USDA United States Department of Agriculture

Eastern Duchesne Watershed

Draft Watershed Plan and Environmental Assessment

Duchesne County Water Efficiency Project

Duchesne County, Utah

Lead Federal Agency: USDA Natural Resources Conservation Services

Sponsoring Local Organization: Duchesne County Water Conservancy District

April 2025

Utah State Office
Natural Resources Conservation Service
nrcs.usda.gov/

Draft

Watershed Plan and Environmental Assessment
for the
Eastern Duchesne Watershed
Duchesne County Water Efficiency Project
Duchesne County, Utah

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

Sponsoring Local Organization: Duchesne County Water Conservancy District

Cooperating Agency: None

Authority: This Watershed Plan and Environmental Assessment (Plan-EA) has been prepared under the authority of the NRCS Watershed and Flood Prevention Operations Program, which includes the Flood Prevention Operations Program authorized by the Flood Control Act of 1944 (Public Law [PL] 78-534) and the provisions of the Watershed Protection and Flood Prevention Act of 1954 [Public Law 83-566 (PL 83-566) Stat. 666 as amended (16 U.S.C Section 1001 et seq.).

Abstract: The Duchesne County Water Efficiency Project (Project) is located in east central Duchesne County, Utah. The purpose of the Project is to provide agricultural water management improvements for irrigation water delivery efficiency and water conservation in the existing irrigation systems of the Eastern Duchesne Watershed. There is a need to reduce water loss, improve system reliability and safety, expand the system to meet existing user water rights, provide pressurized irrigation capabilities, improve water quality, and reduce problematic and costly operations and maintenance issues in the current systems. A No Action Alternative and proposed Action Alternative were evaluated in detail in the Plan-EA. The NRCS preferred alternative for the Project is the proposed Action Alternative which was also determined to be the environmentally preferable alternative. The proposed Action Alternative modifications would include lining segments of the Yellowstone Feeder and Gray Mountain Canals, and installation of pipeline replacing open canal systems at South Boneta Canal, Dry Gulch Class B and Class C Canal Systems, and Red Cap Extension Canals/Laterals. This alternative was determined to be the least cost alternative that successfully meets the goals for the agricultural water management Project purpose. The installation cost estimate for this alternative is $41,049,000.

Comments: NRCS has completed this Draft Watershed Plan and Environmental Assessment (Plan-EA) in accordance with the National Environmental Policy Act (NEPA) and NRCS guidelines and standards. Reviewers should provide their comments to NRCS during the allotted Draft Plan-EA review period. Comments need to be submitted by May 23, 2025, to become part of the Administrative Record. Please send comments and questions to:

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WATERSHED PLAN AGREEMENT

(TO BE INCLUDED IN FINAL PLAN-EA)

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Summary (Office of Management and Budget Fact Sheet)

S-1.0 Title of Proposed Action

Draft Watershed Plan and Environmental Assessment (Plan-EA) for the Eastern Duchesne Watershed Duchesne County Water Efficiency Project (Project)

S-2.0 Watershed Name

Eastern Duchesne Watershed

S-3.0 County, State

Duchesne County, Utah

S-4.0 Congressional District

Utah Congressional District 3

S-5.0 Sponsoring Local Organizations

The Sponsoring Local Organizations (SLO) for the Project is Duchesne County Water Conservancy District (DCWCD).

S-6.0 Cooperating Agency

No agencies have accepted cooperating agency status on the Project.

S-7.0 Authority

This Plan-EA has been prepared under the authority of United States Department of Agriculture Natural Resources Conservation Service (NRCS) Watershed and Flood Prevention Operations (WFPO) Program, which authorizes funding to help urban and rural communities protect, improve, and develop land resources in watersheds up to 250,000 acres in size. The WFPO Program includes the Flood Prevention Operations Program authorized by Flood Control Act of 1944 (Public Law [PL] 78-534) and the provisions of the Watershed Protection and Flood Prevention Act of 1954 (PL 83-566) Stat. 666 as amended (16 U.S.C. Section 1001 et seq.). The Plan-EA has been prepared in accordance with Section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969, Public Law 91-190, as amended (42 U.S.C. 4321 et seq.).

S-8.0 Purpose and Need for Action

The purpose of the Project is to provide agricultural water management improvements for irrigation water delivery efficiency and water conservation in the existing irrigation systems of the Eastern Duchesne Watershed. There is a need to reduce water loss, improve system reliability and safety, expand the system to meet existing user water rights, provide pressurized irrigation capabilities, improve water quality, and reduce problematic and costly operations and maintenance (O&M) issues in the current systems.

S-9.0 Description of Proposed Action (Preferred Alternative)

Proposed modifications would include agricultural water management improvements within seven irrigation problem areas that would consist of the following.

- Site 1 (Yellowstone Feeder Canal): Line ten sections of the Yellowstone Feeder Canal with concrete, totaling approximately 13,926 linear feet.
- Site 2 (Coyote Canal): Pipe approximately 4,413 linear feet of open canal and armor 477 linear feet of canal.
- Site 3 (South Boneta Canal): Pipe approximately 12,883 linear feet of open canal.
- Site 4 (Dry Gulch Class B Canal System): Pipe sections of the existing open canal system, installing approximately 79,293 linear feet of pipe.
- Site 5 (Dry Gulch Class C Canal System): Pipe sections of the existing open canal system, installing approximately 33,292 linear feet of pipe.
- Site 6 (Red Cap Extension Canals/Laterals): Convert an open canal system into a pressurized irrigation system, installing approximately 106,161 linear feet of pipe.
- Site 7 (Gray Mountain Canal): Line three sections of the Gray Mountain Canal with concrete, totaling approximately 10,475 linear feet.

S-10.0 Resource Information

Table S-1. Existing Resoure Information

Resource	Description
Latitude / Longitude (WGS84)	Site 1 (Yellowstone Feeder Canal): 40.43826° / -110.28540° Site 2 (Coyote Canal): 40.43118° / -110.14458° Site 3 (South Boneta Canal): 40.36209° / -110.32580° Site 4 (Dry Gulch Class B Canal System): 40.36207° / -110.22929° Site 5 (Dry Gulch Class C Canal System): 40.25377° / -110.18744° Site 6 (Red Cap Extension Canals/Laterals): 40.20762° / -110.3258° Site 3 (Gray Mountain Canal): 40.15008° / -110.22125°
Hydrologic Unit Name / Code[1]	Duchesne / 14060003, Lower Green-Desolation Canyon 14060005
Watershed Climate[2]	July average high/low: 98°F / 45°F January average high/low: 44°F / -14°F
Watershed Topography	Elevation Range 4,900 to 7,180 feet Basin at the south edge of the Uinta Mountains, sloping generally southeast
Average Annual Precipitation[2]	6.34 inches
Eastern Duchesne Watershed Area	298.8 square miles (191,216 acres)
Land Uses of Watershed[3]	Developed 11,200 acres Agricultural 90,147 acres Undeveloped Open Land 88,807 acres Water 1,062 acres

Resource	Description
Land Ownership of Watershed[4]	Tribal 21% Federal/State 1% Private 78% *All land in the Watershed is within the Uintah and Ouray Indian Reservation*
Population (Duchesne County[5])	19,950
Farms Present (Duchesne County[6])	1,063 Farms
Land in Farms (Duchesne County[6])	1,057,413 ac
Average Farm Size (Duchesne County[6])	995 ac

1 - Source: U.S. Environmental Protection Agency (EPA) 2022a
2 - Source: National Oceanic Atmospheric Administration (NOAA) 2022a
3 – Based on review of National Land Cover Database (Multi-Resolution Land Characteristics Consortium [MRLC] 2019) and water related land use data (Utah Geospatial Resource Center (UGRC 2022)
4 - Utah School of Trust Lands Administration (SITLA) and U.S. Bureau of Land Management (BLM) 2022
5 - U.S. Census Bureau (USCB) 2020
6 – U.S. Department of Agriculture (USDA) 2017a

S-11.0 Alternative Plans Considered

Alternative plans considered in detailed study and evaluated in this Plan-EA include the No Action Alternative and the Action Alternative for seven sites. The proposed Action Alternative is the preferred alternative and is the environmentally preferable alternative for the Project. Several other alternatives were considered during the planning process but were eliminated from detailed study due to environmental impacts; if they were considered infeasible, had exorbitant costs, did not meet the purpose and need of the Project; or other critical factors. A description of the alternatives analyzed in detailed study and associated installation and operation and maintenance (O&M) costs are included below. The installation costs for the alternatives were prepared to equal levels of detail judged appropriate for identification of the NEE alternative. Installation costs include construction, engineering, permitting, real property rights, and administration.

No Action Alternative – The No Action Alternative considers the actions that would take place if no federal action or federal funding were provided for the Project. The No Action Alternative would not improve the irrigation systems. There are no installation costs associated with this alternative. The O&M costs are estimated at $222,100 per year.

Action Alternative – The Action Alternative would improve irrigation systems within the irrigation problem areas. This would include the measures listed for the proposed Action Alternative in Section S-9.0. The total installation cost is estimated at $41,049,000 with O&M estimated at $31,600 per year.

S-12.0 Project Costs and Funding Source

The breakdown of the estimated installation cost for the Action Alternative is provided in Table S-2. NRCS provides PL 83-566 funding for engineering and 75% funding for construction. The SLO is responsible for real property rights, permitting, and costs associated with their own

administrative time to install the Project. NRCS is also responsible for their own administrative time to install the Project measures.

Table S-2. Estimated Project Installation Cost

Item	PL 83-566 Funds		Other Funds		Total	
Site 1 (Yellowstone Feeder Canal)						
Construction	$1,874,000	75%	$625,000	25%	$2,499,000	81%
Engineering	$500,000	100%	$0	0%	$500,000	16%
Permits	$0	0%	$8,000	100%	$8,000	>1%
Project Administration	$37,500	N/A	$37,500	N/A	$75,000	2%
Subtotal	**$2,411,500**	78%	**$670,500**	22%	**$3,082,000**	100%
Site 2 (Coyote Canal)						
Construction	$1,095,000	75%	$365,000	25%	$1,460,000	81%
Engineering	$292,000	100%	$0	0%	$292,000	16%
Permits	$0	0%	$7,000	100%	$7,000	>1%
Project Administration	$22,000	N/A	$22,000	N/A	$44,000	2%
Subtotal	**$1,409,000**	78%	**$394,000**	22%	**$1,803,000**	100%
Site 3 (South Boneta Canal)						
Construction	$484,000	75%	$162,000	25%	$646,000	80.5%
Engineering	$130,000	100%	$0	0%	$130,000	16.2%
Permits	$0	0%	$8,000	100%	$8,000	1.0%
Project Administration	$9,500	N/A	$9,500	N/A	$19,000	2.5%
Subtotal	**$623,500**	78%	**$179,500**	22%	**$803,000**	100%
Site 4 (Dry Gulch Class B Canal System)						
Construction	$3,608,000	75%	$1,202,000	25%	$4,810,000	81%
Engineering	$962,000	100%	$0	0%	$962,000	16%
Permits	$0	0%	$25,000	100%	$25,000	<1%
Project Administration	$48,000	N/A	$48,000	N/A	$96,000	2%
Real Property Rights	$0	0%	$48,000	100%	$48,000	1%
Subtotal	**$4,618,000**	78%	**$1,323,000**	22%	**$5,941,000**	100%
Site 5 (Dry Gulch Class C Canal System)						
Construction	$9,626,000	75%	$3,208,000	25%	$12,834,000	81%
Engineering	$2,566,000	100%	$0	0%	$2,566,000	16%
Permits	$0	0%	$8,000	100%	$8,000	<1%
Project Administration	$190,500	N/A	$190,500	N/A	$381,000	2%
Real Property Rights	$0	0%	$4,000	100%	$4,000	1%
Subtotal	**$12,382,500**	78%	**$3,410,500**	22%	**$15,793,000**	100%

Item	PL 83-566 Funds		Other Funds		Total	
Site 6 (Red Cap Extension Canals/Laterals)						
Construction	$5,630,000	75%	$1,876,000	25%	$7,506,000	81%
Engineering	$1,502,000	100%	$0	0%	$1,502,000	16%
Permits	$0	0%	$25,000	100%	$25,000	<1%
Project Administration	$94,000	N/A	$94,000	N/A	$188,000	2%
Real Property Rights	$0	0%	$37,000	100%	$37,000	<1%
Subtotal	**$7,226,000**	78%	**$2,032,000**	22%	**$9,258,000**	100%
Site 7 (Gray Mountain Canal)						
Construction	$2,660,000	75%	$887,000	25%	$3,547,000	81%
Engineering	$710,000	100%	$0	0%	$710,000	16%
Permits	$0	0%	$5,000	100%	$5,000	<1%
Project Administration	$53,500	N/A	$53,500	N/A	$107,000	2%
Subtotal	**$3,423,500**	78%	**$945,500**	22%	**$4,369,000**	100%
Total	**$32,077,000**	78%	**$8,972,000**	22%	**$41,049,000**	100%

S-13.0 Project Benefits

The Project provides long-term benefits for water and agriculture in the Eastern Duchesne Watershed. It conserves agricultural water by reducing water lost to canal seepage and improves water quality by decreasing salinity. Surface water quantities and flow in the natural stream systems and irrigation systems are anticipated to increase during the irrigation season (April through October) after implementation of the Project. Improved water quality and quantity in the natural stream systems would benefit Endangered Species Act (ESA) fish species, Utah species of greatest conservation need (SGCN) fish species, and associated designated critical habitat/suitable habitat that are located in the downstream receiving waters. The water conservation measures also increase resilience to agricultural water availability climate change stressors to better adapt to projected heightened water variability.

The Project would increase crop productivity in the watershed on approximately 90,147 acres of agricultural land located within disadvantaged communities of the Uintah and Ouray Indian Reservation. Costly and problematic O&M issues for the irrigation systems and risk of canal failure would be alleviated. The proposed Action Alternative total annual benefits are estimated at $7,416,000 with a net economic benefit (Project benefit minus Project cost) of $6,057,000. A breakout of benefits by Site is included in Table S-3. The economic benefits of increased crop production would have a beneficial ripple effect to regional economic development. These Project benefits would improve peace and sustainability for the agricultural community, improve community well-being, and help to preserve the agricultural heritage.

S-14.0 Net Economic Benefits

Annual net economic benefits were calculated by comparing the annual proposed Action Alternative costs to the annual benefits (Table S-3).

Table S-3. Estimated Annual Net Economic Benefits

Site	Total Annual Costs	Total Annual Benefits	Benefit-Cost Ratio	Net Economic Benefits
Site 1 (Yellowstone Feeder Canal)	$101,000	$277,000	2.7	$176,000
Site 2 (Coyote Canal)	$51,000	$70,000	1.4	$19,000
Site 3 (South Boneta Canal)	$23,000	$175,000	7.6	$152,000
Site 4 (Dry Gulch Class B Canal System)	$211,000	$3,343,000	15.8	$3,132,000
Site 5 (Dry Gulch Class C Canal System)	$537,000	$781,000	1.5	$244,000
Site 6 (Red Cap Extension Canals/Laterals)	$321,000	$1,319,000	4.1	$998,000
Site 7 (Gray Mountain Canal)	$115,000	$1,451,000	12.6	$1,336,000
Total	**$1,359,000**	**$7,416,000**	**5.5**	**$6,057,000**

S-15.0 Period of Analysis and Discount Rate

The period of analysis is the time required for installation of the Project plus the evaluated life of the Project (project life). All alternatives were evaluated with a period of analysis of 52 years (50-year project life plus 2 years for installation). The NRCS 2024 discount rate of 2.75% was used for economic cost and benefit calculations.

S-16.0 Project Life

Project improvements are anticipated to function successfully and provide benefits to the Eastern Duchesne Watershed for 50 years, incorporating proper O&M. Therefore, a 50-year project life was selected.

S-17.0 Environmental Impacts

Table S-4 lists the resources of concern and associated environmental consequences associated with the proposed Action Alternative. Resources that would not be impacted by the proposed Action Alternative are not listed in this table.

Table S-4. Summary of Resource Concerns and Impacts

Resource Concern	Summary of Concern	Consequence
Soil		
Upland Erosion	Disturbance to soils from alternative measures	Increased erosion potential is anticipated on disturbed areas during construction. Impacts would be offset through implementation BMPs[1] that would be installed during and after construction and restoration/ stabilization of disturbed areas after construction completion. Direct benefits from reduced erosion are anticipated over the long term. Benefits at Site 1 and 6 would be minor and benefits at Site 2 would be moderate.
Sedimentation	Changes to Sedimentation	Direct long-term benefits are anticipated that would reduce sedimentation within the canal systems. All canals would experience minor benefits except for Coyote Canal (Site 2), which would have moderate benefits from reduction of 6.76 ac-ft of sedimentation into Brown's Draw Reservoir.
Prime and Unique Farmland	Disturbance to Prime and Unique Farmland	Temporary disturbance on 78.2 acres and permanent disturbance on 1.6 acres of soil classified as prime or unique would occur. Temporarily disturbed soils would be restored upon construction completion. Permanent impacts would be negligible based on avoidance/minimization measures, minimal effected lands at 0.025% of farmland of statewide importance within the watershed, and the results of the farmland conversion impact rating. Long-term benefits to prime and unique farmlands are anticipated from restored irrigation capabilities provided to 627 acres of soils classified as "prime farmland if irrigated," "prime farmland if irrigated and reclaimed of excess salts and sodium," and "farmland of statewide importance."
Water		
Surface Water/ Groundwater Quality	Construction activities to occur near and in surface water	Construction impacts would be negligible based on implementation of construction BMPs and activities would not violate federal or state water quality rules/regulations. Alternative measures would reduce salinity loads into surface water and groundwater by approximately 5,394 tons annually. This is anticipated to have a direct moderate beneficial impact that would improve surface water and groundwater quality within the watershed and to downstream receiving waters over the long term.

Resource Concern	Summary of Concern	Consequence
Surface Water Quantity and Flow	Changes to surface water flow	Long-term benefits are anticipated from decreased canal seepage and phreatophyte water consumption that would increase surface water quantities in the natural stream systems and irrigation systems during the irrigation season (April through October). A net accretion is anticipated from a reduction in consumptive use. Water conservation measures would increase resilience to climate change stressors to better adapt to the projected heightened water variability.
Groundwater Quantity	Change to canal seepage	Reduced canal seepage would have a negligible change to groundwater recharge; however, minor fluctuations in localized shallow groundwater elevations along piped/lined canal segments could occur.
Waters of the U.S. Including Wetlands	Disturbance within waters of the U.S. and wetlands	Moderate direct short-term impacts are anticipated from temporary disturbance in 23.02 acres of wetland, 0.79 acres of pond, and 1,634 linear feet of natural streams, but these areas would be restored after construction completion. Permanent direct impacts to wetlands would be negligible at 0.01 acres. Permanent direct impacts would occur along 152,653 linear feet of canals for canal lining and piping measures. Long-term indirect impacts from reduction of wetlands hydraulically connected to canals are anticipated. However, this would be offset from improved water quality and quantity of natural waters of the U.S. in and downstream of the watershed over the long term.
Air		
Air Quality	Emissions from construction activities	Short-term increase in emissions concentrated around the construction sites are anticipated. Construction activities would not violate air quality standards and emissions are not expected to exceed the EPA de minimis criteria for the General Conformity regulations. BMPs[1] would be implemented, as needed, and short-term impacts would be negligible. There would be no long-term impacts to air quality.

Resource Concern	Summary of Concern	Consequence
Plants		
Vegetation Communities	Disturbance to vegetation	Temporary disturbance to 231.60 acres of vegetated areas would occur but these areas would be restored upon construction completion. Permanent removal of 2.23 acres of vegetated areas would occur from construction of new access roads. However, this would be offset from conversion of approximately 19.34 acres of open canal systems to vegetated areas. Moderate direct short-term impacts from lack of vegetative cover are anticipated for the first year until the new vegetation becomes established. Long-term direct impacts would occur from permanent changes to vegetation communities, but would be minor based on revegetation efforts and net increase of vegetated areas within the Project area.
Special Status Plant Species	Disturbance to suitable habitat for Ute ladies'-tresses (ULT)	Alternative measures would result in permanent loss of approximately 205 ULTs and 16.3 acres of suitable occupied habitat from construction disturbance and/or dewatering through eliminating canal seepage. This is anticipated to result in moderate direct impacts to ULT over the short term. Avoidance and minimization measures would be implemented during and after construction. Unavoidable impacts would be mitigated through contributions to the ULT Conservation Fund and direct long-term impacts would be minor. A BA[1] with a determination of May Affect, Likely to Adversely Affect for the species (included in Appendix E) was submitted to the USFWS[1] to comply with Section 7 of the ESA[1] and a BO[1] was issued with a concurrence of the determination on January 29, 2025 (included in Appendix A).
Noxious Weeds and Invasive Plant Species	Increases risk of noxious weeds and invasive species from ground disturbance.	Short-term direct impacts would occur during construction and until reestablishment of vegetative cover that would put the area at risk for invasion of noxious weeds and invasive plants. A PCRP[1] would be developed, and short-term impacts would be minor with implementation of BMPs and development of a PCRP[1]. Long-term impacts are not anticipated.

Resource Concern	Summary of Concern	Consequence
Riparian Areas	Disturbance to riparian areas	Approximately 4.12 acres of riparian areas would be disturbed for installation of alternative measures. Larger trees would be avoided to the greatest extent possible to preserve mature riparian vegetation. Disturbed areas would be restored upon construction completion. Minor direct short-term impacts from removal of riparian vegetation are anticipated until the new vegetation becomes established. Long-term impacts would occur from permanent changes converting artificial riparian areas to upland vegetated areas, but would be minor to negligible based on restoration efforts, abundant natural higher quality riparian areas available in the watershed, and minimal conversion of artificial riparian areas to upland.
		Animals
Fish and Wildlife	Disturbance to fish and wildlife species/habitat	Approximately 231.60 acres of terrestrial habitat would be temporarily disturbed but would be restored upon construction completion. Permanent removal of 2.23 acres of terrestrial habitat would occur from construction of new access roads, but would be offset from an increase of 19.34 acres of new terrestrial habitat from piping of open canal systems. Minor reduction to artificial low-quality habitat would occur from canal modifications but is not anticipated to have a measurable long-term impact to fish/aquatic species. Temporary activities performed in Lake Fork River at the existing irrigation structure would have direct short-term impacts during construction that would be minor based on the limited amount of modification required. Long-term direct benefits to fish/aquatic species and habitat is anticipated within the natural stream corridors in and downstream of the watershed from increased water quantity and improved water quality.

Resource Concern	Summary of Concern	Consequence
Special Status Animal Species	Potential for special status animal species to occur in Project area	One ESA[1] Candidate insect species, monarch butterfly, could occur in the Project area. Based on construction timing (October through May) impacts to the species are not anticipated. Monarch butterfly suitable habitat would be disturbed from alternative actions, but these areas would be restored upon construction completion and no long-term impacts to the species or suitable habitat are anticipated. State-listed SGCN[1] have the potential to be impacted from alternative actions. Short-term impacts would be minor to negligible based on preconstruction surveys and implementation of avoidance and minimization measures. No Long-term adverse impacts to SGCN[1] are anticipated. Long-term direct benefits to ESA[1]/SGCN[1] fish species and associated designated critical habitat/suitable habitat that occur downstream of the Project area are anticipated from increased water quantities and improved water quality for the downstream receiving waters. A BA[1] was prepared determining the action would: not likely jeopardize the continued existence of the monarch butterfly; may affect but is not likely to adversely affect bonytail chub, Colorado Pikeminnow, humpback chub, and razorback sucker (Colorado River fish); may affect but would not adversely modify critical habitat for Colorado River fish (Appendix E). The BA[1] was submitted to the USFWS[1] to comply with Section 7 of the ESA[1] and a BO[1] was issued with a concurrence of the determination on January 29, 2025 (Appendix A).
Migratory Birds / Bald and Golden Eagles	Construction disturbance in potential habitat	Migratory birds and bald/golden eagles could be present in the Project area. Preconstruction surveys would be performed, and spatial buffers would be established as necessary in coordination with USFWS[1] and NRCS. Based on the short duration of construction, timing of construction (October through May), and implementation of avoidance/minimization measures, short-term direct construction impacts are expected to be minor. No measurable long-term impacts to birds or habitat are anticipated.

