both disturbed and undisturbed areas. Implementation of any alternative would not adversely affect bat species.

5.5.3 Big game

Big game species such as mule deer, Rocky Mountain elk, and white-tailed deer may range through and forage in the project area; however, big game use of the area is likely limited due to the proximity with residential development and human presence. Based on the temporary nature of disturbance associated with the alternatives, implementation of any would not adversely affect big game species.

5.5.4 Black bear and Mountain lion

Although black bears and mountain lions could range incidentally through the project area, individuals are unlikely to inhabit the immediate area due to the proximity with residential development and human presence. Implementation of any alternative would not adversely affect black bears or mountain lions, nor increase the risk of human conflict.

5.5.5 Peregrine falcon

Most peregrine eyries in the region are situated on cliff faces that range from 40 to 2,100 feet high. Prey availability is the major factor in nest site selection; prey species are primarily small to medium-sized terrestrial birds, shorebirds, and waterfowl. Adequate prey sources are typically found within 10 miles of the eyrie, but falcons have been known to travel up to 17 miles (USFWS 1984). Potentially suitable cliff nesting habitat occurs within 10 miles of the project area, and the riparian area associated with the Purgatoire River could provide prey for foraging falcons.

Because project activities would be localized to the project area upstream of the river, falcons could avoid the immediate area of project disturbance and continue to hunt along the river during project activities. Because the impacts to foraging habitat would be localized and avoidable, and similar available habitat is abundant in the area, there would be no adverse effect to peregrine falcon from implementation of any alternative.

5.5.6 Wild turkey

Merriam's wild turkey are typically associated with ponderosa pine forests, but will use other forest types including pinyon-juniper woodland (NRCS 1999). Pinyon-juniper woodland occurs around and upstream

of the dam embankment, and turkeys may forage opportunistically within the project area. Turkey use of the area is likely limited due to the proximity with residential development and human presence. Based on the temporary nature of disturbance associated with the alternatives, implementation of any would not adversely affect wild turkey.

5.5.7 Migratory Birds

Other migratory birds that may breed, nest, or forage within the project area include Cassin's finch, evening grosbeak, ferruginous hawk, Lewis's woodpecker, and pinyon jay.

As much as practicable, vegetation would be removed the fall prior to construction to reduce impacts to migratory birds and suitable nesting habitat, per design feature Wildlife 1 (see Table 4-1). Vegetation removal would be minimized as much as practicable and similar vegetation would remain adjacent to the area of potential effect.

Operation and maintenance activities would create the same type of disturbance as construction activities. Such activities would occur on an as-needed basis; the associated increase in human presence and noise would be temporary and localized to the immediate work area. There would be no long-term or permanent impacts as a result of maintenance or operations.

With adherence to the design features, and because impacts would be temporary (during construction or maintenance), implementation of any alternative would not adversely impact migratory birds.

5.5.8 Small mammals, reptiles, and amphibians

Small mammals that may inhabit the project area include Botta's pocket gopher, dwarf shrew, and southern red-backed vole.

Reptiles and amphibians that may inhabit the project area include the bullsnake, coachwhip, common lesser earless lizard, eastern collared lizard, Hernandez's short-horned lizard, milksnake, North American racer, Plains hog-nosed snake, prairie lizard, plateau fence lizard, prairie rattlesnake, western rattlesnake, ring-necked snake, six-lined racerunner, smooth greensnake, garter snake, many-lined skink, and green toad.

Impacts to these animals could include direct mortality and displacement during project activities. Small animal species populations may be affected in direct proportion to the amount of habitat disturbed. Suitable habitats are relatively common throughout the area. Where practicable, disturbed areas would be reseeded after project activities per design feature Reclamation 2; reseeded areas would be expected to provide suitable cover and forage as soon as the next growing season.

Due to the localized disturbance area and the temporary timeframe of disturbance, implementation of any alternative could impact individual small animals, but would not adversely affect populations within the watershed area.

5.6 Floodplain Management

The area of potential effect for all alternatives is outside of the FEMA-designated floodplain or floodway; there are no mapped floodplains associated with the dam or the channel. Any of the alternatives would continue to provide the current level of protection, and there would be no change in floodplain management or function.

5.7 Invasive Species

Invasive species are the predominant vegetation type within the area of potential effect for the alternatives; species include Siberian elm, sunflower, kochia, and bindweed.

5.7.1 No Action Alternative

Rehabilitation activities under the No Action Alternative would result in disturbance of up to 3.3 acres, which increases the risk of spreading invasive species. Requiring equipment to be washed and inspected prior to entering the project area would reduce the risk of spreading invasive species.

5.7.2 Action Alternative or Federal Decommissioning

Implementation of the Action Alternative or the Federal Decommissioning Alternative would result in up to 11.6 or 9.7 acres of ground disturbance, respectively, which increases the risk of spreading invasive species. Adherence to design features (see Table 4-1) would reduce the risk of additional invasive species by preventing spread and establishing desirable species in disturbed areas; therefore, implementation of the Action Alternative or Federal Decommissioning Alternative would not be anticipated to increase the spreading of invasive species in the short or long term. Due to the limited amount of ground disturbance associated with operation and maintenance activities, there would be no long-term or permanent risk of spreading invasive species as a result of maintenance or operations.

With adherence to the design features, and because impacts would be temporary (during construction/decommissioning or maintenance), implementation of the Action Alternative or the Federal Decommissioning Alternative would not increase the spreading of invasive species in the short or long term.

5.8 Land Use

5.8.1 No Action Alternative

Land uses would not change as a result of implementation of the No Action Alternative. The dam and inundation areas would continue to be used for flood control.

5.8.2 Action Alternative

Land uses would not change as a result of implementation of the Action Alternative. The dam and inundation areas would continue to be used for flood control.

5.8.3 Federal Decommissioning

Implementation of the Federal Decommissioning Alternative would eliminate the need for the dam and inundation area. The area could be available for other uses; however, due to the location of the natural channel that would continue to convey storm flows to the Purgatoire River, a change in use would not be anticipated.

5.9 Prime and Unique Farmlands

Soils classified as “prime farmland if irrigated” occur at the downstream end of the conveyance channel in areas that are heavily developed and not irrigated; therefore, they are not considered prime farmland. There would be no effect to prime or unique farmland with implementation of any alternative.

5.10 Public Health and Safety

To ensure safety during construction, industry standards would be followed. Public access to the project area would be restricted. The construction contractor would be responsible for preparing and implementing a traffic management plan where project activities intersect existing roads. Increased

hazards from construction would be temporary and normal traffic conditions would be re-established immediately upon construction completion.

5.10.1 No Action Alternative

The No Action Alternative would reduce the risk of dam failure; however, a dam breach would result in a moderate to high probability of loss of life. The breach inundation area includes developed areas adjacent to and interspersed with the floodplain of the Purgatoire River (see Map C-2 in Appendix C). The dam would continue to operate as a high-hazard dam, and in the event of a dam breach, up to 19 buildings could be inundated.

Because the No Action Alternative would reduce the risk of dam failure and breach, implementation of the No Action Alternative would have an overall beneficial impact on public health and safety.

5.10.2 Action Alternative

The Action Alternative would reduce the risk of dam failure, but the dam would continue to operate as a high-hazard dam. The same 19 buildings would be at risk for inundation as a result of dam failure and breach. Full rehabilitation would reduce the risk of dam failure over the extended design life of the dam (100 years).

Based on the anticipated temporary hazards associated with construction, operation, and maintenance of the project and the reduced risk of dam failure, implementation of the Action Alternative would have an overall beneficial impact on public health and safety.

5.10.3 Federal Decommissioning

Implementation of the Federal Decommissioning Alternative would eliminate the risk of dam breach and the associated risk of loss of life, but would provide the same level of flood protection through increased conveyance capacity. Implementation of the Federal Decommissioning Alternative would not adversely affect public health or safety.

Based on the anticipated temporary hazards associated with construction, operation, and maintenance of the project and the elimination of dam breach risk, implementation of the Federal Decommissioning would have an overall beneficial impact on public health and safety.

5.11 Riparian Areas

Riparian vegetation is limited within the area of potential effect; the banks of the inlet and outlet channel of the dam are vegetated predominantly with upland and weed species. Riparian vegetation becomes denser and more mature along the channel to the north, from Jefferson Street to First Street. The channel above the dam supports isolated patches of riparian vegetation.



Figure 1. Channel immediately downstream of dam outlet exhibiting minimal riparian vegetation

5.11.1 No Action Alternative

The No Action Alternative would not impact riparian areas; project impacts would be localized to the dam embankment.

5.11.2 Action Alternative

Implementation of the Action Alternative would require disturbance of up to 1,000 feet of channel between the dam outlet and Jefferson Street; limited riparian vegetation along this segment would likely be removed by channel grading and stabilization activities. Riparian vegetation would likely re-establish in the channel within 2 years after project disturbance.

Operation and maintenance activities would create the same type of disturbance as construction activities. Such activities would occur on an as-needed basis; the associated disturbance would be temporary and localized to the immediate work area. Based on the anticipated short duration of disturbance to complete the work, operation and maintenance activities are not expected to permanently affect riparian areas. There would be no long-term or permanent adverse effect to riparian areas as a result of implementation of the Action Alternative.

5.11.3 Federal Decommissioning

Implementation of the Federal Decommissioning Alternative would require disturbance of up to 300 feet of channel between the dam outlet and the Purgatoire River; limited riparian vegetation along this segment would likely be removed by channel grading and stabilization activities. Operation and maintenance activities would occur in the same manner and location. Riparian vegetation would likely re-establish in the channel within 2 years after project disturbance. There would be no long-term or permanent adverse effect to riparian areas as a result of implementation of the Federal Decommissioning Alternative.

5.12 Socioeconomic Factors

Socioeconomic factors would not change as a result of any alternative. Any of the alternatives would continue to provide at least the current level of protection to downstream properties.

5.13 Soil Resources

5.13.1 No Action Alternative

Under the No Action Alternative, soil disturbance would be localized to the dam embankment. Up to 3.3 acres could be disturbed by implementation of limited rehabilitation measures. Direct impacts to soil would include exposure due to vegetation removal associated with grading of erosional features on the embankment; however, riprap would be installed to reduce erosion of the surface soils. There would be limited loss of topsoil productivity. Implementation of the No Action Alternative would not adversely affect soil resources on the embankment of the dam.

5.13.2 Action Alternative

Implementation of the Action Alternative would disturb up to 11.6 acres. Direct impacts to soil would include exposure due to vegetation removal, mixing of soil horizons, loss of topsoil productivity, soil compaction, and increased susceptibility to erosion.

Per design feature Reclamation 1, topsoil would be salvaged, stockpiled, and placed on the downstream embankment of the dam after rehabilitation was complete. Per design feature Reclamation 2, disturbed areas would be reseeded to stabilize soils and reduce erosion. Impacts to soil resources on the reclaimed areas would be short-term (during construction and up to 2 years after), and would diminish as reclamation was achieved.

Per design feature Water Quality 2, a stormwater pollution prevention plan (SWPPP) would be prepared prior to construction in compliance with Section 402 of the Clean Water Act, and would describe measures to minimize erosion and prevent soils from leaving each site during construction activities. The measures outlined in this plan would stabilize disturbed areas during and after construction.

Operation and maintenance activities would create the same type of disturbance as construction activities. Such activities would occur on an as-needed basis; the associated disturbance to soils would be temporary and localized to the immediate work area. Based on the anticipated short duration of ground disturbance to complete the work, operation and maintenance activities are not expected to adversely affect soil resources. There would be no long-term or permanent impacts as a result of maintenance or operations.

With adherence to the design features, and because impacts would be short-term (during construction or maintenance and until vegetation established on disturbed soils), implementation of the Action Alternative would not adversely impact soil resources.

5.13.3 Federal Decommissioning

Implementation of the Federal Decommissioning Alternative would disturb up to 9.7 acres. Qualitative impacts to soils would be the same as those described with implementation of the Action Alternative. With adherence to the design features, and because impacts would be short-term (during construction or maintenance and until vegetation established on disturbed soils), implementation of the Federal Decommissioning Alternative would not adversely impact soil resources.

5.14 Water Quality

5.14.1 No Action Alternative

Up to 3.3 acres would be disturbed by implementation of the No Action Alternative; this disturbance could lead to increased erosion and sedimentation of the disturbed soils and discharge of pollutants from equipment into the waters downstream of the disturbance. Adverse impacts to the water quality would be temporarily additive during limited rehabilitation activities. The dam would continue to capture approximately 0.21 acre-feet of sediment annually. Due to the temporary nature of the disturbance, the embankment protection measures that would be applied, and the sediment detention in the basin, implementation of the No Action Alternative would not adversely affect water quality in the long term.

5.14.2 Action Alternative

Approximately 11.6 acres would be disturbed by implementation of the Action Alternative; this disturbance could lead to increased erosion and sedimentation of the disturbed soils and discharge of pollutants from equipment into the waters downstream of the disturbance. Pollutant discharges associated with construction would be minimized by implementation of design features Water Quality 1-3. In particular, a SWPPP would be prepared prior to initiation of ground disturbance per design feature Water Quality 2. The SWPPP would detail the best management practices and site-specific measures to prevent sediment and other pollutants from discharging into surface waters during construction. Implementation of the SWPPP would reduce sedimentation and the risk of pollution to surface waters during construction. Seeding disturbed areas would also reduce erosion and sedimentation after construction was completed. The dam would continue to capture approximately 0.21 acre-feet of sediment annually.

Maintenance activities would create the same type of disturbance as construction activities. Such activities would occur on an as-needed basis; the associated ground disturbance and potential for increased sedimentation would be temporary and localized to the immediate work area. There would be no long-term or permanent adverse impacts to water quality as a result of maintenance.

With adherence to the design features, and because the dam would continue to capture sediment and potential adverse impacts would be temporary (during construction or maintenance), implementation of the Action Alternative would not adversely affect water quality.

5.14.3 Federal Decommissioning

Implementation of the Federal Decommissioning Alternative would disturb up to 9.7 acres; qualitative impacts to water quality would be the same as those described with implementation of the Action Alternative. Approximately 0.21 acre-feet of sediment would no longer be captured behind the dam, but would drain into the Purgatoire River; therefore, implementation of the Federal Decommissioning Alternative would adversely impact water quality.

5.15 Waters of the U.S.

5.15.1 No Action Alternative

The No Action Alternative would not affect waters of the U.S., as project impacts would be localized to the existing dam embankment and appurtenances.

5.15.2 Action Alternative

Implementation of the Action Alternative would result in impacts to waters of the U.S. if the channel were determined to be jurisdictional by the USACE. If determined to be jurisdictional, a Clean Water Act

Section 404 permit would be acquired prior to placement of fill within the channel. Installation of 250 feet of gabion basket within the channel would likely be permitted under Nationwide Permit 13 (bank stabilization). Grading of the 1,000 feet of channel between the dam outlet and Jefferson Street would not result in fill, and would not require permitting with the USACE. Maintenance activities would likely be authorized under the maintenance conditions of the permit. There would be no significant impacts to waters of the U.S. with implementation of the Action Alternative.

5.15.3 Federal Decommissioning

Similar to the Action Alternative, implementation of the Federal Decommissioning Alternative would result in impacts to waters of the U.S. if the channel were determined to be jurisdictional by the USACE. A permit (likely Nationwide Permit 13; bank stabilization) would be acquired prior to placement of up to 300 feet of riprap fill within the channel. Maintenance activities would likely be authorized under the maintenance conditions of the permit. There would be no significant impacts to waters of the U.S. with implementation of the Federal Decommissioning Alternative.

5.16 Wetlands

Jurisdictional wetlands are also waters of the U.S., and project impacts would be permitted with the USACE in compliance with Section 404 of the Clean Water Act.

5.16.1 No Action Alternative

The No Action Alternative would not affect wetlands, as project impacts would be localized to the existing dam embankment and appurtenances, where wetlands do not occur.

5.16.2 Action Alternative

Wetlands may occur along the margins of the outlet channel, and could be impacted by activities within the channel between the dam outlet and Jefferson Street. Less than 0.1 acres of wetland would be lost by installation of gabion basket within the channel. These impacts would likely be permitted under the same Nationwide Permit 13 for the jurisdictional waters discussed in Section 5.15.2. Less than 0.1 acres of wetlands would be dredged along the channel during grading; the dredged material would be placed in upland areas. Wetlands would be anticipated to re-establish naturally along the channel, as the hydrology and hydric soils would remain, and vegetation would return as a result of natural recruitment. There would be no significant impacts to wetlands with implementation of the Action Alternative.

As the proposed measures are the minimum necessary for the alternative to meet the purpose and need and are integral to the proposal, there is no practicable method to avoid the anticipated impacts to wetlands. All practicable measures have been considered to minimize harm to wetlands; therefore, implementation of the Action Alternative would be in compliance with Executive Order 11990 – Protection of Wetlands.

5.16.3 Federal Decommissioning

Wetlands that may occur along the margins of the outlet channel could be impacted by grading and armoring along 300 feet of channel downstream of the dam. Less than 0.1 acres of wetland would be lost by installation of up to 300 feet of riprap within the channel. These impacts would likely be permitted under the same Nationwide Permit 13 for the jurisdictional waters discussed in Section 5.16.2. Less than 0.1 acres of wetlands would be dredged along the channel during grading; the dredged material would be placed in upland areas. Wetlands would be anticipated to re-establish naturally along the channel, as the hydrology and hydric soils would remain, and vegetation would return as a result of natural recruitment.

There would be no significant impacts to wetlands with implementation of the Federal Decommissioning Alternative.

As the proposed measures are the minimum necessary for the decommissioning alternative to meet the purpose and need and are integral to the proposal, there is no practicable method to avoid the anticipated impacts to wetlands. All practicable measures have been considered to minimize harm to wetlands; therefore, implementation of the Federal Decommissioning Alternative would be in compliance with Executive Order 11990 – Protection of Wetlands.

5.17 Cumulative Effects

5.17.1 Introduction

The purpose of the cumulative effects section is to describe the interaction among the effects of the alternatives and relevant past, present, and reasonably foreseeable actions. This interaction may be:

- Additive: the effects of the actions add together to make up the cumulative effect.
- Countervailing: the effects of actions balance or mitigate the effects of other actions.
- Synergistic: the effects of the actions together are greater than the sum of their individual effects.

5.17.2 Spatial and Temporal Context for Effects Analysis

The cumulative impacts area represents a landscape surrounding the project area where past, present, and reasonably foreseeable future management actions have occurred or will occur. The cumulative impacts area varies by resource, and specific geographical boundaries are detailed with each resource.

5.17.3 Methodology

Past, present, or reasonably foreseeable projects with potential for cumulative effects were identified through the following methods:

- NRCS internally reviewed projects and activities
- Review of BLM's ePlanning website
- Review of Colorado Division of Reclamation Mining and Safety's AUGER map
- Google search for "Trinidad Colorado Project"
- Aerial imagery was reviewed to identify current land uses

5.17.4 Past, Present, and Reasonably Foreseeable Actions

Relevant known past, present, and reasonably foreseeable future actions in the geographic area of the Watershed Plan are summarized below:

- Residential and commercial development: The population of Trinidad is estimated to be 8,200 people; this is a reduction of about 10 percent from 2010 (U.S. Census Bureau 2021). If similar trends continue, residential and commercial development would be unlikely to increase in the area.
- Agricultural development: Most agricultural development occurs adjacent to or within the floodplain of the Purgatoire River, in the valley bottom. Due to constraints with existing development and topography, agriculture is unlikely to expand in the future.
- There is at least one inactive coal permit, two inactive coal exploration permits, one inactive sand and gravel pit permit, and two inactive borrow source permits within the watershed area.

- Water management: In 2013, the U.S. Army Corps of Engineers authorized the Trinidad Lake State Park Fuels Management Project. The project area is upstream of the Watershed Area, and would not affect this watershed planning effort.
- Infrastructure: The I-25 through Trinidad project was completed in 2011, and included construction of the Purgatoire River Pedestrian Trail with streetlights, parking lot paving, curb and gutter, drainage inlets, landscaping, and sidewalk.

5.17.5 Air Quality

The cumulative impact area for air quality is Las Animas County, as the EPA conducts monitoring for emissions by county.

Adverse impacts to air quality in Las Animas County would be temporarily additive during project activities as emissions would increase; however, the effects would be localized and temporary. Based on the anticipated short duration of equipment operation to complete the work for any alternative, project activities are not expected to violate air quality standards in the short or long term in Las Animas County; therefore, no alternative would result in significant cumulative adverse impacts to air quality.

5.17.6 Cultural Resources

Impacts to cultural resources from construction activities are not necessarily additive across a landscape because the sites are typically discrete; therefore, there would be no cumulative effects to cultural resources.

5.17.7 Endangered and Threatened Species

There would be no cumulative effects to listed species with implementation of any alternative because there would be no direct or indirect effects.

5.17.8 Environmental Justice and Civil Rights

As there would be no disproportionate impacts on minority or low-income populations with implementation of any alternative, cumulative impacts are not anticipated for any population.

5.17.9 Fish and Wildlife

The cumulative impact area for fish and wildlife species (including migratory birds) is the 29,416-acre Watershed Plan area.

Fish and wildlife within the cumulative impact area have been impacted by mining, infrastructure, residential, agricultural, and commercial development. Possible effects of these actions include displacement into less suitable habitats, behavioral disruption, and stress due to noise and human activity. The impacts of temporary disturbance during construction or maintenance of any alternative would add cumulatively to the disturbance impacts from present and future actions; however, the species of concern (including migratory birds, Colorado-listed threatened and endangered species, Colorado “special concern” species, and Colorado species of greatest conservation need as identified in the State Wildlife Action Plan) would likely avoid areas where project disturbance is occurring, and abundant suitable habitat is accessible within the cumulative impact area. Due to the temporary nature of disturbance associated with the project and the abundance of accessible alternate habitat, implementation of any alternative would not result in significant cumulative adverse impacts to fish or wildlife.

5.17.10 Floodplain Management

There would be no cumulative effects to floodplain management with implementation of any alternative because there would be no direct or indirect effects.

5.17.11 Invasive Species

The cumulative impact area for invasive species is the 29,416-acre Watershed Plan area. Cumulative impacts are unlikely to spread beyond the topographical boundaries that contain project activities. Most impacts to soils and vegetation in the area are due to surface disturbing activities associated with municipal and residential development. The area captures similar surface disturbance from motorized vehicles and other surface disturbing activities that could provide transport for noxious weeds and invasive plants into or from the area.

Disturbance from implementation of any alternative could add cumulatively to the spread of invasive or noxious weeds within the cumulative impact area; however, the risk of weed spreading would be temporarily additive only during implementation. Application of the design features or other proper cleaning measures would decrease the potential spread of weeds into or from the project area.

Therefore, implementation of any alternative would not result in cumulative impacts to the risk of spreading invasive species.

5.17.12 Land Use

There would be no cumulative effects to land use with implementation of the No Action or Action alternative because there would be no direct or indirect effects. There would be no cumulative effects with implementation of the Federal Decommissioning Alternative because the impacts would be localized to the area surrounding the channel that would still provide stormwater conveyance.

5.17.13 Prime and Unique Farmlands

There would be no cumulative effects to prime or unique with implementation of any alternative because there would be no direct or indirect effects.

5.17.14 Public Health and Safety

Since impacts to public health and safety would be localized to the area of potential effect and the dam breach inundation area, and other actions are not anticipated to impact public health and safety within these areas, there would be no cumulative effects to public health and safety.

5.17.15 Riparian Areas

Because impacts to riparian areas would be temporary and localized to the channel associated with the dam, there would be no cumulative impacts to riparian areas.

5.17.16 Socioeconomic Factors

There would be no cumulative effects to socioeconomic factors with implementation of any alternative because there would be no direct or indirect effects.

5.17.17 Soil Resources

The cumulative impact area for soil resources is the is the 29,416-acre Watershed Plan area. Cumulative impacts are unlikely to spread beyond the topographical boundaries that contain project activities. Most

impacts to soils in the area are due to surface disturbing activities associated with municipal and residential development.

Disturbance from implementation of any alternative could add cumulatively to soil impacts, such as erosion, within the larger area; however, implementation of erosion control measures or design features would stabilize soils, which would decrease the magnitude of potential effects to soil resources within the project area. A maximum of 11.6 acres (0.04 percent) of the cumulative impact area would be disturbed. Adverse impacts to the soil resources would be temporarily additive (during construction and up to 2 years after), but would reduce as reclamation was completed and vegetation re-established on disturbed areas. Because of the temporary nature of the disturbance and the limited geographic scope relative to the Watershed Plan area, there would be no cumulative adverse effects to soil resources with implementation of any alternative.

5.17.18 Water Quality

The cumulative impact area for water quality is the 3,449-square mile HUC 8 Purgatoire River Watershed.