Resource Concern	Summary of Concern	Consequence
Human		
Social Issues and Economy	Economic and social implications	Measures would increase crop production, reduce salinity in surface water, and decrease costs associated with O&M and pumping, resulting in an annual economic benefit of $7,416,000 and a net annual economic benefit of $6,057,000. This is anticipated to have a minor ripple effect of increased income and employment improving regional economic development. A long-term benefit to the social wellbeing, economy, and regional economic development of Uintah and Ouray Indian Reservation rural agricultural communities within the watershed is expected. Short-term increases in employment and income are also anticipated from construction employment requirements to install the measures.
Historic Properties / Cultural Resources / Native American Religious Concerns	Historic Canals would be adversely affected	Alternative measures would impact 12 historic canals determined by the NRCS to be eligible for the NRHP[1]. The NRCS made a determination of "Adverse Effect to Historic Properties" for the Project and SHPO[1] concurred with the determination in letters dated December 2, 2021, and May 12, 2023 (Appendix A). A Draft MOA[1] has been developed with the Ute THPO[1] (who has assumed NHPA[1] authority), the project Sponsor, canal companies, and other consulting parties, to mitigate adverse effects (Appendix A). The MOA[1] will be executed prior to finalizing the Plan-EA. No Native American religious concerns were identified by Tribes during consultation, pursuant to EO 13007, EO 13175, the AIRFA[1], and the NHPA[1] (Appendix A). Refer to Section 7.1.5 of the Plan-EA for a list of tribes consulted, dates of consultation, and responses received from tribes.
Visual Resources	Disturbed grounds and construction equipment	Minor direct short-term impacts to visual quality would occur during construction from construction equipment and disturbance but these areas would be restored after construction completion. Long-term impacts to visual resources are not anticipated.

Resource Concern	Summary of Concern	Consequence
Transportation Infrastructure	Work within transportation corridors	Minor direct short-term impacts are anticipated that could slow down or delay travel times through vehicle travel corridors. After construction completion the roadways would be reopened to normal vehicle traffic and no long-term adverse impacts are anticipated. Alternative measures at Site 2 (Coyote Canal) would benefit Boulder Boulevard by eliminating erosion and maintenance issues at the canal crossing over the long term.
Noise	Construction activities would produce noise	Minor direct short-term impacts are anticipated during construction, but BMPs would be in place and there would be no violations of applicable noise programs/regulations. There would be no long-term noise impacts.

[1] BMPs = Best Management Practices; PCRP = Post-Construction Restoration Plan, ESA = Endangered Species Act, BA = Biological Assessment, BO = Biological Opinion, NHPA National Historic Preservation Act, SHPO = State Historic Preservation Office, AIRFA = American Indian Religious Freedom Act, THPO = Tribal Historic Preservation Office, MOA = Memorandum of Agreement, USFWS = U.S. Fish and Wildlife Service

S-18.0 Major Conclusions

The proposed Action Alternative (preferred alternative) meets the purpose and need of the Project, as well as the goals and objectives. It was determined to be the locally preferred, environmentally preferred, and socially preferred alternative. Short-term adverse effects from alternative actions would be offset through restoration, avoidance/minimization measures, and implementation of BMPs. Long-term adverse effects would be mitigated as appropriate to offset and reduce impacts. The alternative measures would result in long-term positive environmental, social, and economic benefits for agricultural water management of the Eastern Duchesne Watershed.

S-19.0 Areas of Controversy and Issues to be Resolved

There are no known areas of controversy. The following are issues to be resolved for the Project:

- Land Easements – Easements on private lands would need to be secured by the SLO for alternative modifications at Site 4 (Dry Gulch Class B Canal System), Site 5 (Dry Gulch Class C Canal System), and Site 6 (Red Cap Extension Canals/Laterals).
- O&M Agreements would be developed with the SLO for each site. The new O&M Agreement would be signed before the Project Agreement is signed.

S-20.0 Evidence of Unusual Congressional or Local Interest

There is no known evidence of unusual congressional or local interest in the Project.

S-21.0 In Compliance

Is this report in compliance with executive orders, public laws, and other statutes governing the formulation of water resource projects? ☒ Yes ☐ No

1.0 Actions Requiring Preparation of a Watershed Plan

1.1 Introduction

As the lead federal agency, the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) is proposing to provide funding for a new agricultural water management project within the NRCS proposed Eastern Duchesne Watershed. The Duchesne County Water Efficiency Project (Project) is proposed in cooperation with the Sponsoring Local Organizations (SLO), Duchesne County Water Conservancy District (DCWCD). This Watershed Plan and Environmental Assessment (Plan-EA) evaluates alternatives to improve irrigation water delivery efficiency within problematic irrigation systems of the Eastern Duchesne Watershed.

The project is being authorized through the Watershed and Flood Prevention Operations Program, which helps urban and rural communities protect, improve, and develop land resources in watersheds up to 250,000 acres in size. This Plan-EA was prepared for NRCS to comply with the requirements of the National Environmental Policy Act (NEPA) of 1969 and its implementing regulations, which are set forth in the Council on Environmental Quality (CEQ) regulations 40 CFR Parts 1500-1508; the Principles, Requirements, and Guidelines for Federal Investments in Water Resources (PR&G) (CEQ 2013 and 2014); and NRCS policy and guidelines (NRCS 2010 and 2016a). The Plan-EA assists NRCS in determining if the selected alternative would have a significant impact on the quality of the human environment and if preparation of an Environmental Impact Statement is required.

1.1.1 Plan-EA Format and Procedures

This document combines an NRCS Areawide Watershed Plan and an Environmental Assessment into one product. The format of this document follows the plan format outline that must be followed for Watershed Project Plans as outlined in the NRCS National Watershed Program Manual (NWPM) Parts 500 through 506 (NRCS 2015), and as guided by the NRCS National Watershed Program Handbook (NWPH), Parts 600 through 606 (NRCS 2014). The planning and decision-making process followed PR&G (CEQ 2013 and 2014), U.S. Department of Agriculture (USDA) Department Manual (DM) 95000-013 (USDA 2017), the PR&G eight step evaluation process (refer to the PR&G Analysis Report included in Appendix E), and the nine-step planning procedures from the National Planning Procedures Handbook (NRCS 2021a).

Areawide Watershed Plans are voluntary, comprehensive plans for a watershed or other large geographic area. Planning policy for them requires consideration of all natural resources within a planning area, as well as social and economic considerations. Areawide Watershed Plans are developed through a voluntary locally led effort to achieve the following:

- Assess natural resource conditions and needs,
- Set goals,
- Identify programs,
- Alternative actions and other resources to solve those needs,
- Develop proposals and recommendations to solve those needs,
- Implement solutions, and
- Measure success

The NRCS planning process consists of nine steps, divided into three phases covering development, implementation, and evaluation of an Areawide Conservation Plan. The nine-step planning process was considered and incorporated into this Plan-EA as identified below.

Phase 1 Collection and Analysis

- Step 1 – Identify Problems and Opportunities: Problems and opportunities were identified during the Project scoping process and are included in Section 2.3 (Watershed Problems and Opportunities). Input from the Sponsors, agencies, the public, organizations, and tribes were solicited as described in Sections 3.0 (Scope of the Plan-EA) and Section 7.3.2 (Project Scoping) to help identify problems and opportunities. Engineering analysis was completed to further identify and evaluate problems as documented in the engineering technical memorandums (TMs) included in Appendix E.
- Step 2 – Determine objectives: The purpose and need statement for the project was formulated with the problems and opportunities in consideration. Where the "purpose" identifies the fundamental reason why the action is being proposed and the "need" describes the problem/s that the proposed action is intended to address and explains the underlying causes of the problem/s. The purpose and need statement and information supporting the purpose and need is included in Section 2.0 (Purpose and Need).
- Step 3 – Inventory Resources: Resources relevant to the proposed action were determined during the scoping process as described in Section 3.0 (Scope of the Plan-EA). The existing conditions of resources determined to be relevant are documented in Section 4.0 (Affected Environment).
- Step 4 – Analyze Resource Data: The environmental baseline conditions for resources to be evaluated against alternative actions were identified and are included in Section 4.0 (Affected Environment). The best available data and science was used to inventory the existing resource conditions at the level and scale of analysis determined reasonable for evaluating alternatives and impacts.

Phase 2 Decision Support

- Step 5 – Formulate Alternatives: Project alternatives were formulated in consideration of the federal objective as set forth in the Water Resources Development Act of 2007, the PL 83-566 general purposes, and the Project purpose and need. Alternatives were formulated following procedures outlined in the NWPM, NWPH, and PR&G. Alternatives formulated are described in Section 5.0.
- Step 6 – Evaluate Alternatives: The effects of alternatives included in detailed study were determined for each resource relevant to the proposed action. The evaluation of alternatives is included in Section 6.0 (Environmental Consequences) and assessed the proposed alternatives against the baseline data presented in Section 4.0 (Affected Environment).
- Step 7 – Make Decisions: A preferred alternative was selected based on the evaluation performed. The selection was made for the alternative that best maximized public benefits (environmental, economic, and social) with appropriate consideration of costs. Section 8.0 (Preferred Alternative) provides information on the decision-making process for selection of the preferred alternative.

Phase 3 Application and Evaluation (Future Work)

- Step 8 – Implement the Plan: The Plan-EA is the first phase of three phases to be completed for implementation of the proposed action (preferred alternative). After the Final Plan-EA is completed, phase 2 would consist of final design, and phase 3 installation of the Project measures.
- Step 9 – Monitor the Plan: After the installation of measures from phase 3, NRCS and the Sponsors would evaluate the effectiveness of the plan in solving the resource concerns. Adjustments to the plan would be made as needed.

1.2 Proposed Watershed Boundary

Areawide Watershed Plans are limited for watershed size and structure size. The maximum watershed size allowed is 250,000 acres and structures cannot provide more than 12,500 acre-feet (ac-ft) of floodwater detention capacity or more than 25,000 ac-ft of total capacity. The Eastern Duchesne Watershed (watershed) boundary for the Watershed Plan consists of approximately 191,216 acres of land within Duchesne and Uintah County, Utah (Appendix B – Map B1) and is within the limit established for Areawide Watershed Plans. The watershed boundary encompasses an agricultural irrigation problem area[1], that includes seven individual service areas identified with problematic irrigation systems. Each service area consists of the agricultural areas serviced by the problematic irrigation system and the associated conveyance/distribution components of the irrigation systems. Service area boundaries can be seen in Appendix B – Map B1. For legal description purposes and better-defined boundaries, the overall watershed boundary encompassing the service areas, followed public land survey section lines and parcel boundaries, where applicable.

Benefited and unbenefited land was identified for each service area. Benefited land includes agricultural areas that are currently or are proposed to receive irrigation benefits from the irrigation systems. A map of benefited agricultural land and their associated irrigation method is provided in Appendix C – Map C1. Unbenefited land consists of areas not receiving direct irrigation benefits such as developed areas and unirrigated lands. A breakout of acreage of benefitted and unbenefited land in the irrigation problem areas for each service area is provided in Table 1-1.

[1] The irrigation problem area making up the Eastern Duchesne Watershed consists of the 7 service areas identified in Appendix B – Map B1.

Table 1-1. Irrigation Problem Areas of the Eastern Duchesne Watershed

Service Area Name	Benefited Land (acres)*	Unbenefited Land (acres)	Total Service Area (acres)
Yellowstone Feeder Canal Service Area	36,716	53,590	90,306
Coyote Canal Service Area	8,871	9,177	18,048
South Boneta Service Area	1,693	419	2,112
Class B Canal Service Area	10,670	10,387	21,057
Class C Canal Service Area	12,187	9,960	22,147
Red Cap Service Area	5,854*	8,285	14,139
Gray Mountain Service Area	14,156	9,251	23,407
Total	**90,147**	**101,069**	**191,216**
Total Watershed Area			**191,216**

** Only 3,035 acres of the 5,854 are currently being farmed.*

2.0 Purpose and Need

2.1 Purpose and Need Statement

The purpose of the Project is to provide agricultural water management improvements for irrigation water delivery efficiency and water conservation in the existing irrigation systems of the Eastern Duchesne Watershed. There is a need to reduce water loss, improve system reliability and safety, expand the system to meet existing user water rights, provide pressurized irrigation capabilities, improve water quality, and reduce problematic and costly operations and maintenance (O&M) issues in the current systems.

2.2 Support for Purpose and Need

The following are goals and objectives identified by the SLO, stakeholders, agencies, organizations, and the public during development of the Plan-EA. Seven service areas across the watershed were identified for agricultural water management improvements to support the goals and objectives identified below.

- Site 1 (Yellowstone Feeder Canal): Reduce water seepage in areas of high water loss along the canal while also maintaining an open canal system for continued stock watering capabilities for existing grazing operations and wildlife access on Ute Indian Tribe lands. Reduce bank erosion and risk of canal bank failure.
- Site 2 (Coyote Canal): Reduce erosion along canal banks and reduce sediment transport and deposition from canal bank erosion into Brown's Draw Reservoir.
- Site 3 (South Boneta Canal): Reduce water loss due to seepage, reduce maintenance issues, and improve downstream pressure in the existing pressurized irrigation system.

- Site 4 (Dry Gulch Class B Canal System): Reduce water loss due to seepage along the F, I, and Bluebell Laterals within the canal system, and reduce sediment entering the canal. Provide pressure in the system to support existing and new pressurized irrigation capabilities and reduce pumping costs.
- Site 5 (Dry Gulch Class C Canal System): Reduce water loss due to seepage, reduce sediment entering the system from erosion of the canal banks, and improve reliability. Provide pressure in the system to support existing and new pressurized irrigation capabilities. Stabilize a section of the canal along a hillside that is prone to failure and requires routine maintenance.
- Site 6 (Red Cap Extension Canals/Laterals): Reduce water loss due to seepage along the canal, reduce erosion and undermining along the existing canal wasteway into Midview Reservoir, and provide a new pressurized distribution system to support pressurized irrigation capabilities.
- Site 7 (Gray Mountain Canal): Reduce water seepage in areas of high water loss and improve system reliability/safety.

2.3 Watershed Problems and Opportunities

The Eastern Duchesne Watershed is located within a semi-arid climate within the Great Basin Desert. It is classified within the “Class B” climates which are characterized by potential evaporation and transpiration exceeding precipitation. Due to the semi-arid climate, irrigation water is needed to support agricultural activities within the watershed and agricultural development is limited by the amount of available water to irrigate.

Much of the irrigation infrastructure within the Eastern Duchesne Watershed was constructed over 100 years ago to support agricultural activities. The watershed currently supports approximately 87,328 acres of cropland (benefited land) that includes primarily alfalfa, grass hay, various grains, and livestock production. Information regarding irrigation methods and crop types within each of the irrigation service areas is included in Table 2-1 and a map is provided in Appendix C – Map C1. Land ownership within the benefited areas is 14% Ute Indian Tribe lands, 86% privately owned lands, and less than 1% state/federal lands (Appendix C – Map C2). The existing distribution systems for irrigated lands consist primarily of unlined open canals. Flood irrigation practices, irrigation delivery methods, and outdated infrastructure in the watershed have resulted in substantial water losses, primarily through canal seepage. Seepage losses include phreatophytes consumptive use, which is estimated to be 60% of the seepage loss in The Uintah Basin (Jones and DeMille Engineering [JDE] 2024 – Attached in Appendix E). Based on seepage analyses (refer to Appendix D), approximately 46,702 acre-feet (ac-ft) of water is lost per year due to seepage along the current irrigation canals within the problematic service areas. A summary of the water loss calculated for each of the service areas is provided in Table 2-2.

Table 2-1. Existing Irrigation Systems Land and Crop Types Summary

Site No.	Service Area Name	Crop/Pasture Irrigation Method and Acres Applied					Crop Types
		Flood	Sprinkler	Dry Crop	Sub-irrigated	Total	
1	Yellowstone Feeder Canal	22,425	12,088	999	1,204	36,716	Alfalfa, grass hay, stock production, various grains
2	Coyote Canal	5,015	3,268	310	278	**8,871**	Grass/pasture and other hay crops
3	South Boneta	688	949	38	18	**1,693**	Grass/pasture and other hay crops
4	Dry Gulch Class B Canal System	3,935	6,597	97	41	**10,670**	Grass/pasture, alfalfa, other hay crops
5	Dry Gulch Class C Canal System	3,266	8,425	259	237	**12,187**	Grass/pasture, alfalfa, other hay crops
6	Red Cap Extension Canals/Laterals	1,804	1,160	51	20	**3,035**	Grass/pasture, alfalfa, other hay crops
7	Gray Mountain Canal	1,834	10,941	456	925	**14,156**	Grass/pasture, alfalfa, grass other hay crops
Total		**38,967**	**43,428**	**2,210**	**2,723**	**87,328**	

Table 2-2. Water Loss Summary

Site No.	Service Area Name	Average Loss from Seepage	
		%	Annual (ac-ft)
1	Yellowstone Feeder Canal	18.9	2,960
2	Coyote Canal	13.5	591
3	South Boneta Canal	58.7	812
4	Dry Gulch Class B Canal: Class B Main System	4.9	854
	Dry Gulch Class B Canal: Lateral F	84.5	5,021
	Dry Gulch Class B Canal: Lateral I	34.0	3,612
	Dry Gulch Class B Canal: Bluebell Lateral	51.6	10,685
	Dry Gulch Class B Canal Total		**20,172**
5	Dry Gulch Class C Canal	21.9	4,662
6	Red Cap Extension Canals/Laterals	35.8	4,784
7	Gray Mountain Canal	23.4	12,721
Total			**46,702**

Canal seepage has been identified as a large component of surface water and groundwater degradation in the Eastern Duchesne Watershed. Information provided in the Duchesne River Water Restoration Plan stated the following and recommended lining or piping canals to reduce canal seepage that contribute to salinity/total dissolved solid (TDS) issues (Uinta Basin Watershed Council 2015):

"Seepage of water from unlined canals is a known contributor to TDS loading of streams in the Duchesne River watershed. Bureau of Reclamation and NRCS estimates that canal seepage increases the TDS load by 67 tons per mile of canal. Return flows are mostly through subsurface flows and several of these returns were observed to be entering active stream channels."

The canal systems in the Project area total approximately 82.4 miles in length contributing approximately 5,521 tons of TDS through canal seepage to streams in the Duchesne River Watershed, using the 67 tons per mile of canal estimate above. The canal seepage also contributes to degradation of groundwater quality. Based on a review of the Duchesne River Watershed boundary as defined in the Duchesne River Water Restoration Plan, the boundary fully encompasses the extent of the Eastern Duchesne Watershed boundary developed for this Plan-EA.

In addition to water loss/water quality issues, the irrigation systems are outdated/unreliable, require costly and frequent maintenance, produce sediment deposition issues from unlined bank erosion, do not provide adequate pressures in existing pressurized irrigation systems, and pose safety issues. Specific information on each site and identified agriculture water management issues are described in Sections 2.3.1 through 2.3.7 below and were summarized from information provided in JDE Technical Memorandums (TMs) (JDE 2020, 2021a, and 2021b) and Franson Civil Engineers (FCE) TMs (FCE 2021a, 2021b, 2021c, 2021d), included in Appendix E.

Opportunities to be achieved based on the watershed problems identified include improvements to seven problematic irrigations systems to benefit water quality, water quantity, and crop yield in the watershed, and decrease O&M costs. Irrigation improvements for water conservation would increase resilience to climate stressors, improve the sustainability and well-being of the rural agricultural and tribal communities of the watershed, and reduce adverse human impacts on the natural stream ecosystems.

2.3.1 Site 1 Yellowstone Feeder Canal

The Site 1 Yellowstone Feeder Canal consists of an open canal that is mostly unlined (Figure 2-1) extending approximately 22.3 miles that was excavated between 1938 and 1940. It is located approximately 5 miles north of the town of Altamont and conveys irrigation water by gravity from a diversion on the Yellowstone River to Spring Branch Creek (Appendix B – Map B3.1). The service area for this canal consists of 90,306 acres and the canal provides irrigation water to approximately 36,716 acres of land. The canal is operated and maintained by the Moon Lake Water Users Association (MLWUA) who convey and store water from multiple rivers to distribute irrigation water to lands located within eastern Duchesne County and western Uintah County, Utah.

Figure 2-1. Unlined Sections of Yellowstone Feeder Canal

The Yellowstone Feeder Canal has been experiencing substantial water losses from seepage. In May 2017, approximately 4,222 linear feet of the canal was lined with concrete to reduce water seepage. These lined areas were identified as high seepage areas or areas having higher than normal water losses. The remaining sections of the canal consist of an unlined excavated earthen channel. The MLWUA has identified 10 additional high seepage sections of the canal since completing the lining activities in 2017. A seepage analysis found that the canal loses approximately 18.9% of the average daily flow (58.2 cubic feet per second [cfs]) to seepage, which corresponds to approximately 2,960 ac-ft of water loss per year. The unlined high seepage sections identified by the MLWUA contribute approximately 62.8% of those losses, or approximately 1,858 ac-ft of the total water lost to seepage per year. Additional items of concern for the canal included bank erosion issues at canal bends increasing the risk of bank failure/flooding and maintaining water access for stock/wildlife on Ute Indian Tribe lands.

2.3.2 Site 2: Coyote Canal

The Coyote Canal consists of an open unlined gravity canal (Figure 2-2) extending approximately 8,147 feet that was constructed in 1981. It is located approximately 6 miles northeast of the town of Bluebell and conveys irrigation water by gravity from the Yellowstone Feeder Canal to Brown's Draw Reservoir (Appendix B – Map B3.1). Coyote Canal is the primary water source that feeds Brown's Draw Reservoir and water is drawn from the Reservoir for irrigation purposes. The service area for this canal consists of 18,048 acres and the canal provides irrigation water to approximately 8,871 acres of land. The canal has a steep gradient and drops down a series of steep chutes to Brown's Draw Reservoir with an elevation change of approximately 600 feet along its length. The canal is operated and maintained by the MLWUA.

Figure 2-2: Coyote Canal Erosion

Erosion of Coyote Canal and sedimentation into Brown's Draw Reservoir is the greatest concern for this section of open canal. A combination of irrigation flows, soil conditions, and rain events have caused substantial erosion along the canal. Recent erosion had even damaged an existing road (Boulder Boulevard) requiring emergency repairs to the roadway and culvert. In a sediment and erosion analysis completed by JDE, it was estimated that approximately 9.42 ac-ft (15,200 cubic yards) of sediment eroded from the canal and deposited in Brown's Draw Reservoir since 1981, reducing its storage capacity. There is potential for an additional 6.76 ac-ft (10,900 cubic yards) of material to be eroded from the canal over the next approximately 28 years and deposit into the reservoir. The canal was also identified to lose approximately 13.5% or 591 ac-ft of water

due to seepage per year with an assumed average daily flow of 28.4 cfs, based on a seepage analysis.

2.3.3 Site 3: South Boneta Canal

The South Boneta Canal is operated and maintained by the South Boneta Irrigation Company. It consists of an approximately 2.4-mile unlined open gravity canal (Figure 2-3) that was constructed over 100 years ago. It is located approximately 1.5 miles west of Altamont City and conveys irrigation water by gravity from a diversion on the Lake Fork River to an irrigation pond, then into an 18-inch irrigation pipeline (Appendix B – Map B3.1) where it is distributed to water users. The service area for this canal consists of 2,112 acres and the canal provides irrigation water to approximately 1,693 acres of land.

Figure 2-3: South Boneta Canal

The South Boneta Canal has been experiencing substantial water losses due to seepage. A seepage analysis found that the canal loses approximately 58.7% of the average daily flow (3.3 cfs) to seepage, which corresponds to approximately 812 ac-ft of water loss per year. Sedimentation and structural aging of the existing canal diversion in Lake Fork River, and pressure deficiencies in the piped section of the system, downstream of the existing open canal, have also been identified. Irrigation users have had to purchase and use pumps to boost pressures in the existing system and meet the irrigation pressure requirements for their sprinkler irrigation.

2.3.4 Site 4: Dry Gulch Class B Canal System

The Dry Gulch Class B Canal System is an open unlined gravity canal system (Figure 2-4) consisting of approximately 31 miles of canals constructed over 100 years ago. It begins at a diversion on the Lake Fork River, approximately 3.4 miles west-northwest of the community of Altonah, and ends at an irrigation reservoir, approximately 3.3 miles south of the town of Bluebell (Appendix B – Map B3.1). The service area for this canal consists of 21,057 acres and the canal system provides irrigation water to approximately 10,670 acres of land. The system contains four sections of canal (Class B Main, F Lateral, I Lateral, and Bluebell Lateral) and delivers water to 170 shareholders between the diversion structure and the town of Bluebell. The Dry Gulch Irrigation Company (DGIC) owns and operates the system.

Figure 2-4: Dry Gulch Class B Canal

Water loss due to seepage is a concern along the Dry Gulch Class B Canal System. A seepage analysis found that the system loses approximately 35.4% of the flow due to seepage based on a weighted average. The highest water losses were found to occur along Lateral F, Lateral I, and Bluebell Lateral, which contribute an overall loss of 5,021 ac-ft, 3,612 ac-ft, and 10,685 ac-ft per year, respectively. The three combined have a total water loss per year of 19,318 ac-ft. The Class B Main section water loss was estimated at 854 ac-ft per year and only contributes to approximately 4% of the overall water loss of the system. In addition to water loss, the existing distribution system to shareholders requires ponds and pumping by the shareholders to increase pressure for sprinkler irrigation. Maintenance issues are also a concern and cleaning of sediment from the canal and reshaping of canal banks is required on an annual basis.

2.3.5 Site 5: Dry Gulch Class C Canal System

The Dry Gulch Class C Canal System consists of an open, mostly unlined canal (Figure 2-5) extending approximately 8.3 miles that was constructed over 100 years ago. It is located approximately 4 miles northwest of Myton. Sections of system along a hillside have been lined with cement to protect from sliding and failure. The Class C Canal conveys irrigation water east-southeast by gravity from the Big Sand Wash Reservoir to an irrigation pond (Appendix B – Map B3.2). The service area for this canal consists of 22,147 acres and the canal provides irrigation water to approximately 12,187 acres of land. There are a few irrigation turnouts along the canal length, but the majority of the water is conveyed to an existing irrigation pond at the end of the canal system. From the pond, water is diverted into an existing pipeline system. The canal is operated and maintained by the DGIC Class C.

Figure 2-5: Dry Gulch Class C Canal

Multiple issues have been identified for this system including, water loss from seepage, sediment from bank erosion, slope stability for the section along the hillside, and problematic pond water surface fluctuations due to water delivery inefficiencies. A seepage analysis found that the canal loses approximately 21.9% of the average daily flow (115 cfs) to seepage, which corresponds to approximately 4,662 ac-ft of water loss per year. Slope stability poses a threat along the canal where the canal adjoins the Lake Fork River Canyon. Based on erosion issues and seepage along this steep slope, the threat of canal breach is anticipated within the next 10 years. Failure would result in the loss of ability to deliver water to the agricultural lands in the service area. Additional concerns for the system include unauthorized water use which occurs with a few users along the open canal.

2.3.6 Site 6: Red Cap Extension Canals/Laterals

The Red Cap Extension Canals/Laterals consists of an open canal system (Figure 2-6) constructed in approximately 1967, extending approximately 9 miles. It is located near the community of Arcadia and conveys irrigation water by gravity. The system contains several canals and laterals that deliver water from a diversion along the Duchesne River. (Appendix B – Map B3.2). The service area for this canal includes 14,139 acres. The canal system is operated and maintained by the Uintah Indian Irrigation Project O&M Company (UIIP) and delivers water to approximately 3,432 acres of the 5,854 acres of land in their water right. Approximately 3,035 acres of land within the benefitted area are currently being farmed.

Figure 2-6: Red Cap Extension Canal

Water loss due to infiltration is a concern along the canal system. A seepage analysis found that the system loses approximately 35.8% of the average flow (31.48 cfs) due to seepage accounting for approximately 4,784 ac-ft of water per year. Additional concerns with the system include erosion and undermining of the wasteway into Midview Reservoir. It is anticipated that the wasteway would fail in the next 10 years if not replaced. Failure would result in a large headcut of the canal system and loss of ability to deliver water to the agricultural lands in the service area.

2.3.7 Site 7: Gray Mountain Canal

The Gray Mountain Canal consists of an open mostly unlined irrigation canal system (Figure 2-7) extending approximately 7.9 miles that was constructed over 100 years ago. It is located just

south of the community of Bridgeland and conveys irrigation water by gravity from a diversion on the Duchesne River to water users in the service area. The canal discharges into the Pleasant Valley Irrigation Company's system at its downstream end (Appendix B – Map B3.2). The service area for this canal consists of 23,407 acres. The canal is owned by the Bureau of Indian Affairs (BIA) and provides water for the Uintah Basin Irrigation Company (UBIC) and the Ute Indian Tribe. It services approximately 185 shareholders (82 shareholders for UBIC and 103 shareholders for the Tribe) to irrigate 14,156 acres of land.

Figure 2-7: Gray Mountain Canal

Water loss due to infiltration is a concern along the Gray Mountain Canal. A seepage analysis found that the system loses approximately 23.1% of the average daily flow (128 cfs) due to seepage accounting for approximately 12,721 ac-ft of water per year. System reliability and safety is also a concern due to seepage out of the canal banks and associated breaches of the banks. There have been multiple canal bank failures within the last 10 years, primarily caused by roots growing into the canal banks. Irrigators have gone without water during the repairs for the breached canal banks, and flooding from these breaches poses a safety issue.

3.0 Scope of the Plan-EA

A scoping process was completed to identify relevant resources, environmental concerns, and ecosystem services to be analyzed in detail and to determine which could be eliminated from detailed study. These items were identified for the Project based on required scoping concerns outlined in the NWPM Section 501.24 B (NRCS 2015) and from any additional concerns identified by the public, SLO, stakeholders, tribes, or agencies during the scoping process.

A scoping meeting for the Project was held on October 30, 2019. The meeting presented the overall project and Plan-EA process. It also provided opportunities for the public, SLO, agencies, tribes, and any other attendees to express specific concerns and their relevance to the proposed action. Six scoping comments were received during the announced open comment period (October 15, 2019, through November 14, 2019). The comments received were considered in preparation of the Plan-EA. A Scoping Report was prepared summarizing the scoping process (JDE 2022) and is included in Appendix A.

3.1 Resource Categories of Concern

A summary of resource concerns and their relevance to the proposed action was determined during the scoping process and is provided in Table 3-1 below. Resource items determined to not be relevant to the proposed action have been eliminated from detailed study. Resource items determined to be relevant to the proposed action have been included in detailed studies described in this Plan-EA.

Table 3-1. Resource Concerns Summary

Item/Concern	Relevant to the Alternatives?		Rationale
	Yes	No	
Soil			
Upland Erosion	X		Construction disturbance could increase erosion potential.
Sedimentation	X		Alternative measures would change sediment transport conditions.
Prime and Unique Farmland	X		The Project area contains prime and unique farmland.
Water			
Surface Water/Groundwater Quality	X		Alternative ground disturbing activities could affect surface water quality.
Surface Water Quantity and Flow	X		Alternative measures reduce water infiltration and have the potential to influence surface water flows.
Ground Water Quantity	X		Alternative measures reduce water infiltration and have the potential to influence groundwater levels.
Waters of the U.S. Including Wetlands	X		Waters of the U.S. and wetlands are located within the Project area.
Regional Water Mgt. Plans and Coastal Zone Management Areas	X		Duchesne County has developed a Comprehensive Water Resource Master Plan (CH2MHill 2001). The plan is addressed for applicable resources concerns including surface water resources for water quality and quantity. Coastal Zone Management Areas are not applicable (N/A).
Floodplain Management		X	Floodplains exist within the Project area, but Project actions would not modify features that have influence on flooding conditions nor change existing floodplain conditions and maintain compliance with 7 CFR 650.25(c)(2)(ii).
Wild and Scenic Rivers		X	There are no wild and scenic rivers in or near the Project area, according to National Wild and Scenic Rivers System (NWSRS) interactive map (NWSRS 2022) and the Nationwide Rivers Inventory (NPS 2024).
Sole Source Aquifers		X	No sole-source aquifers are in or near the Project area, according to U.S. Environmental Protection Agency (EPA) Sole Source Aquifer interactive map (EPA 2022b).

Item/Concern	Relevant to the Alternatives?		Rationale
	Yes	No	
Air			
Air Quality	X		Alternative construction activities would produce emissions and fugitive dust.
Clean Air Act		X	Project actions would not generate long-term emissions. Permits would not be required.
Greenhouse Gases / Climate Change		X	The project will have no measurable impact to greenhouse gases or climate change.
Plants			
Special Status Plant Species	X		Endangered Species Act (ESA)-listed Ute ladies'-tresses occur within the Project area.
Forest Resources		X	There are no forest resources within the Project area.
Noxious Weeds and Invasive Plant Species	X		Alternative construction disturbance increases risk of invasive plant species becoming established.
Protected Natural Areas/ Conservation Areas		X	There are no protected natural areas or conservation areas located in the Project area.
Riparian Areas	X		Riparian habitat is present within the Project area.
Animals			
Essential Fish Habitat		X	There is no essential fish habitat located in the Project area based on National Oceanic and Atmospheric Administration (NOAA) fisheries Essential Fish Habitat Mapper (NOAA 2022b).
National Wildlife Refuges / Wilderness Areas		X	There are no Wildlife Refuges or Wilderness Areas in or near the Project area (U.S. Fish and Wildlife Service [USFWS] 2022a and Utah Geospatial Resource Center [UGRC] 2022).
Fish and Wildlife	X		Alternative measures would disturb general fish and wildlife habitat.
Coral Reefs		X	Not applicable.
Special Status Animal Species	X		ESA-listed monarch butterfly and state-listed Species of Greatest Conservation Need (SGCN) have the potential to occur in the Project area.
Invasive Animal Species		X	No potential for introduction of invasive animal species.
Migratory Birds / Bald and Golden Eagles	X		Migratory birds, bald/golden eagles, and associated habitat are present within the Project area.
Human			
Social Issues and Economy	X		Alternatives could impact socioeconomic conditions of the community.
Historic Properties / Cultural Resources	X		Alternative actions would impact historic/cultural resources

Item/Concern	Relevant to the Alternatives?		Rationale
	Yes	No	
Hazardous Materials		X	Hazardous materials within the Project area do not appear to be a concern at this time, but on-site surveys would be necessary to ensure the absence of potential hazardous materials prior to construction. Equipment and associated fuels would be working/stored on-site during construction, but effects would be negligible based on adherence to applicable laws and regulations. See Section 8.3 for avoidance and minimization measures.
Public Health and Safety		X	There are no public health and safety risks associated with alternative actions.
Recreation		X	No recreation activities would be affected by alternative actions.
Land Use / Public Access		X	Changes to land use and public access would not change from to alternative measures.
Visual Resources	X		There are no scenic views within the Project area that would be impacted. Alternatives may impact visual resources from construction disturbance and equipment.
National Scenic and Historic Trails		X	There are no National Scenic and Historic Trails located in or near Project area according to the National Trails System Map (National Park Service [NPS] 2022a).
Parklands		X	There are no parks located within or near the Project area according to National Parks and Monuments Map (NPS 2022b) and Utah State Parks Map (Utah Department of Natural Resources [UDNR] 2022a).
Transportation Infrastructure	X		Alternative disturbance would occur along road corridors.
Noise	X		Alternatives would produce construction-related noise.
Ecological Critical Areas		X	None present in or near the project area based on review of Areas of Critical Environmental Concern (BLM 2022).
National Landmarks, Monuments, and Historical Sites		X	None located in or near Project area based on National Natural Landmarks Map (NPS 20202c), National Register of Historic Places (NRHP) data (NPS 2022d), and National Parks and Monuments Map (NPS 2021b).
Scientific Resources		X	There are no unique geologic sites or paleontological sites (scientific resources) in the Project area based on a review of paleontological sites (Paleobiology Database 2024) and the geologic map (Sprinkel 2018).

3.2 Ecosystem Services

An ecosystem services framework is required by the PR&G and provides for an integrated approach that allows consideration and transparent evaluation of the benefits (both tangible and intangible) and tradeoffs of potential alternatives. Four categories of ecosystem services are described in the PR&G and are included below for reference.

1) **Provisioning services** are tangible goods provided for direct human use and consumption, such as food, fiber, water, timber, or biomass.
2) **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 filtrations, climate stabilization or crop pollination.
3) **Supporting services** refer to the underlying processes maintaining conditions for life on earth, including nutrient cycling, soil formation, and primary production.
4) **Culture services** make the world a place in which people want to live – recreational use, spiritual, aesthetic viewsheds, or tribal values.

Ecosystem service benefits can be both monetary and nonmonetary. Appropriate metrics should be based on current methodology to quantify impacted services over time for determination of project- and/or regional-specific effects. For reference, a list of ecosystem service categories and their subcategories is provided in Figure 3-1.

Ecosystem service categories overlap with the resource concerns and therefore, are not discussed separately from the resource concerns. For reference, the ecosystem service categories relevant to this Project and the applicable resource concerns that discuss these categories are provided in Table 3-2.

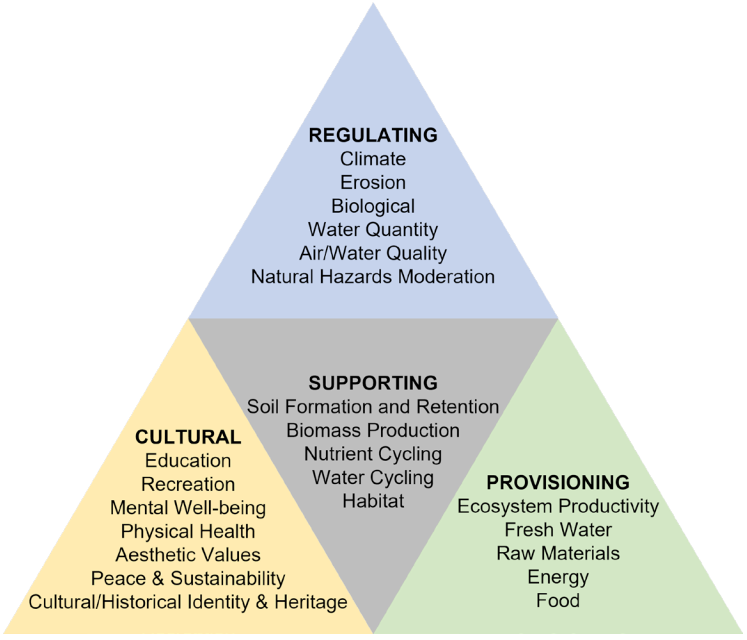

Figure 3-1. Ecosystem Services

Table 3-2. Applicable Ecosystem Services and Related Resources

Category	Service	Applicable Resources
Provisioning	Ecosystem Productivity	Includes all plant and animal resources along with the water and soil resources that support them
	Food (agriculture)	Social issues and economy
Regulating	Climate	Water quantity, social issues and economy
	Water (Quality & Quantity)	Surface/groundwater quality and quantity
	Biological (plants & animals)	Includes all plant and animal resources
Cultural	Peace & Sustainability	Social issues and economy
	Community Well-being	Social issues and economy, visual resources, and noise
	Cultural/Historical Identity & Heritage	Social issues and economy and historic properties/cultural resources/native American religious concerns
Supporting	Water Cycling	Surface/groundwater quantity
	Habitat and Biomass	Includes all plant and animal resources along with the water and soil resources that support them.

The applicable ecosystem services from above were evaluated as part of the PR&G eight-step evaluation process. This process includes consideration of the federal objective, PL 83-566 general purposes, guiding principles, and ecosystem services to assist in decision making. Refer to the PR&G Analysis Report included in Appendix E for documentation of the PR&G eight-step evaluation process used for decision making.

4.0 Affected Environment

This section describes the resources that could be affected by the proposed alternatives. Describing the affected environment defines the context in which the impacts could occur. The environmental analysis process has been conducted in compliance with applicable federal, state, and local regulations. Resources relevant to the Project are described in Sections 4.1 through 4.6. The environmental consequences to each of the resources discussed in this section are included in Section 6.0.

The Eastern Duchesne Watershed is located in the Unita Basin within Duchesne and Uinta Counties, Utah (Appendix B – Map B1). Alternatives considered for detailed study and their associated Project area include 809.4 acres of land situated within the Eastern Duchesne Watershed (Appendix B – Map B2). The Project area encompasses areas proposed for access, staging, and improvements for alternatives included in detailed study. Table 4-1 summarizes the physical setting of the Project area.

Table 4-1. Physical Setting Summary

Physical Setting Information		Information Source
Location		
The Project area is located in the eastern-central portion of Duchesne County, Utah.		N/A
Size		
809.4 acres		Measured from QGIS version 3.16
Topography		
Elevation	5,300 to 7,200 feet	ESRI Topo from QGIS version 3.16
General Topographic Gradient	Sloping southwest	
Geology		
Geologic Units	Qal (river and stream alluvium), Qap3 (Piedmont alluvium, level 3), Qags (glacial outwash of Smiths Fork age), Qagb (glacial outwash of Blacks Fork age), Qago (glacial outwash of pre-Blacks Fork age), Qc (colluvium), Qms (landslide deposits), Qgb (Blacks Fork till), Qac (mixed alluvium and colluvium), Qace (mixed alluvium, colluvium, and eolian deposits), Qac/Tdl (mixed alluvium and colluvium on Duchesne River Formation, Lapoint Member), Qac/Tuc (mixed alluvium and colluvium on Uinta Formation, member C), Qc/Tdl (colluvium on Duchesne River Formation, Lapoint Member), Tdd (Duchesne River Formation, Dry Gulch Creek Member), Tdl (Duchesne River Formation, Lapoint Member), Tuc (Uinta Formation, member C)	Utah Geological Survey Interim Geologic Map of the Duchesne 30' x 60' Quadrangle (Sprinkel 2018)
Soil Characteristics		
Soil Types	See Table 4-2 in Section 4.1.	Web Soil Survey (NRCS 2021b and 2021c)
Land Information		
Land Ownership	Private 518.8 acres (64%) Tribal 285.6 acres (36%)	Land Ownership GIS Layer (SITLA and BLM 2022)

Each resource in this Section includes the baseline environmental conditions in the Project area and may extend beyond the Project area to the benefitted area, watershed, or beyond the watershed, for some resources to include the areas of potential impact for adequately addressing the impacts of alternative measures.

4.1 Soil Resources

Soil information presented in this section has been summarized from NRCS Web Soil Survey data (NRCS 2021b and 2021c). Soils found within the Project area are listed in Table 4-2 and information in the table was summarized from the NRCS soil and farmland classification map reports included in Appendix E. Note that some areas within the Project extents consist of disturbed lands and may not be consistent with the soil descriptions listed below.

Table 4-2. Soil and Farmland Classification Summary

Symbol	Soil Unit Name	Slope	Farmland Classification	Acres
23	Blackston loam	0-2%	Prime Farmland*	33.2
24	Blackston loam	0-6%	Not Prime Farmland	2.9
27	Boreham loam	0-4%	Prime Farmland*	0.3
52	Clapper-Montwel complex	2-40%	Not Prime Farmland	14.8
61	Crib loam	1-3%	Not Prime Farmland	29.7
94	Greybull-Utaline-Badland complex	4-40%	Not Prime Farmland	3.7
108	Honlu sandy loam	1-8%	Not Prime Farmland	8.0
120	Jenrid sandy loam	0-4%	Not Prime Farmland	0.1
125	Lambsen loam	1-3%	Farmland of statewide importance	0.3
127	Lapoint-Pointla complex	2-4%	Farmland of statewide importance	11.3
147	Montwel-Hideout complex	2-20%	Not Prime Farmland	21.3
162	Nolava-Nolava, wet complex	0-2%	Prime Farmland*	6.2
176	Parohtog loam	0-2%	Farmland of statewide importance	0.1
223	Stygee silty clay loam	0-2%	Not Prime Farmland	61.3
225	Sugun sandy loam	0-4%	Not Prime Farmland	8.2
242	Turzo loam	0-4%	Not Prime Farmland	110.7
243	Turzo -Umbo complex	0-2%	Prime Farmland*	16.2
244	Turzo -Umbo complex	2-4%	Prime Farmland*	1.4
251	Umbo clay loam	0-2%	Farmland of statewide importance	50.0
252	Umbo silty clay loam	0-2%	Farmland of statewide importance	29.4
280	Yarts-Samala, bery stony-Silka, frequently flooded complex	0-40%	Farmland of statewide importance	13.0
285	Water	N/A	Not Prime Farmland	14.6
541	Gash, occasionally flooded-Fluvaquentic Haplustolls family, frequently flooded complex	0-4%	Not Prime Farmland	7.6
ALB	Kaiar-Walknolls-Honlu	2-15%	Not Prime Farmland	5.4
APC	Grunnell-Pariette-Persayo complex	2-15%	Not Prime Farmland	1.2
BMD	Gapmesa-Mespun-Hideout complex	0-20%	Not Prime Farmland	18.6
CeC	Cedarview, ery stony-Lapoint complex	2-10%	Not Prime Farmland	9.4
CnD	Odome-Casmos-Chipeta association	1-10%	Not Prime Farmland	12.0
EwB	Effington-Rairdent complex	1-8%	Not Prime Farmland	10.8
FaB	Rairdent clay loam	0-8%	Not Prime Farmland	1.3
GME	Gerst-Clapper-Bullpen complex	12-65%	Not Prime Farmland	17.8
HhD	Hanksville-Chipeta-Badland complex	2-8%	Not Prime Farmland	7.7
MaB	Mikim loam	3-5%	Not Prime Farmland	7.1

Symbol	Soil Unit Name	Slope	Farmland Classification	Acres
MbA	Breezy-Bunkwater-Hickerson complex1-6%		Not Prime Farmland	1.5
MpB	Billiesdraw-Altonah, extremely stony-Utahn complex	1-8%	Not Prime Farmland	11.6
NcC	Neola, rubbly-Lapoint complex	2-10%	Not Prime Farmland	4.7
SJC	Heldt silty clay loam	2-8%	Not Prime Farmland	40.5
SKB	Sagers-Vickel complex	0-8%	Not Prime Farmland	0.9
TKG	Paynecanal-Duffson complex	10-50%	Not Prime Farmland	2.8
UdA	Stygee silty clay loam, wet, saline	0-3%	Prime Farmland**	35.5
VgA	Blonhue-Blackston complex	0-4%	Farmland of statewide importance	0.3
VKE	Chickenhill-Buddson family complex	10-40%	Not Prime Farmland	3.6
ZaB	Gapmesa-Vonid-Kaiar complex	2-8%	Not Prime Farmland	75.8
ZbB	Solirec-Hazmaz complex	2-8%	Not Prime Farmland	1.4
ZcB	Bluehon-Lapoint-Hazmaz complex	2-5%	Not Prime Farmland	1.5
No Soil Information Available				93.7
			TOTAL	**809.4**

* Prime farmland if irrigated
** Prime farmland if irrigated and reclaimed of excess salts and sodium

4.1.1 Upland Erosion

Soils within the Project area vary and the erosivity is dependent upon soil characteristics and the erosional forces acting on them. Erosion of surface materials occurs from wind and water interaction. Chemical processes can also help breakdown surface materials and contribute to erosion. Water is the most powerful erosive force and does the most damage when combined with steep gradients. The steeper the terrain, the greater the potential for erosion from water interaction due to increased water velocities. The soils in the Project area are unrated for erosion hazard potential (NRCS 2021b and 2021c), but erosion potential generally increases with slope. Soils on slopes greater than 15% would have a greater risk of erosion from water interaction. Additionally, any areas that have been disturbed and/or lack vegetative cover would have a higher susceptibility for erosion.