Ground disturbance from implementation of any alternative could add cumulatively to water quality impacts, such as sedimentation, within the Watershed Plan area; however, disturbance associated with implementation would be limited to the project area and a maximum of 11.6 acres would be disturbed. Adverse impacts to the water quality would be temporarily additive (during project activities and up to 2 years after), but would reduce as vegetation re-established on disturbed area.

Because of the temporary nature of the disturbance and the limited geographic scope relative to the cumulative impact area, there would be no cumulative adverse effects to water quality with implementation of the No Action or Action Alternative, and the long-term sediment capture behind the dam would countervail other sedimentation impacts.

The Federal Decommissioning Alternative would have a cumulative adverse effect on water quality as sediment would no longer be captured behind the dam, but the drainage area above the dam only accounts for approximately 1 percent of the total cumulative impact area. Due to the limited area impacted by the project, there would be no significant cumulative impacts to water quality with implementation of the Federal Decommissioning Alternative.

5.17.19 Waters of the U.S.

Since impacts to waters of the U.S. would be localized to the project area and permitted in a manner to minimize adverse impacts, there would be no cumulative effects to waters of the U.S.

5.17.20 Wetlands

Since impacts to wetlands would be localized to the project area and permitted in a manner to minimize adverse impacts, there would be no cumulative effects to wetlands.

5.17.21 Summary and comparison of alternative plans

The alternatives proposed for consideration and analyzed in detail in this Supplemental Plan-EA have been compared against each other to discern the merits and disadvantages of each alternative. The comparison of effects is summarized in Table 5-2.

Table 5-2. Summary and comparison of alternative plans table

Item or Concern	No Action Alternative (Limited Rehabilitation)	Full Dam Rehabilitation Alternative	Federal Decommissioning Alternative
Measures to address: Flood damage	Preservation of flood protection for uncertain future time period	Preservation of flood protection at greater than the 500-year storm level for the 100-year minimum design life of the rehabilitation	Reduced flood protection to 100-year storm level
Ecosystem service: Water quality	Continued sediment capture of 0.21 acre-feet per year	Continued sediment capture of 0.21 acre-feet per year	No sediment capture
Ecosystem service: Flood control	Reduced risk of flood damage; breach risk remains	Reduced risk of flood damage at greater than the 500-year storm level; significantly lower breach risk remains	Reduced risk of flood damage at 100-year storm level and no breach risk
Installation Cost	NRCS: \$0 Sponsor ² : \$1,791,360 Total: \$1,791,360	NRCS: \$3,121,600 Sponsor: \$1,372,200 Total: \$4,493,800	NRCS: \$2,953,500 Sponsor: \$1,316,500 Total: \$4,270,000
Average Annual Cost ¹	Installation: \$131,900 O, M, & R ³ : \$4,900 Total ⁴ : \$136,800	Installation: \$122,700 O, M, & R ³ : \$1,600 Total ⁴ : \$124,300	Installation: \$116,600 O, M, & R ³ : \$500 Total ⁴ : \$117,100
Annual Benefits ¹	---	\$136,900	\$136,000
Annual Costs ¹	---	\$124,300	\$117,100
Annual Net Benefits ¹	---	\$12,600	\$18,900
Air quality	No violation of air quality standards	No violation of air quality standards	No violation of air quality standards
Cultural resources	No adverse impacts to NRHP-eligible resources	No adverse impacts to NRHP-eligible resources	No adverse impacts to NRHP-eligible resources
Endangered and threatened species	No effect to listed species	No effect to listed species	No effect to listed species
Environmental justice and civil rights	No disproportionate adverse impacts	No disproportionate adverse impacts	No disproportionate adverse impacts
Fish and wildlife	Potential impacts to various species	Potential impacts to various species	Potential impacts to various species
Floodplain management	No changes to floodplain management	No changes to floodplain management	Increased risk to Carbon Arroyo floodplain

Item or Concern	No Action Alternative (Limited Rehabilitation)	Full Dam Rehabilitation Alternative	Federal Decommissioning Alternative
Invasive species	Disturbance associated with implementation may increase risk of spread	Disturbance associated with implementation may increase risk of spread	Disturbance associated with implementation may increase risk of spread
Land use	No change	No change	Dam and inundation area may be available for other land uses
Prime and unique farmlands	No impacts to irrigated farmlands	No impacts to irrigated farmlands	No impacts to irrigated farmlands
Public health and safety	Reduced risk to public safety from reduced risk of dam breach flooding for uncertain future time period	Reduced risk to public safety from significantly reduced risk of dam breach flooding for the 100-year minimum design life of the rehabilitation	Eliminated risk to public safety from dam breach flooding; increased risk for larger and more frequent storm flow within Carbon Arroyo
Riparian areas	No change	Temporary loss of riparian vegetation along up to 1,000 feet of downstream channel	Temporary loss of riparian vegetation along up to 300 feet of downstream channel
Socioeconomic factors	No change	No change	No change
Soil resources	Disturbance to 3.3 acres	Disturbance to 11.6 acres	Disturbance to 9.7 acres
Water quality	Temporary increase in turbidity due to disturbance of 3.3 acres, sediment capture of 0.21 acre-feet per year	Temporary increase in turbidity due to disturbance of 11.6 acres, sediment capture of 0.21 acre-feet per year	Temporary increase in turbidity due to disturbance of 9.7 acres, 0.21 acre-feet of sediment per year no longer captured
Waters of the U.S.	No impact	Permanent installation of 250 feet of gabion basket bank stabilization	Permanent installation of up to 300 feet of riprap bank stabilization
Wetlands	No impact	Permanent loss of less than 0.1 acre of wetlands	Permanent loss of less than 0.1 acre of wetlands

Notes:

¹ Values rounded to the nearest hundred, 2021 price level, 2023 base year, amortized using a 2.5 percent discount rate over a 102-year period of analysis. Values shown for the action alternatives are shown relative to the baseline values of the No Action alternative. Regional Economic Development (RED) account concerns were not identified during the scoping process. Therefore, the RED account information is not included.

² The installation costs account for the initial implementation cost of \$1,761,000 plus a reoccurring rehabilitation cost of \$1,000,000 every five years (2027, 2032, 2037, and 2042).

³ “O, M, & R” stands for Operation, Maintenance, and Replacement.

⁴ Estimates are rounded to the nearest hundred; numbers may not appear to sum correctly due to rounding.

Chapter 6. Consultation, Coordination, and Public Participation

6.1 Initial Request for NRCS Assistance

The initial request for NRCS assistance was submitted in November of 2019. Planning was funded and authorized on April 16, 2021.

6.2 Public Participation

The Scoping Report prepared for the project (see Appendix A) outlines the scoping efforts and comments received during the scoping process. The official scoping comment period opened on July 7, 2021, and closed on August 6, 2021.

A virtual public scoping meeting was held on Wednesday, July 21, 2021. There were seven attendees, excluding the project team. One comment was received from the Pawnee Nation in a letter dated August 10, indicating that “the proposed project/s should not affect the cultural landscape of the Pawnee Nation.” No issues were identified through preliminary public scoping.

6.3 Agency Coordination

Representatives from the USFWS and USACE attended the virtual public meeting on July 21, 2021.

Invitations to participate as a cooperating agency were mailed by the NRCS to the USACE and the USFWS on December 7, 2021.

No issues were identified by the agencies prior to publication of the Draft Supplemental Plan-EA.

6.3.1 Colorado State Historic Preservation Office (SHPO)

A Class III cultural resources inventory was conducted by AECOM on October 29, 2021. A total of four sites were recorded and recommended as not eligible for listing on the NRHP. The report was submitted to the Colorado SHPO on February 2, 2022, to comply with Section 106 of the NHPA. The Colorado SHPO responded on April 29, 2022, stating that they concurred with the determinations of eligibility and a determination of no adverse effect to historic properties for the undertaking (see letter in Appendix A).

6.3.2 USACE

The USACE was notified of the project on July 8, 2021, and invited to be a cooperating agency in a letter dated December 7, 2021; the agency declined the invitation in an email on December 14, 2021 (see correspondence in Appendix A). If required, permitting would be completed after sufficient design was prepared and prior to construction. The USACE indicated that a jurisdictional determination would not be issued prior to submittal of a permit application due to higher priorities.

6.3.3 USFWS

The USFWS was notified of the project on July 8, 2021, and invited to be a cooperating agency in a letter dated December 7, 2021; no response was received. An official species list was acquired from the agency on September 13, 2021. Based on an analysis of the species and habitat that may occur within the area, there would be “No Effect” to listed species or critical habitat; therefore, consultation under Section 7 of the Endangered Species Act is not required.

6.3.4 Colorado Parks and Wildlife

Colorado Parks and Wildlife was notified of the project on July 8, 2021. Geospatial data were acquired from the Colorado Natural Heritage Program and Colorado Parks and Wildlife in September of 2021 to identify species of concern within the watershed and species that could be impacted by project activities. Colorado Parks and Wildlife were also provided data for the area of potential effect on September 29, 2021.

6.4 Tribal Coordination and Consultation

Notification of the project and the scoping period was emailed to 42 contacts in the following 22 tribes:

- Apache Tribe of Oklahoma
- Arapaho Tribe of the Wind River Reservation, Wyoming
- Cheyenne and Arapaho Tribes of Oklahoma
- Cheyenne River Sioux Tribe
- Comanche Nation of Oklahoma
- Crow Creek Sioux Tribe of the Crow Creek Reservation, SD
- Eastern Shoshone Tribe of the Wind River Reservation, Wyoming
- Fort Belknap Indian Community
- Fort Sill Apache Tribe
- Jicarilla Apache Tribe
- Kiowa Tribe of Oklahoma
- Mescalero Apache Tribe
- Northern Cheyenne Tribe
- Oglala Sioux Tribe
- Pawnee Nation of Oklahoma
- Rosebud Sioux Tribe
- Shoshone-Bannock Tribes
- Southern Ute Indian Tribe
- Standing Rock Sioux Tribe
- Ute Indian Tribe of the Uintah & Ouray Reservation, Utah
- Ute Mountain Ute Tribe

The Pawnee Nation responded in a letter dated August 10, 2021, that “the proposed project/s should not affect the cultural landscape of the Pawnee Nation.”

Tribal consultation was conducted in accordance with the National Historic Preservation Act (NHPA) of 1966. The report and letters dated February 4, 2022 (see form letter in Appendix A), were sent to the following tribal contacts:

- Mr. Bobby Komardley, Chairperson, Apache Tribe of Oklahoma
- Mr. Max Bear, THPO, Cheyenne and Arapaho Tribes of Oklahoma
- Mr. Steve Vance, THPO, Cheyenne River Sioux Tribe
- Ms. Martina Minthorn, THPO, Comanche Nation of Oklahoma
- Mr. Merle Marks, THPO, Crow Creek Sioux Tribe of the Crow Creek Reservation
- Mr. Joshua Mann, THPO, Eastern Shoshone Tribe of the Wind River Reservation
- Mr. Morris Belgard, THPO, Fort Belknap Indian Community
- Ms. Lori Gooday Ware, Chairperson, Fort Sill Apache Tribe
- Dr. Jeffrey Blythe, THPO, Jicarilla Apache Tribe
- Ms. Kellie Lewis, THPO, Kiowa Tribe of Oklahoma
- Ms. Holly Houghten, THPO, Mescalero Apache Tribe

- Mr. Ben Ridgley, THPO, Northern Arapaho Tribe of the Wind River Reservation
- Teanna Limpy, Director, Tribal Historic Preservation Officer, Northern Cheyenne Tribe of the Northern Cheyenne Indian Reservation
- Mr. Kevin Killer, President, Oglala Sioux Tribe
- Ms. Ione Quigley, Director THPO Office, Rosebud Sioux Tribe
- Louise E. Dixey, Cultural Resources Director, Shoshone-Bannock Tribes of the Fort Hall Reservation
- Chairman Melvin J. Baker, Southern Ute Indian Tribe of the Southern Ute Reservation
- Mr. Jon Eagle, THPO, Standing Rock Sioux Tribe
- Betsy Chapoose, Cultural Rights and Protection Director, Ute Indian Tribe of the Uintah and Ouray Reservation
- Terry Knight Sr., Tribal Historic Preservation Officer, Ute Mountain Ute Tribe

Consultation letters were sent to three additional tribes in February of 2023:

- Taos Pueblo
- Picuris Pueblo
- Santa Clara

The Northern Cheyenne THPO responded on March 4, 2022, that there would be no effect and the “undertaking may proceed as planned,” and requested that if “cultural resources are located during ground disturbance, please halt all activities and notify our office.” The response letter is provided in Appendix A. The Unanticipated Discoveries procedures (Appendix E.3) includes provisions for notifying concerned Tribes in the event of a discovery.

Notice of availability of the Draft Plan-EA was emailed to the following tribal contacts on October 10, 2023:

- Mr. Bobby Komardley, Chairperson, Apache Tribe of Oklahoma
- Mr. Max Bear, THPO, Cheyenne and Arapaho Tribes of Oklahoma
- Mr. Steve Vance, THPO, Cheyenne River Sioux Tribe
- Ms. Martina Minthorn, THPO, Comanche Nation of Oklahoma
- Mr. Merle Marks, THPO, Crow Creek Sioux Tribe of the Crow Creek Reservation
- Mr. Joshua Mann, THPO, Eastern Shoshone Tribe of the Wind River Reservation
- President Jeffery Stiffarm, Fort Belknap Indian Community
- Ms. Lori Gooday Ware, Chairperson, Fort Sill Apache Tribe
- Dr. Jeffrey Blythe, THPO, Jicarilla Apache Tribe
- Ms. Kellie Lewis, THPO, Kiowa Tribe of Oklahoma
- Ms. Holly Houghten, THPO, Mescalero Apache Tribe
- Mr. Ben Ridgley, THPO, Northern Arapaho Tribe of the Wind River Reservation
- Teanna Limpy, Director, Tribal Historic Preservation Officer, Northern Cheyenne Tribe of the Northern Cheyenne Indian Reservation
- Mr. Kevin Killer, President, Oglala Sioux Tribe
- Ms. Ione Quigley, Director THPO Office, Rosebud Sioux Tribe
- Carolyn Smith, Shoshone-Bannock Tribes of the Fort Hall Reservation
- Chairman Melvin J. Baker, Southern Ute Indian Tribe of the Southern Ute Reservation
- Mr. Jon Eagle, THPO, Standing Rock Sioux Tribe
- Betsy Chapoose, Cultural Rights and Protection Director, Ute Indian Tribe of the Uintah and Ouray Reservation
- Mr. Terry Knight Sr., Tribal Historic Preservation Officer, Ute Mountain Ute Tribe

No comments were received in response.

Chapter 7. The Preferred Alternative

7.1 Rationale for Alternative Preference

The Preferred Alternative for the project is the Full Dam Rehabilitation Alternative as described in Section 4.3.2. This alternative meets the purpose and need of the project by efficiently preserving and increasing flood protection downstream of FPC-2. This alternative is the locally preferred alternative, best meets the federal objective of maximizing public benefits with appropriate consideration of costs, and best addresses the PR&G guiding principles and ecosystem services. Project features were located to utilize existing features as much as possible to reduce new disturbance and associated construction costs. The Preferred Alternative would meet current NRCS and Colorado Dam Safety regulations and engineering standards associated with a high-hazard dam, and ensure the useful life of the structure for at least 100 years.

The No Action Alternative is the least desirable alternative because it provides the fewest services and lowest net economic benefit. When comparing the Full Dam Rehabilitation Alternative with the Federal Decommissioning Alternative, the Sponsors believe that the lower net economic tradeoff for Full Dam Rehabilitation is offset by increased flood regulating and water quality services.

The Watershed Plan area associated with the Preferred Alternative is 29,416 acres in size, and is defined as the HUC 12 subwatershed (Powell Arroyo-Purgatoire River; 110200100601) that contains the Preferred Alternative. The Watershed Plan area is wholly within the Purgatoire HUC 8 watershed (11020010). The watershed area contains the municipality of the City of Trinidad. The Preferred Alternative watershed area is shown on the project map in Appendix B.

7.2 Measures to be Installed

The measures to be installed are the same as those described for the Full Dam Rehabilitation Alternative in Section 4.3.2, and consist of:

1. Outlet system component replacement: Excavate and replace the low-level drawdown pipe and install a new multi-level intake structure on the low-level drawdown pipe to prevent passage of sediment into the conduit.
2. Drain system replacement: The existing toe and foundation drain outlet pipes would be replaced. Seepage collars would be supplemented with a new seepage diaphragm and the reconstructed embankment at the contact with the left and right abutment areas on the upstream and downstream faces would be armored with riprap. A monitoring well would be installed at the dam crest and downstream toe to better observe seepage patterns in order to gauge whether there is a gradient along the dam and compare to the drainpipe discharges. Fencing would be installed around the dam to prevent vehicular access on the embankment.
3. Auxiliary spillway upgrades: The auxiliary spillway would be graded to restore a uniform bottom width of 45 feet and side slopes of 2.22:1 and to have positive drainage. Within the spillway, 6 inches of compost or soil amendment would be incorporated into the surface material to facilitate revegetation and reduce erosion long term. A water gap fence would be installed near the top of the spillway to prevent vehicular access.
4. Outlet channel upgrades: A concrete stilling basin and concrete headwall would be installed on the outlet pipe. Gabion baskets would be installed for approximately 250 feet along the west side of the channel from the outlet to stabilize the streambank and prevent erosion and accumulation of sediment. Approximately 1,000 feet of the outlet channel from outlet pipe to Jefferson Street would be graded to prevent sediment accumulation at the outlet and drainpipes.

The Preferred Alternative would disturb up to approximately 11.6 acres (see Map C-4 in Appendix C). The design features listed in Table 4-1 are also incorporated into the Preferred Alternative.

7.3 Mitigation

Proactive measures to avoid or prevent adverse impacts that could otherwise result from project implementation were identified as project design features and are detailed in Table 4-1. With implementation of the project design features, no other mitigation has been identified as necessary for the Preferred Alternative.

7.4 Permits and Compliance

The following federal, state, and local permits and compliance actions would be required for implementation of the Preferred Alternative.

7.4.1 Federal

- USACE: A Clean Water Act Section 404 permit for fill within jurisdictional waters may be required for full rehabilitation of the dam. The USACE suggested that a jurisdictional determination would not be issued prior to submittal of a permit application due to higher priorities.

7.4.2 State

- Colorado Department of Public Health & Environment: If a Clean Water Act Section 404 permit is required, a Section 401 certification will also be required.
- Colorado Dam Safety: Approval would be required for the final design report, construction drawings, and specifications by the Colorado State Engineer.
- Colorado Department of Public Health & Environment: Coverage under the Colorado Department of Public Safety (CDPS) Stormwater General Permit for Discharges Associated with Construction Activity that disturb over 1 acre would be required in compliance with Clean Water Act Section 402. A SWPPP would be prepared and a Notice of Intent (NOI) would be filed.

7.4.3 Local

- Utility easement encroachment permits would also be acquired from local utility companies where necessary.

7.5 Installation and Financing

The City of Trinidad would acquire all necessary authorizations and permits prior to initiation of project construction. Construction schedules would be based on funding and suitable weather conditions.

The NRCS would provide 65 percent of the total construction rehabilitation cost for the Preferred Alternative with funding from the PL-566 program. The City of Trinidad would be responsible for providing the remaining non-federally funded 35 percent of the rehabilitation cost of the project. NRCS would provide 100 percent of design engineering, and both the NRCS and the city would bear project administration costs that each incurs for the project.

Funding for operation and maintenance of the project measures would be acquired through local taxing authority. The operation and maintenance would be budgeted annually to meet periodic maintenance needs.

7.6 Operation, Maintenance, and Replacement

Operation of the dam includes the administration, management, and performance of non-maintenance actions needed to keep the dam structure safe and functioning as designed. Maintenance includes repairing damage as needed to prevent failure, and may be routine or as needed. Damage caused by normal deterioration, droughts, flooding, or vandalism are considered maintenance. Maintenance of the project measures is described for the Full Dam Rehabilitation Alternative in Section 4.3.2.

Inspection of the project measures is necessary to verify that the structure is safe and functioning properly. The City of Trinidad and Colorado Dam Safety would be responsible for inspecting the dams on an annual basis, as well as after major events such as floods or earthquakes. Inspection reports would be supplied to the NRCS following each inspection. Inspections and the associated reports would assess the following items:

- The adequacy of operation and maintenance activities,
- Needed operation and maintenance work,
- Unsafe conditions, including changes in the use of the floodplain below the dams,
- Specify ways of relieving unsafe work or performing other needed work, and
- Set action dates for performing corrective actions.

The City of Trinidad would continue to be responsible for the operation, maintenance, rehabilitation, and future modifications to the dam. A specific operation and maintenance plan would be prepared by the NRCS and the City of Trinidad in accordance with the NRCS National Operation and Maintenance Manual (NRCS 2003). This plan and agreement would be executed prior to the start of construction activities and would be in place for the extended life of the project. The agreement would provide for inspections, reports, and procedures for performing the maintenance items. The agreement would include specific provisions for retention, use, and property improved with PL-566 assistance.

7.7 Economic Tables

The installation (including technical assistance and construction) cost estimate for the Preferred Alternative is detailed in Table 7-1. No installation activities would occur on or impact federal lands.

Table 7-1. Estimated Installation Cost; Fisher Peak Carbon Arroyo Watershed, Colorado (dollars¹)

Works of Improvement	Unit	Non-federal Land	Total Non-federal Land PL 83-566 Funds	Total Non-federal Land Other Funds	Total
Floodwater-retarding dam rehabilitation	Dam	1	\$3,169,700	\$1,324,200	\$4,493,900

Prepared: October 2021

1. Price base: 2021; Costs rounded up to the nearest hundred

Table 7-2 identifies the estimated installation costs to be charged to the PL 83-566 fund and the costs taken by the City of Trinidad.

Table 7-2. Estimated Cost Distribution – Water Resource Project Measures; Fisher Peak Carbon Arroyo Watershed, Colorado (dollars¹)

Works of Improvement	Construction Costs PL 83-566 Funds	Engineering Costs PL 83-566 Funds	Administration Costs PL 83-566 Funds	Total PL 83-566 Funds	Construction Costs Other Funds	Administration Other Funds	Permits Other Funds	Total Other Funds	Total Installation Costs
Floodwater-retarding dam rehabilitation	\$2,449,900	\$591,200	\$128,600	\$3,169,700	\$1,245,300	\$73,900	\$5,000	\$1,324,200	\$4,493,900

Prepared: October 2021

1. Price base: 2021. Costs rounded up to the nearest hundred; numbers may not appear to sum correctly due to rounding.

Table 7-3 shows the installation costs allocated by purpose; the entirety of the project purpose is dam rehabilitation.

Table 7-3. Cost Allocation and Cost Sharing Summary Water Resource Project Measures; Fisher Peak Carbon Arroyo Watershed, Colorado (dollars¹)

Dam Rehabilitation Items	Cost Share – PL 83-566 Funds	Cost Share – Other Funds	Total
Construction	\$2,449,900	\$1,245,300	\$3,695,200
Engineering	\$591,200	\$0	\$591,200
Real Property Rights	\$0	\$0	\$0
Administration	\$128,600	\$73,900	\$202,500
Permits	\$0	\$5,000	\$5,000
Total	\$3,169,700	\$1,324,200	\$4,493,900

Prepared: October 2021

1. Price base: 2021; Costs rounded up to the nearest hundred; numbers may not appear to sum correctly due to rounding.

7.8 Structural Tables

Table 7-4 summarizes the proposed dams with planned storage capacity.

Table 7-4. Structural Data – Dam with Planned Storage Capacity; Fisher Peak Carbon Arroyo Watershed, Colorado

Design Parameter	Unit	FPC-2
Class of structure	-	High
Seismic zone ¹	-	NA
Uncontrolled drainage area	sq-mi	0.32
Controlled drainage area	sq-mi	0
Total drainage area	sq-mi	0.32

¹ Per TR-60, seismic zones are no longer applicable.