Minor erosion issues have been identified along the banks of canals for segments of the Yellowstone Feeder Canal and at the wasteway for the Red Cap Canal. Substantial erosion has been documented along the Coyote Canal at an estimated 15,200 cubic yards of material eroded since 1981 (refer to Section 2.3.2). This has occurred primarily along the segment downstream of Boulder Boulevard where slopes along the canal range from approximately 20-30%. It is estimated that an additional 10,900 cubic yards of material has the potential to erode along the canal.

4.1.2 Sedimentation

Though sediment transport and deposition occur within all the canal systems, the only site experiencing heightened issues with sedimentation is Coyote Canal at Site 2. Substantial sediment has deposited into Brown's Draw Reservoir from erosion along Coyote Canal as

described in Section 4.1.1 above. An estimated 15,200 cubic yards (9.42 ac-ft) of sediment has eroded from the canal since its construction in 1981 and an estimated 10,900 cubic yards (6.76 ac-ft) of sediment could continue to erode and deposit into Brown's Draw Reservoir over the next 20 to 30 years (JDE 2021a included in Appendix E).

4.1.3 Prime and Unique Farmland

NRCS, in cooperation with other interested federal, state, and local governments, has inventoried land that can be used to produce the Nation's food supply. The extent and location of important soils that are best suited for food, feed, fiber, forage, and oilseed crops have been identified and classified as prime farmland, unique farmland, and farmland of statewide or local importance.

The Eastern Duchesne Watershed contains approximately 66,752 acres of land that is designated as prime or unique farmlands and the Project area contains approximately 197.1 acres (refer to Table 4-3). Prime and unique farmland classification within the watershed and Project area include "prime farmland if irrigated," "prime farmland if irrigated and reclaimed of excess salts and sodium," and "farmland of statewide importance." NRCS soil data is not available for approximately 23,148.6 acres within the Eastern Duchesne Watershed which also includes 93.7 acres of the Project area. Therefore, prime and unique farmland designations are not available in areas lacking NRCS soil data. However, based on review of aerial photography and topographic maps, these portions of the Project area are located primarily outside of existing farmlands on steeper slopes not suited for farming. A map of soils designated as prime and unique farmland and areas lacking soil data is included in Appendix C – Map C3. Note that areas developed with hard surfaces (roads, residences, parking areas, etc.) or modified (excavated/filled) would not be considered soils meeting prime or unique farmland classifications.

Table 4-3. Prime and Unique Farmland Summary

Prime and Unique Farmland	Acres
Watershed	**66,752**
prime farmland if irrigated	26,022
prime farmland if irrigated and reclaimed of excess salts and sodium	6,605
Farmland of statewide importance	34,125
Project Area	**197.1**
Prime farmland if irrigated	57.3
Prime farmland if irrigated and reclaimed of excess salts and sodium	35.5
Farmland of statewide importance	104.3

4.2 Water Resources

4.2.1 Surface Water/Groundwater Quality

Surface waters within the Project area are primarily seasonal irrigation water flows conveyed through open canal systems and ponds. There are several intermittent channels, perennial streams, and ponds/reservoirs in and near the Project area. Surface water in Utah is protected, maintained, and restored through Utah's water quality standards regulated through the Clean Water Act (CWA) and Utah Water Quality Act (UWQA). These include establishment of designated uses, water quality criteria, and antidegradation policy. Utah's antidegradation policy

(Rule R317-2-3; Utah Office of Administrative Rules 2018) does not prohibit degradation of water quality unless the Water Quality Board has previously considered the water to be of exceptional recreational or ecological significance (Category 1 or Category 2 waters). Category 1 or Category 2 waters do not exist within or near the project area (Utah Department of Environmental Quality [UDEQ] 2022a); therefore, the antidegradation policy does not apply.

An assessment of the water quality of surface waters in the State of Utah was performed in 2022 (UDEQ 2022b). Four watershed areas were identified as 303d impaired waters in the report that the Project area and Eastern Duchesne Watershed are situated within (Table 4-4). Issues impacting water quality in the Uintah Basin include an increase in salt-loading from irrigated agriculture, water and land contamination due to oil/gas well drilling, and elevated levels of total phosphorus and dissolved solids in several basin streams (Utah Division of Water Resources 1999).

Table 4-4. 303(d) Impaired Waters

Feature Name	Impairment	Segment	Beneficial Uses
Zimmerman Wash	TDS	From Lake Fork River Confluence upstream to headwaters	4
Lake Fork River and Tributaries	Benthic Invertebrate Assessment, Aluminum, Temperature, Dissolved Oxygen	From Duchesne River confluence upstream to Pigeon Creek confluence	3A, 3E, 4
Dry Gulch Creek and Tributaries	E. coli, TDS	From Duchesne River confluence to headwaters	2B, 4
Duchesne River and Tributaries	E. coli, TDS, Boron	From Uinta River confluence upstream to Myton	2B, 4

TDS = Total Dissolved Solids, 2B = Infrequent Primary Contact Recreation, 4 = Agriculture-crop watering, stock irrigation, 3A = Cold Water Fishery/Aquatic Life, 3E = Severely Habitat-limited Waters.

The canal systems within the Project area are open systems that experience bank erosion and collect surface water runoff that contribute sediment and contaminants in irrigation water. Most of the systems run through cultivated agricultural areas where agricultural runoff is present. The irrigation systems that have hydraulic downstream connectivity (surface and subsurface) to natural drainages have the potential to contribute to water degradation of streams within the watershed and downstream of the watershed. As discussed in Section 2.3, the canal systems in Sites 1 through 7 contain approximately 82.4 miles of canal that are estimated to contribute approximately 5,521 tons of TDS through canal seepage to streams in the watershed. This increases salinity issues within the natural stream systems downstream of the canals. It is estimated that 92,200 tons of TDS pass through the Duchesne River at Myton (U.S. Geological Survey [USGS] 2017), which is located directly downstream of the watershed.

The watershed lies at the upstream extent of the larger Colorado River Basin. Great efforts have been implemented to reduce salinity in the Colorado River Basin. In June 1974, Congress enacted the Colorado River Basin Salinity Control Act (PL 93-320), which directed the Secretary of the Interior to proceed with a program to enhance and protect the quality of water available in the Colorado River (Bureau of Reclamation 2024). The Colorado River Water Quality Improvement Program was implemented in 1972 by the Bureau of Reclamation (replaced by the Colorado River

Basin Salinity Control Program) to reduce river salinity generated by seepage losses from unlined canals and ditches. Through this program, numerous canals in Duchesne County were lined or piped to reduce salt loading in surface waters that drain to the Colorado River. Duchesne County Comprehensive Water Resource Master Plan (CH2MHill 2001) outlines the need for lining or piping canals to provide immediate reduction of seepage losses, reduce evaporation, and reduce or eliminate consumptive use by plants growing along the canals. These measures are the primary focus of many current federal water conservation and salinity control programs (CH2MHill 2001).

Salinity is also a primary concern for groundwater quality in Duchesne County. Most groundwater pollution is from natural geologic sources such as the Green River and Wasatch formations (Utah Division of Water Resources 1999). Groundwater development in Duchesne County is hindered by salinity. High salinity concentrations in the consolidated aquifers, commonly in excess of 2,000 milligrams per liter, render it unsuitable for domestic, industrial, or agricultural purposes (CH2MHill 2001). Human induced groundwater quality issues are primarily associated with agriculture and oil/gas drilling (Utah Division of Water Resources 1999). As noted above, canal seepage is a large contributor of contaminants into water. Canal seepage creates shallow groundwater conditions and this shallow groundwater drains to streams contributing to TDS issues in surface waters and contributing to TDS in shallow aquifers.

4.2.2 Surface Water Quantity and Flow

Surface waters in general are generated from stormwater/snowmelt runoff and springs. These waters collect and/or are conveyed through/into streams, lakes, reservoirs, ponds, and wetlands. Surface water flows are commonly modified to store and convey water for industrial, municipal, agricultural, recreational, and wildlife management purposes. This is the case in the Eastern Duchesne Watershed where canals and irrigation ponds/reservoirs have been constructed to store and divert water for various purposes. A map of surface waters and wetlands is included in Appendix C – Map C4. Surface waters within the Project area primarily include irrigation canals and ponds constructed to support the agricultural needs of the community (crop irrigation and water for livestock).

Water is conveyed to the canals seasonally within the Project area from various surface water sources including the Yellowstone River, Lake Fork River, Duchesne River, Moon Lake Reservoir, Starvation Reservoir, and Big Sand Wash Reservoir. The average flows for each of the canals and the surface water source supplying water to the canals is included in 4-5. The canals within the Project area have been conveying surface water seasonally for many years ranging from 41 to 100+ years. This has altered the hydraulically connected natural stream systems by decreasing flows in natural systems from consumptive agricultural use, also referred to as depletion.

Table 4-5. Average Canal Flow and Surface Water Source

Service Area Name	Average Canal flow (cfs)	Surface Water Source
Yellowstone Feeder Canal Service Area	58.2	Yellowstone River
Coyote Canal Service Area	28.4	Yellowstone Feeder Canal
South Boneta Service Area	3.3	Storage in Moon Lake Reservoir delivered through Lake Fork River
Class B Canal Service Area	52.0	Storage in Moon Lake Reservoir delivered through Lake Fork River
Class C Canal Service Area	120.0	Big Sand Wash Reservoir
Red Cap Service Area	31.5	Duchesne River, storage in Starvation Reservoir delivered through Duchesne River and storage in Moon Lake Reservoir delivered through Lake Fork River
Gray Mountain Service Area	128.0	Duchesne River, and storage in Starvation Reservoir delivered through Duchesne River

Water quantities within surface water features are dependent upon precipitation and snowpack, which are highly unpredictable from year to year. Water storage and conveyance within the existing canal systems and storage reservoirs/ponds are managed and adjusted as needed for the constantly fluctuating surface water conditions, but increasing variability in water flow is a concern. Flows in Yellowstone River have a yearly average of approximately 138 cfs, with a maximum flow rate of 1,210 cfs and a minimum of 37 cfs. Flows in Lake Fork River have a yearly average of 140 cfs, with a maximum flow rate of 1,480 cfs and a minimum of 5.3 cfs. Flows in Duchesne River have a yearly average of 135 cfs, with a maximum flow rate of 1,420 cfs and a minimum of 39.1 cfs. A minimum flow recommendation for Duchesne River of 50 cfs has been established by the USFWS.

Climate change has impacted water quantities and availability and climate change studies indicate that more intense droughts and floods are expected in the future (Utah Division of Water Resources 2020). It is projected that more winter precipitation will fall as rain instead of snow decreasing the snowpack water storage (NRCS 2022a). This has made climate adaptation and mitigation measures to cope with and respond to climate change a priority.

4.2.3 Groundwater Quantity

Primary groundwater aquifers within the Eastern Duchesne Watershed include four aquifer units; Uinta-Animas Aquifer, Mesaverde Aquifer, Dakota-Glen Canyon Aquifer, and Coconino-De Chelly Aquifer; listed from shallowest to deepest. The aquifers are present in water-yielding beds of generally sedimentary rocks and are separated by relatively impermeable confining units (Robson and Banta 1995).

Recharge areas vary for each of the aquifers. Recharge of the Uinta-Animas Aquifer and Mesaverde Aquifer occurs along the Uinta Basin boundaries. Dakota-Glen Canyon Aquifer recharge occurs in many areas, one of them located along the northern margin of the Unita Basin. Based on a geologic map review (Sprinkel 2018), the Yellowstone Feeder Canal appears to adjoin the northern margin of the Unita Basin and could contribute recharge to the Uinta-Animas, Mesaverde, and Dakota-Glen Canyon Aquifers. Recharge for the Coconino-De Chelly Aquifer occurs in areas outside of the Eastern Duchesne Watershed.

It is possible that a portion of the Yellowstone Feeder Canal seepage may contribute to aquifer recharge for the Uinta-Animas, Mesaverde, and Dakota-Glen Canyon Aquifers. The total recharge of the Uinta-Animas Aquifer is about 201,000 ac-ft per year (Robson and Banta 1995), and recharge quantities were not quantified for the other aquifers. However, the Duchesne County Comprehensive Water Resource Master Plan (CH2MHill 2001) identifies an estimated annual water supply for the Uintah Basin as a whole of about 630,000 ac-ft. Subtracting water loss from phreatophyte consumption, canal seepage along the Yellowstone Feeder Canal was calculated at 1,184 ac-ft per year (JDE 2024), which is less than 0.6% of the total aquifer recharge reported for the Unita-Animas Aquifer alone and 0.1% of the annual Uintah Basin groundwater supply. This small fraction of a percent of contribution to recharge is considered negligible.

None of the other canal systems within the Project area are located in Uinta Basin boundary areas where primary aquifer recharge occurs. It is likely that the existing canal systems within the Project area influence local shallow groundwater conditions seasonally, within approximately 30 feet of ground surface, when flowing (April through October). Based on information in the Duchesne River Watershed Restoration Plan, canal return flows are mostly through subsurface flows (shallow groundwater) and several of these returns were observed to be entering active stream channels (Uinta Basin Watershed Council 2015). Seepage that enters the shallow groundwater table in the Uinta basin help support return flow to the existing natural stream systems.

4.2.4 Waters of the U.S. Including Wetlands

Section 404 of the Clean Water Act regulates the discharge of dredged or fill material into waters of the U.S. and requires a permit for these activities unless the activities are exempt from Section 404 regulation. Wetland and pond data was obtained from the National Wetlands Inventory (NWI) and riverine feature data was obtained from the National Hydrography Dataset ([NHD] (USGS 2022) and the NWI (USFWS 2022b). Boundaries of NWI wetland features were adjusted to remove filled/developed areas observed during a site visit conducted by Adaptive Environmental Planning, LLC (AEP) in July 2022. For the purpose of this analysis, all features identified from the NWI/NHD data are assumed jurisdictional. It is the responsibility of the U.S. Army Corps of Engineers (USACE) to make the final determination of jurisdictional waters of the U.S. A wetland and waters of the U.S. delineation, and USACE jurisdictional determination would be requested during final design phases for this Project to support USACE Section 404 permitting that may be required.

The Eastern Duchesne Watershed contains approximately 14,959 acres of wetland, 1,723 acres of open water (ponds/lakes/reservoirs), and 1,190 miles of streams/canals/ditches (Appendix C – Map C4). Diversion of waters from natural streams and degraded water quality has greatly impacted the natural waters of the U.S. within the watershed.

Wetlands and waters within the Project area extents for each site are shown in Table 4-6. The Project area contains approximately 51.79 acres of emergent wetland, 7.35 acres of forested/shrub wetland, 1.92 acres of open water (ponds), and 293,636 linear feet of riverine features (Table 4-6). Note that riverine features include streams, canals, and ditches. Many of the waters and wetlands within the project area are artificially created from irrigation water diversion and water conveyance along the canal systems.

Table 4-6. Waters and Wetlands in Project Area

Site No.	Site Name	Emergent Wetland (ac)	Forested/ Shrub Wetland (ac)	Pond (ac)	Riverine (LF)
1	Yellowstone Feeder Canal*	0.11	0.02	-	15,675
2	Coyote Canal*	-	0.10	-	8,529
3	South Boneta Canal*	0.37	3.91	-	13,135
4	Dry Gulch Class B Canal System*	17.14	1.10	1.92	80,340
5	Dry Gulch Class C Canal System*	3.80	0.02	-	29,457
6	Red Cap Extension Canals/Laterals*	30.37	2.19	-	135,655
7	Gray Mountain Canal*	-	0.01	-	10,845
TOTAL		**51.79**	**7.35**	**1.92**	**293,636**

** Riverine features consisting of constructed canals have potential connectivity to downstream jurisdictional waters and may be considered jurisdictional.*

4.3 Air Resources

4.3.1 Air Quality

The U.S. Environmental Protection Agency (EPA) has established health-based National Ambient Air Quality Standards (NAAQS) for six pollutants considered harmful to public health and the environment, known as criteria pollutants. NAAQS pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), sulfur dioxide (SO_2), and lead (Pb). Monitoring of NAAQS pollutants in Utah is delegated to the Utah Division of Air Quality (UDAQ). UDAQ had 22 fixed air quality monitoring stations throughout the state of Utah that monitored the NAAQS pollutants in 2020 (UDEQ 2020). The closest monitoring station to the Project area is in Roosevelt, 7 miles to the east, but is still located within the Eastern Duchesne Watershed. This station was monitored for NO_2, O_3, and PM 2.5. in 2020. Results for the Roosevelt station show NO_2 and PM 2.5 in compliance with air quality standards and O_3 out of compliance. The Unita Basin, which the Project area lies, was identified within a non-attainment area for O_3 (UDEQ 2022c). Major sources for volatile organic compounds (VOCs) and nitrogen oxides (Nox) that chemically react to produce ozone include vehicle engine exhaust, emissions from industrial facilities, gasoline vapors, chemical solvent use, oil and gas production, and biogenic emissions from natural sources, such as vegetative growth (UDEQ 2020). Increased oil and gas exploration and production in the Uinta Basin has contributed to the increase in the precursor gases that lead to the formation of ozone (UDEQ 2021).

Under Title R307 of the Utah Administrative Code, emission inventories must be undertaken to further characterize air quality throughout Utah. Emission inventories are conducted every 3 years, during which UDAQ collects information about the types and quantities of compounds released by all emission sources in the state. Sources can be categorized as point (large stationary industrial or commercial facilities), area (smaller stationary sources that are assessed as a group), or mobile (personal or commercial vehicles). The 2017 triennial inventory is the most recent state-wide inventory available. It covers 486 individual point sources, 128 area categories,

65 oil and gas categories, 32 on-road categories, and 215 non-road categories (UDEQ 2020). The data collected are used by UDAQ to review trends over time and manage the air quality program. Results in tons of compound emitted per year for Duchesne County are shown in Table 4-7.

Table 4-7. 2017 UDAQ Emissions Inventory (tons/year)

County	CO	NO_x	PM10	PM2.5	SO_2	VOC
Duchesne	13,842.39	7,936.32	6,944.39	1,139.99	39.43	37,532.62

UDEQ 2020; VOC = volatile organic compound

4.4 Plant Resources

4.4.1 Vegetation Communities

A combination of land cover data (Multi-Resolution Land Characteristics Consortium [MRLC] 2019), NWI data (USFWS 2022b), and Gap Analysis Project (GAP) data (USGS 2011) was used to determine land cover types. A map of vegetation cover types is included in Appendix C -Map C5. Vegetation communities within the watershed and Project area consist of wetland, riparian, and upland vegetation. Vegetated areas cover approximately 77% of the Project area while unvegetated areas, including developed lands and open water (reservoirs, ponds, rivers, canals, ditches, etc.) cover the remaining 23%. A site visit was conducted by Adaptive Environmental Planning (AEP) in July 2022 to verify vegetation types within these communities. A summary of the data and site visit observations are included below. Vegetative cover and an estimated area of coverage within the Project area based on MRLC, GAP and NWI data is provided in Table 4-8.

Table 4-8. Vegetation Types in the Project Area

Vegetation Type	Acres	%
Wetland Vegetation		
Emergent	51.79	6%
Shrub	7.35	1%
Subtotal	***59.14***	***7%***
Riparian Vegetation		
Riparian	10.78	1%
Upland Vegetation		
Crop/Pasture	251.63	31%
Forest	104.12	13%
Shrub	196.93	24%
Grassland	0.16	<1%
Subtotal	***552.84***	***69%***
Non-Vegetated		
Developed	92.23	11%
Open Water	94.41	12%
Subtotal	***186.64***	***23%***
Total	**809.40**	**100%**

** GAP data provides a substantial overestimate of forested land within the Project area because the MRLC 2019 data does not appropriately depict the cleared unforested canal corridors.*

Wetland vegetation communities consist of emergent and shrub dominated wetlands. Emergent wetland vegetation is dominated by various grasses, reeds, and/or rushes. NWI classified Forested/shrub wetlands within the Project area appeared to be shrub dominant rather than forested, with vegetation heights less than 20 feet tall. The shrub wetland areas were observed to be dominated by various willow species (*Salix sp.*), alder (*Alnus incana*), and Russian olive (*Elaeagnus angustifolia*) based on a site visit conducted by AEP in July 2022. Wetland vegetated areas cover approximately 59.14 acres or 7% of the Project area.

Riparian vegetation grows adjacent to streams, rivers, lakes, reservoirs, and other inland aquatic systems that exist between the aquatic and terrestrial ecosystems. Riparian vegetation includes grasses, forbs, shrubs, trees, or other vegetation between the water/wetland areas and upland areas. Limited riparian vegetation is present along stream and canal segments within portions of the Project area. This vegetation was observed to be dominated by narrow leaf cottonwood (*Elaeagnus angustifolia*), various willow species (*Salix sp.*), alder (*Alnus incana*), and Russian olive (*Elaeagnus angustifolia*) based on a site visit conducted by AEP in July 2022. Riparian areas cover approximately 10.78 acres or 1% of the Project area.

Upland vegetation within the Project area consists of agricultural fields, shrubland, grassland, and forest. These areas cover approximately 552.84 acres or 69% of the Project area. The majority of the uplands (251.63 acres) are comprised of crop and pasture containing alfalfa, grass hay, various grains, and other grasses. Upland shrub areas (196.93 acres) were observed to be dominated by sagebrush (*Artemisia sp.*) and rabbitbrush (*Chrysothamnus sp.*), and non-crop grasslands areas (0.16 acres) were observed as mixed upland grasses/forbs. Upland forested areas (88.93 acres) were observed to be dominated by pinyon pine (*Pinus sp.*) and juniper (*Juniperus sp.*).

The Project area contains a large amount of phreatophyte plant species. Phreatophytes are deep-rooted plants that obtain water from the water table or the layer of soil just above it. As some phreatophytes have a high annual water consumption and occupy extensive areas, the amount of water they consume in a given locality may be large (Robinson 1958). Phreatophyte species are dominant throughout the Project area consisting of, alfalfa, cottonwood, willow, alder, Russian olive, juniper, big sagebrush, and rabbitbrush. Phreatophytes consumptive use is estimated to be 60% of the canal seepage loss in The Uintah Basin (Jones and DeMille Engineering [JDE] 2024 – Attached in Appendix E).

4.4.2 Special Status Plant Species

The ESA was established to protect endangered and threatened species and their habitats. Section 7 of the Act requires federal agencies ensure that federal actions do not jeopardize the existence of any listed species. This is accomplished through Section 7 consultation with USFWS. A Biological Assessment (BA) was completed for the Project (refer to Appendix E for the BA), which identified three ESA-listed plant species for consideration based on a site-specific report produced from the USFWS Information for Planning and Consultation (IpaC) system. These include Pariette cactus (*Sclerocactus brevispinus*), Uinta Basin hookless cactus (*Sclerocactus wetlandicus*), and Ute ladies'-tresses (*Spiranthes diluvialis*). The BA concluded that only one of the species, Ute ladies'-tresses (*Spiranthes diluvialis*), has the potential to occur in the Project area due to presence of suitable habitat. Species, designated critical habitat, or suitable habitat were determined to not be present for the remaining two ESA-listed plant species from the IPaC

report. Section 7 consultation was completed for the Project, and the results of the consultation are discussed in Section 6.5.2 of the Environmental Consequences section.

4.4.2.1 Ute Ladies'-tresses

Ute ladies'-tresses, hereinafter referred to as ULT, were listed as threatened on January 17, 1992, per the final ruling of 57 FR 2048 205. They are a 12- to 60-centimeter-tall perennial herb in the orchid family with a historical range in Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington, and Wyoming (USFWS 2022c). Species suitable habitat is documented to occur within the Project area. No designated critical habitat has been established for the species. Habitat requirements for ULT as summarized from the USFWS Environmental Conservation Online System (USFWS 2022c) includes moist meadows associated with perennial stream terraces, floodplains, and oxbows at elevations between 4300 and 7000 feet. Seasonally flooded river terraces, sub-irrigated or spring-fed abandoned stream channels and valleys, and lakeshores also provide suitable habitat. Populations have also been discovered along irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, roadside borrow pits, reservoirs, and other human-modified wetlands (USFWS 2022c). Threats to ULT include habitat loss/modification, overcollection, competition from exotic weeds, herbicide application, recreation, mowing for hay production, grazing, hydrology change, herbivory by native wildlife, reduction in the number/diversity of insect pollinators, drought, absence or rarity of mycorrhizal symbionts, and conflicting management with other rare species (USFWS 2022c).

Surveys were performed in and around the Project area to identify suitable habitat and document occurrence of ULT (Wetland Resources 2020 and 2021). The ULT Survey Reports are included as an Appendix to the BA, which is attached in Appendix E of the Plan-EA. Suitable habitat was identified within all Sites, except for Site 2 (Coyote Canal) and Site 7 (Gray Mountain Canal). Suitable habitat found to be occupied by ULT was present at only two sites including Site 3 (South Boneta Canal) and Site 4 (Dry Gulch Class B Canal System). Suitable habitat and plant location information for ULT is sensitive in nature and therefore, is not disclosed in this report.

4.4.3 Noxious Weeds and Invasive Plants

Executive Order 13122 states that "a federal agency shall not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction and spread of invasive species in the U.S. or elsewhere." Noxious and invasive weeds (N&I) are non-native plant species designated by state law or county ordinance because they cause, or have the potential to cause, extraordinary negative economic and ecological impacts.

Utah has 54 plant species listed as N&I weeds in the state of Utah (Utah Department of Agriculture and Food [UDAF] 2022). Duchesne County has declared N&I weeds for the County which is the same list provided for UDAF 2022. The weed plan includes a list of weeds that are to be controlled per Utah Noxious Weet Act and are separated into the classes described below.

- Class 1A (Early Detection Rapid Response): Declared N&I weeds not native to Utah and not known to exist in the state but pose a serious threat to the state and should be considered as a very high priority.
- Class 1 B (Early Detection Rapid Response): Declared N&I weeds not native to Utah and known to exist in the state in very limited populations but pose a serious threat to the state and should be considered as a very high priority.

- Class 2 (Control): Declared N&I weeds not native to Utah and known to exist in varying population throughout the state that pose a threat to the state and should be considered a high priority for control. The concentration of these N&I weeds is at a level where control or eradication may be possible.
- Class 3 (Containment): Declared N&I weeds not native to Utah that are widely spread and known to exist in various populations throughout the state. These N&I weeds pose a threat to the agricultural industry and agricultural products. Weed control efforts may be directed at reducing or eliminating new or expanding populations through the state. Known and established weed populations, as determined by the weed control authority, may be managed by any approved weed control methodology, as determined by the weed control authority.
- Class 4 (Prohibited): Declared N&I weeds not native to Utah that pose a threat to the state through the retail sale or propagation in the nursery and greenhouse industry. The weeds are annual, biennial, or perennial plants that the commissioner designates as having the potential or are known to be detrimental the human or animal health, the environment, public roads, crops, or other property.

Most of the Project area is located on disturbed lands within agricultural areas, along excavated irrigation canal/ditch corridors, and near transportation rights-of-way (ROWs). Soil disturbance and seed dispersal from vehicles, foot traffic, livestock, wildlife, and other activities increase the risk for invasion of N&I weeds. N&I weeds were observed in the Project area during a site visit conducted by AEP in July 2022. Weeds observed are included in Table 4-9. Note that many other weeds and non-native plant species were observed in addition to those listed as N&I.

Table 4-9. N&I Weeds Observed in Project Area

Common Name	Scientific Name	Weed Class
Canada thistle	*Cirsium arvense*	3
Diffuse knapweed	*Centaurea diffusa*	2
Field bindweed	*Convolvulus*	3
Goatsrue	*Galega officinalis*	1B
Musk Thistle	*Carduus nutans*	3
Tamarisk	*Tamarix ramosissima*	3
Russian olive	*Elaeagnus angustifolia*	4

4.4.4 Riparian Areas

Riparian Areas exist in the transitional zone between aquatic and terrestrial ecosystems. They feature different vegetative species than the adjoining ecosystems and exhibit more vigorous growth due to shallow groundwater interaction. They generally consist of long strips of vegetation adjacent to streams, rivers, lakes, reservoirs, and other inland aquatic systems that affect or are affected by the presence of water (Fischer et al. 2000). These areas typically harbor a large number of wildlife species and perform numerous ecological functions.

In Duchesne County, riparian areas comprise less than 1% of the land area, but they are among the most productive and valuable natural resources, rivaling our best agricultural lands (Duchesne County 2022a). Human modifications within the watershed have adversely impacted riparian areas over the years, primarily from modification to natural stream flow (dams, water diversions, etc.), farming, grazing, development, and logging.

Riparian areas were identified based on GAP data (USGS 2011) and are depicted in Appendix C – Map C5. The riparian boundaries were adjusted to remove riparian areas from filled/developed and/or cleared areas observed during a site visit conducted by AEP in July 2022. Approximately 10.78 acres of riparian vegetation is located within the Project area. Much of the riparian vegetation is artificially created from irrigation water diversion and occurs near the irrigation canals. Natural (non-artificial) riparian corridors occur where the Project areas or canals intersect natural drainages, streams, or rivers. Riparian vegetation includes grasses, forbs, shrubs, trees, or other vegetation. Dominant vegetation observed in riparian areas during a site visit conducted by AEP in July 2022, included narrow leaf cottonwood (*Populus angustifolia*), various willow species (*Salix sp.*), alder (*Alnus incana*), and Russian olive (*Elaeagnus angustifolia*) (Figure 4-1).

Figure 4-1. Riparian Vegetation

4.5 Animal Resources

4.5.1 Fish and Wildlife

General fish and wildlife habitat are present within the Project area. Wildlife habitat in the Project area may support a range of native and non-native migratory birds, resident birds, mammals, amphibians, and reptiles. Wildlife populations that are the most documented and understood include those that are listed for protection under the ESA, are a state species of concern, or are desired game or furbearers. The UDNR has mapped seasonal habitats for 23 wildlife species within Utah (UDNR 2022b). Crucial and Substantial value habitats for wildlife species are in the Project area and are defined by UDNR as described below. Wildlife species with Crucial or Substantial value habitats within the Project area and the approximate acreage of habitat is provided in Table 4-10. Maps depicting Substantial and Crucial value habitats are provided in Appendix C – Map C6.1 and C 6.2.

- Crucial – habitat on which the local population of a wildlife species depends for survival because there are not alternative ranges or habitats available. Crucial value habitat is essential to the life history requirements of a wildlife species. Degradation or unavailability of crucial habitat will lead to significant declines in carrying capacity and/or numbers of wildlife species in question.
- Substantial – Habitat used by a wildlife species but is not crucial for population survival. Degradation or unavailability of substantial value habitat will not lead to significant declines in carrying capacity and/or numbers of the wildlife species in question.

Table 4-10. State Crucial and Substantial Wildlife Habitat

Wildlife	Habitat Value		Total	Location
	Substantial	Crucial		
Black Bear (*Ursus americanus*)	-	7.2	**7.2**	Site 1
California Quail (*Callipepla californica*)	-	789.9	**789.9**	Site 3, 4, 5, 6, and 7
Chukar (*Alectoris chukar*)	-	39.4	**39.4**	Site 4, 6, and 7
Dusky Grouse (*Dendragapus obscurus*)	-	1.0	**1.0**	Site 1
Elk (*Cervus elaphus canadensis*)	-	1.0	**1.0**	Site 1
Moose (*Alces alces*)	-	30	**30.0**	Site 3, 4, 5, 6, and 7
Mule Deer (*Odocoileus hemionus*)	650.2	121.7	**771.9**	Sites 1-7
Ringneck Pheasant (*Phasianus colchicus*)	102.7	521.2	**623.9**	Site 3 and 4 (Substantial) / Site 5, 6, and 7 (Crucial)
TOTAL	**752.9**	**1,511.4**	**2,264.3**	**Sites 1-7**

Fish and aquatic species habitat are also present within the Project area. Irrigation canals and ponds offer temporary artificial aquatic habitat while flowing water during the irrigation season (April through October). However, aquatic species would be limited due to lack of water flow during the non-irrigation season and structures/features along the canal systems that impede passage of fish/aquatic species into the canal systems. The Project area contains several intermittent streams and one perennial stream (Lake Fork River) where fish/macroinvertebrates and associated habitat would be present, as long as surface water is flowing.

4.5.2 Special Status Animal Species

The ESA was established to protect endangered and threatened species and their habitats. Section 7 of the Act requires federal agencies ensure that federal actions do not jeopardize the existence of any listed species. This is accomplished through Section 7 consultation with USFWS. A BA was completed for the Project (refer to Appendix E for the BA), which identified seven ESA-listed animal species for consideration (Table 4-11) based on a site-specific report produced from the USFWS IpaC system. The BA concluded that one insect species, monarch butterfly (*Danaus plexippus*), has the potential to occur in the Project area due to presence of suitable nectar sources. In addition, four native Colorado River fish species and associated designated critical habitat occur downstream of the Project area including bonytail chub (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), and razorback sucker

(*Xyrauchen texanus*), that could be affected by Project actions. Designated critical habitat for Bonytail chub and humpback chub is located 44 miles downstream in the Green River and for Colorado pikeminnow and razorback sucker is located 11 miles downstream in the Green River. Species, designated critical habitat, or suitable habitat were determined to not be present for the remaining two ESA-listed animal species identified in the IPaC report (Mexican spotted owl and yellow-billed cuckoo) as noted in Table 4-11. Section 7 consultation was completed for the Project, and the results of the consultation are discussed in Section 6.5.2 of the Environmental Consequences section.

The state of Utah has developed a Wildlife Action Plan with the purpose and goal to manage native wildlife species and their habitats, sufficient to prevent the need for additional listings under the ESA (Utah Division of Wildlife Resources [UDWR] 2015). The Wildlife Action Plan identifies Species of Greatest Conservation Need (SGCN) that are considered jurisdictional wildlife under the plan. State-listed SGCN as identified in the Wildlife Action Plan, have potential to occur within the Project area or could be affected from alternative actions. Based on a review of the SGCN status, and UDWR species known occurrence for the available quadrangles containing the Project area (UDWR 2022a), there are 18 SGCN that had documented occurrences, and 15 of those were determined to have the potential to occur within the Project area due to the presence of suitable habitat.

A list of ESA species and SGCN is included in Table 4-11 along with their determination of occurrence within the Project area or potential to be affected. There are no additional species of concern for the Ute Tribe on Reservation lands other than those already identified as ESA or SGCN. Species names that are in bold text have the potential to be impacted from alternative actions.

Table 4-11. Sensitive Species Occurrence

Common Name (Scientific Name)	Status	Habitat/Range Requirements	Potential Occurrence in the Project area
Mammals			
Black-footed ferret (*Mustela nigripes*)	SGCN	Open plain prairie dog colonies (UDWR 2022b).	There is potential for the species to occur in the Project area within areas that are open plain and contain prairie dog colonies.
Gray wolf (*Canis lupus*)	SGCN	Extirpated from Utah by early settlers (UDWR 2022b) with the most recent sighting occurring the Duchesne NE quadrangle in 1916 (UDWR 2022a).	Gray wolf are not anticipated to occur in or near the Project area.
Kit fox (*Vulpes macrotis*)	SGCN	Primarily open desert shrubby or shrub-grass habitat (UDWR 2022b).	The Project area contains open desert shrubby and shrub-grass suitable habitat where the species have the potential to be present.

Common Name (Scientific Name)	Status	Habitat/Range Requirements	Potential Occurrence in the Project area
Townsend's big-eared bat (*Corynorhinus townsendii*)	SGCN	Occurs in a wide variety of habitats including sagebrush steppe, pinyon-juniper, mountain shrub, and mixed conifer associations (UDWR 2022b). The most recent documented sighting occurred in the Myton quadrangle in 1957 (UDWR 2022a).	There is suitable habitat available in the Project area, however the species is not likely to be present, with the most recent documented sighting occurring 65 years ago.
White-tailed prairie dog (*Cynomys leucurus*)	SGCN	Occurs in arid flats that are sparsely vegetated with low shrubs and grasses (UDWR 2022b).	There is potential for the species to occur in the Project area within sparsely vegetated areas or areas with low vegetative cover.
Birds			
Bald eagle (*Haliaeetus leucocephalus*)	SGCN	There are no documented breeding sites in Duchesne County. They typically winter in forested areas adjacent to large bodies of water (USFWS 2022d)	No breeding habitat is present, but the species could occur in the Project area while foraging during the non-breeding season.
Band-tailed pigeon (*Patagioenas fasciata*)	SGCN	Generally found in temperate and mountain coniferous and mixed forests and woodlands. Will also forage in cultivated areas and diverse habitats not used for nesting (UDWR 2022b).	There is potential for the species to present in forest/woodland areas for nesting and foraging could occur across the Project area.
Burrowing owl (*Athene cunicularia*)	SGCN	There are no confirmed breeding occurrences of the species in Duchesne County. Occurrence of the species is in desert valleys, especially in prairie dog colonies (UDWR 2022b).	The species is not anticipated to be present during breeding, but they could occur in the Project area while foraging during the non-breeding season.
Caspian tern (*Hydroprogne caspia*)	SGCN	Habitat for the species is large lakes, marshes, islands, beaches, bays, and coastal waters. There are no known nesting sites in Duchesne County (UDWR 2022b).	The species is not anticipated to be present during breeding, but they could occur in the Project area while foraging during the non-breeding season.
Ferruginous hawk (*Buteo regalis*)	SGCN	During breeding, flat and rolling terrain in grassland or shrub steppe is most often used. In Utah the species reside in lowland open desert terrain (UDWR 2022b).	There is potential for the species to occur in the Project area due to the presence of suitable breeding and foraging habitat.

Common Name (Scientific Name)	Status	Habitat/Range Requirements	Potential Occurrence in the Project area
Golden eagle (*Aquila chrysaetos*)	SGCN	Nests are most often on rock ledges of cliffs but sometimes in large trees. They generally inhabit open and semi-open country such as prairies, sagebrush, arctic and alpine tundra, savannah or sparse woodland, and barren areas, especially in hilly or mountainous regions (UDWR 2022b).	There is potential for the species to occur in the Project area due to the presence of suitable breeding and foraging habitat.
Greater sage-grouse (*Centrocercus urophasianus*)	SGCN	Habitat includes sagebrush communities where there are small streams or springs (UDWR 2022b).	There is potential for the species to occur in the Project area due to the presence of suitable breeding and foraging habitat.
Lewis's woodpecker (*Melanerpes lewis*)	SGCN	Known nesting habitat in Utah include agricultural orchards, shelterbelts, tree farms, montane riparian woodlands, and desert riparian woodlands (UDWR 2022b).	There is potential for the species to occur in the Project area due to the presence of suitable breeding and foraging habitat.
Mexican Spotted Owl (*Strix occidentalis*)	T	Habitat includes old-growth or mature forests and canyons with riparian conifer communities (USFWS 2022).	There is no designated critical habitat or nesting habitat present and the species are not anticipated to occur in the Project area.
Peregrine falcon (*Falco peregrinus*)	SGCN	Breeding habitat in Utah is characterized as cliffs, bluffs, caves, and rock pockets, often near water (UDWR 2022b). Habitat during migration in Utah various water-associated habitats, croplands, cold desert shrub, and sagebrush-rabbitbrush.	There is potential for the species to occur in the Project area due to the presence of suitable breeding and foraging habitat.
Yellow-billed cuckoo (*Coccyzus americanus*)	T / SGCN	Breeding habitat is generally deciduous riparian woodland, especially including dense stands of cottonwood and willow, but also including mesquite and salt cedar in some areas (UDWR 2022b).	There is no designated critical habitat located in the Project area. No suitable nesting habitat occurs within ½-mile of the Project area and the species are not anticipated to be present.
Fishes			
Bonytail (*Gila elegans*)	E	Favor main-stem rivers usually in or near deep swift water, inflowing pools and eddies just outside the main current. They are also found in reservoirs (NatureServe 2022)	The species and designated critical habitat are not known to occur in the Project area, but are located downstream of the Project area and could be affected by alternative actions.

Common Name (Scientific Name)	Status	Habitat/Range Requirements	Potential Occurrence in the Project area
Colorado pikeminnow (*Ptychocheilus lucius*)	E	Found in medium to large rivers with a distribution in the upper Colorado River; mainly in the Green River in Utah and the Yampa and Colorado Rivers in Colorado (NatureServe 2022).	The species and designated critical habitat are not known to occur in the Project area, but are located downstream of the Project area and could be affected by alternative actions.
Flannelmouth sucker (*Catostomus latipinnis*)	SGCN	Prefer large rivers, where they are often found in deep pools of slow-flowing, low gradient reaches. In Utah they are found in the main-stem Colorado River, as well as in many Colorado River's large tributaries (DWR 2022b).	The species and habitat are not known to occur in the Project area, but are located downstream of the Project area and could be affected by alternative actions.
Humpback chub (*Gila cypha*)	T	Restricted to deep, swift, canyon-bound reaches of larger rivers (UDWR 2015).	The species and designated critical habitat are not known to occur in the Project area, but are located downstream of the Project area and could be affected by alternative actions.
Razorback sucker (*Xyrauchen texanus*)	T	Endemic to the Colorado River Basin and populations are maintained in Utah by stocking (UDWR 2015)	The species and designated critical habitat are not known to occur in the Project area, but are located downstream of the Project area and could be affected by alternative actions.
Roundtail chub (*Gila robusta*)	SGCN	Endemic to the Colorado River drainage where it occurs in the large, mainstem rivers and in tributary streams, particularly in the low gradient reaches of large tributaries (DWR 2022b).	The species and habitat are not known to occur in the Project area, but are located downstream of the Project area and could be affected by alternative actions.
Amphibians			
Northern leopard frog (*Lithobates pipiens*)	SGCN	The species live in springs, slow streams, marshes, bogs, ponds, canals, flood plains, reservoirs, and lakes; usually in or near permanent water with rooted aquatic vegetation (DWR 2022b).	The Project area contains areas of permanent and temporary surface waters and wetlands, and the species has the potential to be present.
Insects			
Monarch butterfly (*Danaus plexippus*)	C	The summer range includes portions of the conterminous U.S. where milkweeds occur (NatureServe 2022).	Suitable habitat that provides nectar sources for the species is present within the Project area.

E = ESA Endangered, T = ESA Threatened, C = ESA Candidate, SGCN = Utah Species of Greatest Conservation Need.

4.5.3 Migratory Birds and Bald/Golden Eagles

Eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C 668), which provides specific protection for bald and golden eagles. The act makes it illegal to take, possess, sell, purchase, barter, or transport any bald or golden eagle, alive or dead, or any part, nest, or egg thereof. Under the Bald and Golden Eagle Protection Act, the term *take* includes pursuing, shooting, shooting at, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing. Both bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) have potential to occur within the Project area (refer to Section 4.5.2).

Migratory birds are afforded protection under authority of the Migratory Bird Treaty Act (MBTA) (16 U.S.C 703-712). Under the MBTA, it is unlawful to take, kill, or possess migratory birds, their parts, nests, or eggs. Under the MBTA, the term *take* is defined as any attempt or success at pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting. Migratory bird permits must be obtained through the USFWS Migratory Bird Permit Office for any requested waiver or exception to the MBTA. Migratory birds have the potential to occur within the project area for breeding and foraging.

The USFWS maintains a list of Migratory Birds of Conservation Concern (MBCC), which are migratory non-game birds that are likely to become candidates for listing under the ESA without additional conservation actions. According to the USFWS IPaC list (USFWS 2022e) for the project area, there are 9 MBCC expected to occur at this location. These include bald eagle (*Haliaeetus leucocephalus*), Cassin's finch (*Carpodacus cassinii*), Clark's grebe (*Aechmophorus clarkii*), evening grosbeak (*Coccothraustes vespertinus*), lesser yellowlegs (*Tringa flavipes*), Lewis's woodpecker (*Melanerpes lewis*), long-eared owl (*Asio otus*), olive-sided flycatcher (*Contopus cooperi*), and pinyon jay (*Gymnorhinus cyanocephalus*).

4.6 Human Resources

4.6.1 Social Issues and Economy

The socioeconomic baseline is characterized by economic conditions, population, demographics, employment, and income. The U.S. Census Bureau collects and maintains socioeconomic data per Census Tract. Census tracts are contiguous areas that typically encompass a subsection of a county and have a population between 1,200 and 8,000 individuals (U.S. Census Bureau [USCB] 2022). The Eastern Duchesne Watershed intersects five census tracts (9402, 9403, 94.01, 9405.02, and 9406) within Duchesne and Uinta Counties, Utah. Socioeconomic baseline conditions for population, demographics, employment and income of the watershed are identified in the subsections below, and for comparative purposes, baseline conditions for intersecting counties and Utah are also provided. A general overview of the economy in Duchesne County is also provided.

4.6.1.1 Regional Economy

The economy of Duchesne County is dominated by alfalfa, oil, natural gas, and livestock (Utah State University 2005). Duchesne County is dependent mainly upon agriculture and the oil field for industry (NRCS et al. 2005). The service areas within the watershed contain approximately 87,328 acres of farmland as outlined in Table 2-1 of Section 2.3. Inefficiencies in irrigation water delivery, loss of irrigation water from canal seepage, and inconsistencies in water availability related to climate change, have impacted agricultural productivity in the watershed. Drought is

shown as one of the top causes of crop loss for the state of Utah (NRCS 2022a). In addition, private pumping and O&M costs have put additional financial stressors on individuals and irrigation companies.

Water is critical to agriculture and agriculture must be profitable to be sustainable. Duchesne County's General Plan has identified that improving water distribution systems to deliver water to farmlands in a cost-effective manner will be important for both sustainable agriculture and projected population growth (Duchesne County 2019).

4.6.1.2 Population and Demographics

Most races within the combined census tracts were similar to county and state percentages (within approximately 1% to 2%), with exception of the white and American Indian populations (Table 4-12). American Indian populations were up to 6.1% higher in the combined census tracts than the counties and 9.4% higher than the state percentage. Ethnicity of all races were reported for the census tracts, Duchesne County, Uintah County, and Utah at approximately 8%, 8.1%, 8.5%, and 14.2%, respectively.

Table 4-12. Demographic Profile Summary

Race	Census Tracts (Combined)		Duchesne County		Uintah County		Utah	
	Estimate	%	Estimate	%	Estimate	%	Estimate	%
White	21,369	83.3	17,795	89.2	31,002	86.8	2,682,881	85.1
African American	38	0.1	38	0.2	181	0.5	38,059	1.2
American Indian	2,671	10.4	856	4.3	2,491	6.9	33,222	1.0
Asian	154	0.6	66	0.3	277	0.8	73,190	2.3
Pacific Islander	69	0.3	69	0.3	27	0.1	29,450	0.9
Other Races	690	2.7	669	3.4	455	1.3	160,786	5.1
Two or More Races	670	2.6	457	2.3	1,303	3.6	133,651	4.2
Total	**25,661**	**100**	**19,950**	**100**	**35,736**	**100**	**3,151,239**	**100**

**Source: U.S. Census Bureau 2020*

To respect tribal sovereignty and self-government and to fulfill federal trust and treaty responsibilities to tribal nations, lands within the boundaries of federally recognized tribes are designated as disadvantaged communities (CEQ 2024). The Eastern Duchesne Watershed is located entirely within the Uintah and Ouray Indian Reservation Boundary and is considered a disadvantaged community.

4.6.1.3 Employment and Income

The combined census tracts have the highest unemployment rate, lowest median household income, and highest percentage of poverty than the counties and state (Table 4-13). While the variation in these items is minor between the combined census tracts and counties, there is a moderate difference of 4.8% unemployment rate, $16,481 median household income, and 7% poverty level compared to the state estimates.