Design Parameter	Unit	FPC-2
Runoff curve No. (1-day) (AMC II)	-	76
Time of concentration (Tc)	hours	0.58
Elevation top dam (NAVD 88)	feet	6146.52
Elevation crest auxiliary spillway (NAVD 88)	feet	6140.20
Elevation crest high stage inlet	feet	NA
Elevation crest low stage inlet (NAVD 88)	feet	6127.40
Auxiliary spillway type	-	earthen
Auxiliary spillway bottom width	feet	45
Auxiliary spillway exit slope	percent	0.2
Maximum height of dam	feet	62
Volume of fill	cu-yd	54,293
Total capacity at crest of auxiliary spillway	acre-feet	77.2
Sediment submerged	acre-feet	0
Sediment aerated	acre-feet	13.8
Beneficial use	-	NA
Floodwater retarding	acre-feet	63.3
Between high and low stage	acre-feet	NA
Surface area	acres	11.41
Sediment pool	acres	2.88
Beneficial use pool	acres	NA
Floodwater retarding pool at crest of auxiliary spillway	acres	8.46
Principal spillway design		
Rainfall volume (1-day)	inches	4.92
Rainfall volume (10-day)	inches	7.3
Runoff volume (10-day)	inches	2.8
Capacity of low stage (max.)	cfs	37.5
Capacity of high stage (max.)	cfs	NA
Dimensions of conduit	inch	30
Type of conduit	-	R/C Pipe
Frequency operation-auxiliary spillway	percent chance	< 0.2
Auxiliary spillway hydrograph		
Rainfall volume	inches	10.22
Runoff volume	inches	7.21
Storm duration	hours	24
Velocity of flow (Ve)	ft/s	0.9
Max. reservoir water surface elev.	Feet	6141.93
Freeboard hydrograph		
Rainfall volume	inches	25.3
Runoff volume	hours	21.87

Design Parameter	Unit	FPC-2
Storm duration	hours	24
Max. reservoir water surface elev.	Feet	6144.66
Capacity equivalents		
Sediment volume	inches	0.81
Floodwater retarding volume	inches	3.71
Beneficial volume (identify use)	inches	NA

Table 7-5 summarizes the proposed flood conveyance channel measures.

Table 7-5. Structural Data – Channel Work; Fisher Peak Carbon Arroyo Watershed, Colorado

Item	Unit	Downstream Channel
100 Year freq. design discharge	cfs	36
Water surface elevation	feet asl	6086.4
Hydraulic gradient	feet/feet	0.018
Channel gradient	feet/feet	0.018
Channel bottom width	feet	8
Channel elevation	feet asl	6085.1
Channel side slope	V:1	2.5
<i>n</i> value – aged		0.037
<i>n</i> value – as built		0.037
Velocities – aged ²		2-4.5
Velocities – as built		2-4.5
Excavation volume	cubic yard	1,660
Type of work		II ³
Existing channel type		M ⁴
Present flow condition		Ephemeral

Table 7-6 shows the anticipated average annual costs of the Preferred Alternative. It also summarizes the total annual cost based on the annualized cost of installation, amortized over 100 years, and the average annual cost for operations and maintenance.

² Velocities reflect maximum velocities at the design channel discharge.

³ Enlargement or realignment of existing channel or stream.

⁴ Manmade ditch or previously modified channel or stream

Table 7-6. Estimated Average Annual Costs; Fisher Peak Carbon Arroyo Watershed, Colorado (dollars¹)

Works of Improvement	Project Outlays Amortization of Installation Cost²	O&M	Other Direct Costs	Total
Floodwater-retarding dam rehabilitation	\$122,700	\$1,600	\$0	\$124,300

Prepared: October 2021

1. 2021 price level, 2023 base year, amortized using a 2.5 percent discount rate over a 102-year period of analysis. Numbers may not appear to sum correctly due to rounding.

2. Costs for technical assistance to install measures are included.

Table 7-7 summarizes the estimated average annual benefits and costs of the Preferred Alternative; the proposed measures are combined into a single analysis unit, as the individual measures function together as a single system and depend on each other.

Table 7-7. Comparison of Annual Benefits and Costs; Fisher Peak Carbon Arroyo Watershed, Colorado (dollars¹)

Annual Benefits	\$136,900
Total Average Annual Damages Avoided ²	\$0
Total Average Annual Construction Costs Avoided	\$131,900
Total Average Annual O&M Costs Avoided	\$4,900
Annual costs	\$124,300
Average Annual Construction Costs	\$122,700
Average Annual O&M Costs	\$1,600
Net benefits	\$12,600
Benefit-Cost Ratio	1.1

Prepared: October 2021

1. Values rounded to the nearest hundred, 2021 price level, 2023 base year, amortized using a 2.5 percent discount rate over a 102-year period of analysis. Numbers may not appear to sum correctly due to rounding.

2. Value rounded to the nearest ten.

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Chapter 9. List of Preparers

The Draft Supplemental Plan-EA was reviewed by state NRCS resource specialists and the NRCS's National Water Management Center (NWMC).

Table 9-1. Supplemental Plan-EA Preparers

Name	Affiliation	Title (Years of Experience)	Education	Other
John Andrews	NRCS-Colorado	State Conservation Engineer(42)	B.S. – Agricultural Science B.S. – Agricultural Engineering M.S. – Environmental Engineering	Colorado, Illinois P.E. CPESC
Ana Vargo	NRCS-Colorado	State Geologist (32)	B.A. -Geology M.S. – Geology	Utah and Wyoming, P.G.
Krystal Phillips	NRCS-Colorado	State Biologist & Environmental Compliance Lead (15+)	B.A. – Biology M.A.S. – Environmental Policy – Natural Resources	
Craig Dengel	NRCS-Colorado	State Cultural Resource Specialist (15)	B.A. – Sociology and Anthropology M.S. – Geography Ph.D. ABD. – Anthropology	
Jenna Jorgensen	Jones and DeMille Engineering	Environmental Coordinator (13+)	B.S. – Biology M.S. – Conservation Biology	
Ricky Anderson	Jones and DeMille Engineering	Hydrology/Hydraulics Engineer (11+)	B.S. – Civil Engineering M.S. – Civil Engineering	Utah P.E., CFM
Kedric Curtis	Jones and DeMille Engineering	Project Engineer (5+)	B.S. – Civil Engineering M.S. – Civil Engineering	Utah, New Mexico P.E.
Hayden Coombs	Jones and DeMille Engineering	Project Engineer (3+)	B.S. – Civil Engineering M.S. – Civil Engineering	Utah P.E.
Thomas Carr	AECOM	Archaeologist (28+)	B.A. – Anthropology M.A. Anthropology	Colorado, Utah, Wyoming permits
Jason Weiss	AECOM	Economist (25)	B.S. – Industrial Engineering M.S. – Resources Economics and Policy	
Robert W. Snow	AECOM	Senior Geotechnical Engineer (16+)	B.S. – Civil Engineering M.S. – Civil Engineering	Utah P.E.
Amanda Lopez	AECOM	Structural Engineer (16)	B.S. – Civil/Structural Engineering	Colorado, New Mexico, Arizona, Texas P.E.

Name	Affiliation	Title (Years of Experience)	Education	Other
Hadleigh Tyler	AECOM	Geotechnical Lead (11)	B.S. – Civil Engineering M.S. – Civil Engineering	Colorado, Kansas, New Mexico P.E.
Austin Reed	AECOM	Geologist (9)	B.S. – Geology	Colorado P.G.
Thomas Redstone	AECOM	Economist (4+)	B.A. – Economics and Environmental Studies M.A. – Policy, Planning, and Management	AICP, ENV SP
Alice Chen	AECOM	Economist (2.5)	B.S. – Economics, Environmental Studies M.S. – Environmental Science and Policy	

Chapter 10. Distribution List

A notice of availability for the Draft Supplemental Plan-EA was distributed to the following government agencies/staff and organizations.

10.1 Federal Agencies

Federal Emergency Management Agency (FEMA)

U.S. Environmental Protection Agency (EPA)

U.S. Army Corps of Engineers (USACE)

U.S. Fish & Wildlife Service (USFWS)

10.2 Tribal Entities

Apache Tribe of Oklahoma

Northern Arapaho Tribe of the Wind River Reservation

Cheyenne and Arapaho Tribes of Oklahoma

Northern Cheyenne Tribe of the Northern Cheyenne Indian Reservation

Cheyenne River Sioux Tribe

Oglala Sioux Tribe

Comanche Nation of Oklahoma

Crow Creek Sioux Tribe of the Crow Creek Reservation

Rosebud Sioux Tribe

Eastern Shoshone Tribe of the Wind River Reservation

Shoshone-Bannock Tribes of the Fort Hall Reservation

Fort Belknap Indian Community

Southern Ute Indian Tribe of the Southern Ute Reservation

Fort Sill Apache Tribe

Standing Rock Sioux Tribe

Jicarilla Apache Tribe

Ute Indian Tribe of the Uintah and Ouray Reservation

Kiowa Tribe of Oklahoma

Ute Mountain Ute Tribe

Mescalero Apache Tribe

10.3 State Entities

State Representative

State Senator

U.S. Representatives

U.S. Senators

State of Colorado – Office of the Governor

Colorado Division of Water Resources – Dam Safety

Colorado Department of Public Health & Environment

Colorado State Conservation Board

Colorado Parks and Wildlife

Colorado State Historic Preservation Office

10.4 Local Government

City of Trinidad

Las Animas County

10.5 Other Organizations

No other organizations were identified or expressed interest during the scoping period.

10.6 Private Parties

The names and addresses of private parties who received notices of the Draft Supplemental Plan-EA are not listed in this chapter for privacy.

Chapter 11. Acronyms, Abbreviations, and Short Forms

APE	Area of potential effect
BLM	Bureau of Land Management
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CDPHE	Colorado Department of Public Health & Environment
CDPS	Colorado Department of Public Safety
CPW	Colorado Parks and Wildlife
EPA	U.S. Environmental Protection Agency
FBH	Freeboard Hydrograph
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FPC-2	Fisher Peak Carbon Arroyo Watershed Dam
HUC	Hydrologic Unit Code
IDF	Intensity-Duration-Frequency
IPaC	Information for Planning and Consultation
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NWPM	National Watershed Program Manual
O&M	Operations and Maintenance
PL-566	Public Law 83-566
Plan-EA	Watershed Plan-Environmental Assessment
PSH	Principal Spillway Hydrograph
REPS	CO-NM Regional Extreme Precipitation Study
ROD	Record of Decision
SCS	Soil Conservation Service
SDH	Stability Design Hydrograph
SHPO	Colorado State Historic Preservation Office
SWAP	State Wildlife Action Plan
SWPPP	Stormwater Pollution Prevention Plan
TR-60	Technical Release 210-60
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Chapter 12. Appendices

Appendix A — Comments and Responses

Appendix B — Project Map

Appendix C — Support Maps

Appendix D — Investigation and Analysis Report

Appendix E — Other Supporting Information

Appendix A. Comments and Responses

- A.1. Public Participation Plan
- A.2. Scoping Report
- A.3. Cooperating Agency Invitation Letters and Responses
- A.4. Tribal Consultation Letters and Responses
- A.5. NHPA Section 106 Consultation Documents
- A.6. Draft Plan-EA Comments

A.1. Public Participation Plan



United States
Department of
Agriculture

Natural Resources
Conservation Service

June 2021

Public Participation Plan

Fisher Peak Carbon Arroyo Watershed Dam Rehabilitation Supplemental Watershed Plan-EA Project

Las Animas County, Colorado



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To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html 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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Purpose of This Strategy

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) proposes to supplement the Fishers Peak – Carbon Arroyos Watershed Work Plan under Public Law 83-566 (PL-566) authority (Watershed Protection and Flood Prevention Act of 1954, as amended). The NRCS National Watershed Program Manual (NWPM) sets forth the policy for all watershed plans developed under the PL-566 Program. No project will be funded unless it meets the requirements set forth in the manual. PL-566 authorizes the NRCS to provide technical and financial assistance to sponsoring local organizations (Sponsors) to prepare and implement watershed plans. The Sponsor for this effort is the City of Trinidad.

Fisher Peak Carbon Arroyo Watershed Dam (FPC-2) was designed and constructed by the Soil Conservation Service (now NRCS) under the Fishers Peak – Carbon Arroyos Watershed Work Plan that was approved by Congress in 1960. The dam was constructed in 1962. Recent assessments indicate that the dam and appurtenances do not meet current NRCS or Colorado Dam Safety criteria for numerous criteria. Alterations to bring the dam into compliance with current criteria will require a supplement to the 1960 Plan. The NRCS will assist the City of Trinidad in preparing a supplemental watershed project plan and environmental assessment, which will be combined into a single document, called the Supplemental Plan-EA. The Supplemental Plan-EA will be prepared to comply with the National Environmental Policy Act (NEPA). The purpose of the Supplemental Plan-EA is to develop a watershed project plan so that NRCS can decide whether to provide technical and financial assistance for implementation of the alternative selected by the City of Trinidad.

The intent of this public participation plan is to outline the outreach methods and timing of public participation throughout the planning and NEPA process in developing the Supplemental Plan-EA.

This strategy has been designed to assist with communication between the NRCS, the City of Trinidad, and the public. This document should be considered a “living document” as it may be updated as information changes (such as contact information or as activities are completed or new ones are identified).

Public Participation Objectives

The term “public” used in this document is a broad term that includes private citizens, local, state, regional, and national government entities, federally recognized Indian Tribes, formal collaborative groups, cooperating agencies, special interest groups, community groups, and others.

The primary objectives are to deliver concise, consistent messages regarding the Plan-EA process and to engage the public in the process.

In order to keep the public and all associated agencies and organizations fully informed throughout the duration of the project, the strategy will:

- Familiarize the general public, including private groups and government agencies at local, county, and state levels, with the proposed project.
- Provide a forum for the reception and consideration of public input regarding the project. The desired input includes not only opinion, but also available data.
- Identify and clarify the impacts of the alternatives under consideration.

- Collect existing resource data regarding the Fisher Peak Carbon Arroyo Watershed. The data may be collected from various agencies and citizens.
- Incorporate written comments into the decision-making process.

Techniques to Ensure Public Participation

The following techniques will be implemented within the watershed planning process:

1. Hold a meeting between NRCS and the Sponsor to explain the Watershed Program and process.
2. Contact local agencies, explain the Watershed Program, and request existing resource data about the watershed.
3. Determine if participation by potential Cooperating Agencies is needed, and if so, the required scope and extent of their participation.
4. Contact local media representatives to request their assistance informing the public.
5. Provide opportunities to share information and obtain input from all project stakeholders.
6. Post notices in local forums, municipal buildings, and other gathering places to announce public meetings. Methods may include a public website, project fact sheets, and social media posts.
7. Discuss ongoing developments at meetings to explain the planning process and seek input regarding the project problems and opportunities, the range of alternatives, and the potential project impacts.
8. Develop an email address list to facilitate electronic notification and updates as needed.

Information Provided and Obtained

1. Early in the Planning Process
 - a. Information provided to the public:
 - i. NRCS Watershed Program Outline
 - ii. Objectives of the Supplemental Watershed Plan-EA
 - iii. Known watershed problems and opportunities
 - iv. Discussion of the preliminary potential alternatives
 - v. Explanation of the process through completion
 - b. Information to be obtained:
 - i. Watershed natural resource problems that should be addressed
 - ii. Data and other information that may be pertinent to the planning activities
 - iii. Alternatives that should be considered and how the alternatives may affect their property and lives
 - iv. Range of effects that should be determined relative to the evaluated alternatives
2. Later in the Planning Process
 - a. Information provided to the public:

- i. Identified problems and opportunities
 - ii. Sponsor objectives
 - iii. Alternatives considered
 - iv. Alternatives evaluated, including a comparison of effects (ecological, economic, social, physical, cultural, etc.)
 - v. Preferred alternative
 - vi. Draft Supplemental Plan–EA
 - vii. Finding of No Significant Impact (FONSI) for an Environmental Assessment (EA), or Record of Decision (ROD) for an Environmental Impact Statement (EIS)
- b. Information to be obtained:
 - i. Verbal and written feedback/comments on the above items

Information that is obtained through the public participation process will be reviewed and incorporated into the analysis as appropriate. Substantive comments will be fully addressed in the final Supplemental Plan-EA, per direction in the NEPA regulations and the NWPM.

Schedule of Public Participation Activities

1. First planning meeting: Kick-off meeting with City of Trinidad, NRCS, and Jones and DeMille Engineering (JDE) team
 - Date – September 2, 2020
 - Location – Online/Conference Call
 - Responsibility – JDE with NRCS oversight

2. Preliminary Public Scoping Meeting - Virtual: A virtual meeting will be held during regular business hours to accommodate federal, state, and local agency staff and identified stakeholders to introduce the project, solicit agency-specific questions, request existing resource data about the watershed, and identify likely cooperating agencies. Jones and DeMille Engineering will present the conceptual project plan and an overview of the NEPA process. Members of the public who wish to observe social distancing may also attend the virtual meeting.
 - Date – TBD July, 2021, 2:00 PM MDT
 - Location – Virtual meeting
 - Responsibility – JDE lead, City of Trinidad support, NRCS oversight
 - Methods:

- JDE will prepare a meeting invitation/project flyer for approval by City of Trinidad and NRCS. Meeting details for both public meeting options will be provided. The flyer will be emailed to identified contacts, and posted locally in Trinidad. The notice will also include the project website location.
3. Preliminary Public Scoping Meeting - In-person: An in-person meeting will be held locally to introduce the project and solicit public feedback about the project. Jones and DeMille Engineering will present the conceptual project plan and an overview of the NEPA process.

Date – TBD June/July, 2021, 5:30 PM MDT

Location – Trinidad Community Center.

Responsibility – JDE lead, City of Trinidad support, NRCS oversight

Methods:

- A press release and meeting notice will be published electronically in *The Chronicle-News* on at least 3 different days beginning at least 15 days before the scheduled meeting; the notice will also include the project website location.
 - The meeting flyer will be emailed to the contact list and posted locally.
 - Notices will be posted by City of Trinidad (Sarah Dixon) on social media accounts.
4. Draft PLAN-EA Notice of Availability (NOA): Following the completion of the Draft Supplemental Plan-EA, a Notice of Availability (NOA) will be published locally and will provide the date, location, and time of the public meeting for receiving comments on the Draft Plan-EA.

Date – Fall 2021

Responsibility – JDE lead, City of Trinidad support, NRCS oversight

Methods:

- A new release for the meeting notice will be published in *The Chronicle-News* on at least 3 different days beginning at least 15 days before the scheduled meeting.
- Project notification letters or emails will be mailed to a pre-determined mailing list approximately 2 weeks prior to the public meeting.
- The meeting notice will be posted locally.

- Notices will be posted by City of Trinidad (Sarah Dixon) on social media accounts.
5. Public Review Meeting: A public meeting will be held following publication of the Draft Supplemental Plan-EA, per NWPM 502.21. Jones and DeMille Engineering will present the preferred alternative and evaluation framework, and discuss the environmental effects of the preferred alternative. The meeting will be open to input and feedback from the public concerning the content and effectiveness of the Draft Plan-EA.
- Date – Fall 2021
- Location – TBD
- Responsibility – Jones and DeMille Engineering support NRCS and City of Trinidad
6. Publish Final Supplemental Plan-EA and Finding of No Significant Impact (FONSI) if a Plan-EA: Following the completion of the Final Supplemental Plan-EA, an NOA will be published locally for the Final Supplemental Plan-EA and the FONSI.
- Date – Winter 2021/2022
- Responsibility – Jones and DeMille Engineering support NRCS as lead
- Methods:
- The NOA will be published in *The Chronicle-News*.
 - The NOA will be mailed or emailed directly to identified interested parties on the mailing list.

A.2. Scoping Report



United States
Department of
Agriculture

Natural Resources
Conservation Service

Scoping Report

Fisher Peak Carbon Arroyo Watershed Dam FPC-2 Rehabilitation Project

Las Animas County, Colorado

August 2021



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1. Introduction

The United States Department of Agriculture Natural Resources Conservation Service (NRCS), with the City of Trinidad as the project sponsor, is proposing to partially fund through the Watershed Protection and Flood Prevention Act (Public Law [PL] 83-566), the Fisher Peak Carbon Arroyo Watershed Dam FPC-2 Rehabilitation Project in Las Animas County, Colorado.

NRCS, as the lead federal agency, is initiating National Environmental Policy Act (NEPA) analysis in the form of a new Watershed Plan and Environmental Assessment (Plan-EA) to analyze impacts to the natural and human environment from this project.

The Plan-EA will comply with the Council on Environmental Quality's (CEQ's) regulations at 40 CFR Parts 1500-1508, which require an evaluation of potential environmental impacts associated with federal projects and actions. The purpose of the Plan-EA is to develop a watershed project plan so that NRCS can decide whether to provide technical and financial assistance to the City of Trinidad for implementation of the alternative selected by the city.

1.1. Purpose and Need

Based on recent assessments, the dam had a number of deficiencies and no longer meets federal standards. The need is to bring the dam and spillway facilities into compliance with current federal standards. The purpose of the project is dam rehabilitation; more specifically, to preserve and increase flood protection downstream of FPC-2.

1.2. Scoping Goals and Objectives

Scoping is the first step of and an integral part of the NEPA process. It is an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action (40 CFR Part 1501.7). The objectives of the scoping process are to:

- Engage interested parties and the general public in the early identification of concerns, potential impacts, and possible alternative actions;
- Determine the scope and the significant issues to be analyzed in depth in the Plan-EA;
- Identify potentially significant issues related to the proposed action, as well as identifying and eliminating issues that are not significant or that have been covered by prior environmental review;
- Identify the scope of issues to be addressed and integrate analyses required by other environmental laws (e.g., Endangered Species Act, National Historic Preservation Act); and
- Identify technical studies needed to adequately address potential impacts of the project.

2. Scoping Process

2.1. Schedule

The following dates outline the milestones for the scoping announcement and activities that occurred in preparation for the formal scoping comment period. The scoping comment period opened on July 7, 2021, and closed on August 6, 2021.

- September 2, 2020: Kick-off meeting with the NRCS and sponsor project team
- **July 7, 2020: Opening of formal preliminary public scoping period.**
 - Flyers were mailed to agencies, stakeholders, and tribes
 - Flyers were posted locally
 - Notice was posted to social media accounts by City of Trinidad
 - Meeting details were posted to the project website (<https://fisherpeakdamea.com/>)
- July 8, 2020: Notice was published in *The Chronicle-News* each day until July 22
- July 21, 2021: Virtual preliminary public scoping meeting was held via Zoom at 2:00 p.m. MDT
- July 22, 2021: In-person preliminary public scoping meeting was scheduled at the Trinidad Community Center in Trinidad, Colorado; there were no public attendees.
- **August 6, 2021: Close of formal public comment period**

2.2. Kick-off Meeting

A kick-off meeting with the NRCS and sponsor project team was held virtually on September 2, 2020. The meeting included discussions of the scope of the project, identified scoping methods, and reviewed data collection strategies. The meeting record is attached as Appendix A.

2.3. Mailing List

A project mailing list was compiled by the NRCS, Jones & DeMille Engineering, and the City of Trinidad to identify the entities that would receive scoping materials directly. A total of 25 contacts were emailed the flyer. A tribal mailing list was prepared by the NRCS, and flyers were emailed to 42 tribal members with 25 tribes.

2.4. Public Notice

Public notice of the project and scoping meeting was distributed widely prior to the public scoping meetings on July 21 and 22. The official scoping comment period opened on July 7, 2021, and closed on August 6, 2021. The public notice was published in *Chronicle-News* from July 8 to July 22; the affidavit of publication is attached as Appendix B. The public notice was also posted to the project website, city social media accounts, and mailed to each designated entity on the project mailing list between July 7 and 10. The notice invited all interested members of the relevant agencies and general public to participate in the public meetings, and provided details for submitting comments by website, email, mail, or phone. The scoping notice flyer is attached as Appendix C.

2.5. Preliminary Public Scoping Meetings

A virtual public scoping meeting was held on Wednesday, July 21, 2021. The meeting began with a presentation of the PL-566 program and proposed watershed area, as well as an introduction to the NEPA process; presenters included staff from the NRCS (John Andrews) and Jones and DeMille Engineering (Jenna Jorgensen and Kedric Curtis). The presentation was followed by an open question session where attendees were encouraged to discuss specific concerns with the presentation team. The presentation slides are provided as Appendix D. The attendee list from Zoom is included as Appendix E.

An in-person meeting was offered at the Trinidad Community Center on July 22; there were no public attendees.

3. Comments

The formal open public comment period was from July 7 to August 6, 2021.

Comments could be submitted in person at the meeting or by website, email, mail, or phone. One comment was received from the Pawnee Nation in a letter dated August 10, indicating that “the proposed project/s should not affect the cultural landscape of the Pawnee Nation.”

4. Summary of Identified Issues

No issues were identified beyond the concerns listed in the National Watershed Program Manual section 501.24.B.

Appendix A. Kick-off Meeting Record

CORPORATE

1535 South 100 West
Richfield, UT 84701
435.896.8266

50 South Main, Suite 4
Manti, UT 84642
435.835.4540

1675 South Highway 10
Price, UT 84501
435.637.8266

45 South 200 West (45-13)
Roosevelt, UT 84066
435.722.8267

775 West 1200 North
Suite 200A
Springville, UT 84663
801.692.0219

435 East Tabernacle, Suite 302
St. George, UT 84770
435.986.3622

16 East 300 South
PO Box 577
Monticello, UT 84535
1.800.748.5275

38 West 100 North
Vernal, UT 84078
435.781.1988

Fisher Peak Project NRCS Kick-Off Mtg.