Table 4-13. Employment and Income Summary

Item	Census Tracts (Combined)		Duchesne County		Uintah County		Utah	
	Estimate	%	Estimate	%	Estimate	%	Estimate	%
Civilian labor force	10,703	100	8,578	100	15,335	100	1,595,452	100
Employed	9,806	91.6	7,941	92.6	14,270	93.1	1,537,623	96.4
Unemployed	897	8.4	637	7.4	1,065	6.9	57,829	3.6
Median Household Income	$57,716	-	$61,655	-	$59,428	-	$74,197	-
Percentage Below Poverty Level	-	16.1	-	13.9	-	13.2	-	9.1

**Source: U.S. Census Bureau 2020*

4.6.2 Historic Properties / Cultural Resources / Native American Religious Concerns

The National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. 300101), requires that federal agencies consider the effects of their actions on historic properties. A Class III (intensive) Cultural Resource Survey was completed by Montgomery Archaeological Consultants, Inc. (MOAC) in November of 2021 to identify and document cultural resources with potential to be impacted by alternative measures (MOAC 2021). Cultural resources include archaeological sites, historic structures, sacred sites, and traditional cultural properties (TCPs) that are important to a community's practices and beliefs, and are necessary to maintain a community's cultural identity. The 666.3-acres survey area encompassed the Area of Potential Effects, which included all access roads, staging areas, and improvements for alternatives. The survey identified 14 previously documented cultural resource sites and 20 new cultural resource sites within the Project corridor. A supplemental intensive cultural resource survey was completed in October 2022 by MOAC that encompassed 27.9 acres and a Class III Cultural Resource Survey Report was prepared in February 2023 (MOAC 2023 – Attached in Appendix E). No additional sites were documented.

The NRCS evaluated the cultural resource sites for their eligibility to the National Register of Historic Places (NRHP). Cultural resources that meet the specific criteria outlined in 36 CFR Part 60.4 for listing on the NRHP are referred to as "historic properties." The criteria for evaluating the eligibility of a cultural resources site for the listing on the NRHP is summarized as:

The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of State and local importance that possess integrity of location, design, setting, material, workmanship, feeling, and association, and that they:

- Criterion A – Associated with events that have made a significant contribution to the broad patterns of our history.
- Criterion B – Associated with the lives of significant persons in or past.
- Criterion C – Distinctive characteristics of a type, period, or methods of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

- Criterion D – Yielded or may be likely to yield information important in prehistory or history.

Table 4-14 provides a summary of sites and the NRCS NRHP eligibility determinations within the Project area based on recommendations from MOACs reports (MOAC 2021 and 2023).

Table 4-14. Documented Historic/Cultural Sites within the Project Area

Feature Name/ID	NRHP Status	Description
Site 1 (Yellowstone Feeder Canal)		
Yellowstone Feeder Canal/ 42DC2793	Eligible Criteria A & C	Irrigation canal constructed by the CCC between 1935 and 1941
Site 2 (Coyote Canal)		
Coyote Canal / 42DC4248	Not Eligible	Irrigation canal constructed by the CCC between 1935 and 1941
Site 3 (South Boneta Canal)		
South Boneta Canal / 42DC2013	Not Eligible	Irrigation canal constructed around 1910 by the South Boneta Irrigation Company.
Site 4 (Dry Gulch Class B Canal System)		
F Canal / 42DC3485	Eligible Criterion A	Irrigation canal constructed in 1910 by the Farmers Irrigation Company.
Bluebell Lateral / 42DC4249	Eligible Criterion A	Irrigation lateral constructed in 1913 by the Farmers Irrigation Company.
North I Ditch / 42DC4250	Eligible Criterion A	Irrigation ditch constructed in the 1910s around the same time as the F Canal and Bluebell Lateral.
South I Ditch / 42DC4251	Eligible Criterion A	Irrigation ditch constructed in the 1910s around the same time as the F Canal and Bluebell Lateral.
Lake Fork No. 1 Canal / 42DC3392	Eligible Criterion A	Irrigation canal constructed around 1910 by the Dry Gulch Irrigation Company.
Possible Sawmill / 42DC4252	Not Eligible	Small sawmill in operation during the early 1900s.
Square-notched Cabin / 42DC4253	Not Eligible	Log cabin constructed around 1915.
Trash Scatter / 42DC4254	Not Eligible	Domestic debris dated between 1944 and 1955.
Log Cabin / 42DC4255	Not Eligible	Log cabin constructed sometime after 1936.
Log Shed, Corral/Pen, and Chute / 42DC4256	Not Eligible	Log shed and corral constructed before 1962.
Corral / 42DC4257	Not Eligible	Corral and animal pen likely used in the 1950s.
Site 5 (Dry Gulch Class C Canal System)		
Class C Canal / 42DC1328	Eligible Criterion A	Irrigation canal constructed by the Dry Gulch Irrigation Company between 1905 and 1907.
Cabin / 42DC4258	Not Eligible	Partially complete cabin constructed sometime after 1923.
South Lateral Lake Fork Canal / 42DC4267	Eligible Criterion A	Irrigation lateral constructed in 1906 by the Dry Gulch Irrigation Company.

Feature Name/ID	NRHP Status	Description
Site 6 (Red Cap Extension Canals/Laterals)		
Lateral No. 5 / 42DC3059	Eligible Criterion A	Irrigation lateral constructed by the CCC between 1937 and 1939
Duchesne Feeder Canal / 42DC376	Eligible Criteria A & C	Irrigation canal constructed by the CCC between 1937 and 1939.
Midview Ditch / 42DC3029	Eligible Criterion A	Irrigation ditch constructed by the CCC between 1939 and 1939.
Midview Lateral / 42DC3030	Eligible Criteria A & C	Irrigation lateral constructed by the CCC between 1939 and 1939.
Red Cap Canal / 42DC3081	Eligible Criterion A	Irrigation canal constructed in the 1890s under the Uintah Indian Irrigation Project.
Moon Lake Canal / 42DC3084	Eligible Criteria A & C	Irrigation canal constructed by the CCC between 1937 and 1939
Historic Structure and Trash Scatter / 42DC3100	Eligible Criterion D	Irrigation canal constructed by the CCC between 1937 and 1939.
Abandoned Residence / 42DC3112	Eligible Criterion C	Abandoned residence constructed in the early 1900's
Corral / 42DC4259	Not Eligible	Corral with and interior pen constructed between 1923 and 1953.
Abandoned Residence / 42DC4260	Not Eligible	Single level residence constructed between 1958 and 1962.
Lateral Ditch / 42DC4261	Not Eligible	Irrigation lateral ditch constructed around 1938.
Lateral Ditch / 42DC4262	Not Eligible	Irrigation lateral ditch constructed around 1938.
Corral / 42DC4263	Not Eligible	Large corral constructed between 1968 and 1976.
Lateral Ditch / 42DC4264	Not Eligible	Irrigation lateral ditch constructed around 1938.
Trash Scatter / 42DC4265	Not Eligible	Domestic trash scatter dated between 1942 and 1969.
Site 7 (Gray Mountain Canal)		
Gray Mountain Canal / 42DC375	Eligible Criterion A	Irrigation canal constructed in 1907 as part of the Uintah Indian Irrigation Project.
Trash Scatter / 42DC4266	Not Eligible	Domestic debris dated between 1935 and 1950s.

The NRCS consulted with the SHPO on the determinations of NRHP site eligibility in letters dated December 1, 2021 and May 8, 2023 (Appendix A). The SHPO concurred with determinations of site eligibility in letters dated December 2, 2021 and May 12, 2023 (Appendix A). During the development of this Plan-EA, the Ute Tribe of the Uintah and Ouray Reservation established a THPO and associated officer to assume historic and cultural preservation authority over reservation lands, including the exterior boundaries. The NRCS consulted with the THPO on the determinations of NRHP site eligibility in letters dated November 15, 2021 and May 8, 2023 (Appendix A). The THPO concurred verbally with the determination on October 9, 2024, and

indicated that they will provide formal concurrence in writing (Appendix A). Tribal Consultation letters were also sent to comply with EO 13007, EO 13175, the American Indian Religious Freedom Act (AIRFA), and the NHPA. Letters were sent to the Ute Indian Tribe of the Uintah and Ouray Reservation Tribal Historic Preservation Office (THPO), the BIA, the Shoshone-Bannock Tribes of the Fort Hall Reservation, the Eastern Shoshone Tribe of the Wind River Reservation, Wyoming, and the Northwest Band of the Shoshone Nation on November 15, 2021, and May 8 2023 (Appendix A). Refer to Section 7.1.5 for details on tribal consultation.

4.6.3 Visual Resources

Visual landscape can be influenced by urban development, vegetation, hydraulic features, geologic conditions, wildlife, and recreation. Most of the Project area runs through existing irrigation canal system corridors and agricultural lands that do not offer scenic views. Lands within the Project area are located almost entirely within private- and Tribe-owned lands where public access to scenic views is not permitted. While the visual landscape at each site varies, all sites contain canal corridors surrounded by grassland, crop/pasture, shrubland, forested areas, developed road corridors, and/or rural residences. Please refer to Section 4.4.1 for a description of vegetative land cover types within the Project area that contribute to the visual landscape. The Project area is located primarily on gently sloping gradients within agricultural areas on mixed alluvium, colluvium, and glacial outwash sediments. The combined topography, geologic conditions, and disturbed cultivated lands do not offer unique or outstanding views.

There are two sites located outside of the agricultural lands that have more dynamic topographic conditions. These include Site 1 (Yellowstone Feeder Canal) and Site 2 (Coyoted Canal). Lands adjoining these canals are primarily undeveloped areas in a somewhat natural state with a greater visual quality. Site 1 is surrounded by hilly terrain with varying vegetative cover of primarily pinyon-juniper forest and sagebrush dominated shrubland, however, there is no public access to this canal and it is outside of the public viewshed. Site 2 is also located in hilly terrain with a section running through a canyon, and has pinyon juniper forest, sagebrush dominated shrubland, and riparian vegetation along its alignment. Portions of the Coyote Canal can be viewed from public roads and from Brown's Draw Reservoir, which is open to the public for fishing.

4.6.4 Transportation/Infrastructure

The canal systems within the Project area intersect several rural paved and dirt roads within the communities. Most roads have small amounts of traffic as they are located in rural remote areas, but some higher traffic roadways intersect the Project area. The C canal and Boneta Canal intersect Highway 87, and the Gray Mountain Canal intersects Highway 191 within the Project area extents. Intersecting roads and highways along canal alignments have bridge or culvert structures to allow vehicle crossings over these features. Roads and bridge/canal structures within the Project area are maintained by Duchesne County Road Department for county roads, the BIA for roads within the Uintah & Ouray Indian Reservation, and Utah Department of Transportation for state highways. Each responsible road department has different permits and requirements for work to be performed within their right of way (ROW).

Canal flows and impacts to culverts/roads has occurred along the canal systems in the Project area. At one location along the Coyote Canal (Site 2), the culvert and road along its intersection with Boulder Boulevard were damaged from erosion, requiring emergency repairs by Duchesne County. Other issues of note include seepage water from the Yellowstone Feeder Canal

impacting tribal roadways downstream of the canal, which were identified by tribal members and the Ute Tribe Business Committee during coordination with MLWUA.

4.6.5 Noise

Applicable noise laws for the Project area are provided in the Noise Control Act of 1972 (42 U.S.C. 4901 et seq.), amended by the Quiet Communities Act of 1978 (42 U.S.C. 4913), which promotes the development of state and local noise control programs. Duchesne County also has regulations regarding noise included in the Duchesne County Code (Duchesne County 2022b). Noise ordinances have not been established on lands within the Uintah and Ouray Indian Reservation.

Ambient noise in the Project area has not been measured, and therefore no baseline is available. General noise sources in the Project area are produced from vehicle traffic, agricultural operations, air traffic, and other general community operational noises.

Noise-sensitive receptors are those facilities, land areas, or wildlife populations that require lower noise levels for health and function. Examples include residential neighborhoods, medical facilities, schools, churches, research facilities, parks, and open space. The Project area is located in rural agricultural communities where there are no known human noise-sensitive receptors, except for rural residences. The Project area may contain various wildlife species (see Section 4.5.1) that would be sensitive to noise.

5.0 Alternatives

5.1 Project Scoping

Early in the scoping process, comments were requested from the public, tribes, organizations, and government agencies. Comments were accepted during the scoping open comment period (October 15, 2019 through November 14, 2019). The primary purpose of the scoping process was to gather input and feedback on the project's purpose and need, potential alternatives for consideration, environmental issues to be addressed in the Plan-EA, methodologies to be used to evaluate impacts, and the overall public participation process. There were six scoping comments received for the Project. Refer to Section 3.0 for additional Scoping information and the Scoping Report is included in Appendix A.

5.2 Formulation Process

The process of formulating alternatives for the project followed procedures outlined in the NRCS NWPM (NRCS 2015) Parts 500 through 506; NRCS NWPH (NRCS 2014), Parts 600 through 606; PR&G (CEQ 2013 and 2014), DM 9500-013 (USDA 2017b); and other NRCS watershed planning policy. Numerous alternatives were developed by the Project team with consideration for issues and concerns discovered during the scoping process and based on their ability to address the purpose and need of the Project. Alternatives were formulated in consideration of four criteria: completeness, effectiveness, efficiency, and acceptability. In accordance with NEPA (40 CFR 1502.14), some initial alternatives were eliminated from further analysis due to exorbitant costs, logistics, environmental reasons, or other critical factors. The project team analyzed one action alternative and one No Action Alternative in detailed study. Multiple additional alternatives were formulated but were eliminated from further study.

5.3 Decision Matrix

NRCS must identify the federally-assisted alternative that maximizes the economic, environmental, and social benefits, otherwise known as the National Economic Efficiency (NEE) Alternative. NRCS must also decide whether the selected alternative would 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 human 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 human environment, then an Environmental Impact Statement (EIS) and a Record of Decision (ROD) must be prepared and signed before the project can proceed.

5.4 Alternatives Considered but Eliminated from Detailed Study

5.4.1 Site 1 (Yellowstone Feeder Canal)

Alternatives and options formulated but eliminated from detailed study at Site 1 (Yellowstone Feeder Canal) are described below.

- Membrane Liner: Install a plastic membrane liner with a cobble and sand cover over the liner, along segments identified with high seepage potential. This alternative does not meet a minimum service life of 50 years and only provides for a minimum service life of 10 years, requiring replacement four times over the Project life. There are also damage and puncture concerns with livestock grazing operations and high wildlife traffic crossing the canal. The added replacement and O&M costs associated with this alternative resulted in a higher cost over the life of the Project with a lower cost-benefit. Due to stability issues associated with stock/wildlife crossing and higher costs over the life of the Project when compared to the proposed Action Alternative (preferred alternative) with no added benefit, this alternative was eliminated from further study. Costs and benefits for this alternative are documented in the PR&G Analysis Report included in Attachment E.
- Pipe Segments with High Density Polyethylene (HDPE): Install 60-inch HDPE along the canal alignment within high seepage areas. There are substantial risks for trash plugging pipeline inlet screens and causing canal overtopping/failure. This alternative was eliminated from detailed study because it does not meet the project goals to provide open water for wildlife/stock access and creates canal stability concerns.
- HDPE Pipeline: Install 60-inch HDPE along 10.6 miles of the canal alignment. The construction cost is estimated at $14,000,000 (2015 dollars). This alternative was eliminated from detailed study because it does not meet the project goals to provide open water for wildlife/stock access and is exorbitant, costing over 5 times more than other alternatives considered.

5.4.2 Site 2 (Coyote Canal)

Alternatives and options formulated but eliminated from detailed study at Site 2 (Coyote Canal) are described below.

- PVC Pipe: This alternative would be the same as described for the proposed Action Alternative (preferred alternative) in Section 5.5.2.2, except PVC pipe would be used

instead of HDPE. Since PVC pipe diameters of 54 or 63 inches are not possible, a dual PVC pipeline would be required. This would consist of two 36-inch diameter pipes extending for 3,528 feet and two 48-inch diameter pipes extending for 885 feet. Costs of PVC pipe are greater than the equivalent HDPE and require dual pipes which also add cost. Installation costs for this alternative were determined to be 2.3 times greater than the HDPE alternative with no added benefits. Additionally, O&M costs would be greater than the preferred alternative to maintain a dual pipeline system. Therefore, this alternative was eliminated from detailed study. Costs and benefits for this alternative are documented in the PR&G Analysis Report included in Attachment E.

- Metal Pipe: Metal pipe material was also considered similar to the PVC pipe alternative above. Metal pipe costs are more than HDPE or PVC and would result in added cost with no additional benefits as described for the PVC alternative. Therefore, this alternative was eliminated from detailed study.
- Riprap and Erosion Control: Install riprap over geotextile material along the segments of the canal with high erosion potential. This alternative does not meet a minimum service life of 50 years and only provides a minimum service life of 10 years. Additionally, it creates logistical issues for access and does not reduce water loss due to seepage. Therefore, this alternative was eliminated from detailed study.
- Dual Pipeline: Install two parallel HDPE pipelines (42-inch and 48-inch) along problematic segments of the canal alignment. The construction cost is estimated at $1,623,000. This alternative costs more than the proposed Action Alternative (preferred alternative) and does not provide additional benefit; therefore, it was eliminated from detailed study.

5.4.3 Site 3 (South Boneta Canal)

Alternatives and options formulated but eliminated from detailed study at Site 3 (South Boneta Canal) are described below.

- PVC Pipe: This alternative be would the same as described for the proposed Action Alternative (preferred alternative) in Section 5.5.2.3, except PVC pipe would be used instead of HDPE. Costs of PVC pipe are greater than the equivalent HDPE and result in installation costs 3.2 times greater than the HDPE alternative with no added benefits. Therefore, this alternative was eliminated from detailed study. Costs and benefits for this alternative are documented in the PR&G Analysis Report included in Attachment E.
- Metal Pipe: Metal pipe material was also considered similar to the PVC pipe alternative above. Metal pipe costs are more than HDPE or PVC and would result in added cost with no additional benefits as described for the PVC alternative. Therefore, this alternative was eliminated from detailed study.
- Canal Lining: Install a plastic membrane liner with cobble and sand cover in the bottom of the canal liner. This alternative does not meet a minimum service life of 50 years and only provides a minimum service life of 20 years. It does not meet the project goals of increased system pressures and does not protect against wildlife traffic damage. Therefore, this alternative was eliminated from detailed study.
- Pipe Segments: Install a polyvinyl chloride (PVC) or HDPE pipeline along portions of the canal. There are substantial risks for trash plugging pipeline inlet screens and causing canal overtopping/failure. This alternative was eliminated from detailed study because it

creates canal stability concerns, increases O&M requirements, and does not meet the project goals of increased system pressures.

- Pipe and Realign: Install HDPE pipeline along the existing and new alignments, and install irrigation control structures. This alternative has added costs for property acquisition, resulting in higher costs than the proposed Action Alternative (preferred alternative) with no added benefit, and was, therefore, eliminated from detailed study.

5.4.4 Site 4 (Dry Gulch Class B Canal System)

Alternatives and options formulated but eliminated from detailed study at Site 4 (Dry Gulch Class B Canal System) are described below.

- PVC Pipe: This alternative be would the same as described for the proposed Action Alternative (preferred alternative) in Section 5.5.2.4, except PVC pipe would be used instead of HDPE. Costs of PVC pipe are greater than the equivalent HDPE and result in installation costs 3 times greater than the HDPE alternative with no added benefits. Therefore, this alternative was eliminated from detailed study. Costs and benefits for this alternative are documented in the PR&G Analysis Report included in Attachment E.
- Metal Pipe: Metal pipe material was also considered similar to the PVC pipe alternative above. Metal pipe costs are more than HDPE or PVC and would result in added cost with no additional benefits as described for the PVC alternative. Therefore, this alternative was eliminated from detailed study.
- Canal Lining: Install a plastic membrane liner with partial or full cobble and sand cover. This alternative does not meet a minimum service life of 50 years and only provides a minimum service life of 20 years. It does not meet the project goals of increased system pressures and does not protect against wildlife and livestock traffic damage. Therefore, this alternative was eliminated from detailed study.
- Pipe Segments: Install a PVC or HDPE pipeline along select segments of the canal. This alternative does not meet the project goals of increased system pressures. There are substantial risks for trash plugging pipeline inlet screens and causing canal overtopping/failure. Therefore, this alternative was eliminated from detailed study.

5.4.5 Site 5 (Dry Gulch Class C Canal System)

Alternatives and options formulated but eliminated from detailed study at Site 5 (Dry Gulch Class C Canal System) are described below.

- PVC Pipe: This alternative would be the same as described for the proposed Action Alternative (preferred alternative) in Section 5.5.2.5, except PVC pipe would be used instead of HDPE. Since PVC pipe diameters of 72 inches are not possible, a triple PVC pipeline would be required. This would consist of three 42-inch diameter pipes extending for 28,517 feet. Costs of PVC pipe are greater than the equivalent HDPE and triple pipes also add cost. Installation costs for this alternative were determined to be 2.5 times greater than the HDPE alternative with no added benefits. Additionally, O&M costs would be greater than the proposed Action Alternative (preferred alternative) to maintain a triple pipeline system. Therefore, this alternative was eliminated from detailed study. Costs and benefits for this alternative are documented in the PR&G Analysis Report included in Attachment E.

- Metal Pipe: Metal pipe material was also considered similar to the PVC pipe alternative above. Metal pipe costs are more than HDPE or PVC and would result in added cost with no additional benefits as described for the PVC alternative. Therefore, this alternative was eliminated from detailed study.
- Canal Lining: Install a plastic membrane liner with partial or full cobble and sand cover. This alternative does not meet a minimum service life of 50 years and only provides a minimum service life of 20 years. It does not meet the project goals of increased system pressures and does not protect against wildlife and livestock traffic damage. Therefore, this alternative was eliminated from detailed study.
- Pipe Segments: Install a steel or HDPE pipeline along select segments of the canal. This alternative does not meet the project goals of increased system pressures. There are substantial risks for trash plugging pipeline inlet screens and causing canal overtopping/failure. Therefore, this alternative was eliminated from detailed study.

5.4.6 Site 6 (Red Cap Extension Canals/Laterals)

Alternatives and options formulated but eliminated from detailed study at Site 6 (Red Cap Extension Canals/Laterals) are described below.

- PVC Pipe: This alternative be would the same as described for the proposed Action Alternative (preferred alternative) in Section 5.5.2.6, except PVC pipe would be used instead of HDPE. Costs of PVC pipe are greater than the equivalent HDPE and result in installation costs 2.6 times greater than the HDPE alternative with no added benefits. Therefore, this alternative was eliminated from detailed study. Costs and benefits for this alternative are documented in the PR&G Analysis Report included in Attachment E.
- Metal Pipe: Metal pipe material was also considered similar to the PVC pipe alternative above. Metal pipe costs are more than HDPE or PVC and would result in added cost with no additional benefits as described for the PVC alternative. Therefore, this alternative was eliminated from detailed study.
- Pipeline with Pump Station: Install HDPE pipelines along segments of the canals/laterals ranging from 8 to 48 inches and construct a centralized pump station. The construction cost is estimated at $9,486,000 and annual O&M costs are estimated at $260,000. This alternative increase shareholder costs due to pumping, increases O&M costs, and has logistical issues with management of one pump station involving multiple entities/agencies. Additionally, it costs more than the proposed Action Alternative (preferred alternative) with no added benefit. Therefore, this alternative was eliminated from detailed study.
- Line with Concrete: Install a geomembrane liner with shotcrete or concrete, 3 inches thick. This alternative does not meet the project goals of increased system pressures or meet the capabilities to use the full water right and was eliminated from detailed study.

5.4.7 Site 7 (Gray Mountain Canal)

Alternatives and options formulated but eliminated from detailed study at Site 7 (Gray Mountain Canal) are described below.