9-2-20, 3:00 – 4:20 pm MT

Invitees / Attendees:

NRCS: Sharla Goforth (CO), John Andrews (COR), Liz With (Assist. State Cons. & Program Manager), Levi Montoya (Trinidad Office Manager, Keep him aware of all progress, any on-site mtgs... Also a local coordinator, mtg. facilitator, etc. for the project), Todd Bolt, Anna Vargo (State Geologist, Invite her to Geotech drilling planning, and Geotech on-site)

Trinidad City: Tom Beach, Public Works Director, Point of Contact until Mid November. Jenny Jackson is the Project Manager for Cap. Improvement projects.

Another great contact

Other Agency Folks: Mark Perry, Colo. Dam Safety over this region, Pueblo Colo. Office (Wants to accompany us on the on-site) phone: (719)-250-5606

JDE: Ricky Anderson, Jenna Jorgenson, Darin Robinson, Kedric Curtis

AECOM: Amanda Lopez, Hadleigh Tyler, Jason Weiss,

Introductions:

- NRCS, Trinidad, Dam Safety, other Agencies – John Andrews
- Invoicing process & frequency – John Andrews
 - Review process (review of progress completed first, then submit to Sharla in IPP)
- Delivery Team members changes – Darin
 - Jeff Irvin (AECOM) – Up-front advisement & Sr. peer review as needed.
 - Support staff/horsepower: Addition of Kedric Curtis PE in H&H role
- Communication protocol brief overview- Darin (Email it out after the mtg.)

Project Overview

- SOW overview & Sponsor and Co-Sponsor general expectations – John A., Sharla, : Four phases of SOW are clearly laid out.
 - Trinidad: Looking for a more functional inlet structure that requires less maintenance. As it stands right now, they must clean the inlet after almost every storm. Deep-rooted veg build-up at outlets have been a problem as well.
 - Overview GIS map (watershed area, key features, risks, geo-tech drilling plan, etc..) – Ricky / Hadleigh:
 - Available data summary & Additional Requests overview (See accompanying document) - Ricky
- Scope and Schedule Details – Ricky / Darin
 - Scope overview high level assumptions and limitations (Darin)
 - Overall Schedule, Deliverables, Milestones.. - Ricky
 - Project progress meetings & updates
 - Deliverable schedule
 - Schedule Risks Discussion
 - Mtgs. & Conferences (NEPA and planning, field work, On-Site, etc..) - Jenna & Team

- Assumptions: Scoping meetings would occur during Phase IB (After Phase 1A is complete)
 - John doesn't see any barrier to starting the scoping/public participation except that Phase 1A work will outline the required work..
 - Combine meetings where possible for efficiency/maximizing participants time
- Alternatives to Consider - Darin
 - Discuss concept ideas on locally preferred alternative: Keep the Dam in service after identifying any necessary upgrades to meet the new hydrology standards.
 - Non-structural alternative (dam decommissioning, floodproofing, relocating hazards) NOT a reasonable option per Tom Beach.
- Next Steps
 - Field Work, City Coordination, etc..
 - City doesn't have equipment to clean the outlet conduit. Probably 6" to 8" of sediment. As long as we conduct video inspection while the sediment is dry for camera access, it will not be a problem (Adequate visibility of conduit).
 - Tom Beach: Will take a picture of the outlet, and foundation drain outlets.
 - Access into the outlet channel is steep, might be some trash and debris.
 - On-Site: Planned for the week of October 5th. Levi and Tom are available that week. Need to check with Mark Perry.
 - Lidar Data Availability: John Andrews has gathered the available Lidar data and remaining available data. Will provide the data through Sharefile..
 - Additional GIS data can be made available as needed. John will provide access to NRCS GIS person if needed.
 - Scheduling of Conferences:
 - Tentative appointments for conferences will be provided not for calendar placeholders. Can make adjustments and combinations as needed as the work progresses.
 - Other Critical Path Items Scheduling
 - Public and Agency scoping (Phase IB)
- Economics Overview (Not Discussed. Will discuss at pertinent upcoming conference call):
 - PR&G vs. P&G changes.. discussion (what it means to them and their project)
 - Without Project Alternative explanation..
- PPP Draft – Jenna
 - PPP schedule review (Pending completion of Phase IA:
 - Scoping notice?
 - Work out that process with the City and provide the drafts to the City to be publicized. City will advertise/scope if we provide them with the info



- Initial scoping meetings – separate agencies and public?
 - Provide a recommendation to them as it gets closer..
- Tribal consultation initiation letter – draft letter for NRCS archaeologist?

Action Items:

Items	Responsible	Date / Notes
Pictures of conduit and drain pipe outlets	Tom Beach	9-23-20
Data Sharing Site - Sharefile	Ricky / Darin	9-23-20
Schedule and coordinate field survey / on-site (week of Oct. 5)	Darin	9-23-20
Upload remaining data, Lidar, etc.	John Andrews	9-23-20
Provide Communication Protocol, Schedule of Deliverables, etc.	Darin / Ricky	9-23-20

Miscellaneous Items:

Miscellaneous Fisher Peak notes:

One of the main reasons for this project from the SOW:

Dam Safety agencies in Colorado and New Mexico have recently completed the CO-NM Regional Extreme Precipitation Study (REPS). REPS precipitation data is considered more appropriate to determine the IDF than the sources used in the 2015 assessment. Both NRCS criteria (TR-210-60, March 2019) and Colorado Dam Safety Criteria (Colorado Rules and Regulations for Dam Safety and Dam Construction, January 1, 2020) have been revised since the dam assessment was completed. Therefore, the findings in the 2015 assessment report must be revisited to evaluate the adequacy of current spillway capacity.

Quick notes from the last assessment report from 2015:

- Dam built in 1961
- Height = 61.7'
- Storage = 119.8 ac-ft
- Drainage area = 0.34 sq-mi
- Current rating is High Hazard, previous study confirmed High Hazard
- Not much sediment has accumulated, estimated at 0.2 ac-ft in 2015
- To pass 72-hour PMP (also FBH) without overtopping dam (2,547 cfs)...
 - Alt 1: Widen Auxiliary Spillway (\$837,000)



- Alt 2 (recommended): raise dam of crest by 3.5 foot raise (\$613,000)
- Primary Outlet (as-built screenshot below)
 - Low level outlet = 12" steel pipe
 - Concrete riser (2nd outlet) leads to 30" RCP pipe
- PDF Pages for Maps and Pictures:
 - 25 - Dam maps
 - 212 - Flood Map (sunny day breach)
 - 258 - Pictures (embankment, principal spillway outlet)

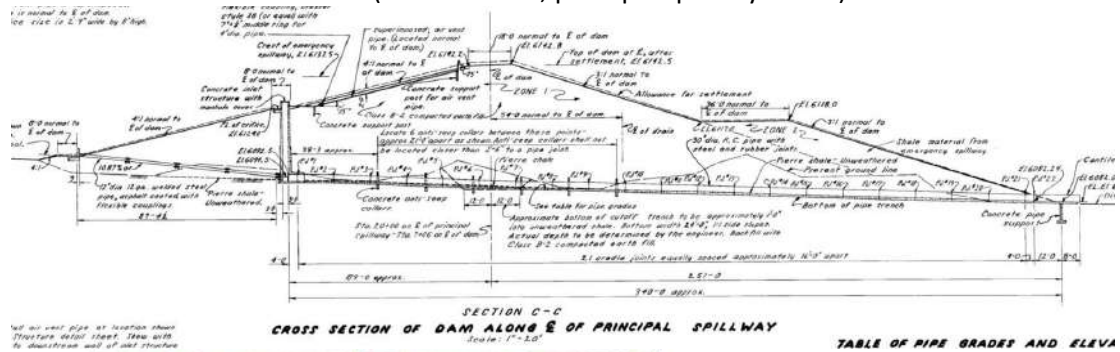


Photo 9: Principal spillway riser inlet showing vegetation at inlet opening. (12/11/2014)



Photo 10: Low level inlet showing sediment accumulation and water impounding at inlet due to deteriorated and corroded low level inlet pipe downstream of the concrete inlet. (12/11/2014)





Photo 15: Interior of outlet pipe showing sediment accumulation. (12/11/2014)

SOW Details for Discussion:

Dam rehabilitation activities are authorized to accomplish one or more of the following objectives:

- 1. Protecting the integrity of the dam or extending the useful life of the dam beyond the original evaluated life expectancy.**
2. Correcting the deterioration of structural components that are deteriorating at an abnormal rate.
- 3. Upgrading the dam to meet changed land use conditions in a watershed served by the dam or changed safety criteria applicable to the dam.**
4. Decommissioning (removal) of the structure and stabilizing the site.

Additionally, in accordance with PRG and/or NRCS regulation and policy, the following alternatives shall be identified:

- i. The locally preferred (sponsor's) alternative
- ii. A non-structural alternative (least-cost combination of structural and non-structural features)
- iii. The Net Economic Efficiency (NEE) alternative

The A-E will document consideration of completeness, effectiveness, efficiency, and acceptability of the alternatives.



Fisher Peak Carbon Arroyo Watershed Dam - Plan EA

Client: City of Trinidad, Colorado

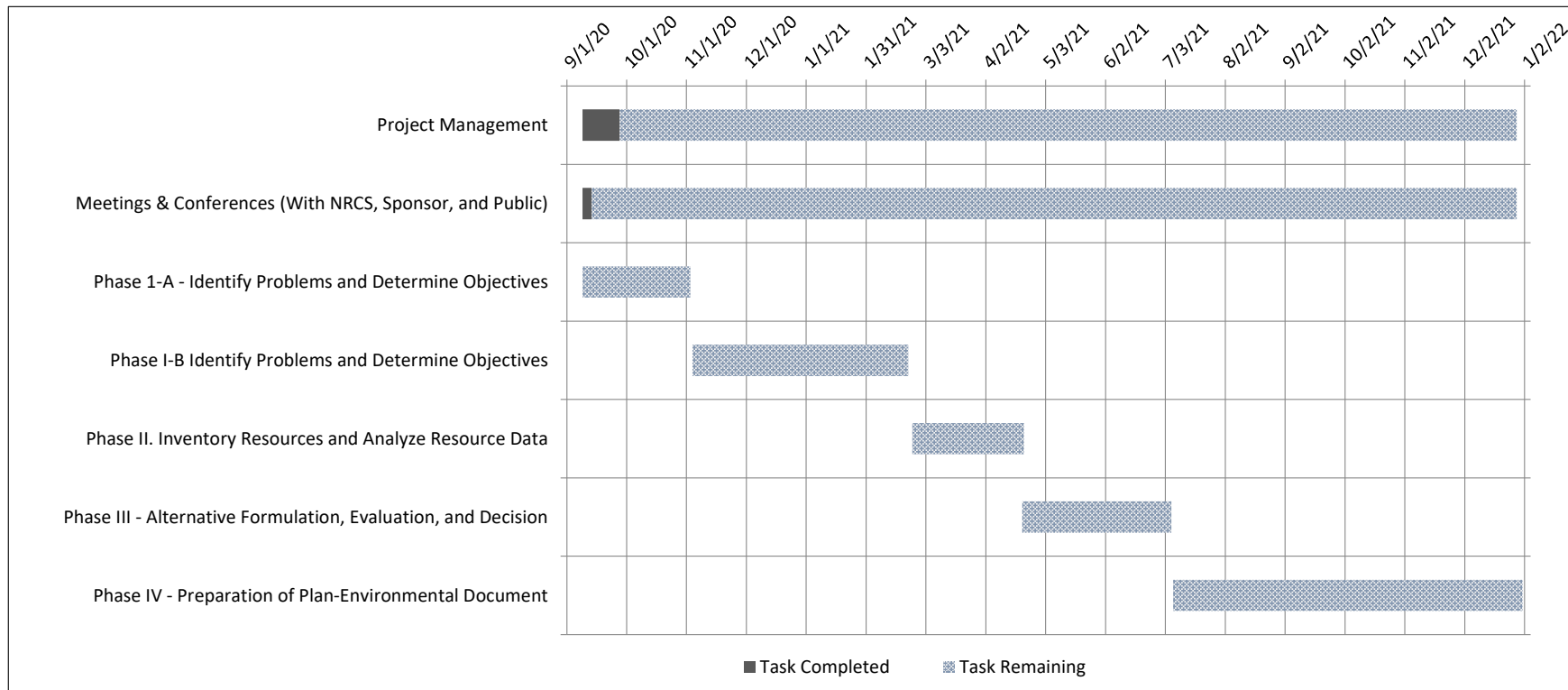
Proj #: 2009-056

PM: Darin Robinson

Date: 9/22/2020

Phase Schedule

Phase Number	Phase Name	Start Date	End Date	Percent Complete	Task Duration	Task Completed	Task Remaining	Notes
-	-	<i>date</i>	<i>date</i>	<i>%</i>	<i>days</i>	<i>days</i>	<i>days</i>	-
NA	Project Management	9/9/2020	1/5/2022	4%	476	19	457	
10	Meetings & Conferences (With NRCS, Sponsor, and Public)	9/9/2020	1/5/2022	1%	476	5	471	
20	Phase 1-A - Identify Problems and Determine Objectives	9/9/2020	11/4/2020	0%	55	0	55	
30	Phase I-B Identify Problems and Determine Objectives	11/4/2020	2/24/2021	0%	110	0	110	
40	Phase II. Inventory Resources and Analyze Resource Data	2/24/2021	4/21/2021	0%	57	0	57	
50	Phase III - Alternative Formulation, Evaluation, and Decision	4/21/2021	7/7/2021	0%	76	0	76	
60	Phase IV - Preparation of Plan-Environmental Document	7/7/2021	1/5/2022	0%	178	0	178	



Deliverable Summary

ID	Title
General	
NA	Monthly Project Updates (COB Last Friday of Each Month Report Last Month, Issues/Concerns/Needs, Plans for Next Month)
Phase 1-A - Identify Problems and Determine Objectives	
D-1	Deliverable: Inspection Report, Sediment Survey, Topographic Maps, CAD Files of Survey (1h)
D-2	Deliverable: Existing Conditions H&H Analysis Narrative as Appropriate for Appendix D (3c)
Phase I-B Identify Problems and Determine Objectives	
D-3	Deliverable: H&H, Geotechnical, etc. Analysis Technical Memo Sections for Appendix D of Plan-EA (2b)
D-4	Deliverable: H&H Analysis Narrative, Inundation Maps per Appendix D of Plan EA (3e)
D-5	Public Participation Plan, Agency Outreach, Documentation, etc. (4a - 4c)
Phase II. Inventory Resources and Analyze Resource Data	
D-6	Deliverable: Written Plan-EA Sections, Maps, etc. as Appropriate (4)
Phase III - Alternative Formulation, Evaluation, and Decision	
D-7	Deliverable: Summary and Comparison Table and Preferred Alternative Description (2dvi, 2dvii)
D-8	Deliverable: Drawings, Flood Maps, Economic and Structural Table, etc. for Preferred Alternative as required by Plan-EA (2e)
Phase IV - Preparation of Plan-Environmental Document	
D-9	Initial Draft of Plan-EA for NRCS/Sponsor Review (1a - 1c)
D-10	Preliminary Plan ED for NRCS NWMC Review (45 Day Review Period 2a, 2b)
D-11	Address NWMC Comments and Concerns & Document (3a, 3b)
D-12	Prep of Public Draft Plan EA by Addressing Comments(4a, 4b)
D-13	Public Participation Summary of Concerns, Comments, Etc. (5a, 5b)
D-14	Final Plan EA (6a, 6b)
D-15	Identify and List Expected Permits and Mitigation (7a - 7c)

Conference Summary

ID	Title	Conference Call / In-Person
C-1	Meetings - Five Internal W/NRCS & Sponsor (Kick-off, End of Phases 1-A, 1-B, III, VI 1a - 1e)	Conference Call
C-2	Meetings - Three External (Public/Agency Scoping, Initial Public Meeting, Alternatives Review 2a - 2c)	Conference Call
C-3	Conferences - Project Progress Updates (Monthly 1)	Conference Call
C-4	Conferences - As-Needed W/Sponsor (2)	Conference Call
C-5	Conferences - Pre-Public Scoping (3)	Conference Call
C-6	Conferences - Geologic Investigation (4)	Conference Call
C-7	Conferences - Plan-ED Review (5)	Conference Call

*Two in-person meetings are assumed, with a conference call for people to join remotely

Appendix B. Affidavit of Publication

Advertising Invoice

Chronicle-News

1

P.O. Box 763
Trinidad, CO 81082

Phone: 719-846-3311
Fax: 719-846-3612

JENI JACKSON
CITY OF TRINIDAD
125 N. ANIMAS
TRINIDAD, CO 81082

Cust #: 12111593
Phone: (719)846-9843
Date: 07/07/2021
Ad #: 00077878
Salesperson: KHoffman Ad Taker: KHoffman

Class: 90

Ad Notes:

Description	Start	Stop	Ins.	Cost/Day	Extras	Amount
Fisher Peak Carbon Arroyo	07/08/2021	07/22/2021	11	11.82	7.00	129.98

Ad Text:

Fisher Peak Carbon Arroyo Dam Rehabilitation
Public Meeting Notice

Payment Reference:

Project Information

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), with the assistance of the City of Trinidad as the project sponsor, is considering alterations to the Fisher Peak Carbon Arroyo Watershed Dam (FPC-2) to bring the structure into compliance with current NRCS design criteria. The dam was designed and constructed under the Fishers Peak - Carbon Arroyos Watershed Work Plan that was approved by Congress in

Total: 129.98
Tax: 0.00
Net: 129.98
Prepaid: null

Total Due 129.98

THE CHRONICLE-NEWS

Proudly Serving Southeastern Colorado and Northeastern New Mexico

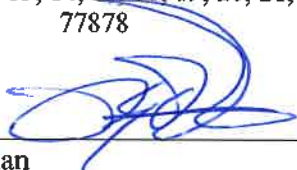
PROOF OF PUBLICATION

STATE OF COLORADO
COUNTY OF LAS ANIMAS} SS

Rich Hoffman, of lawful age, being first duly sworn upon oath, deposes and says that he is the authorized agent of The Chronicle-News, daily newspaper of general circulation which is published and circulated in the City of Trinidad, Las Animas County, Colorado, that said newspaper is a newspaper of general circulation complying with all of the requirements of Articles I to VII, Chapter 130, 1935, Colorado Statutes Annotated, and all other laws of said State, and that said legal / notice has been so published for the period of time prescribed in said newspaper proper and not a supplement.

The attached Notice was published in said newspaper in its issue(s) dated

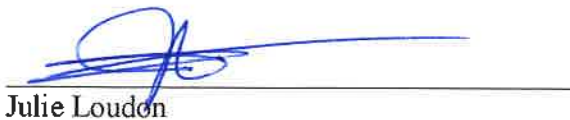
July 8, 9, 12, 13, 14, 15, 16, 19, 20, 21, 22, 2021
77878



Rich Hoffman

Subscribed and sworn to before me this

23rd day of July
A. D., 2021.


Julie Loudon

My commission expires on November 7, 2022
STATE OF COLORADO
COUNTY OF LAS ANIMAS} SS

JULIE LOUDON
NOTARY PUBLIC - STATE OF COLORADO
NOTARY ID 20184043509
MY COMMISSION EXPIRES NOV 7, 2022

Fisher Peak Carbon Arroyo Dam Rehabilitation Public Meeting Notice

Project Information

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), with the assistance of the City of Trinidad as the project sponsor, is considering alterations to the Fisher Peak Carbon Arroyo Watershed Dam (FPC-2) to bring the structure into compliance with current NRCS design criteria. The dam was designed and constructed under the Fisher Peak - Carbon Arroyos Watershed Work Plan that was approved by Congress in 1960. Alterations to bring the dam into compliance with current NRCS criteria will require a supplement to the 1960 Plan, which was implemented with assistance from the USDA Soil Conservation Service (now NRCS).

The project team will hold a preliminary public scoping meeting to provide information about the proposed project and to solicit comments. At this time, we are requesting comments on the project to identify issues and resource concerns. Written comments are due within 30 days post-marked by August 6, 2021.

Preliminary Public Scoping Meeting:

The public is invited to attend, discuss, and comment during the following public scoping meetings:

Virtual

Date: Wednesday, July 21, 2021
Time: 3:00 p.m. to 4:00 p.m.
Place: Online at zoom.us
Meeting ID: 947 5453 6652
Call-in number: (346) 248-7799

In-person

Date: Thursday, July 22, 2021
Time: 6:30 p.m. to 7:30 p.m.
Place: Trinidad Community Center
(1309 Bechoar Avenue)

How to Submit a Comment:

Comments may be submitted with one of the following methods, or during the public scoping meeting. Comments must be received by August 6, 2021.

Web: <https://fisherpeakdama.com>

Email: comment@fisherpeakdama.com

Mail: Jones & DeMille Engineering

Attn: Jenna Jorgensen

1535 G, 109 W, Richfield, UT 84701

Phone: (435) 896-8266

Published: July 8 thru July 22, 2021 77878

Appendix C. Scoping Notice Flyer

Fisher Peak Carbon Arroyo Watershed Dam Rehabilitation

Scoping Notice - Fact Sheet



Project Information

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), with the assistance of the City of Trinidad as the project sponsor, is considering alterations to the Fisher Peak Carbon Arroyo Watershed Dam (FPC-2) to bring the structure into compliance with current NRCS design criteria. The dam was designed and constructed under the Fishers Peak – Carbon Arroyos Watershed Work Plan that was approved by Congress in 1960. Alterations to bring the dam into compliance with current NRCS criteria will require a supplement to the 1960 Plan, which was implemented with assistance from the USDA Soil Conservation Service (now NRCS).

The NRCS will assist the City of Trinidad in preparing a supplemental watershed project plan and environmental assessment, which will be combined into a single document, called the Supplemental Plan-EA. The Supplemental 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 fall of 2021.

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 July 7, 2021, and ending on August 6, 2021.

Additional information can be found at the project website: <https://fisherpeakdamea.com>

Public Comment Period

Comments may be submitted via the following options:
Website:
<https://fisherpeakdamea.com>
Email:
comment@fisherpeakdamea.com

July 21

Wednesday, July 21, 2021
 8:00 AM – 4:00 PM
 475 S. 100 W.
 Richfield, UT 84701
 Phone: (435) 896-8266

July 22

Thursday, July 22, 2021
 8:00 AM – 4:00 PM
 475 S. 100 W.
 Richfield, UT 84701
 Phone: (435) 896-8266

Map of Project Location



How to Submit a Comment

Comments may be submitted via the following options:

Website:
<https://fisherpeakdamea.com>

Email:
comment@fisherpeakdamea.com

Address:
 Jones & DeMille Engineering
 Attn: Jenna Jorgensen
 1535 S. 100 W.
 Richfield, UT 84701

Phone: (435) 896-8266



Appendix D. Scoping Meeting Presentation Slides



Fisher Peak Carbon Arroyo Dam Rehabilitation - Preliminary Scoping Meeting - Sponsor: City of Trinidad



Welcome and Introductions

Sponsor – City of Trinidad

Jeni Jackson – Project Manager

Natural Resources Conservation Service (NRCS)

John Andrews – State Conservation Engineer

Heidi Ramsey – Watershed Program Manager

Sam Molinaro – District Conservationist

Jones & DeMille Engineering

Jenna Jorgensen – Planning Lead

Kedric Curtis – Project Engineer

Amanda Lopez – Local Contact



Website:
<https://fisherpeakdamea.com/>



PL-566 Program Overview

Public Law 83-566; the Watershed Protection and Flood Prevention Act of 1954, as amended

General Purposes

- Preventing damage from erosion, floodwater, and sediment
- Furthering conservation, development, utilization, and disposal of water
- Furthering conservation and proper utilization of land



PL-566 Program Overview

Authorized Purposes

- ★ **Watershed structure rehabilitation** ★
- Flood prevention (flood damage reduction)
- Watershed protection
- Public recreation
- Public fish and wildlife
- Agricultural water management
- Municipal and industrial water supply
- Water quality management



Purpose and Need

Purpose: Preserve and increase flood protection downstream of Fisher Peak Carbon Arroyo Watershed Dam (FPC-2).

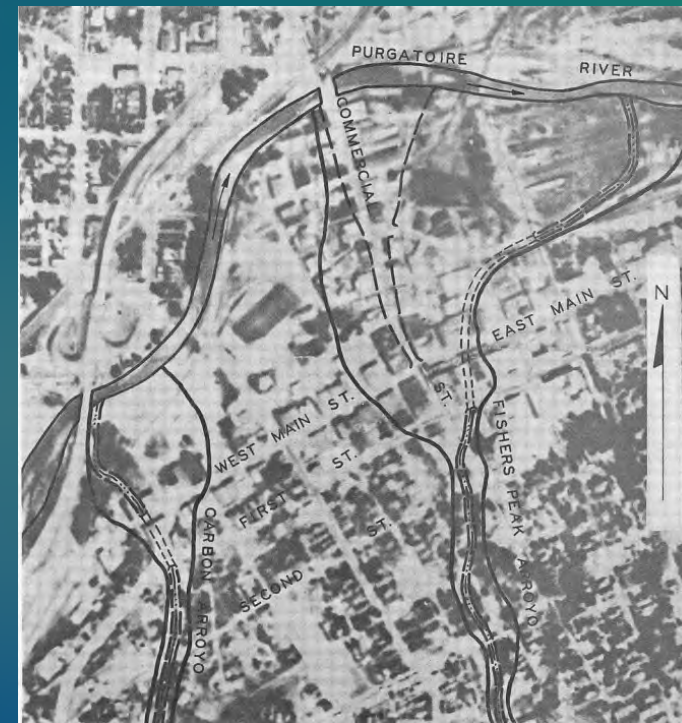
Need: Bring the dam and spillway facilities into compliance with current federal standards.

FPC-2 Dam History



FPC-2 Dam History

- Constructed in 1962 under the Fishers Peak – Carbon Arroyos Watershed Work Plan
- Two dams were constructed: FPC-1 on Fisher Peak Arroyo and FPC-2 on Carbon Arroyo
- Flood protection for commercial district in Trinidad



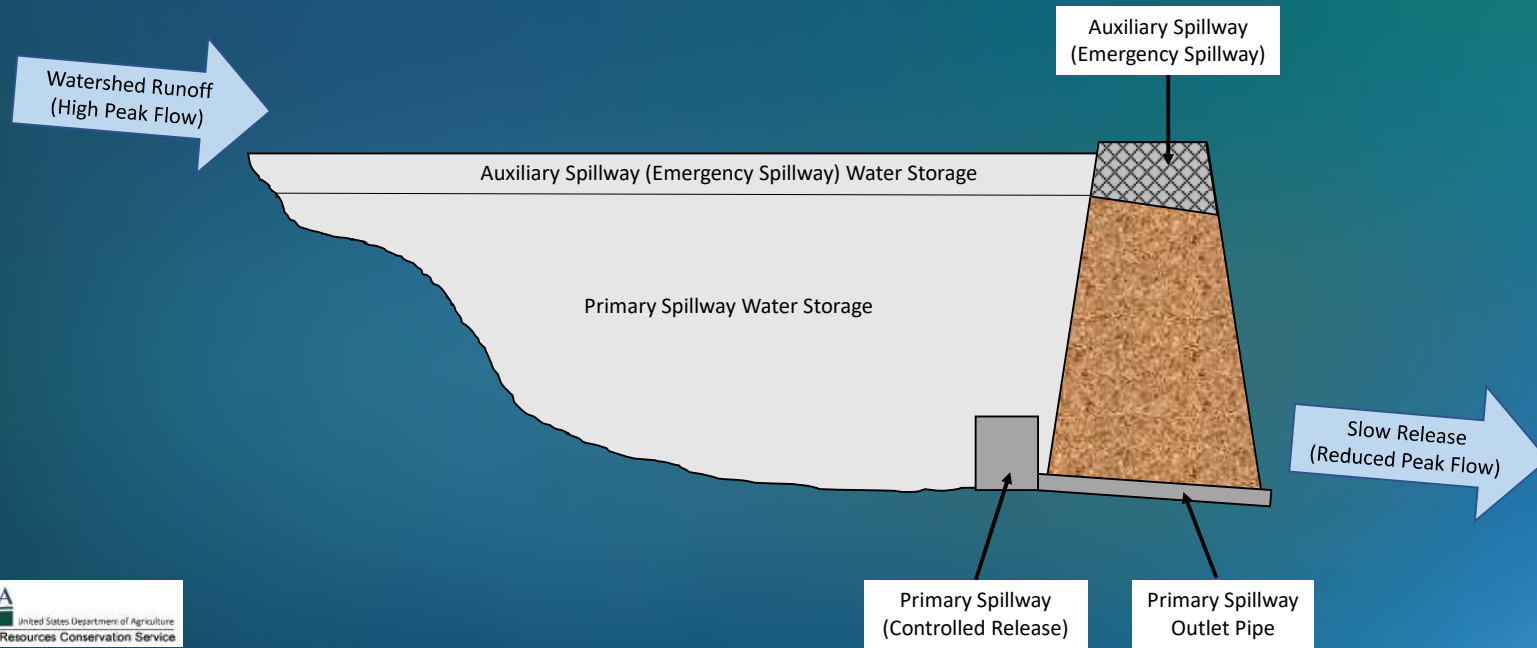
FPC-2 Dam Facility Overview



Downstream Conveyance



Detention Basin Function Overview



FPC-2 Dam Facility Photos



FPC-2 Dam Facility Photos

Low-Level
Drawdown
Pipe Inlet



Looking up
auxiliary spillway



Principal
Spillway with
Trash Rack



Principal Spillway
Outlet



Noted Deficiencies

Sedimentation - Sediment build-up at low-level drawdown pipe, principal spillway outlet, and downstream channel; clogging of outlet and toe drains.

Erosion – Erosion on the embankment and auxiliary spillway, vehicle tracks and ruts on embankment and auxiliary spillway; erosion in auxiliary spillway during the passage of the design storm; a need to re-grade auxiliary spillway from the inlet to outflow to maintain positive drainage.

Seepage - Seepage through dam, toe/foundation drains, Outdated seepage/drain system, slump area near the downstream toe.

Pipe Damage and Corrosion – Damage to low-level drawdown pipe, damage and corrosion on drain pipes.



Rehabilitation Concepts being Considered

Sedimentation

- Regrade downstream channel, Install multi-level intake structure

Erosion

- Excavate and regrade auxiliary spillway, Install concrete sill and riprap in auxiliary spillway, Fencing/barriers to restrict vehicular access

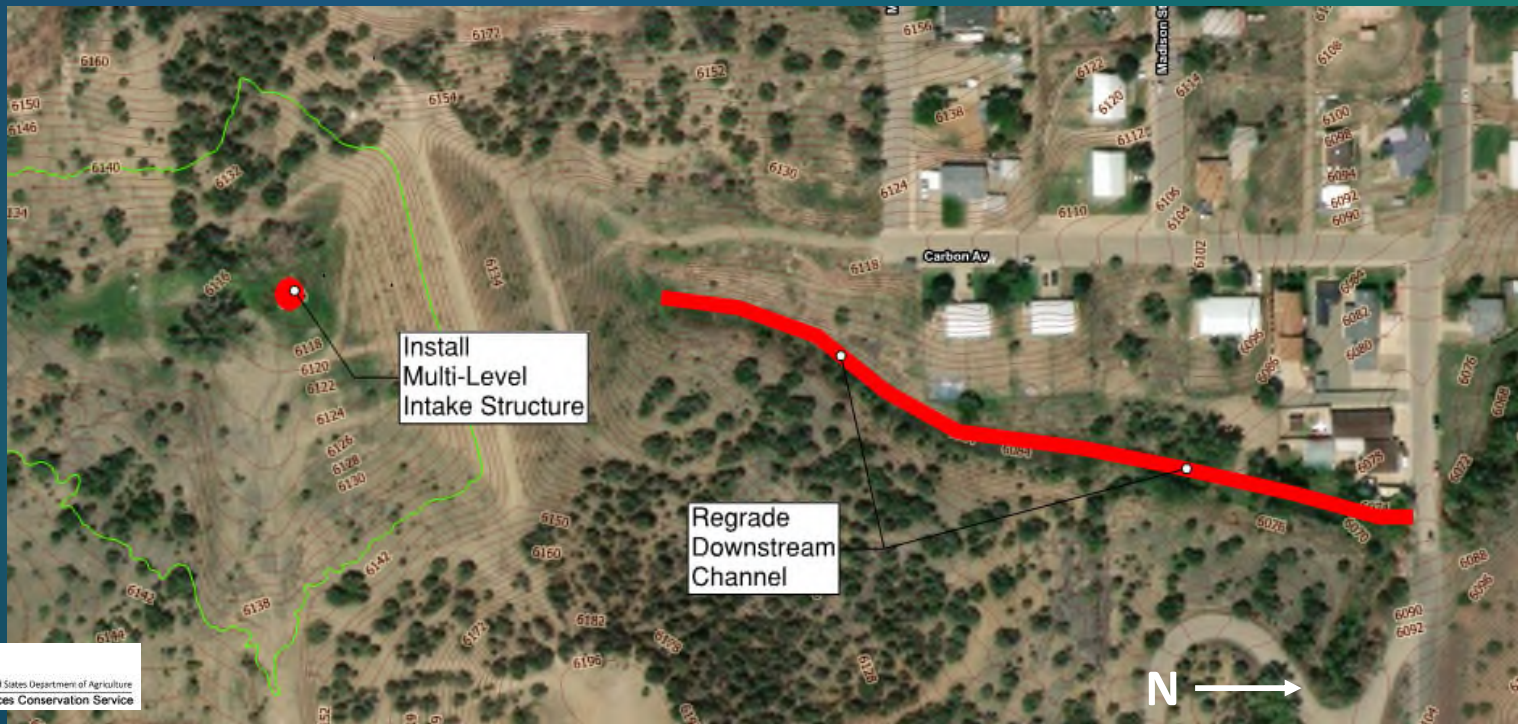
Seepage

- Replace drain system, Install monitoring wells

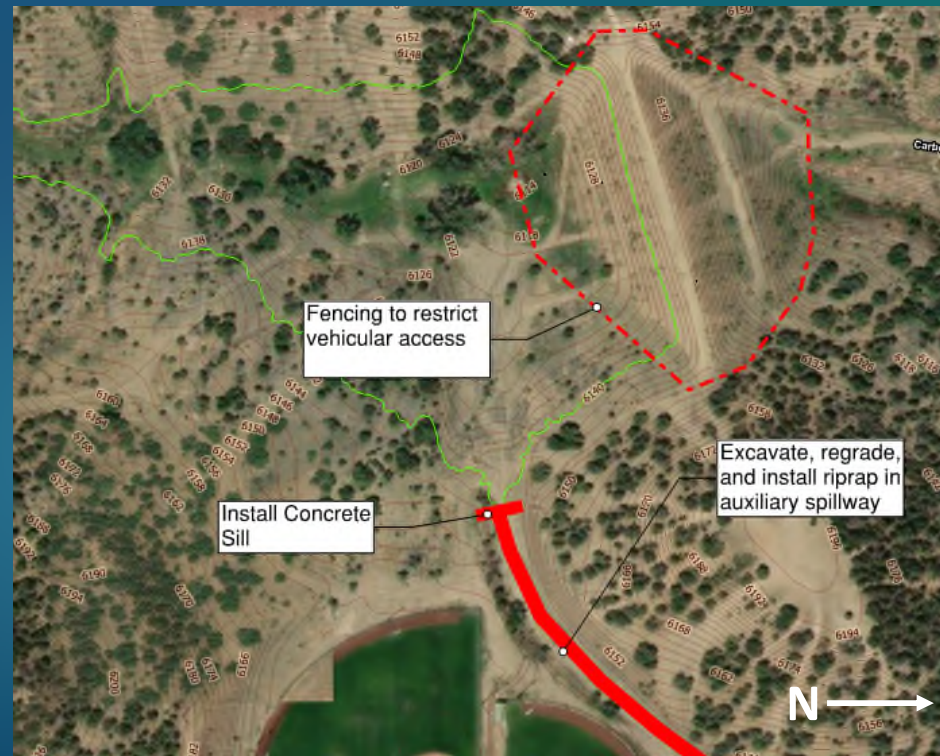
Pipe Damage & Corrosion

- Replace low level drawdown pipe

Rehabilitation Concepts being Considered - Sedimentation



Rehabilitation Concepts being Considered - Erosion



Rehabilitation Concepts being Considered – Seepage, Pipe Damage & Corrosion



Purpose of this Planning Phase

Federal funds = NEPA

(National Environmental Policy Act)

*Federal lands and federal permits also invoke NEPA requirements

NEPA aims to:

1. Consider environmental consequences
2. Inform the public

40 CFR 1501.9 - Scoping

“Agencies shall use an early and open process to determine the scope of issues for analysis . . .”

Issues to consider



Air Quality



Cultural Resources



Water Resources



Land Uses



Visual Resources



Policy and Regulation



Economics



Wildlife



Alternatives to Consider

PL-566 Standard Alternatives (for comparison):

1. Rehabilitation (30% design)
2. Non-Structural
3. Federal Decommissioning
4. No Federal Action

Questions to identify the scope:

- Are there concerns with the possible outcomes?
- What are the most important environmental concerns?
- Is there any controversy?
- What other environmental laws apply?
- When does the decision need to be made?

Schedule (Phase I)

Public scoping comment period:
July 7 – August 6, 2021 (30 days)

Draft Plan-ED/30% Design: estimated fall 2021

- 45-day comment period

Final Plan-ED & Decision: estimated spring 2022



Future Phases

Upon publication of the Draft Plan-EA, City of Trinidad can request Design (Phase II) and Construction (Phase III) funding

- Design can be prepared concurrent with the end of Phase I
- Other permitting is typically completed during Phase II

Comments

Online: <https://fisherpeakdamea.com>

Email: comment@fisherpeakdamea.com

Call: Jenna Jorgensen @ (435) 896-8266

Mail: Jenna Jorgensen

Jones and DeMille Engineering

1535 S. 100 W., Richfield, UT 84701



Appendix E. Meeting Attendees

Name recorded in Zoom	Entity
Jenna Jorgensen	JDE
Kedric Curtis JDE	JDE
T Hass	Las Animas County
John Andrews	NRCS
phil.dorenkamp@lasanimascounty.org	Las Animas County
Glenn Moltre	
Felix M. Lopez	Las Animas County
17205955875	Heidi Ramsey - NRCS
mike.valentine	Trinidad
Amanda Lopez	AECOM
Jeni Jackson	Trinidad
Julie Knudson	Purgatoire Partners
Jen Williams	USFWS
Ricky Anderson (JDE PE# CFM)	JDE
Ana.Vargo	NRCS
Krystal Phillips# NRCS	NRCS
Kara Hellige	USACE

A.3. Cooperating Agency Invitation Letters and Responses

Jenna Jorgensen

From: SPA-RD-CO <SPA-RD-CO@usace.army.mil>
Sent: Tuesday, December 14, 2021 4:30 PM
To: Andrews, John - NRCS, Denver, CO
Subject: RE: Cooperating Agency Request letter from NRCS

Andrew

Based on the draft plan summary, the activity will not cause adverse effects to waters of the U.S. Without having a detailed design and a waters impact map/report, I can not confirm the level of impact. However, assuming the project qualifies for our Nationwide Permit program, which authorizes projects that result in minimal adverse effects to waters of the U.S., we do not need to be a cooperating agency. I greatly appreciate your invite. For future correspondence relating to this project, including the submittal of a preconstruction notification, please reference DA# SPA-2021-409.

Sincerely

Kara Hellige
Chief, Southern Colorado Branch
US Army Corps of Engineers, Albuquerque District
970-259-1604 ext 1007 (office)
970-218-7466 (cell)

Please visit our website at: <https://www.spa.usace.army.mil/Missions/Regulatory-Program-and-Permits/>

From: Andrews, John - NRCS, Denver, CO <john.andrews@usda.gov>
Sent: Wednesday, December 8, 2021 12:59 PM
To: SPA-RD-CO <SPA-RD-CO@usace.army.mil>
Cc: Ramsey, Heidi - NRCS, Denver, CO <heidi.ramsey@usda.gov>; Clemons, Deric - NRCS, Colorado Springs, CO <deric.clemons@usda.gov>; Molinaro, Sammie - NRCS, Trinidad, CO <sammie.molinaro@usda.gov>; Macklin, Tim - NRCS, Denver, CO <tim.macklin@usda.gov>; Hjelmstad, Cyndee - NRCS, Denver, CO <cyndee.hjelmstad@usda.gov>
Subject: [Non-DoD Source] RE: Cooperating Agency Request letter from NRCS

Kara,

Yes, you can delay your response, how much time will you need? A preliminary draft plan-Environmental Assessment has been prepared - I attached a summary of that preliminary draft to provide you some additional information about the project and can provide you the entire first (rough) draft plan if you wish to see it now.

Our current project schedule is to circulate the preliminary draft for internal NRCS review in a couple weeks and have a final draft ready for formal Agency and Public review in early February. Your review & comments will be much appreciated at any point in the process.

Best,

John



From: SPA-RD-CO <SPA-RD-CO@usace.army.mil>

Sent: Wednesday, December 8, 2021 9:44 AM

To: Hjelmstad, Cyndee - NRCS, Denver, CO <cyndee.hjelmstad@usda.gov>; SPA-RD-CO <SPA-RD-CO@usace.army.mil>

Cc: Andrews, John - NRCS, Denver, CO <john.andrews@usda.gov>; Ramsey, Heidi - NRCS, Denver, CO <heidi.ramsey@usda.gov>; Clemons, Deric - NRCS, Colorado Springs, CO <deric.clemons@usda.gov>; Molinaro, Sammie - NRCS, Trinidad, CO <sammie.molinaro@usda.gov>; Macklin, Tim - NRCS, Denver, CO <tim.macklin@usda.gov>

Subject: RE: Cooperating Agency Request letter from NRCS

Hi Ms. Hjelmstad

It might be too soon to ask, but do you have a description of the quantity of impacts to waters for the preferred alternative? The Corps has already completed NEPA for any project that qualifies for a general permit. Therefore, if the project will result in minimal adverse effects to waters of the U.S., then Corps is not interested in being a cooperating agency. However, if impacts are greater than minimal, and the work would require an individual permit from us, then it may be beneficial for us to act as a cooperating agency. Is it possible for us to delay our response until we can complete a pre-application consultation?

I greatly appreciate the invite and look forward to working with you further on this project.

Kara Hellige
Chief, Southern Colorado Branch
US Army Corps of Engineers, Albuquerque District
970-259-1604 ext 1007 (office)
970-218-7466 (cell)

Please visit our website at: <https://www.spa.usace.army.mil/Missions/Regulatory-Program-and-Permits/>

From: Hjelmstad, Cyndee - NRCS, Denver, CO <cyndee.hjelmstad@usda.gov>

Sent: Tuesday, December 7, 2021 11:00 AM

To: SPA-RD-CO <SPA-RD-CO@usace.army.mil>

Cc: Andrews, John - NRCS, Denver, CO <john.andrews@usda.gov>; Ramsey, Heidi - NRCS, Denver, CO <heidi.ramsey@usda.gov>; Clemons, Deric - NRCS, Colorado Springs, CO <deric.clemons@usda.gov>; Molinaro, Sammie - NRCS, Trinidad, CO <sammie.molinaro@usda.gov>; Hjelmstad, Cyndee - NRCS, Denver, CO <cyndee.hjelmstad@usda.gov>; Macklin, Tim - NRCS, Denver, CO <tim.macklin@usda.gov>; Hellige, Kara A CIV USARMY CESP (USA) <Kara.A.Hellige@usace.army.mil>

Subject: [Non-DoD Source] Cooperating Agency Request letter from NRCS

Importance: High

Hello,

Attached is a letter and attachment from Tim Macklin, Acting State Conservationist for NRCS Colorado, regarding the Formal request to be a cooperating agency in the development of the Fisher Peak – Carbon Arroyos Supplemental Watershed Plan-Environmental Assessment (Plan-EA) for rehabilitation of the FPC-2 dam.

Thanks!

Cyndee Hjelmstad
Natural Resources Conservation Service (NRCS) – Colorado
720-544-2809 office
303-829-5251 work cell

A.4. Tribal Consultation Letters and Responses



United States Department of Agriculture

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

February 4, 2022

Name
Title
Tribe
Address

Reference: *Class III Cultural Resource Survey of the Fisher Peak Dam and Detention Reservoir (FPC-2), City of Trinidad, Las Animas County, Colorado*

_____:

Enclosed for your review is the cultural resources report for the Fisher Peak EA in Las Animas County, Colorado. In brief, The City of Trinidad, Colorado, intends to rehabilitate the FPC-2 dam within the Fisher Peak-Carbon Arroyo Watershed (the project). The project is partially funded through of a partnership with the United States Department of Agriculture Natural Resources Conservation Service (NRCS). The Fisher Peak Carbon Arroyo Watershed Dam (FPC-2) currently provides flood protection for the City of Trinidad. FPC 2 is an earthen embankment dam that was designed and built in 1962 by the Soil Conservation Service (now NRCS) under the PL-566 program. Based on recent assessments, the dam has a number of deficiencies and no longer meets federal or state dam safety standards. The need is to bring the dam and spillway facilities into compliance with current standards. The purpose of the project is dam rehabilitation to preserve and increase flood protection downstream of FPC-2; more specifically, to reduce the risk of flood damage to approximately 19 structures and public infrastructure within the area.

The project is located in the southern portion of the City of Trinidad, in Las Animas County, Colorado. The Limits of Disturbance Area, hereafter termed the area of potential effects (APE), is an irregularly shaped polygon that includes the dam, areas above the dam where flood waters accumulate, and the channel below the dam. In total, the APE encompasses an area of approximately 34 acres. The project will likely involve dredge and fill impacts to waters that are considered jurisdictional waters of the United States (U.S.) under the Clean Water Act (33 United States Code [U.S.C.] §1251 et seq.) of 1972. One or more Section 404 permits must be approved by the U.S. Army Corps of Engineers (USACE), which is a federal action. Therefore, the USACE is obliged under the conditions of Section 106 of the National Historic Preservation Act of 1966 (54 U.S.C. §300101-320303), as amended through 2014, to consider the effect of this undertaking on any historic properties within the APE. A historic property is any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP) (36 Code of Federal Regulations [CFR] 800.16[1][1]). The City has engaged AECOM Technical Services, Inc. (AECOM) to complete the cultural resources survey of the APE and report on the results.

A cultural resources inventory of the APE was completed by AECOM in November 2021. Within or overlapping the APE are four identified cultural resources. These resources are listed in the below table. NRCS has determined that all the resources are Not Eligible for listing on the NRHP.

Site Number	Type	Age or Date	Description	NRHP Eligibility	Management Recommendation
5LA.14391	Historic Dam	1962	Earthen flood control dam, detention reservoir and channel improvements	Field Not Eligible	No adverse effect
5LA.14392	Historic Bridge	1960s	Steel pedestrian bridge over Carbon Arroyo	Field Not Eligible	No adverse effect
5LA.14393	Historic Bridge	1920-1930	Stone arch bridge over Carbon Arroyo at Jefferson Street	Field Not Eligible	No adverse effect
5LA.14403	Historic Storm Drain	1920-1930	Storm drain for Carbon Arroyo from 1 st street to Purgatoire River	Field Not Eligible	No adverse effect

The NRCS has determined that the proposed undertaking will have no adverse effect to historic properties, and no further cultural resources work appears warranted prior to construction of the project. As the lead agency, the NRCS requests concurrence for the NRHP eligibility determination for the cultural resource sites, and requests concurrence for the determination of project effects for this undertaking. If you have any questions, comments, or concerns, please contact Craig Dengel, State Cultural Resources Specialist, at 720-544-2840 or craig.dengel@usda.gov at your earliest possible convenience.

Sincerely,

Craig Dengel
State Cultural Resources Specialist, NRCS

Enclosures:

- Cultural Resource Report. *Class III Cultural Resource Survey of the Fisher Peak Dam and Detention Reservoir (FPC-2), City of Trinidad, Las Animas County, Colorado*. AECOM



Northern Cheyenne Tribal Historic Preservation

14 E. Medicine Lodge Drive | P.O. Box 128 | Lamé Deer, MT. 59043

Ph: (406) 477- 4838/ 4839/ 8113/ 8114

CONSULTATION REQUEST

CONSULTING AGENCY

Denver Federal Center

ADDRESS

Bldg. 56, RM. 2604
P.O. Box 25426

CITY/STATE/ZIP

Denver, CO 80225-0426

PHONE

(719) 749-8596

FAX

E-MAIL

craig.dengel@usda.gov

AGENCY CONTACT

Craige Dengel

PROJECT CONTACT

PREPARED BY:

Gary LaFranier

PROJECT TYPE	Fisher Peak Dam and Detention Reservoir
FEDERAL AGENCY	USDA
STATE / COUNTY	Colorado/ Las Animas

CORRESPONDENCE	
DATE RECEIVED	2/4/2022
REVIEW PERIOD	30-DAY
DEADLINE	3/4/2022

DOCUMENTATION RECEIVED	
MAPS	YES
SURVEY	CLASS III
TRIBAL SURVEY	N/A

DETERMINATION	
<u>FINDING</u>	NO EFFECT
COMMENT	Your undertaking may proceed as planned

ADDITIONAL COMMENTS	
If cultural resources are located during ground disturbance, please halt all activities and notify our office.	