- Membrane Liner Option 1: Install a plastic membrane liner with a cobble and sand cover over the liner, along segments identified with high seepage potential (approximately 13,926 feet or 2.64 miles). This alternative does not meet a minimum service life of 50 years and only provides for a minimum service life of 20 years, requiring replacement twice over the Project life. The added replacement and O&M costs associated with this alternative resulted in a higher cost over the life of the Project with a lower cost-benefit. Therefore, this alternative was eliminated from further study. Costs and benefits for this alternative are documented in the PR&G Analysis Report included in Attachment E.
- Membrane Liner Option 2: Install a plastic membrane liner with cobble and sand cover in the bottom of the canal along 35,000 linear feet (6.6 miles) with a bottom cover or a full cover. The construction costs for this alternative are substantially more than the proposed Action Alternative (preferred alternative) at $13,755,000 for the bottom cover and $16,890,000 for the full cover. This alternative does not meet a minimum service life of 50 years and only provides a minimum service life of 20 years. This would require replacement twice over the Project life and result in at minimum, triple the cost over the project life. Because certain segments of the canal have much lower seepage rates, lining those segments was determined to not provide enough benefit to substantiate the cost. It also does not protect against wildlife or livestock traffic damage. Therefore, this alternative was eliminated from detailed study.
- Slip Lined Concrete: Install a slip lined concrete canal liner along 35,000 linear feet (6.6 miles) of the canal. The construction cost is over five times more than the proposed Action Alternative (preferred alternative) at $19,010,000 and it does not meet a minimum service life of 50 years, only providing a minimum service life of 25 years. Similar to the Membrane Liner Option 2 above, the high cost, the additional replacement cost, and lining areas with lower seepage rates result in costs that would be greater than the benefit. Therefore, it was eliminated from detailed study.
- HDPE and Steel Pipeline: Install two parallel pipes consisting of a 63-inch HDPE pipe and 84-inch steel pipe. The construction cost estimate for this alternative was exorbitant at $51,720,000, and it was eliminated from detailed study.
- Steel Pipeline: Install a 108-inch diameter steel pipe along the canal. The construction cost estimate for this alternative was exorbitant at $52,340,000, and it was eliminated from detailed study.

5.4.8 Phreatophyte Management Alternative (Nonstructural Alternative)

An alternative to manage phreatophytes along the canal systems was explored. Removing problematic phreatophyte species would provide some water savings, but these measures do not meet the purpose and need of the Project. The measures do not improve system reliability and safety, improve water quality, provide pressurized irrigation capabilities, nor reduce problematic and costly O&M issues in the current system. Water would continue to be lost from canal seepage and this seepage would continue to degrade water quality. Management of phreatophyte species would require a long-term large O&M commitment. Removal of phreatophyte species would be needed along a wide buffer from 20 feet to 200 feet from the canal alignment, depending on the site conditions, and expand onto many private lands/farmlands. Private landowners would have to give up their farming practices and vegetation management of their lands for this alternative, which is an unreasonable expectation. Based on the alternative not meeting the purpose and

need and impracticable landowner permission requirements, this alternative was determined unreasonable and eliminated from detailed study.

5.5 Alternatives Considered for Detailed Study

The alternatives considered in detailed study at each of the seven sites are described in Sections 5.5.1 and 5.5.2 below. These include a No Action Alternative and Action Alternative. The cost estimates for the alternatives provide a level of detail judged appropriate for the purpose of identifying the NEE Alternative among the alternatives considered. Project costs provided for alternatives selected for detailed study include installation and O&M costs. Installation costs include costs to be incurred for installing the works of improvement after the Project is authorized for installation. Installation costs include, as applicable, construction, engineering, real property rights, natural resource rights, permitting, replacement in-kind relocation payments, and Project administration costs (NRCS 2015). A further breakdown of Project installation costs for alternatives included in detailed study is provided in Section 5.7, Table 5-5. Detailed construction cost estimates are provided in Appendix D.

5.5.1 No Action Alternative

The No Action Alternative considers the actions that would take place if no federal action or federal funding were provided for the Project. The SLO's most likely course of action at each of the seven sites without federal involvement is listed below. To support the economic evaluation, the No Action Alternative operation and maintenance (O&M) costs at each site were estimated over a 50-year project life and an approximate yearly cost determined.

- Site 1 (Yellowstone Feeder Canal): No measures would be installed and the sponsor would maintain O&M operations along the canals to maintain the current system at a cost of approximately $17,600 per year.
- Site 2 (Coyote Canal): No measures would be installed and the sponsor would maintain O&M operations along the canals to maintain the current system. This would include measures to stabilize and/or repair problematic sections of the canal over the project life at a cost of approximately $16,600 per year.
- Site 3 (South Boneta Canal): No measures would be installed and the sponsor would maintain O&M operations along the canals to maintain the current system at a cost of approximately $8,600 per year.
- Site 4 (Dry Gulch Class B Canal System): No measures would be installed and the sponsor would maintain O&M operations along the canals to maintain the current system at a cost of approximately $22,800 per year.
- Site 5: Dry Gulch Class C Canal System: No measures would be installed and the sponsor would maintain O&M operations along the canals to maintain the current system at a cost of approximately $63,700 per year.
- Site 6: Red Cap Extension Canals/Laterals: No measures would be installed and the sponsor would maintain O&M operations along the canals to maintain the current system at a cost of approximately $41,800 per year.

- Site 7: Gray Mountain Canal No measures would be installed and the sponsor would maintain O&M operations along the canals to maintain the current system at a cost of approximately $51,000 per year.

5.5.2 Proposed Action Alternative

The Action Alternative considers the actions that would take place at each of the seven sites for improvements to meet the Project purpose and need, and specific goals for each irrigation system. Improvements are anticipated to function successfully and provide benefits to the Eastern Duchesne Watershed for 50 years, incorporating proper O&M. The measures proposed are anticipated to reduce seepage due to infiltration by approximately 41,190 ac-ft per year and extend irrigation capabilities to 2,422 acres of tribal land, providing full use of the tribes existing water shares. Reduced canal seepage is anticipated to improve the water quality and quantity in the watershed, increase water availability for irrigation, and improve water delivery efficiency. A summary of the water savings achieved through implementation of alternative measures for each of the irrigation systems is provided in Table 5-1 below.

For piping measures, HDPE pipe was selected for use because it is the least cost material with the greatest durability and longest lifespan. The HDPE provides a leak free connection as opposed to other piping materials that use gaskets and gluing sealants. It also can withstand higher pressures than other piping materials and has decreased risk for failure.

Alternative measures incorporate avoidance and minimization measures as necessary to avoid and reduce impacts to resources. The alternative also incorporates mitigating measures for adverse impacts to resources that cannot be avoided. See Section 8.3 for avoidance, minimization, and mitigation measures incorporated into the alternative action.

Table 5-1. Action Alternative Canal Seepage Reduction

Site No.	Site Name	Annual Amounts (ac-ft)		
		Existing Seepage	Proposed Seepage	Action Alternative Water Savings
Site 1	Yellowstone Feeder Canal	2,960	1,102	1,858
Site 2	Coyote Canal	591	288	303
Site 3	South Boneta Canal	812	0	812
Site 4	Dry Gulch Class B Canal System	20,172	854	19,318
Site 5	Dry Gulch Class C Canal System	4,662	0	4,662
Site 6	Red Cap Extension Canals/Laterals	4,784	0	4,784
Site 7	Gray Mountain Canal	12,721	3,268	9,453
Total		**46,702**	**5,512**	**41,190**

Source: JDE 2020, 2021a, and 2021b; FCE 2021a, 2021b, 2021c, 2021d, in Appendix E: calculations provided by JDE.

Construction access for all improvements would follow the existing irrigation company access roads, where provided. Entrance into the Project area for improvements would be from existing road ROWs and access roads, where available. Improvements to access roads (grubbing, grading, placement of gravel, etc.) or new access roads would be required within the existing irrigation company ROWs as needed, to provide appropriate construction equipment/vehicle access. Staging would occur within the irrigation company ROWs as needed. Areas temporarily

disturbed from staging would be restored after construction completion. New access roads would be left in place, where applicable, to maintain appropriate canal O&M access. Maps depicting access are included in Appendix B – Maps B 4.1 through B 4.6.

Materials and soil to construct project measures would be obtained and purchased from offsite permitted facilities or native soil produced from excavation activities would be used. Excess native soil from canal bank reshaping and pipe trench excavation would be saved and stockpiled onsite for use as backfill, where appropriate. If excess soil/materials cannot be spread and distributed within the irrigation company ROWs, they would be disposed of at an appropriate offsite permitted facility. No dumping of soil/materials would occur outside of existing irrigation company ROWs or approved permitted facilities.

Any existing canal segments intercepting flood flows would remain unchanged and continue to intercept these flows. Therefore, there are no anticipated changes to flooding conditions from alternative measures.

The total installation cost for the measures is $41,049,000 and includes $33,302,000 for construction, $6,662,000 for engineering, $86,000 for permitting, $89,000 for real property rights, and $910,000 for administration. Annual O&M cost would decrease substantially after installation of alternative measures. Installation measures and costs for each individual irrigation system are described below.

5.5.2.1 Site 1 (Yellowstone Feeder Canal)

Canal Lining Measures

Ten sections of the Yellowstone Feeder Canal totaling approximately 13,926 linear feet would be reshaped as needed to provide consistent cross sections and lined with concrete. Base material would be compacted in modified sections of the canal for stabilization and a composite impermeable geomembrane placed. Shotcrete would then be sprayed over the lining or cast-in-place concrete placed at a 3-inch thickness. Minor adjustments to the canal alignment would be performed to minimize bends within the liner sections, but the new alignments would stay within the existing canal ROW. Disturbed areas would be stabilized and/or revegetated, as appropriate. Modified channel sections would be designed for a maximum flow of 90 cfs. Concrete cutoff walls at the beginning and end of each segment of lining would be included, as well as riprap for energy dissipation and erosion control to the earthen channel. Improvements are depicted in Appendix B – Map B4.1. The proposed measures are anticipated to reduce canal seepage by approximately 1,858 ac-ft of water per year, reduce the bank erosion/bank failure issues, and maintain the stock/wildlife watering access on Ute Indian Tribe lands.

Construction Staging and Access

Construction access would use the existing canal access road adjoining the Yellowstone Feeder Canal. Improvements to the existing access road would be performed as needed for construction equipment access. Improvements may include grubbing, grading, or placement of gravel. A new approximately 1,033-foot-long gravel access road would be installed for construction access to the eastern-most modified canal segment and be left in place for permanent O&M access after construction is completed. Construction staging would take place along the existing canal ROW within areas proposed for disturbance as part of the canal lining measures.

Schedule

These measures would be constructed over one to two seasons and occur outside of the irrigation delivery season or storage flow windows between December and April of 2025 and 2026.

Costs

Installation costs for these measures are estimated at $3,082,000, which include construction ($2,499,000), engineering ($500,000), permitting ($8,000), and administration ($37,500 for Sponsor and $37,500 for NRCS). The cost of O&M is estimated at $1,700 per year.

5.5.2.2 Site 2 (Coyote Canal)

Piping and Channel Stabilization Measures

Approximately 4,413 linear feet of the existing open channel would be piped along the canal alignment and the diversion structure replaced at the canal headgate. A dissipation structure would be constructed at the pipe outlet. HDPE 54-inch pipe would be installed along approximately 3,528 linear feet and 63-inch diameter HDPE pipe would be installed along approximately 885 linear feet to convey 90 cfs while remaining in open channel flow (non-pressurized). The pipe would be installed along the existing channel alignment and backfilled with native material. The ground surface would be graded to match the surrounding ground elevations and disturbed areas would be stabilized and/or revegetated, as appropriate.

Riprap would be placed for grade stabilization as needed. The ground surface would be restored to match the surrounding ground elevations, and seeded/hydroseeded, where appropriate, with an NRCS-approved seed mix. Approximately 477 linear feet of canal would be graded and stabilized by placement of riprap to reduce erosion. Improvements are depicted in Appendix B – Map B4.1. Measures are anticipated to reduce canal seepage by approximately 303 ac-ft of water per year and reduce channel erosion and sedimentation of Brown's Draw Reservoir by approximately 380 cubic yards annually.

Construction Staging and Access

Two new access roads would be installed for construction access and left in place for O&M access after construction is completed. One approximately 970-foot-long gravel access road would be installed from Boulder Boulevard to the canal diversion along the canal ROW. Another approximately 2,900-foot-long gravel access road would be installed from a gravel road off Boulder Boulevard to the proposed dissipation structure at the new pipeline outfall along the canal ROW. Construction access would follow the areas proposed for disturbance to install the pipeline. Construction access for the grade stabilization measures would follow an existing gravel road and a new ingress/egress installed into the canal. The new ingress/egress would be constructed within the proposed disturbance boundary from installation of the grade stabilization measures. Construction staging would take place along the existing canal ROW within areas proposed for disturbance as part of the pipeline installation and grade stabilization measures.

Schedule

These measures would be constructed over one season and occur outside of the irrigation season from March to May of 2025.

Costs

Installation costs for these measures are estimated at $1,803,000, which include construction ($1,460,000), engineering ($292,000), permitting ($7,000), and administration ($22,000 for Sponsor and $22,000 for NRCS). The cost of O&M is estimated at $600 per year.

5.5.2.3 Site 3 (South Boneta Canal)

Piping Measures

Approximately 12,883 linear feet of the existing open canal would be piped with 22-inch diameter HDPE and a pressure reducing valve installed. The existing rock diversion at Lake Fork River would be improved as needed at its existing location. The existing headgate would be replaced, and a new pipe intake installed. The pipeline will terminate with an energy dissipation structure into the existing pond. Improvements are depicted in Appendix B – Map B4.2. These measures would provide a pressurized irrigation system designed to meet NRCS National Engineering Handbook (NEH) guidelines (NRCS 1997 and 2016b) and NRCS Conservation Practice Standards (CPS) for sprinkler irrigation (NRCS 2020). The pipe would be installed along the existing canal channel alignment and backfilled with native material. The ground surface would be graded to match the surrounding ground elevations and disturbed areas would be stabilized and/or revegetated, as appropriate. Measures are anticipated to reduce canal seepage by approximately 812 ac-ft of water per year.

Construction Staging and Access

Construction access to the canal ROW would use the existing canal access roads. Existing access roads would be improved as needed for construction equipment access. Improvements may include grubbing, grading, or placement of gravel. Construction access would follow the areas proposed for disturbance to install the pipeline. Three new permanent gravel access roads would be installed, with lengths of approximately 20 feet, 95 feet and 80 feet, from 17545 W Street to the proposed pipeline. Construction staging would take place along the existing areas proposed for disturbance as part of the pipeline installation measures.

Schedule

These measures would be constructed over one season and occur outside of the irrigation season from February 2025 to April of 2025.

Costs

Installation costs for these measures are estimated at $803,000, which include construction ($646,000), engineering ($130,000), permitting ($8,000), and administration ($9,500 for Sponsor and $9,500 for NRCS). The cost of O&M is estimated at $1,600 per year.

5.5.2.4 Site 4 (Dry Gulch Class B Canal System)

Piping Measures

A total of approximately 79,293 linear feet (15.0 miles) of HDPE pipe with four pressure reducing valves (PRVs) would be installed (Table 5-2). Three new pipe inlet structures would be constructed at the pipeline intakes and a control structure installed at one pipeline split location. Some segments of the pipeline would have a drain or outlet, and one terminates at an existing pond. Outlets and drains will be designed with energy dissipation for erosion control. Improvements are depicted in Appendix B – Map B4.3. These measures would provide a

pressurized irrigation system designed to meet NEH guidelines (NRCS 1997 and 2016b) and NRCS CPS for sprinkler irrigation (NRCS 2020). Pipes would be installed primarily along the existing canal ROWs with the exception of 85.4 acres of land that would require a new easement (Appendix C – Map C7.1 and C7.2). Approximately 24,837 linear feet of existing canal would be backfilled in areas where the new pipelines follow or intersect the existing canal sections. These segments, in addition to approximately 48,943 linear feet of other undisturbed canal segments, would no longer flow irrigation water. In backfilled canal segments, the ground surface would be restored to match the surrounding ground elevations. Disturbed areas would be stabilized and/or revegetated, as appropriate. Measures are anticipated to reduce canal seepage by approximately 19,318 ac-ft of water per year.

Table 5-2. Site 4 Proposed HDPE Piping

Pipe Diameter (inches)	Pipe Length (feet)	Pipe Diameter (inches)	Pipe Length (feet)
8	3,634	24	3,063
10	10,093	28	3,803
12	1,670	30	6,800
16	10,495	32	2,641
18	5,078	34	6,394
20	9,625	36	3,855
22	2,697	42	9,445
Total Pipe Length 79,293 feet			

Construction Staging and Access

Construction access to the canal ROW would use the existing canal access roads, where available, and improvements to existing access are not anticipated. Construction access would follow the areas proposed for disturbance to install the pipeline. Four new gravel access roads would be constructed including: An approximate 1,300-foot-long road installed from 7000 N Street to the new pipe inlet structure at the northern site extent; an approximate 450-foot-long road installed from N 12750 W to a new pipe inlet structure in the central portion of the site; an approximate 35-foot-long Road from 7000 N Street to the pipeline; and an approximate 110-foot-long access road installed from W 2000 N to a new PRV at the southern site extent. Construction staging would take place along the existing areas proposed for disturbance as part of the pipeline installation measures.

Schedule

These measures would be constructed over two seasons and occur outside of the irrigation season (November through April) of 2025 through 2027.

Costs

Installation costs for these measures are estimated at $5,941,000, which include construction ($4,810,000), engineering ($962,000), permitting ($25,000), real property rights ($48,000), and administration ($48,000 for Sponsor and $48,000 for NRCS). The cost of O&M is estimated at $9,600 per year.

5.5.2.5 Site 5 (Dry Gulch Class C Canal System)

Piping Measures

Approximately 33,292 feet (6.3 miles) of HDPE pipe with one PRV would be installed, and an inlet structure constructed at the pipe intake, to provide adequate pressure for shareholders and efficiently convey water to the irrigation pond at its downstream extent (Table 5-3). Energy dissipation at the outlet of the pipeline would be installed, as needed. Improvements are depicted in Appendix B – Map B4.4. This would provide a pressurized irrigation system designed to meet NRCS NEH guidelines (NRCS 1997 and 2016b) and NRCS CPS for sprinkler irrigation (NRCS 2020). The piping measures would also remove the slope failure issues along the steep hillside section of canal. The pipeline would be realigned from the canal alignment to minimize the length of pipe needed in areas. Pipes would be installed primarily along the existing canal ROWs with the exception of 6.34 acres of land that would require a new easement (Appendix C – Map C7.3). Approximately 31,562 linear feet of the existing canal would be backfilled in areas where the new pipelines follow or intersect the existing canal sections. In these areas, the ground surface would be restored to match the surrounding ground elevations. Disturbed areas would be stabilized and/or revegetated, as appropriate. Measures are anticipated to reduce canal seepage by approximately 4,662 ac-ft of water per year.

Table 5-3. Site 5 Proposed HDPE Piping

Pipe Diameter (inches)	Pipe Length (feet)
8	1,404
10	1,200
12	1,971
16	200
72	28,517
Total	**33,292**

Construction Staging and Access

Construction access to the canal ROW would use existing roads. Construction access would follow the areas proposed for disturbance to install the pipeline. Approximately 1,340 feet of an existing access road would be improved as needed from 11000 W Street to a new pipe inlet structure, located at the upstream (western) site extent. Improvements may include grubbing, grading, or placement of gravel. Construction staging would take place along the existing areas proposed for disturbance as part of the pipeline installation measures.

Schedule

These measures would be constructed over a single season and occur outside of the irrigation season from October 2025 to April of 2026.

Costs

Installation costs for these measures are estimated at $15,793,000, which include construction ($12,834,000), engineering ($2,566,000), permitting ($8,000), real property rights ($4,000), and

administration ($190,500 for Sponsor and $190,500 for NRCS). The cost of O&M is estimated at $4,000 per year.

5.5.2.6 Site 6 (Red Cap Extension Canals/Laterals)

Piping Measures

Approximately 106,161 linear feet (20.1 miles) of HDPE pipeline would be installed (Table 5-4) to efficiently convey water as well as provide additional pressure for shareholders. A new pipe inlet structure would be constructed at the pipeline intake and the adjoining wasteway reconstructed to stabilize the canal. The pipeline will terminate at an existing pond and energy dissipation and pressure reduction would be provided to stabilize the transition from pipe to open water. Improvements are depicted in Appendix B – Map B4.5. This would provide a pressurized irrigation system to meet NRCS NEH guidelines (NRCS 1997 and 2016b) and NRCS CPS for sprinkler irrigation (NRCS 2020). Pipeline would be realigned from the canal alignments in areas to minimize the length of pipe needed. Pipes would be installed primarily along the existing canal ROWs with the exception of 66.47 acres of land that would require a new easement. Approximately 54,080 linear feet of the existing canal would be backfilled in areas where the new pipelines follow or intersect the existing canal sections. These segments, in addition to approximately 80,426 linear feet of other undisturbed canal segments, would no longer flow irrigation water. In backfilled canal segments, the ground surface would be restored to match the surrounding ground elevations. Disturbed areas would be stabilized and/or revegetated, as appropriate. Measures are anticipated to reduce canal seepage by approximately 4,784 ac-ft of water per year.

Table 5-4. Proposed HDPE Piping

Pipe Diameter (inches)	Pipe Length (feet)	Pipe Diameter (inches)	Pipe Length (feet)
8	7,899	26	1,929
12	4,823	28	4,523
16	6,834	36	6,507
18	758	42	6,345
20	24,720	48	9,094
24	32,729		
Total Pipe Length 106,161 feet			

Construction Staging and Access

Construction access to the canal ROW would use existing roads. Construction access would follow the areas proposed for disturbance to install the pipeline. Existing access roads would be improved as needed for construction equipment access. Improvements may include grubbing, grading, or placement of gravel. Two new gravel access roads would be installed (one approximately 30-foot-long and one 40-foot-long) from W 6000 S Street to the new pipeline alignment, located at the western edge of the new pipeline. Construction staging would take place along the existing areas proposed for disturbance as part of the pipeline installation measures.

Schedule

These measures would be constructed over two seasons and occur outside of the irrigation season from October 2025 to April of 2027.

Costs

Installation costs for these measures are estimated at $9,258,000 which include construction ($7,506,000), engineering ($1,502,000), permitting ($25,000), real property rights ($37,000), and administration ($94,000 for Sponsor and $94,000 for NRCS). The cost of O&M is estimated at $12,800 per year.

5.5.2.7 Site 7 (Gray Mountain Canal)

Canal Lining Measures

Three sections of the Gray Mountain Canal totaling approximately 10,475 linear feet would be reshaped as needed to provide consistent cross sections and lined with concrete. Base material would be compacted in modified sections of the canal for stabilization as necessary and a composite impermeable geomembrane placed. Shotcrete would then be sprayed over the lining or cast-in-place concrete placed at a 3-inch thickness. Minor adjustments to the canal alignment would be performed to minimize bends within the liner sections, but the new alignments would stay within the existing canal ROW. End treatments for the canal lining will include concrete cutoff and riprap to transition flow and velocity to the existing earthen channel. Disturbed areas would be stabilized and/or revegetated, as appropriate. Modified channel sections would be designed for a maximum flow of 250 cfs which incorporate a 10% flow safety factor. Improvements are depicted in Appendix B – Map B4.6. Measures are anticipated to reduce canal seepage by approximately 9,453 ac-ft of water per year.

Construction Staging and Access

Construction access to the canal ROW would use existing roads and no road improvements or new access roads are anticipated. Construction staging would take place along the existing areas proposed for disturbance as part of the canal lining measures.

Schedule

These measures would be constructed over a single season and occur outside of the irrigation season from mid-October 2025 to April of 2026.