<i>Teanna Limpy</i>
Tribal Historic Preservation Officer
3/4/2022
DATE

LITTLEWOLF AND MORNING STAR- Out of Defeat and exile they led us back to Montana and won our Cheyenne Homeland that we will keep forever



CONSULTING AGENCY

Denver Federal Center

ADDRESS

Bldg. 56, RM. 2604
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craig.dengel@usda.gov

AGENCY CONTACT

Craige Dengel

PROJECT CONTACT

PREPARED BY:

Gary LaFranier

**LITTLEWOLF AN
our Cheyenne Hon**

A.5. NHPA Section 106 Consultation Documents



History Colorado

Mr. Craig Dengel
Natural Resource Conservation Service
US Department of Agriculture
Denver Federal Center
Bldg. 56, Room 2400
Denver, Colorado 80225-0426

RE: Fisher Peak Dam and Detention Reservoir (FPC-2)
City of Trinidad, Las Animas County, Colorado
History Colorado No. 80969

Dear Mr. Dengel:

Thank you for your correspondence dated February 2, 2022, which our office received on February 3, 2022, initiating consultation of the aforementioned project under Section 106 of the National Historic Preservation Act of 1966, as amended (54 USC § 306108), and its implementing regulations, 36 CFR Part 800. Our office requested additional information and revised documentation for the undertaking, which we received on April 21, 2022.

We have reviewed all documentation submitted for this project and agree the defined area of potential effect (APE) is appropriate for the undertaking. Based on the submitted documentation and available information, we concur the four identified resources—5LA.14391, 5LA.14392, 5LA.14393, 5LA.14403—are *not eligible* for inclusion in the National Register of Historic Places. We also concur the undertaking as described will result in no adverse effect to historic properties.

Should unidentified archaeological resources be discovered in the course of the project, work must be interrupted until the resources have been evaluated in terms of the National Register eligibility criteria (36 CFR §60.4) in consultation with our office pursuant to 36 CFR §800.13. Also, should the consulted-upon scope of the work change, please contact our office for continued consultation under Section 106 of the National Historic Preservation Act.

We request being involved in the consultation process with the local government, which as stipulated in 36 CFR §800.3 is required to be notified of the undertaking, and with other consulting parties. Additional information provided by the local government or consulting parties might cause our office to re-evaluate our eligibility and potential effect



History Colorado

findings. Please note that our compliance letter does not end the 30-day review period provided to other consulting parties.

Determinations of National Register eligibility subject to this letter were made in consultation pursuant to the implementing regulations of Section 106 of the National Historic Preservation Act, 36 CFR Part 800. Please note other Federal programs such as the National Register of Historic Places and the Federal Investment Tax Credit Program may have additional documentation and evaluation standards. Final determinations remain the responsibility of the Keeper of the National Register.

Thank you for the opportunity to comment. If we may be of further assistance, please contact Mitchell K. Schaefer, Section 106 Compliance Manager, at (303) 866-2673 or mitchell.schaefer@state.co.us.

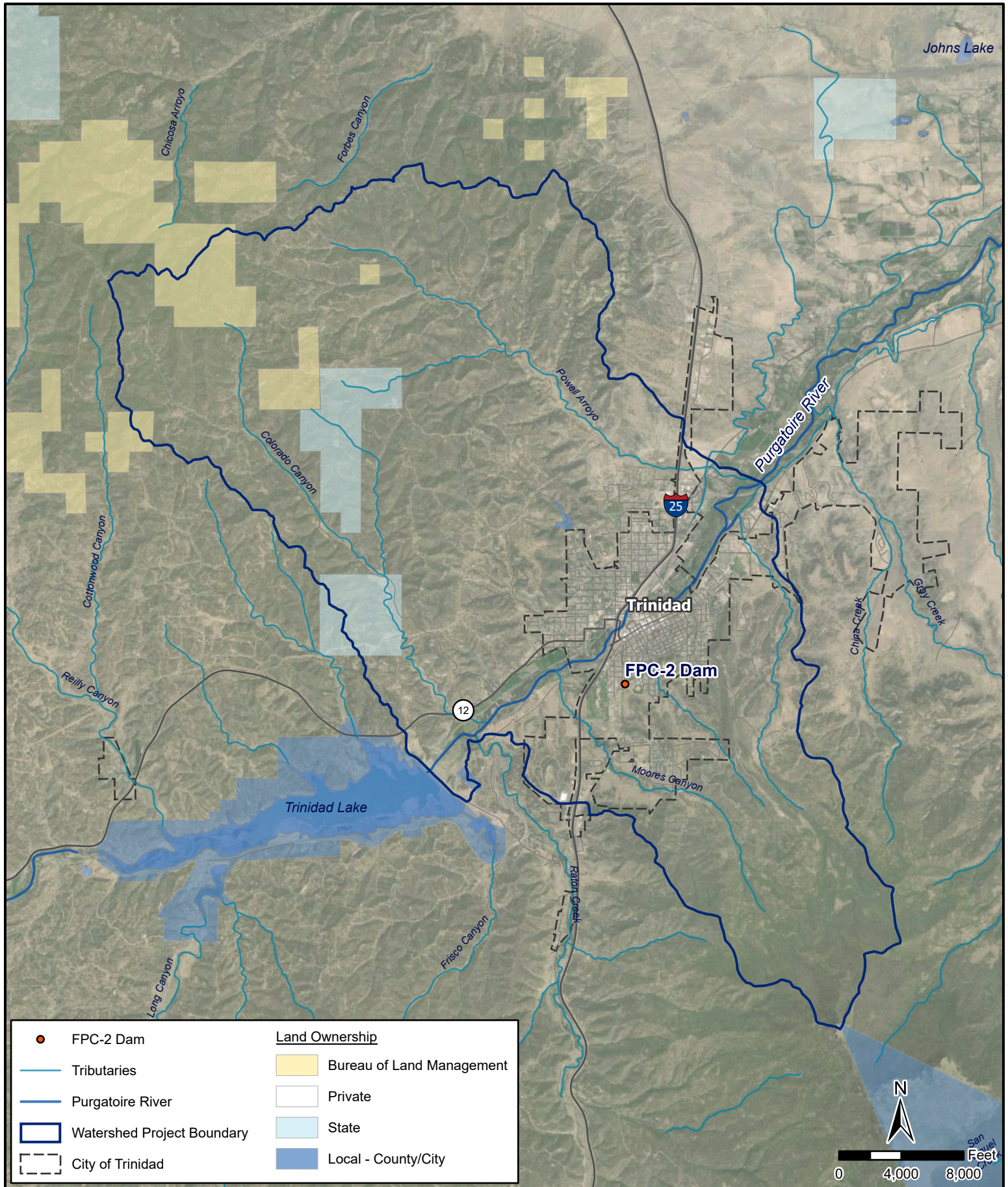
Sincerely,

Dawn DiPrince
State Historic Preservation Officer

A.6. Draft Plan-EA Comments

No comments were received on the Draft Plan-EA.

Appendix B. Project Map



FPC-2 Dam	<u>Land Ownership</u>
Tributaries	Bureau of Land Management
Purgatoire River	Private
Watershed Project Boundary	State
City of Trinidad	Local - County/City



**Jones & DeMille
Engineering**

- Shaping the Quality of Life -
800.748.5275 www.jonesanddemille.com

Fisher Peak Carbon Arroyo Watershed Dam FPC-2 Rehabilitation Project

*Supplemental Watershed Plan-EA
Project Map*

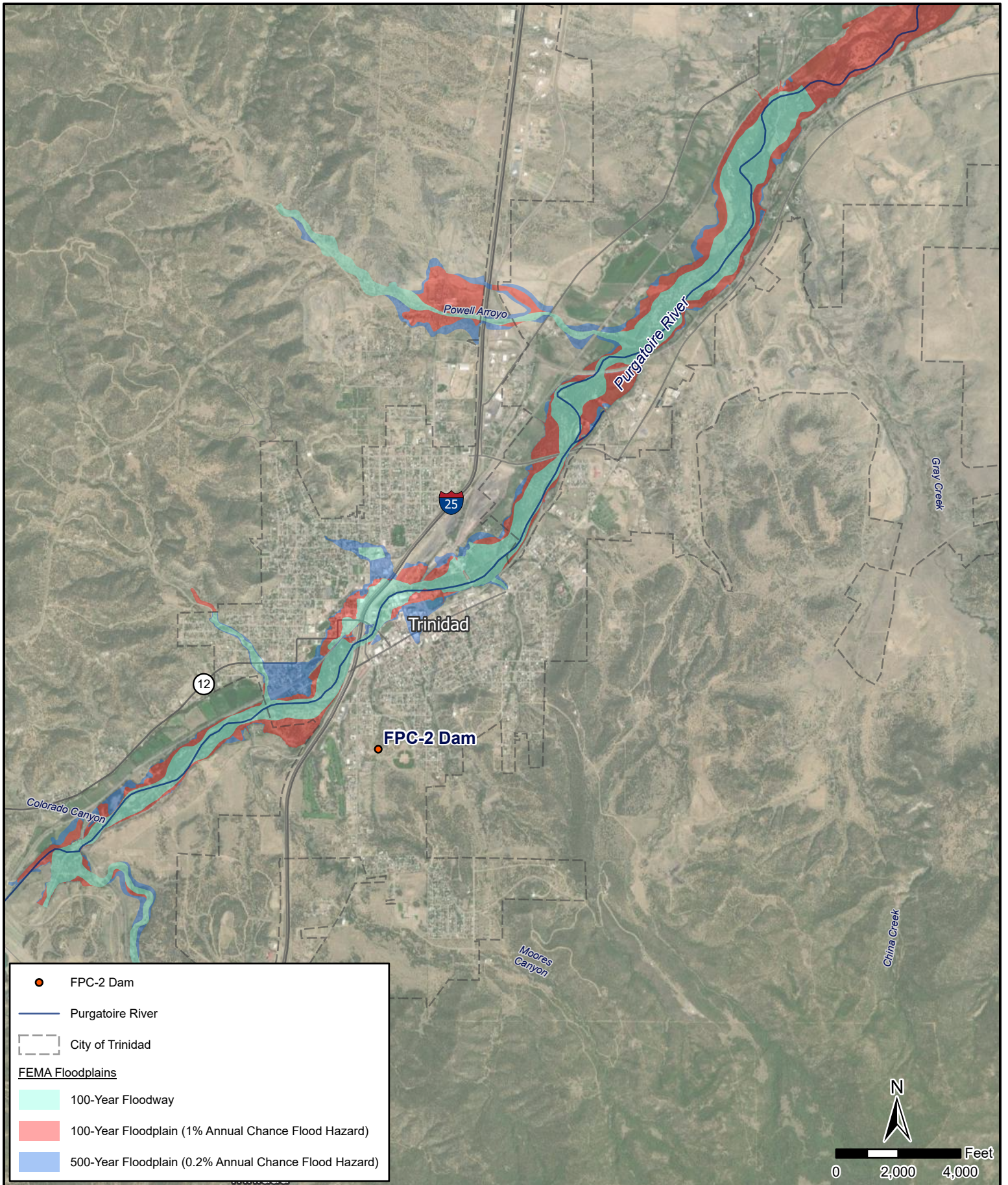
Map Name: H:\JD\Proj\2009-056\Design\GIS\Projects\Environmental\2009-056_Env\Matanzas Dam.aprx - ExhB-1 Watershed Planning Boundary 8.5x11P
Project Number: 2009-056 Drawn by: TAS 09-21 Last Edit: 11/04/2021

Las Animas County

Scale: 1" = 8,000'

B-1

Appendix C. Support Maps



- FPC-2 Dam
- Purgatoire River
- City of Trinidad

FEMA Floodplains

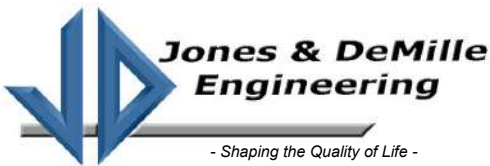
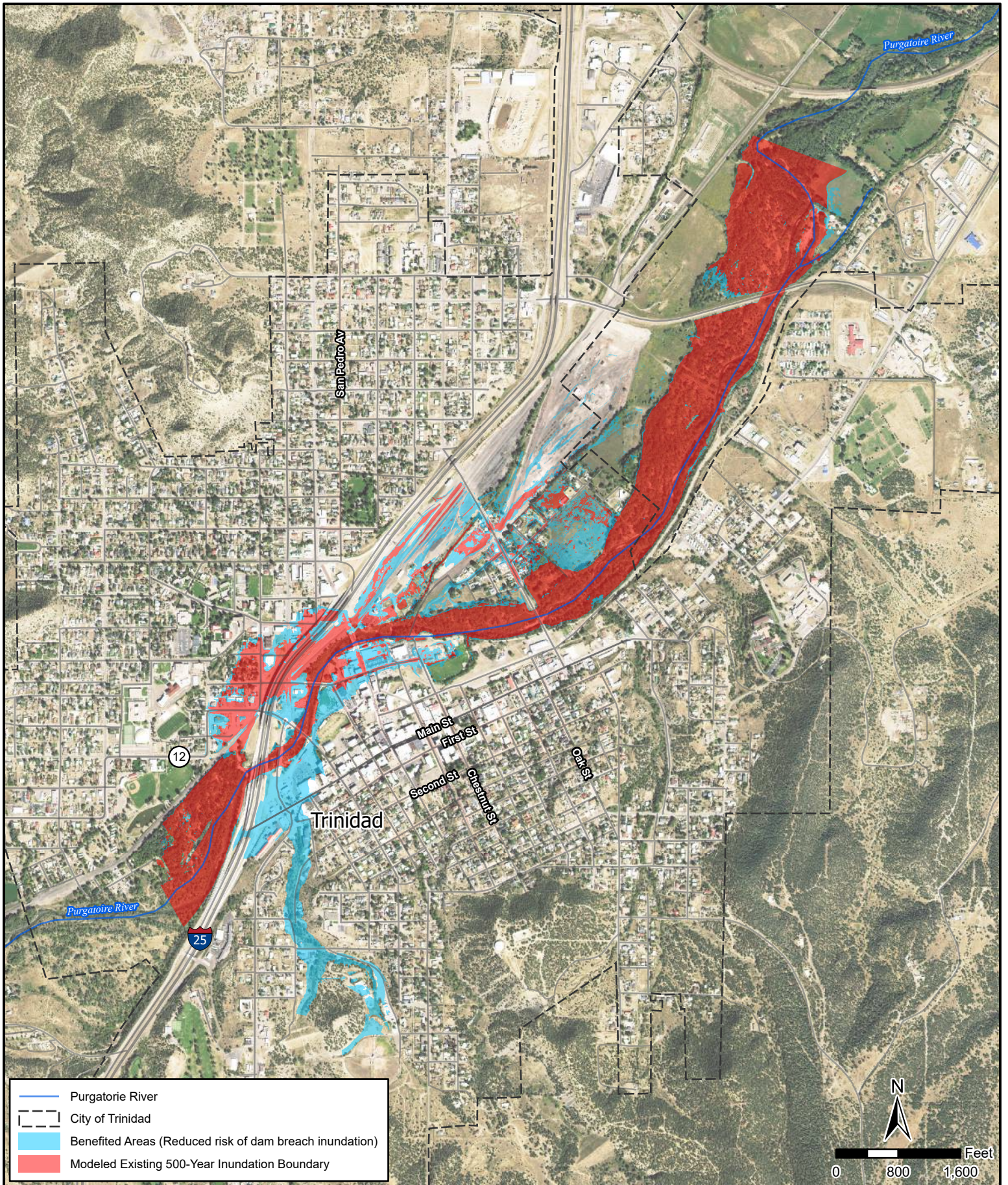
- 100-Year Floodway
- 100-Year Floodplain (1% Annual Chance Flood Hazard)
- 500-Year Floodplain (0.2% Annual Chance Flood Hazard)

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 800.748.5275 www.jonesanddemille.com

Fisher Peak Carbon Arroyo Watershed Dam FPC-2 Rehabilitation Project
Supplemental Watershed Plan-EA
FEMA Floodplains

Map Name: H:\JD\Proj\2009-056\Design\GIS\Projects\Environmental\2009-056_Env.aprx - ExtC-1 FEMA Floodplains 8x5x11P
 Project Number: 2009-056 Drawn by: TAS 09-21 Last Edit: 01/19/2022

Las Animas County
 Scale: 1" = 4,000'
C-1



Fisher Peak Carbon Arroyo Watershed Dam FPC-2 Rehabilitation Project

Las Animas County

**Supplemental Watershed Plan-EA
Modeled Dam Breach Impact Areas**

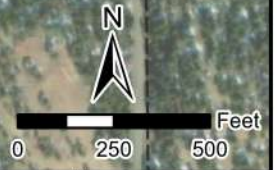
Scale: 1" = 1,600'

Map Name: H:\JD\Proj\2009-056\Design\GIS\Projects\Environmental\2009-056_Env\Matanzas Dam.aprx - ExhC-2 Benefited Areas 8.5x11P
Project Number: 2009-056 Drawn by: TAS 10-21 Last Edit: 11/04/2021

C-2



- FPC-2 Dam
- No Action - Area of Potential Effect (3.24 acres)




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800.748.5275 www.jonesanddemille.com

Fisher Peak Carbon Arroyo Watershed Dam FPC-2 Rehabilitation Project

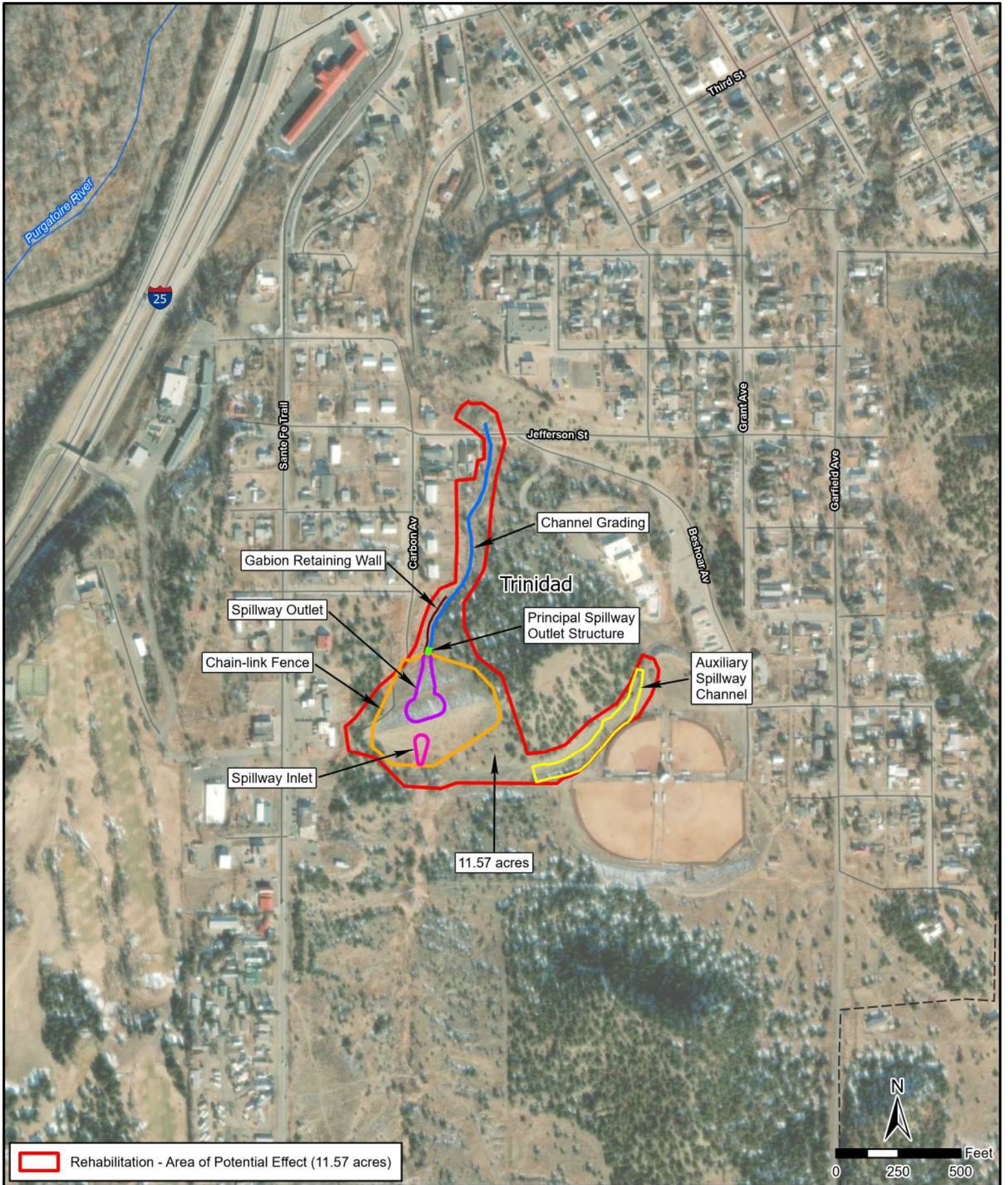
**Supplemental Watershed Plan - EA
No Action Alternative Overview**


Map Name: H:\UD\Proj\2009-056\Design\GIS\Projects\Environmental\2009-056_Env.aprx - Evh C-3 Fisher Peak - Supplemental Watershed Plan - No Action Alternative 8.5x11P
Project Number: 2009-056 Drawn by: JEM 04-23 Last Edit: 04/28/2023

**Las Animas County,
Colorado**

Scale: 1" = 500'

C-3



 Rehabilitation - Area of Potential Effect (11.57 acres)



**Jones & DeMille
Engineering**

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800.748.5275 www.jonesanddemille.com

Fisher Peak Carbon Arroyo Watershed Dam FPC-2 Rehabilitation Project

**Supplemental Watershed Plan - EA
Rehabilitation Alternative Overview**

Map Name: H:\JD\Proj\2009-056\Design\GIS\Projects\Environmental\2009-056_Env.aprx - Exh C-4 Fisher Peak - Supplemental Watershed Plan - Rehabilitation Alternative 8.5x11P
Project Number: 2009-056 Drawn by: JEM 04-23 Last Edit: 04/28/2023

**Las Animas County,
Colorado**

Scale: 1" = 500'

C-4



- FPC-2 Dam
- Decommission - Area of Potential Effect (9.67 acres)



**Jones & DeMille
Engineering**

- Shaping the Quality of Life -
800.748.5275 www.jonesanddemille.com

Fisher Peak Carbon Arroyo Watershed Dam FPC-2 Rehabilitation Project

*Supplemental Watershed Plan - EA
Decommission Alternative Overview*

Map Name: H:\JD\Proj\2009-056\Design\GIS\Projects\Environmental\2009-056_Env.aprx - Exh C-5 Fisher Peak - Supplemental Watershed Plan - Decommission Alternative 8.5x11P
Project Number: 2009-056 Drawn by: JEM 04-23 Last Edit: 04/28/2023

**Las Animas County,
Colorado**

Scale: 1" = 500'

C-5

Appendix D. Investigation and Analysis Report

D.1. Introduction

The planning studies presented in this Investigation and Analysis Report are based on standard methods, procedures, and computer programs used and approved for use by the NRCS. The following information gives a summary of the investigation and analysis for the key planning studies in the preparation of the proposed Fisher Peak Carbon Arroyo Watershed Dam FPC-2 Rehabilitation Project. The information in this section is summarized from technical memos (TM) prepared for this project, which are available upon request. Requests for additional information can be submitted to the following address:

USDA-NRCS
Denver Federal Center
Bldg 56, Room 2604
Denver, CO 80225

D.2. Existing Conditions

The Supplemental Plan-EA involves evaluation of the Fisher Peak Carbon Arroyo Watershed Dam FPC-2. A summary of the existing conditions of the FPC-2 dam, spillway, and outlet works is provided in *TM001 – Existing Conditions Assessment* in Appendix E. The report includes general information on the dam, review of available records, and a summary of the topographic survey, dam inspection, geotechnical investigation, geologic features, and sediment survey. The dam inspection included a video assessment of the outlet conduit, dam drains, and concrete riser. Still photos from the inspections are included in the report. The full videos are available in the project files of the NRCS, the City of Trinidad, and AECOM.

JDE and AECOM conducted a site visit on November 4, 2020, to observe the condition of the dam. An inspection of the dam was conducted in conjunction with City of Trinidad officials, local NRCS staff, and Mark Perry with Colorado Dam Safety.

The overall conditions at FPC-2 were noted as satisfactory. Regular maintenance appears to have been performed at FPC-2. The channel downstream of the dam had been cleaned and excavated prior to the site visit. It was apparent that the downstream channel conditions are conducive to sediment build up. Prior to the site visit, the outlet channel had filled with sediment, leading to water and sediment backing up into the outlet pipe.

The embankment upstream, downstream, and crest areas were observed to be in acceptable condition; however, several areas of surface erosion features (gullies and rills) were observed at the contact with the left and right abutment areas on the upstream and downstream faces of FCP-2 up to 1 foot deep in localized areas. There were also signs of recent and ongoing ATV traffic on the slope faces and crest of the dam.

Water was observed exiting on both sides of the outlet conduit where the toe/foundation drains were assumed to be. The drains were covered with sediment and not visible. The drains outfalls were exposed using a shovel. The corrugated metal pipe ends were damaged and showed signs of corrosion. It appeared that the left drainpipe had water coming from around the sides of the pipe. The low-level outlet pipe was visible, but it was apparent that there was significant sediment build-up at this location. The pipe appeared to be in poor condition and previous inspections noted replacement was needed. The concrete riser was inspected and appeared to be in good condition.

In previous inspections, the outlet conduit was silted in significantly, but the channel was cleared prior to our inspection. There was still a significant amount of sediment in the conduit (approximately 12 inches) during the site visit in November 2020.

The auxiliary spillway was observed to be in acceptable condition with some rutting identified throughout due to ATV traffic. Surface erosion features were noted on the upstream extent of the spillway entrance that slopes down towards the reservoir area.

A CCTV inspection of the principal spillway conduit was performed on February 2, 2021, and a drain inspection was completed on February 26, 2021, by AECOM.

The inspection of the downstream portion of the conduit from the downstream end to the manhole was completed with a remote operated vehicle (ROV). The ROV progressed upstream all the way to the manhole entrance. There was an obstruction blocking the entrance from the manhole to the upstream side of the conduit. The downstream conduit was generally in good condition. There were visible lines on the sides of the conduit from previous sediment. No joint offsets were noted.

The inspection of the upstream portion of the conduit from the upstream end found a defect in the pipe at approximately 28 feet from the upstream end of the pipe. The camera fell downward slightly at this point and could not be pushed any further. The first few sections of pipe that were previously replaced by the city were in good condition. The pipe that was visible downstream from the damaged area had visible rust and looked to be in fair to poor condition. A full condition assessment was not completed since the camera would not proceed any further.

The inspection of the right drain was attempted, but a blockage in the pipe at approximately 6 feet from the drain end blocked the camera from moving forward. The portion of the right drain that was inspected showed deterioration and rust, along with the blockage that could be a rock or a broken piece of pipe.

The inspection of the left drain found a small blockage at approximately 3 feet. The drain was inspected to 19.6 feet into the pipe, where a blockage prevented the camera from going further into the pipe. The left drain showed deterioration and rust along the entire length that was inspected.

According to the sediment survey, there is approximately 11.98 acre-feet of sediment that has accumulated up to the auxiliary spillway crest from 1962 to 2018. This equates to an average annual rate of sediment deposition of 0.21 acre-feet per year. This rate does not account for any sediment that may have been removed over the years. According to city officials, there is little potential for further development in the watershed; therefore, it is assumed that the future sediment accumulation rate will be similar to the historic rate. The remaining capacity was estimated to be 13.84 acre-feet. This equates to a remaining sediment storage life of approximately 65 years.

D.3. Preliminary Field Investigation and Geotechnical Analyses Report

A preliminary field investigation and geologic reconnaissance mapping were performed to obtain site-specific data of the existing auxiliary spillway and embankment. Preliminary geotechnical analyses were also completed on the existing embankment to evaluate the FPC-2 structure. Full documentation for the field investigation, laboratory results, parameter recommendations, and geotechnical analyses are presented in *TM002 – Preliminary Field Investigation and Geotechnical Analyses* in Appendix E. Subsurface field investigations were completed in November 2020 within the existing auxiliary spillway. The field investigation included four vertically aligned test holes located along the existing auxiliary spillway alignment, drilled using hollow-stem augers and HQ size rock coring with a CME Buggy Rig by Authentic Drilling of Kiowa, Colorado, to depths ranging from 15.7 feet to 21.3 feet below ground surface, and included geologic/geotechnical logging, sampling of soil materials, and coring of bedrock. Each test hole was backfilled and abandoned with cement-bentonite grout to the ground surface.

Laboratory testing was performed by Advanced Terra Testing of Lakewood, Colorado and performed on selected soil and bedrock samples. Soil testing performed included moisture content, Atterberg limits, grain-size analysis, and dispersion testing. Bedrock testing performed included unconfined compressive strength, point load strength index, and slake durability. Samples were selected to reduce the influence of discontinuities or microdefects (i.e., stress cracks and fractures) that could result in an underestimation of the strength properties of the rock.

The existing embankment as detailed on the redline record drawings from 1963 was constructed primarily with Zone I Embankment Material with some areas of the downstream slope constructed with Zone II

Embankment Material with the embankment structure founded on bedrock. Zone I materials were generally characterized as low plasticity clay (CL) to low plasticity silty clay (CL-ML), and Zone II materials were generally characterized as clayey gravel (GC) to fractured weathered shale. The bedrock observed proximate to the embankment is very likely the same bedrock unit encountered within auxiliary spillway field investigation from the Pierre Shale Formation. The bedrock was observed to be olive to dark brown siltstone with interbedded shale, highly fractured, and highly to completely weathered at the surface and shallow depths, with inclusions of chert nodules. The weathering profile of the shallow bedrock was consistent with outcrops observed at the site and the shale transitioned to slightly weathered with depth.

The existing auxiliary spillway is an open earthen channel on the ground surface and was observed to be comprised of surface overburden materials characterized as clayey sand to clayey gravel with some sand, clean clay, and silty clay underlain by bedrock of the Pierre Shale Formation.

Laboratory testing was performed to evaluate and recommend headcut erodibility parameters for the shale material unit observed in the existing auxiliary spillway and to provide ‘best-case’ and ‘worse-case’ values. These two values incorporate the minimum and maximum laboratory test results and were developed for use in the SITES program, since overburden materials would likely be removed as part of any future spillway rehabilitation efforts. The “best-case” headcut erodibility parameter was recommended to be 101.8 with the “worse-case” parameter recommended to be 60.8.

Geotechnical analyses were performed to establish the seismic response spectrum and to evaluate the seismic response during loading (i.e., liquefaction), seepage, and slope stability of the existing embankment dam based on historical documentation. Seismicity was established using the 975-year return period, which resulted in a PGA of 0.062g. The Soil Mechanics Report (SMR) developed by NRCS (1961) was reviewed and engineering data evaluated to establish material properties for use in liquefaction, seepage, and slope stability analyses.

Liquefaction (cyclic softening) is used to describe the onset of high excess pore water pressures and large shear strains during undrained cyclic loading. FPC-2 is a flood control structure and the methods and mechanisms of cyclic and infrequent hydraulic loading during flood events are not anticipated to result in development of high excess pore water pressures nor development of large shear strains during undrained loading. Risk is relatively low during seismic events, meaning a strength loss of the embankment dam materials following a seismic event is unlikely.

Seepage analysis was performed to evaluate the progression of material saturation under a variable flood loading duration using a transient approach to quantify the general behavior of the structures during flood loading, including incorporation of a phreatic surface through the embankment dam and the pore water pressure distribution within these materials for use in slope stability analysis. Seepage material properties assigned are summarized in Table D-1.

Table D-1. Summary of Material Properties Used for Seepage Analysis

Material	Horizontal Hydraulic Conductivity - k_x (cm/s)	Vertical Hydraulic Conductivity - k_y (cm/s)	Ratio (k_x/k_y)
Embankment Material	9.0×10^{-6}	1.0×10^{-6}	9
Bedrock	1.0×10^{-4}	1.0×10^{-7}	1000

In general, the maximum upstream reservoir water surface elevation impounded by FPC-2 during the IDF event occurs at an elevation of 6144.2 feet. The estimated maximum saturation of the upstream slope materials of FPC-2 during (and following) the IDF occurs about 2.2 hours after the start of the IDF and

progresses about 6.5 feet into the upstream slope. Therefore, the likelihood of a steady-state phreatic surface developing at FPC-2 is low.

Slope stability evaluations at maximum cross section for FPC-2 were completed to meet CO-DSB (2020) and NRCS (2019) guidelines. The model evaluated the maximum embankment cross section as presented from the redline record drawings (NRCS 1963) under the following loading conditions: (1) steady-state, (2) end-of-construction, (3) flood loading, (4) rapid-drawdown, and (5) pseudo-static. Shear strength parameters assigned are summarized in Table D-2. No laboratory testing was performed on the underlying bedrock at FPC-2; therefore, the unit was assigned as a ‘very strong’ material that limits any shear surfaces from progressing into the bedrock.

Table D-2. Summary of Material Properties Used for Stability Analysis

Material Description	Unit Weight (pcf)	Drained Shear Strength		Undrained Shear Strength Ratio (s_u/σ'_{fc}) psi	Total Undrained Shear Strength (su) psi
		Friction Angle (degrees)	Cohesion (psf)		
Embankment Zone I	108	30	0	$0.36\sigma'_{fc} + 4.0$ psi	9.5
Embankment Zone II	121	38	0	Drained Strength	Drained Strength
Bedrock	140	Very Strong			

The 2D limit-equilibrium computer program UTEXAS4 (Wright 1999) using Spencer’s method of slices was used to identify critical shear failure surfaces. Spencer’s method satisfies conditions of static equilibrium, including horizontal and vertical force imbalance and moment imbalance. Near-surface (infinite slope) surfaces that were not considered to have a global stability impact or impact the safety of the dam were not reported in the results, and non-circular and circular shear surfaces were considered in the stability evaluation. The factor of safety results exceeded all minimum guidelines for all loading conditions evaluated.

Subsurface investigations and geologic reconnaissance mapping conducted in 2020 do not indicate that the geologic conditions encountered would present a fatal flaw from a Preliminary Watershed Plan-EA (alternatives) assessment level with regards to rehabilitating the existing auxiliary spillway alignment. Geotechnical analyses performed on the existing embankment dam also do not indicate that the dam exhibits any structural or hydraulic deficiencies other than the observed erosional features and slump area proximate to the downstream toe.

D.4. Existing Hydrology Analysis

A hydrologic analysis of FPC-2 was completed. The analysis included an evaluation of the existing dam and any needed improvements needed to bring the dam into compliance with State of Colorado and NRCS guidelines.

The CO-NM Regional Extreme Precipitation Study (REPS) was used for all design storms where possible. The precipitation depths and distributions were taken from REPS with the exception of a few storms per NRCS criteria. Where REPS was not used, the precipitation data was supplemented with NOAA Atlas 14.

NRCS Design Storm Results

The sites results for the PSH and the 6- and 24-hour ASH/SDH and FBH are summarized in Table D-3.

Table D-3. Existing Conditions SITES Results

Parameter	FBH/SDH 6-hr	FBH/SDH 24-hr	PSH 100-yr 10-day
Site Identification	FPC2	FPC2	FPC2
Watershed Runoff Curve Number	76	76	76
Total Watershed Drainage Area (Sq. Miles)	0.32	0.32	0.32
Watershed Time of Concentration (Hours)	0.58	0.58	0.58
SDH Rainfall Total (Inches)	7.24	10.22	
SDH Rainfall Duration (Hours)	6	24	
FBH or Storm Rainfall Total (Inches)	18.9	25.3	
FBH or Storm Rainfall Duration (Hours)	6	24	
SDH Inflow Peak (CFS)	325.2	327.8	
FBH or Storm Inflow Peak (CFS)	1091.7	900.1	
Initial Reservoir Elevation (Feet)	6127.4	6127.4	6127.41
Maximum WS SDH (Feet)	6140.36	6141.93	
Maximum WS FBH or Storm (Feet)	6144.57	6144.66	
Storage at Max. WS FBH or Storm (Acre-Ft)	116.5	117.4	
Top Dam (Feet)	6144.57	6144.66	
Storage, Top Dam (Acre-Ft)	117	117	
PSH Drawdown (Days)			6.57
PS Crest (Feet)	6127.4	6127.4	6127.4
Storage, PS Crest (Acre-Ft)	14	14	14
PS Discharge at AS Crest (CFS)	32.2	32.2	26
PS Discharge for SDH (CFS)	32.4	34.3	
PS Discharge FBH or Storm (CFS)	37.4	37.5	
AS Crest (Feet)	6140.2	6140.2	6135.91
Storage, AS Crest (Acre-Ft)	77.2	77.2	49.2
AS Max. Head SDH (Feet)	0.16	1.73	
AS Peak Discharge SDH/Storm (CFS)	2.7	174.9	
Hp FBH or Storm (Feet)	4.37	4.46	
AS Peak Discharge FBH/Storm (CFS)	806	834	
Uncontrolled Drainage Area (Sq. Miles)	0.32	0.32	0.32

Based on the results, FPC-2 meets all NRCS hydrologic criteria for a High Hazard dam. The local 24-hour storm controlled per NRCS FBH criteria and was used as the NRCS FBH. The local 24-hour storm controlled per NRCS SDH criteria and was used as the NRCS SDH. Per TR-60 criteria, the PSH was used to evaluate the principal spillway. Table D-4 summarizes which criteria are met for the existing condition.

Table D-4. SITES Results Summary

TR-60 Requirement	Assessment Results
	Existing
PSH Routed without operating Earth Auxiliary Spillway?	Yes
Meets 10-day PSH drawdown requirements?	Yes
6-hour FBH Contained without Overtopping?	Yes
24-hour FBH Contained without Overtopping?	Yes
Route through Primary and Auxiliary Spillway without encroaching on required freeboard?	Yes

NRCS criterion requires that the primary spillway route the PSH without activating the auxiliary spillway and drain 85 percent of the flood retarding pool storage within 10 days. It was determined that the existing reservoir meets this criterion, as the auxiliary spillway was not activated and the dam drains 85 percent of the storage within 6.57 days.

The NRCS FBH and SDH storms were routed through the reservoir to determine the critical events. The 24-hour storm was the most critical event for both the FBH and SDH. The NRCS criterion requires the reservoir to route the FBH without overtopping the dam and route the SDH with sufficient freeboard. The FBH is the most restrictive design criteria for the auxiliary spillway size. The existing reservoir routes the IDF with 1.97 feet of freeboard.

Colorado DSB Flood Hydrology - Hydrologic Hazard Curve

The HEC-HMS model results for all 21 MetPortal design storms and 5 PMP design storms is summarized in Table D-5. Based on the results, the worst-case scenario is the 2-hour Local Storm AEP 10^{-7} with a peak inflow of 1750.0 cfs and a peak outflow of 1273.7 cfs. It should be noted that for all 26 design storms, the dam does not overtop and there appears to be residual freeboard.

Based the hydrologic analysis, there appear to be no hydrologic deficiencies for FPC-2 for NRCS and DSB criteria. The proposed conditions for all alternatives do not significantly change the hydraulic performance of the dam; therefore, the existing condition hydrology analysis is representative of the proposed conditions. For more information on this analysis, refer to *TM003 – Existing Hydrology Analysis* in Appendix E.

Table D-5. Hydrologic Hazard Curve Model Results Summary

Design Storm	SCS CN Losses							
	Precip Depth (in)	Precip Depth (in)	Runoff Volume (in)	Loss Volume (in)	Peak Inflow (cfs)	Peak Outflow (cfs)	Peak WSEL (ft)	Peak Storage (ac-ft)
REPS 72-hr TS, PMP	14.4	15.41	12.17	3.23	236.6	217	6142.6	96.9
REPS 72-hr GS, PMP	22.2	23.75	20.34	3.41	359.1	335.5	6143.1	102.2
REPS 24-hr LS, PMP	25.3	27.07	23.62	3.45	968.1	940.3	6145.1	121.7
REPS 6-hr LS, PMP	18.9	20.22	16.87	3.35	1170.8	1110.4	6145.5	126.2
REPS 2-hr LS, PMP	12.6	13.48	10.32	3.17	1516.5	1191.7	6145.7	128.3
MetPortal 48-hr MLC, AEP 10 ⁻⁷	17.35	19.49	16.16	3.34	328.3	278.7	6142.9	99.8
MetPortal 48-hr MLC, AEP 10 ⁻⁶	14.23	15.99	12.74	3.25	262.2	219	6142.6	97
MetPortal 48-hr MLC, AEP 10 ⁻⁵	11.44	12.85	9.71	3.14	202.5	166	6142.3	94.3
MetPortal 48-hr MLC, AEP 10 ⁻⁴	8.96	10.07	7.07	3	149.2	119.9	6142	91.6
MetPortal 48-hr MLC, AEP 10 ⁻³	6.75	7.58	4.78	2.8	101.9	77.3	6141.6	88.9
MetPortal 48-hr MLC, AEP 10 ⁻²	4.78	5.37	2.84	2.53	60.5	41.4	6141.3	86.1
MetPortal 48-hr MLC, AEP 10 ⁻¹	2.99	3.36	1.26	2.09	25.8	13.9	6140.9	82.8
MetPortal 6-hr MEC, AEP 10 ⁻⁷	14.47	15.48	12.25	3.24	1511.4	1114.3	6145.6	126.3
MetPortal 6-hr MEC, AEP 10 ⁻⁶	11.23	12.02	8.91	3.1	1093.4	754.7	6144.6	116.3
MetPortal 6-hr MEC, AEP 10 ⁻⁵	8.57	9.17	6.23	2.94	753.1	483.8	6143.7	107.6
MetPortal 6-hr MEC, AEP 10 ⁻⁴	6.39	6.84	4.11	2.72	483.1	286.2	6142.9	100.1
MetPortal 6-hr MEC, AEP 10 ⁻³	4.6	4.92	2.47	2.45	275.1	149.9	6142.2	93.4
MetPortal 6-hr MEC, AEP 10 ⁻²	3.14	3.36	1.26	2.1	126.6	60	6141.5	87.7
MetPortal 6-hr MEC, AEP 10 ⁻¹	1.92	2.05	0.44	1.61	37.6	12.1	6140.9	82.5
MetPortal 2-hr LS, AEP 10 ⁻⁷ USBR UH	10	11.07	8.02	3.06	1320.7	-	-	-
MetPortal 2-hr LS, AEP 10⁻⁷	10	11.07	8.02	3.06	1750	1156.2	6145.7	127.4
MetPortal 2-hr LS, AEP 10 ⁻⁶	8.21	9.09	6.16	2.93	1335.1	834.6	6144.8	118.7
MetPortal 2-hr LS, AEP 10 ⁻⁵	6.61	7.32	4.54	2.78	972.3	573.9	6144	110.5
MetPortal 2-hr LS, AEP 10 ⁻⁴	5.17	5.73	3.14	2.58	661.7	353.1	6143.2	102.8
MetPortal 2-hr LS, AEP 10 ⁻³	3.88	4.3	1.97	2.33	403	186.4	6142.4	95.4
MetPortal 2-hr LS, AEP 10 ⁻²	2.73	3.02	1.03	1.99	201.8	71.5	6141.6	88.5
MetPortal 2-hr LS, AEP 10 ⁻¹	1.67	1.85	0.34	1.51	62	9.6	6140.8	82

D.5. SITES Stability and Integrity Analysis

The auxiliary spillway consists of a non-vegetated, unlined trapezoidal channel with a bottom width of approximately 45 feet and side slopes of approximately 2.22H:1V. The auxiliary spillway surface condition parameters were assigned as follows:

- The effective soil stress was estimated by using a vegetal retardance curve index value of 2.9 (for the low end of the practical range).
- The vegetal cover factor applied was 0 (non-vegetated).
- The maintenance code is 1 (non-vegetated).
- The potential root depth was left blank (non-vegetated surface).

The auxiliary spillway consists of two distinct soil layers: 1) a relatively shallow layer of overburden and 2) an underlying layer of shale. The auxiliary spillway material characterization parameters are summarized in Table D-6.

Table D-6. Auxiliary Spillway Material Characterization Summary

Layer	Overburden	Shale
Plasticity Index	9	0
Dry Density (lbs/ft ³)	117	143
Head Cut Index	0.07	60.8
Percent Clay	7	0
Representative Diameter (inches)	0.236	12

TR-60 requires use of the 6-hour SDH AS discharge for stability. Allowable shear stresses for soil and vegetation were estimated based on the methods presented AH677. Results of the SITES and stability analysis indicate the AS is stable during the 6-hour SDH.

TR-60 requires use of both the 6- and 24-hour FBH for the integrity analysis. The TR-60 integrity criteria are that the AS does not breach during the SITES evaluation of the 6- and 24-hour FBH; results of both runs indicate that the current AS satisfies these criteria.

The results of the stability and integrity analysis indicate that the soil overburden would erode back to approximately Station 7+50 for both the 6-hour and 24-hour events; however, the underlying shale layer would remain intact. This indicates the existing auxiliary spillway meets NRCS stability and integrity requirements.

For more information on this analysis, refer to *TM004 – Spillway Stability and Integrity Analysis* in Appendix E.

D.6. Frequency Flood Routing

Hydraulic modeling was completed for the routing of frequency-based floods to determine the flood impacts upstream and downstream of the dam for all alternatives considered. The recurrence-interval floods to be included in the flood routing are the 10-, 25-, 50-, 100-, 200-, and 500-year 24-hour storm events. The watershed for FPC-2 and the downstream sub-basins were evaluated to determine the peak flows for the alternatives. The peak outflows for FPC-2 are shown in Table D-7 and the peak flows for the Jefferson Street and 1st Street sub-basins are shown in Table D-8. The peak flows for Purgatoire River for the same recurrence-interval floods were determined with a Bulletin 17-B analysis for the USGS 07124410 stream gage. Note that the Rehabilitation, Non-Structural, and No Federal Action alternatives for FPC-2 do not include significant hydraulic improvements; therefore, the peak outflows for these alternatives are equivalent to the existing conditions of FPC-2. For the Non-Structural alternative, the flood inundation boundary from a dam breach during the PMP storm event scenario was used since the alternative considers purchasing downstream infrastructure that are at risk due to non-compliance.

Table D-7. Recurrence-Interval Floods for FPC-2

24-Hour Recurrence-Interval (year)	Peak Inflow (cfs)	Peak Outflows (cfs)			
		Alt. 1: Rehabilitation	Alt. 2: Non-Structural ¹	Alt 3: Decommission	Alt 4: No Federal Action
10	49	16	16	49	16
25	251	20	20	251	20
50	345	30	30	345	30
100	450	36	36	450	36
200	568	41	41	568	41
500	738	46	46	738	46

¹The inundation boundary produced by a dam breach during the PMP storm event is used for evaluating the Non-Structural alternative since it requires purchasing downstream infrastructure which are at risk due to non-compliance.

Table D-8. Recurrence-Interval Floods for Jefferson St. and 1st St.

24-Hour Recurrence-Interval (year)	Peak Flow (cfs)	
	Jefferson St.	1 st St.
10	95	98
25	152	145
50	205	187
100	263	232
200	329	281
500	422	350

The U.S. Army Corps of Engineers River Analysis System (HEC-RAS version 5.0.7) was used for the hydraulic routing of the recurrence-interval floods for each alternative. Flood inundation maps were created to show downstream flood impacts for each alternative. For the Federal Decommissioning alternative, the results of the hydraulic routing identified the need to improve the culverts at Jefferson Street and 1st Street and channel improvements between these two intersections. The proposed improvements for this alternative were designed to provide flood protection for the 100-year 24-hour event.

For more information on this analysis, refer to *TM005 – Frequency Flood Routing* in Appendix E, which also includes the flood inundation maps.

D.7. Dam Hazard Classifications

A dam breach analysis was conducted to determine the hazard classification of FPC-2. In addition, Colorado Dam Safety requires a hydrologic hazard to be completed. NRCS's TR-60 and Colorado Dam Safety guidelines for dam breach analysis were followed for the study.

The peak breach flow for a sunny-day failure of FPC-2 using Froehlich was determined to be approximately 16,360 cfs. There are several structures within the FPC-2 dam breach inundation area. The majority of these inundated structures had DV values greater than seven and flood depths greater than 2 feet, which meets the criteria per Colorado Dam Safety to determine potential loss of life. Based on the results of the dam breach analysis, FPC-2 meets the criteria for a High Hazard classification.

The peak breach flow for the hydrologic hazard was determined by breaching FPC-2 at the peak reservoir elevation during the 2-hour local storm PMP (IDF). The approximate peak break flow for this scenario is 17,047 cfs. Per Colorado Dam Safety guidelines, a Comprehensive Dam Safety Evaluation was completed to determine that the dam breach could cause a loss of life of 0-15 persons. It is recommended that FPC-2 receive a hydrologic hazard classification of Extreme Hazard.

For more information on this analysis, refer to *TM006 – Hazard Classification* in Appendix E, which also includes dam breach inundation maps.

D.8. Hydraulic Design

The flood-frequency routing analysis for FPC-2 identifies the need for downstream improvements for the Federal Decommissioning Alternative to provide flood protection up to the 100-year 24-hour storm event. At Jefferson Street, the analysis shows that the existing 14-foot by 4.5-foot arch culvert has sufficient capacity to pass the 100-year flows; however, clearing of debris and sediment and regrading of channel slope are needed to restore the designed capacity of the existing culvert. The existing 80-inch RCP culvert at First Street would be replaced with a 7-foot by 8-foot RCP box culvert to provide 100-year flood protection. Based on available LiDAR data, approximately 300 feet of channel improvements are needed between Jefferson Street and First Street to prevent overtopping of the west channel bank and flooding

into Second Street. The proposed channel cross section consists of a minimum bottom width of 10 feet, 2.5:1 bank slopes, and regrading of the channel to an average channel slope of 3.5 percent.

For more information on the hydraulic calculation of the proposed improvements, refer to *TM007 – Hydraulic Design* in Appendix E.

D.9. Economic Analysis

Whether a proposed project alternative (i.e., actions at a location within the watershed basin) is economically feasible is determined by comparing the average annual benefits to the average annual costs. An economic analysis was performed to quantify the benefits and costs of each action alternative relative to the No Action alternative. If the average annual benefits for a project alternative exceed the average annual costs, then the project alternative is considered economically feasible. The economic analysis considers the no-action scenario (hereafter the “without-project alternative”) as the baseline condition, which does not have any benefits or costs associated with it. Changes resulting from implementation of a with-project alternative in relation to the without-project alternative are measured as a cost or a benefit. An economic analysis was performed to quantify the benefits and costs of each with-project alternative. The following summarizes the results of the economic analysis. Additional detail on the economic analysis can be found in *TM008 – Economic Analysis* in Appendix E.

Benefits and costs over the period of analysis were annualized to allow for a direct comparison of average annual benefits to average annual costs. The benefits and costs were evaluated using a 2021 price level, 2023 base year, and amortized over a 100-year period using a discount rate of 2.5 percent. The analysis uses inundation models for six flood recurrence intervals, which are the 10-percent- (10-year), 4-percent- (25-year), 2-percent- (50-year), 1-percent- (100-year), 0.5-percent- (200-year), and 0.2-percent- (500-year) annual-probability flood events, to estimate future damages from flooding within the study area. Average annual benefits were compared to the average annual costs to generate a benefit-cost ratio for each project alternative.

The benefit categories evaluated were: (1) residential and nonresidential structure, content and auto damages avoided; (2) reduction in debris removal costs; and (3) construction, operations, and maintenance (O&M) costs avoided. Table D-9 lists the building class, structure type, and number of structures examined in this analysis.

Table D-9. Number of Structures by Building Class and Structure Type

Building Class	Structure Type	Number of Structures
Grocery	Nonresidential	2
Retail-Electronics	Nonresidential	1
Residential	Residential	4
Convenience Store	Nonresidential	2
Fast Food	Nonresidential	1
Hotel	Nonresidential	1
Medical Office	Nonresidential	6
Warehouse - Non-Refrigerated	Nonresidential	1
Apartment	Nonresidential	1
Total		19

The average annual structure-related damages for each with-project alternative were compared with those of the without-project alternative. The differences in the amounts were counted as the structure-related

benefits (damages avoided) in this analysis. Total average annual damages and structure-related benefits are summarized in Table D-10.

Table D-10. Total Average Annual Damages and Structure-Related Benefits for Each Project Alternative

Alternative	Definition	Total Average Annual Damages	Total Structure-Related Benefits
Alternative 1	Full Rehabilitation	\$10	\$0
Alternative 2	No Federal Action	\$10	Not Applicable
Alternative 3	Federal Decommission	\$910	-\$900
Alternative 4	Non-Structural	\$0	\$10

Notes: Values rounded to the nearest ten, 2021 price level, 2023 base year, 2.5 percent discount rate, 102-year period of analysis.

Average annual costs associated with the project alternatives include costs for construction and O&M. Costs for Alternative 4 include both the costs of acquiring structures downstream, as well as the costs for purchasing downstream easements to restrict future development. O&M costs include annual costs (except Alternative 3) and recurring costs every fifth year starting the base year (2023). Table D-11 summarizes the average annual costs for each project alternative.

Table D-11. Average Annual Construction and O&M Costs for Each Alternative

Alternative	Definition	Average Annual Construction Costs	Average Annual O&M Costs
Alternative 1	Full Rehabilitation	\$122,700	\$1,600
Alternative 2	No Federal Action	\$131,900	\$4,900
Alternative 3	Federal Decommission	\$116,600	\$500
Alternative 4	Non-Structural	\$179,100	\$2,900

Note: Costs rounded to the nearest hundred. 2021 price level, 2023 base year, amortized using a 2.5 percent discount rate over a 102-year period.

Comparing the with-project alternatives (Alternative 1, 3, and 4) against the without-project alternative (Alternative 2), the average annual construction costs of \$131,900 for Alternative 2 was considered as the amount of construction costs that could be avoided for each with-project alternative, thus counted as a benefit. Similarly, the average annual O&M costs of \$4,900 was considered as the amount of O&M costs that could be avoided for each with-project alternative, thus also counted as a benefit. Table D-12 summarizes the average annual benefits, average annual costs, net benefits, and the benefit-cost ratio for each with-project alternative.

Table D-12. Benefit-Cost Analysis Summary

Item	Alternative 1 (Full Rehabilitation)	Alternative 2 (No Federal Action)	Alternative 3 (Federal Decommission)	Alternative 4 (Non-Structural)
Costs				
Average Annual Construction Costs	\$122,700	\$131,900	\$116,600	\$179,100
Average Annual O&M Costs	\$1,600	\$4,900	\$500	\$2,900
Total Average Annual Costs	\$124,300	N/A	\$117,200	\$182,000
Benefits				
Total Average Annual Damages Avoided*	\$0	N/A	\$(900)	\$10

Total Average Annual Construction Costs Avoided	\$131,900	N/A	\$131,900	\$131,900
Total Average Annual O&M Costs Avoided	\$4,900	N/A	\$4,900	\$4,900
Total Average Annual Benefits	\$136,900	N/A	\$136,000	\$137,900
Evaluation				
Average Annual Net Benefits	\$12,600	N/A	\$18,800	\$(45,100)
Benefit-Cost Ratio**	1.1	N/A	1.2	0.8

Notes: Values rounded to the nearest hundred, 2021 price level, 2023 base year, amortized using a 2.5 percent discount rate over a 102-year period; *values rounded to the nearest ten; **values rounded to two decimal places.

D.10. Conceptual Drawings

The Preferred Alternative was evaluated to approximately a 30-percent design level. Design drawings were generated to help communicate the geospatial locations and conceptual design details of the project elements and aid in cost estimating. *TM009 – Conceptual Drawings* in Appendix E contains a full set of 30-percent design drawings.

D.11. Probable Cost

The probable cost of each project element was determined by considering 30-percent design quantities, past and present unit costs, and engineering experience. *TM010 – Probable Costs* in Appendix E contains detailed quantities, unit cost, and total project element costs. A summary of the cost is shown in Table D-13.

Table D-13. Alternative Probable Cost Summary

Alternative	Total Construction Cost	Total Engineering Cost	Total Permitting Cost	Total Administration Cost	Total Installation Costs
Full Rehabilitation	\$3,695,000	\$591,000	\$5,000	\$202,000	\$4,493,000
No Federal Action	\$1,518,000	\$243,000	\$0	\$30,000	\$1,791,000
Federal Decommissioning	\$3,539,000	\$531,000	\$7,000	\$193,000	\$4,270,000

D.12. Statement of Limitations

This document represents Jones & DeMille Engineering’s professional judgment based on the information available at the time of its completion and as appropriate for the project scope of work. Services performed in developing the content of this document have been conducted in a manner consistent with that level and skill ordinarily exercised by members of the engineering profession currently practicing under similar conditions. No warranty, express or implied, is made.

D.13. References

Natural Resources Conservation Service (NRCS). 2019. Technical Release 210-60: Earth Dams and Reservoirs. Conservation Engineering Division. March 2019.

Appendix E. Other Supporting Information

- E.1. USFWS IPaC Report
- E.2. Fish and wildlife species of concern
- E.3. Unanticipated Discoveries Procedures
- E.4. Technical Memoranda

E.1. USFWS IPaC Report



United States Department of the Interior



FISH AND WILDLIFE SERVICE
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Phone: (303) 236-4773 Fax: (303) 236-4005
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<http://www.fws.gov/platteriver>

In Reply Refer To:

September 13, 2021

Consultation Code: 06E24000-2021-SLI-1329

Event Code: 06E24000-2021-E-03368

Project Name: Fisher Peak Dam Rehabilitation

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://](http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html)

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:

Colorado Ecological Services Field Office

Denver Federal Center
P.O. Box 25486
Denver, CO 80225-0486
(303) 236-4773

Project Summary

Consultation Code: 06E24000-2021-SLI-1329
Event Code: Some(06E24000-2021-E-03368)
Project Name: Fisher Peak Dam Rehabilitation
Project Type: DAM
Project Description: Rehabilitation of the FPC-2 dam
Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@37.173881550000004,-104.52279468500139,14z>



Counties: Las Animas County, Colorado

Endangered Species Act Species

There is a total of 4 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 Fisheries¹, 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.

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 <i>Lynx canadensis</i> 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
New Mexico Meadow Jumping Mouse <i>Zapus hudsonius luteus</i> 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/7965	Endangered

Birds

NAME	STATUS
Mexican Spotted Owl <i>Strix occidentalis lucida</i> 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

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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 Act¹ and the Bald and Golden Eagle Protection Act².

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 <i>Haliaeetus leucocephalus</i> 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 Oct 15 to Aug 31
Cassin's Finch <i>Carpodacus cassinii</i> 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

NAME	BREEDING SEASON
Clark's Grebe <i>Aechmophorus clarkii</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 1 to Aug 31
Evening Grosbeak <i>Coccothraustes vespertinus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Ferruginous Hawk <i>Buteo regalis</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/6038	Breeds Mar 15 to Aug 15
Pinyon Jay <i>Gymnorhinus cyanocephalus</i> 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

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 $0.05/0.25 = 0.2$.

- 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 (|)

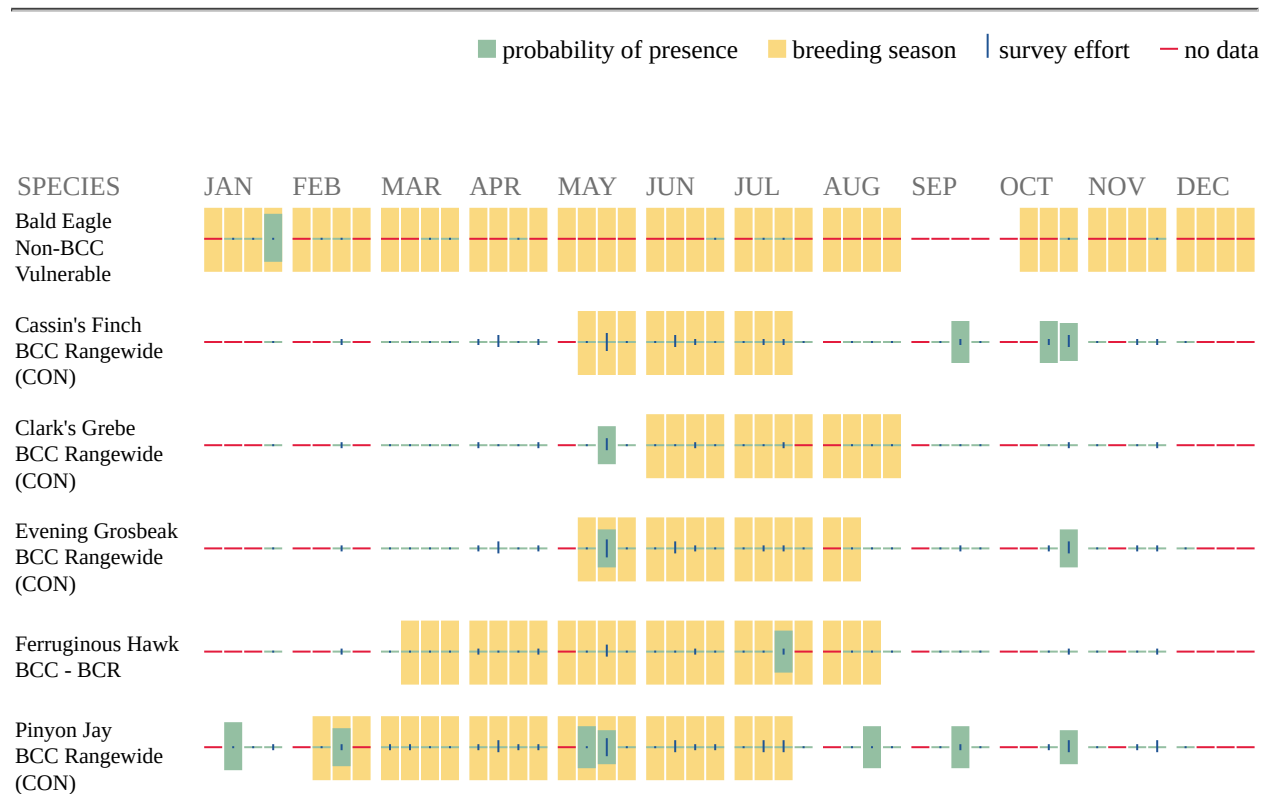
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

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 to 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.

LAKE

- [L1UBHx](#)
- [L2USAx](#)

FRESHWATER FORESTED/SHRUB WETLAND

- [PSS1C](#)

FRESHWATER POND

- [PUBF](#)
- [PUSA](#)
- [PUSC](#)

RIVERINE

- [R2UBG](#)
- [R2USA](#)
- [R2USC](#)
- [R4SBA](#)
- [R4SBC](#)
- [R5UBFx](#)
- [R5UBH](#)

E.2. Fish and wildlife species of concern

Species	Classification	Status relative to watershed area	Potential to occur within impact areas
Arkansas darter (<i>Etheostoma cragini</i>), brassy minnow (<i>Hybognathus hankinsoni</i>), common shiner (<i>Luxilus cornutus</i>)	State threatened fish	The watershed is outside of the species' known ranges.	None. Suitable aquatic habitats do not occur within the project area.
Lake chub (<i>Couesius plumbeus</i>), northern redbelly dace (<i>Phoxinus eos</i>), plains minnow (<i>Hybognathus placitus</i>), Rio Grande sucker (<i>Catostomus plebeius</i>), southern redbelly dace (<i>Phoxinus erythrogaster</i>), suckermouth minnow (<i>Phenacobius mirabilis</i>)	State endangered fish	The watershed is outside of the species' known ranges.	None. Suitable aquatic habitats do not occur within the project area.
Abert's squirrel (<i>Sciurus aberti</i>)	SWAP Tier 2	Part of the species range occurs within the watershed area.	None. Ponderosa pine forest areas do not occur within the project area.
Bald eagle (<i>Haliaeetus leucocephalus</i>)	SWAP Tier 2, migratory bird	No bald eagle nests or roost sites are known to occur within the watershed area. Trinidad Lake and the Purgatoire River are identified as winter range.	Likely.
Big brown bat (<i>Eptesicus fuscus</i>)	Species of concern	The watershed is within the species range.	Possible.
Big free-tailed bat (<i>Tadarida brasiliensis</i>)	SWAP Tier 2	Part of the species range occurs within the watershed area.	Possible.
Black bear (<i>Ursus americanus</i>)	Species of concern	Summer and fall concentration areas occur within the watershed.	Possible.
Black-tailed prairie dog (<i>Cynomys ludovicianus</i>)	SWAP Tier 2	A small portion of the species' range occurs within the east portion of the watershed area.	None. The area of potential effects is outside the species range.
Boreal toad (<i>Bufo boreas boreas</i>)	State endangered	The watershed is outside of the species range.	None. The area of potential effects is outside the species range.
Botta's pocket gopher (<i>Thomomys bottae cultellus</i>)	SWAP Tier 2	The watershed is within the species range.	Possible.
Brazilian free-tailed bat (<i>Tadarida brasiliensis</i>)	Species of concern	The watershed is within the species range.	Possible.
Bullsnake (<i>Pituophis catenifer sayi</i>)	Species of concern	The watershed is within the species range.	Possible.

Species	Classification	Status relative to watershed area	Potential to occur within impact areas
Burrowing owl (<i>Athene cunicularia</i>)	State threatened	The watershed is within the species range.	None. Suitable open prairie habitat does not occur within or near the project area.
Canada goose (<i>Branta canadensis</i>)	Species of concern	Winter range occurs within the watershed area.	None. Wintering range and suitable aquatic habitats do not occur within or near the project area.
Cassin's finch (<i>Carpodacus cassinii</i>)	SWAP Tier 2, migratory bird	The species may breed in the watershed area.	Possible.
Clark's grebe (<i>Aechmophorus clarkii</i>)	Migratory bird	The species may breed in the watershed area.	None. Suitable aquatic habitats do not occur within or near the project area.
Coachwhip (<i>Masticophis flagellum</i>)	Species of concern	The watershed is within the species range.	Possible.
Common lesser earless lizard (<i>Holbrookia maculata</i>)	Species of concern	Part of the species range occurs within the watershed area.	Possible.
Dwarf shrew (<i>Sorex nanus</i>)	SWAP Tier 2	The watershed is within the species range.	Possible.
Eastern collared lizard (<i>Crotaphytus collaris</i>)	Species of concern	The watershed is within the species range.	Possible.
Evening grosbeak (<i>Coccothraustes vespertinus</i>)	Migratory bird	The species may breed in the watershed area.	Possible.
Ferruginous hawk (<i>Buteo regalis</i>)	SWAP Tier 2, migratory bird	The species may breed in the watershed area.	Possible.
Flathead chub (<i>Platygobio gracilis</i>)	SWAP Tier 1	The species is known to occur within the watershed.	None. Suitable aquatic habitats are outside the area of potential effect.
Fringed myotis (<i>Myotis thysanodes</i>)	SWAP Tier 1	The species has been observed within or near the watershed.	Possible.
Green toad (<i>Anaxyrus debilis</i>)	SWAP Tier 2	Suitable aquatic habitats likely occur within the watershed.	Possible.
Hernandez's short-horned lizard (<i>Phrynosoma hernandesi</i>)	Species of concern	The watershed is within the species range.	Possible.
Hoary bat (<i>Lasiurus cinereus</i>)	SWAP Tier 2	The watershed is within the species range.	Possible.
Kit fox (<i>Vulpes macrotis</i>)	State endangered	The watershed is outside of the species known range in the state.	None. The area of potential effects is outside the species known range.
Least tern (<i>Sterna antillarum</i>)	State endangered	The watershed is outside of the species known range in the state.	None. The area of potential effects is outside the species known range.

Species	Classification	Status relative to watershed area	Potential to occur within impact areas
Lewis's woodpecker (<i>Melanerpes lewis</i>)	SWAP Tier 2, migratory bird	Suitable forest habitats likely occur within the watershed.	Possible.
Lesser prairie-chicken (<i>Tympanuchus pallidicinctus</i>)	State threatened	The watershed is outside of the species range.	None. The area of potential effects is outside the species range.
Little brown myotis (<i>Myotis lucifugus</i>)	SWAP Tier 1	The watershed is within the species range.	Possible.
Long-eared myotis (<i>Myotis evotis</i>)	Species of concern	The watershed is within the species range.	Possible.
Long-legged myotis (<i>Myotis volans</i>)	Species of concern	The watershed is within the species range.	Possible.
Milksnake (<i>Lampropeltis triangulum</i>)	SWAP Tier 2	The watershed is within the species range.	Possible.
Mountain lion (<i>Puma concolor</i>)	Species of concern	The watershed is within the species range.	Possible.
Mule deer (<i>Odocoileus hemionus</i>)	Species of concern	The watershed contains summer, winter, and severe winter habitats.	Possible.
North American racer (<i>Coluber constrictor</i>)	Species of concern	Part of the species range occurs within the watershed area.	Possible.
Osprey (<i>Pandion haliaetus</i>)	Species of concern	Foraging habitat occurs in association with Trinidad Lake.	Possible.
Peregrine falcon (<i>Falco peregrinus anatum</i>)	SWAP Tier 2	Potential nesting habitat is identified around Fisher Peak.	Possible.
Pinyon jay (<i>Gymnorhinus cyanocephalus</i>)	SWAP Tier 2, migratory bird	The species may breed in the watershed area.	Possible.
Plains hog-nosed snake (<i>Heterodon nasicus</i>)	Species of concern	Part of the species range occurs within the watershed area.	Possible.
Plains sharp-tailed grouse (<i>Tympanuchus phasianellus jamesii</i>)	State endangered	The watershed is outside of the species range.	None. The area of potential effects is outside the species range.
Prairie lizard (<i>Sceloporus consobrinus</i>) and plateau fence lizard (<i>Sceloporus tristichus</i>)	Species of concern	The watershed is within the species' ranges.	Possible.
Prairie rattlesnake (<i>Crotalus viridis</i>) and western rattlesnake (<i>Crotalus atrox</i>)	Species of concern	The watershed is within the species' ranges.	Possible.
Red bat (<i>Lasiurus borealis</i>)	Species of concern	Part of the species range occurs within the watershed area.	Possible.

Species	Classification	Status relative to watershed area	Potential to occur within impact areas
Ring-necked snake (<i>Diadophis punctatus</i>)	Species of concern	The watershed is within the species range.	Possible.
River otter (<i>Lontra canadensis</i>)	State threatened	The watershed is outside of the species range.	None. The area of potential effects is outside the species range.
Rocky Mountain elk (<i>Cervus elaphus nelsoni</i>)	Species of concern	The watershed contains summer, winter, and severe winter habitats.	Possible.
Silver-haired bat (<i>Lasionycteris noctivagans</i>)	Species of concern	The watershed is within the species range.	Possible.
Six-lined racerunner (<i>Aspidoscelis sexlineata</i>)	Species of concern	The watershed is within the species range.	Possible.
Smooth greensnake (<i>Opheodrys vernalis</i>)	Species of concern	The watershed is within the species range.	Possible.
Southern red-backed vole (<i>Myodes gapperi</i>)	SWAP Tier 2	Part of the species range occurs within the watershed area.	Possible.
Terrestrial garter snake (<i>Thamnophis elegans</i>)	Species of concern	The watershed is within the species range.	Possible.
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	SWAP Tier 1	The watershed is within the species range.	Possible.
Variable skink/many-lined skink (<i>Plestiodon multivirgatus</i>)	Species of concern	Part of the species' ranges occur within the watershed area.	Possible.
Western small-footed myotis (<i>Myotis ciliolabrum</i>)	Species of concern	The watershed is within the species range.	Possible.
White-tailed deer (<i>Odocoileus virginianus</i>)	Species of concern	The watershed is within the species range.	Possible.
Wild turkey (<i>Meleagris gallopavo merriami</i>)	Species of concern	Part of the species range occurs within the watershed area.	Possible.
Wolverine (<i>Gulo gulo</i>)	State endangered	Wolverine may range in the high forested areas of the watershed (USFWS 2018).	None. Suitable remote coniferous forest does not occur within or near the project area.

USFWS. 2018. Species status assessment report for the North American wolverine (*Gulo luscus*). Version 1.2. March 2018. U.S. Fish and Wildlife Service, Mountain-Prairie Region, Lakewood, CO.

E.3. Unanticipated Discoveries Procedures

- A. In the events that previously unidentified cultural resources are identified during project implementation, 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. Contact the Area 3 CRS: Michael Troyer, 719-749-8286, michael.troyer@usda.gov
 3. The NRCS CRS shall inspect the discovery within 24 hours, if weather permits, and in consultation with the project sponsor, concerned Indian tribes, the Colorado State Historic Preservation Office (SHPO), 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 it is appropriate and safe for the resources and workers.
 6. The NRCS CRS shall notify the Colorado SHPO no later than 48 hours 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 concerned Indian tribes, the Colorado SHPO, and technical experts not employed by the NRCS.
 7. The Colorado SHPO shall respond within 48 hours of 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 Colorado SHPO of the actions when they are completed.
- B. If human remains are exposed on private land, any unmarked burials would be treated under Colorado Revised Statute (CRS) 24-80-1301 et seq. 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.
2. Immediately notify the NRCS CRS and appropriate project manager.
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.

E.4. Technical Memoranda

- TM001 – Existing Conditions Assessment
- TM002 – Preliminary Field Investigation and Geotechnical Analyses
- TM003 – Existing Hydrology Analysis
- TM004 – Spillway Stability and Integrity Analysis
- TM005 – Frequency Flood Routing
- TM006 – Hazard Classification
- TM007 – Hydraulic Design
- TM008 – Economic Analysis
- TM009 – Conceptual Drawings
- TM010 – Probable Costs