Costs

Installation costs for these measures are estimated at $4,369,000, which include construction ($3,547,000), engineering ($710,000), permitting ($5,000), and administration ($53,500 for Sponsor and $53,500 for NRCS). Costs for O&M are estimated at $1,300 per year.

5.6 National Economic Efficiency Alternative

Alternatives were compared to select one alternative that “best” maximized public benefits (environmental, economic, and social goals) with appropriate consideration of costs, guiding principles, the federal objective, PL 83-566 general purposes, and ecosystem services. This alternative is known as the NRCS National Economic Efficiency (NEE) Alternative. The NEE Alternative for the Project was determined to be the Action Alternative for concrete canal lining and piping with HDPE based on the alternative analysis performed. A PR&G Analysis was

completed in support of decision making for the NEE Alternative and is included in Appendix E. The NEE Alternative was also determined to be the locally preferred, environmentally preferred, and socially preferred alternative (see the PR&G Analysis in Appendix E).

5.7 Summary and Comparison of Alternative Plans

The alternatives proposed for consideration and analyzed in detail in this Plan-EA have been compared against each other to discern the merits and disadvantages of each alternative. This includes a side-by-side comparison of environmental, social, and economic effects. A summary of effects for resource concerns is provided in Table 5-5. Ecosystem service effects overlap with the resource concerns effects, but have been broken out separately in Table 5-6. The PR&G Analysis Report (included in Appendix E) provides an individual ecosystem service framework for each of the seven Sites for improvement. For ease of comparison, effects of ecosystem services in Table 5-6 have been simplified to include an overall summary of combined effects from all seven Sites. The ecosystem services focus on long-term effects while resource concerns include a description of short-term and long-term effects. The detailed analysis of environmental consequences for each alternative that support the summaries in Table 5-5 and Table 5-6 is provided in Section 6.0.

Table 5-5. Summary and Comparison of Alternative Plans – Resource Concerns

Resource Concern	No Action Alternative	Action Alternative
Upland Erosion	Direct adverse effects from erosion issues along Yellowstone Feeder Canal (Site 1), the wasteway at the Red Cap Canal (Site 6), and along Coyote Canal (Site 2) would continue over the long term. Adverse erosion effects to Site 1 and 6 would be minor and to Site 2 would be moderate.	Increased erosion potential is anticipated on disturbed areas during construction. Impacts would be offset through implementation Best Management Practices (BMPs) that would be installed during and after construction and restoration/ stabilization of disturbed areas after construction completion. Direct benefits from reduced erosion are anticipated over the long term. Benefits at Site 1 and 6 would be minor and benefits at Site 2 would be moderate.
Sedimentation	Direct adverse sedimentation conditions would remain for all canals over the long term. The Coyote Canal (Site 2) effects are moderate contributing 9.42 ac-ft sedimentation into Brown's Draw Reservoir with an additional 6.76 ac-ft more anticipated over the next 20 to 30 years. All other canals would have minor adverse sedimentation effects.	Direct long-term benefits are anticipated that would reduce sedimentation within the canal systems. All canals would experience minor benefits except for Coyote Canal (Site 2), which would have moderate benefits from reduction of 6.76 ac-ft of sedimentation into Brown's Draw Reservoir.

Resource Concern	No Action Alternative	Action Alternative
Prime and Unique Farmlands	There would be no change from existing conditions and no disturbance to prime and unique designated soils above what is currently experienced.	Temporary disturbance on 78.2 acres and permanent disturbance on 1.6 acres of soil classified as prime or unique would occur. Temporarily disturbed soils would be restored upon construction completion. Permanent impacts would be negligible based on avoidance/minimization measures, minimal effected lands at 0.025% of farmland of statewide importance within the watershed, and the results of the farmland conversion impact rating. Long-term benefits to prime and unique farmlands are anticipated from restored irrigation capabilities provided to 627 acres of soils classified as “prime farmland if irrigated,” “prime farmland if irrigated and reclaimed of excess salts and sodium,” and “farmland of statewide importance.”
Surface Water/ Groundwater Quality	Direct adverse effects to water quality would remain over the long term from canal seepage introducing TDS into shallow groundwater and into streams within the watershed, increasing salinity.	Construction impacts would be negligible based on implementation of construction BMPs and activities would not violate federal or state water quality rules/regulations. Alternative measures would reduce salinity loads into surface water and groundwater by approximately 5,394 tons annually. This is anticipated to have a direct moderate beneficial effect that would improve surface water and groundwater quality within the watershed and to downstream receiving waters over the long term.
Surface Water Quantity and Flow	Direct adverse effects to surface water quantities would continue from canal seepage, and phreatophyte/agricultural consumptive use resulting in decreased river flows. Climate change stressors would continue to impact water availability.	Long-term benefits are anticipated from decreased canal seepage and phreatophyte water consumption that would increase surface water quantities in the natural stream systems and irrigation systems during the irrigation season (April through October). A net accretion is anticipated from a reduction in consumptive use. Water conservation measures would increase resilience to climate change stressors to better adapt to the projected heightened water variability.
Groundwater Quantity	Canal water seepage would continue to directly contribute to the shallow groundwater table over the long term, which flows downgradient into natural stream systems.	Reduced canal seepage would have a negligible change to groundwater recharge; however, minor fluctuations in localized shallow groundwater elevations along piped/lined canal segments could occur.

Resource Concern	No Action Alternative	Action Alternative
Waters of the U.S. including wetlands	Water quality and quantity would continue to have adverse effects to waters of the U.S. in and downstream of the watershed over the long term.	Moderate direct short-term impacts are anticipated from temporary disturbance in 23.02 acres of wetland, 0.79 acres of pond, and 1,634 linear feet of natural streams, but these areas would be restored after construction completion. Permanent direct impacts to wetlands would be negligible at 0.01 acres. Permanent direct impacts would occur along 152,653 linear feet of canals for canal lining and piping measures. Long-term indirect impacts from reduction of artificial wetlands hydraulically connected to canals are anticipated. However, this would be offset from improved water quality and quantity of natural waters of the U.S. in and downstream of the watershed over the long term.
Air Quality	There would be no change to air quality conditions.	Short-term increase in emissions concentrated around the construction sites are anticipated. Construction activities would not violate air quality standards and emissions are not expected to exceed the EPA de minimis criteria for the General Conformity regulations. BMPs would be implemented, as needed, and short-term impacts would be negligible. There would be no long-term impacts to air quality.
Vegetation Communities	There would be no impacts to vegetation communities.	Temporary disturbance to 231.60 acres of vegetated areas would occur but these areas would be restored upon construction completion. Permanent removal of 2.23 acres of vegetated areas would occur from construction of new access roads. However, this would be offset from conversion of approximately 19.34 acres of open canal systems to vegetated areas. Moderate direct short-term impacts from lack of vegetative cover are anticipated for the first year until the new vegetation becomes established. Long-term direct impacts would occur from permanent changes to vegetation communities, but would be minor based on revegetation efforts and net increase of vegetated areas within the Project area.

Resource Concern	No Action Alternative	Action Alternative
Special Status Plant Species	There would be no change to habitat and no impacts to special status species would occur.	Alternative measures would result in permanent loss of approximately 205 ULTs and 16.3 acres of suitable occupied habitat from construction disturbance and/or dewatering through eliminating canal seepage. This is anticipated to result in moderate direct impacts to ULT over the short term. Avoidance and minimization measures would be implemented during and after construction. Unavoidable impacts would be mitigated through contributions to the ULT Conservation Fund and direct long-term impacts would be minor. A BA with a determination of may affect, likely to adversely affect for the species (included in Appendix E) was submitted to the USFWS to comply with Section 7 of the ESA and a Biological Opinion (BO) was issued with a concurrence of the determination on January 29, 2025 (included in Appendix A).
Noxious Weeds and Invasive Plants	No activities are planned and the potential for establishment of weeds would remain the same.	Short-term direct impacts would occur during construction and until reestablishment of vegetative cover that would put the area at risk for invasion of noxious weeds and invasive plants. A Post Construction Rehabilitation Plan (PCRP) would be developed, and short-term impacts would be minor with implementation of BMPs and development of a PCRP. Long-term impacts are not anticipated.
Riparian Areas	There would be no changes to riparian areas.	Approximately 4.12 acres of riparian areas would be disturbed for installation of alternative measures. Larger trees would be avoided to the greatest extent possible to preserve mature riparian vegetation. Disturbed areas would be restored upon construction completion. Minor direct short-term impacts from removal of riparian vegetation are anticipated until the new vegetation becomes established. Long-term impacts would occur from permanent changes converting artificial riparian areas to upland vegetated areas, but would be minor to negligible based on restoration efforts, abundant natural higher quality riparian areas available in the watershed, and minimal conversion of artificial riparian areas to upland.

Resource Concern	No Action Alternative	Action Alternative
Fish and Wildlife	There would be no change to fish/wildlife or associated habitat. Degradation of water quantity and quality in the natural stream systems would continue to have a direct adverse effect to aquatic species and habitat in and downstream of the watershed over the long term.	Approximately 231.60 acres of terrestrial habitat would be temporarily disturbed but would be restored upon construction completion. Permanent removal of 2.23 acres of terrestrial habitat would occur from construction of new access roads, but would be offset from an increase of 19.34 acres of new terrestrial habitat from piping of open canal systems. Minor reduction to artificial low-quality habitat would occur from canal modifications but is not anticipated to have a measurable long-term impact to fish/aquatic species. Temporary activities performed in Lake Fork River at the existing irrigation structure would have short-term direct impacts during construction that would be minor based on the limited amount of modification required. Long-term direct benefits to fish/aquatic species and habitat is anticipated within the natural stream corridors in and downstream of the watershed from increased water quantity and improved water quality.

Resource Concern	No Action Alternative	Action Alternative
Special Status Animal Species	There would be no change to habitat or to special status species. Degradation of water quantity and quality in the natural stream systems would continue to have a direct adverse effect to ESA-listed fish species/Utah SGCN and critical habitat/suitable habitat downstream of the watershed over the long term.	One ESA-listed Candidate insect species, monarch butterfly, could occur in the Project area. Based on construction timing (October through May) impacts to the species are not anticipated. Monarch butterfly suitable habitat would be disturbed from alternative actions, but these areas would be restored upon construction completion and no long-term impacts to the species or suitable habitat are anticipated. State-listed SGCN have the potential to be impacted from alternative actions. Short-term impacts would be minor to negligible based on preconstruction surveys and implementation of avoidance and minimization measures. No Long-term adverse impacts to SGCN are anticipated. Long-term direct benefits to ESA/SGCN fish species and associated designated critical habitat/suitable habitat that occur downstream of the Project area are anticipated from increased water quantities and improved water quality for the downstream receiving waters. A BA was prepared determining the action would: not likely jeopardize the continued existence of the monarch butterfly; may affect but is not likely to adversely affect bonytail chub, Colorado Pikeminnow, humpback chub, and razorback sucker (Colorado River fish); may affect but would not adversely modify critical habitat for Colorado River fish (included in Appendix E). The BA was submitted to the USFWS to comply with Section 7 of the ESA and a BO was issued with a concurrence of the determination on January 29, 2025 (included in Appendix A).
Migratory Birds/Bald and Golden Eagles	There would be no change to habitat and no impacts to migratory birds or eagles.	Migratory birds and bald/golden eagles could be present in the Project area. Preconstruction surveys would be performed, and spatial buffers would be established as necessary in coordination with USFWS and NRCS. Based on the short duration of construction, timing of construction (October through May), and implementation of avoidance/ minimization measures, short-term direct construction impacts are expected to be minor.

Resource Concern	No Action Alternative	Action Alternative
Social Issues and Economy	Inefficiencies in irrigation water delivery, loss of irrigation water from canal seepage, and inconsistencies in water availability related to climate change would continue to adversely affect agricultural productivity in the Eastern Duchesne Watershed. Decreased crop production has an adverse ripple effect to regional economic development that would continue to occur over the long term. A minor long-term decrease in income and employment in the Eastern Duchesne Watershed is anticipated based on this ripple effect.	Measures would increase crop production, reduce salinity in surface water, and decrease costs associated with O&M and pumping, resulting in in an annual economic benefit of $7,416,000 and a net annual economic benefit of $6,057,000. This is anticipated to have a minor ripple effect of increased income and employment improving regional economic development. A long-term benefit to the social wellbeing, economy, and regional economic development of Uintah and Ouray Indian Reservation rural agricultural communities within the watershed is expected. Short-term increases in employment and income are also anticipated from construction employment requirements to install the measures.
Historic / Cultural Resources / Native American Religious Concerns	There would be no change to existing historical features identified within the Project area.	Alternative measures would impact 12 historic canals determined by the NRCS to be eligible for the NRHP. The NRCS made a determination of “Adverse Effect to Historic Properties” for the Project and SHPO concurred with the determination in letters dated December 2, 2021, and May 12, 2023 (Appendix A). A Draft MOA has been developed with the Ute THPO (who has assumed NHPA authority), the project Sponsor, canal companies, and other consulting parties, to mitigate adverse effects (Appendix A). The MOA will be executed prior to finalizing the Plan-EA. No Native American religious concerns were identified by Tribes during consultation, pursuant to EO 13007, EO 13175, the AIRFA, and the NHPA (Appendix A). Refer to Section 7.1.5 of the Plan-EA for a list of tribes consulted, dates of consultation, and responses received from tribes.
Visual Resources	There would be no change to existing visual resources within the Project area.	Minor direct short-term impacts to visual quality would occur during construction from construction equipment and disturbance but these areas would be restored after construction completion. Long-term impacts to visual resources are not anticipated.

Resource Concern	No Action Alternative	Action Alternative
Transportation Infrastructure	There would be no change to conditions impacting transportation infrastructure for this alternative. The culvert along Coyote Canal and Boulder Boulevard would continue to experience erosional issues and require regular maintenance/repairs.	Minor direct short-term impacts are anticipated that could slow down or delay travel times through vehicle travel corridors. After construction completion the roadways would be reopened to normal vehicle traffic and no long-term adverse impacts are anticipated. Alternative measures at Site 2 (Coyote Canal) would benefit Boulder Boulevard by eliminating erosion and maintenance issues at the canal crossing over the long term.
Noise	No noise would be produced above and beyond what is currently produced and there would be no noise impacts.	Minor direct short-term impacts are anticipated during construction, but BMPs would be in place and there would be no violations of applicable noise programs/ regulations. There would be no long-term noise impacts.

Table 5-6. Summary and Comparison of Alternatives – Ecosystem Services

Resource Concern/Item	No Action Alternative	Action Alternative
Provisioning Service - Ecosystem Productivity	Artificial irrigation systems continue to degrade surface water impacting ecosystem health of the downstream river systems. Canal seepage continues to result in more water diverted from natural systems to meet irrigation needs decreasing water availability in the natural systems.	Conserves irrigation water leaving more water in the natural systems and reduces input of TDS into natural systems improving water quality. These measures improve the health and function of the ecosystems downstream and would result in increased productivity of the natural ecosystems connected to these waters.
Provisioning Service - Food/Biomass (crop yield)	Irrigation delivery would remain the same with continued loss of irrigation water from canal seepage and decreased crop yields.	Improves irrigation delivery efficiency and increases crop production. An annual benefit of $5,653,000 would be achieved from increased agricultural productivity.
Regulating Service - Climate	Climate change would continue to result in drought and decreased water availability.	Climate change would continue to cause drought, but alternative measures result in water conservation to better adapt and increase resilience to climate stressors.
Regulating Service - Water Regulation (quality and quantity)	Extra water would continue to be diverted to offset the water lost from canal seepage. Canal seepage would continue to degrade surface and groundwater sources from high input of TDS increasing salinity.	Metering, reduced phreatophyte water consumption, and reduced canal seepage results in less water being diverted from the natural system. This would provide more water in the natural systems and improve water quality by reducing salinity in the watershed and in the downstream receiving waters. An annual benefit of $1,763,000 would be achieved from reduced salinity.

Resource Concern/Item	No Action Alternative	Action Alternative
Regulating Service - Biological Regulation (plants and animals)	Degradation of water quality and quantity in the natural stream systems would continue to adversely impact plant communities, aquatic species, and wildlife species that inhabit those corridors, including special status species.	Improved water quantity and quality in natural stream systems would benefit plant communities, aquatic species, and wildlife species that inhabit those corridors, including special status species.
Cultural Service - Peace and Sustainability	Decreased crop yield, canal water losses, degraded water quality, and climate change stressors would continue to adversely affect the peace and sustainability of the Uintah and Ouray Indian Reservation rural agricultural communities.	Improved irrigation water conveyance, water conservation, improved water quality, increased crop production, and increased resilience to climate change stressors benefit the peace and sustainability of the Uintah and Ouray Indian Reservation rural agricultural communities.
Cultural Service - Well-being	Decreased crop production and increased private pumping costs would continue that add financial stressors, adversely impact the well-being of the Uintah and Ouray Indian Reservation rural agricultural communities within the watershed.	Increased crop yields and decrease in private pumping costs would result that reduce financial stressors, improving the well-being of the Uintah and Ouray Indian Reservation rural agricultural communities within the watershed
Cultural Service - Cultural/Historical Identity and Heritage	The historic canal systems that have serviced the Uintah and Ouray Indian Reservation rural agricultural communities would continue to operate as-is. Conserving agricultural heritage would become more difficult in the watershed based on the adverse effects of climate change, reduced water availability from canal seepage, decreased crop production, and continued pumping expenses.	The historic canal systems that have serviced the Uintah and Ouray Indian Reservation rural agricultural communities would be improved. Adverse effects to historic canals would be mitigated per the MOA. Water conservation improvements would help preserve the agricultural heritage of the community through improved crop production, reduced climate change stressors, and lowered operating expenses.
Supporting Service-Water Cycling	Increased diversion of water resources to compensate for canal seepage and introduction of TDS would continue to alter the natural water cycling process.	Water conservation improvements would result in more water remaining in the natural system and decreasing TDS input, reducing the human impact to the natural water cycling process.
Supporting Service-Habitat and Biomass	Degradation of water quality and reduced water quantities in natural systems would continue to adversely impact habitat and biomass of the natural systems.	Benefits water quality and quantity in the natural stream systems that would improve habitat and biomass.

Resource Concern/Item	No Action Alternative	Action Alternative
Economic Analysis – Cost and Benefit Summary[1]		
Federal Installation Cost (PL-53566)	$0	$32,094,000
Sponsor Installation Cost	$0	$8,955,000
Total Installation Cost	$0	$41,049,000
Annual Installation Cost[2]	$0	$1,552,000
Annual O&M Cost above No Action[2]	$0	($193,000)
Total Annual Costs[2]	$224,000	$1,359,000
Total Annual Benefits	**$0**	**$7,416,000**
Benefit-Cost Ratio	**-**	**5.5**
Net Annual Benefits	**($210,000)**	**$6,057,000**

1 – All numbers rounded to the nearest thousand. Annual costs were calculated FY 2024 Water Resources Discount Rate (2.75%), annualized over 50-year evaluation period (project life). Refer to Section D17 of Appendix D for calculations of annual installation costs and benefits.

2 – Annual No Action Alternative O&M was calculated at $224,000 and the preferred alternative was calculated at $31,000. Therefore, the O&M cost would decrease by $193,000 annually with the implementation of the alternative and was subtracted from the annual installation cost to arrive at the total annual cost.

6.0 Environmental Consequences

NRCS has the responsibility under NEPA to identify and address effects on the environment that may result from the proposed alternatives. These alternatives include the No Action Alternative and the proposed Action Alternative (preferred alternative). This section describes the potential effects of the alternatives within each resource category as defined in Section 4.0.

The following lists the specific terminology used to describe impacts associated with alternative measures:

Type

- Direct Effect: Impacts caused by a proposed action and occurring at the same time and place.
- Indirect Effect: Impacts caused by an action that are later in time or farther removed in distance but are still reasonably foreseeable.
- Cumulative Effect: The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person is undertaking such other action.

Duration

- Temporary and Permanent Impacts: Temporary impacts are impacts that are not lasting and the affected resource will return or be restored to its previous (pre-project) state. Permanent

impacts are those in which the affected resource will not return to its previous state within one's lifetime.

- Short- and Long-Term Impacts: Short-term impacts are those that last through the duration of construction and shortly after (duration of impact is approximately 2 to 3 years). Long-term impacts are those that last for an extended duration of time. For this evaluation, long-term impacts extend beyond year 3 up to the evaluated life of the project (50 years).

Intensity

- No Impact – Resource conditions would not change.
- Negligible – Resource condition changes would be so slight there would be no measurable or perceptible consequence to the resource.
- Minor – A small measurable effect to the resource, but localized, small, and of little consequence to the resource. Mitigation measures, if needed to offset adverse effects, would be easily implemented and successful based on knowledge and experience.
- Moderate – A measurable effect to the resource from the alternative actions. Mitigation measures would likely be needed to offset adverse effects and could be extensive, moderately complicated to implement, and probably successful based on knowledge and experience.
- Substantial – A large, measurable effect to the resource from the alternative actions. Mitigation measures would be needed to offset adverse effects and could be extensive and complicated to implement.

6.1 Soil Resources

6.1.1 Upland Erosion

Please refer to Section 4.1.1 for existing upland erosion conditions for the Project area.

6.1.1.1 No Action Alternative

Upland erosion conditions would not change from existing conditions and erosion would continue at the same rate it has historically occurred. The erosion issues along Yellowstone Feeder Canal at Site 1, the wasteway for the Red Cap Canal at Site 6, and along Coyote Canal at Site 2 would continue to have direct adverse effects to the canal systems over the long term. Adverse effects along the Yellowstone Feeder and Red Cap Canals would be minor based on the minimal extent of identified erosion issues. A moderate adverse effect from continued erosion along the Coyote Canal is anticipated due to the considerable extent of erosion and large amount of sediment that could be eroded.

6.1.1.2 Action Alternative

Areas disturbed during construction activities to install measures at all Sites would have an increased potential for erosion. Proper BMPs would be installed during and after construction to offset impacts that would help prevent and control soil erosion. Areas disturbed would be restored and stabilized through establishment of ground cover after construction completion (refer to Section 6.4.1.2 regarding vegetation restoration). Based on implementation of BMPs, the short-term direct effects of increased erosion potential would be minor.

This alternative would line problematic erosional sections of the Yellowstone Feeder Canal at Site 1, reconstruct/stabilize the wasteway for the Red Cap Canal at Site 6, and pipe problematic erosional sections of the Coyote Canal at Site 7. The O&M needs of the systems would be reduced after implementation of alternative measures that would decrease associated disturbance. These measures are anticipated to reduce erosional issues resulting in benefits to the canal systems over the long term. Minor direct benefits are anticipated along the Yellowstone Feeder and Red Cap Canals based on the minimal extent of identified erosion issues. A moderate direct beneficial effect from decreased erosion along the Coyote Canal is anticipated. Long-term adverse effects to upland erosion are not anticipated from alternative measures. The future O&M activities are not anticipated to have a measurable effect on upland erosion conditions based on the limited activities, existing established access routes, and minimal extents of disturbance to perform O&M.

6.1.2 Sedimentation

Please refer to Section 4.1.2 for existing sedimentation conditions for the Project area.

6.1.2.1 No Action Alternative

Sedimentation conditions would not change from existing conditions and would continue at the same rate it has historically occurred. The sedimentation issues currently present would continue over the long term, adversely impacting the canal systems. All canals experience sedimentation but heightened sedimentation issues were only identified for the Coyote Canal system at Site 2. Therefore, direct adverse sedimentation effects for all canal systems would be minor, except for Coyote Canal. The Coyote Canal system has and will continue to have moderate adverse effects on sedimentation in Brown's Draw Reservoir due the amount of sediment entering the reservoir and decreasing the reservoir water holding capacity (9.42 ac-ft already deposited with 6.76 ac-ft more over the next 20 to 30 years).

6.1.2.2 Action Alternative

Alternative measures are anticipated to reduce sedimentation issues over the long term from stabilization of areas experiencing erosion and conversion of open canals to piped systems. For those canal systems currently experiencing little sedimentation issues (Site 1 and Site 3-7), direct benefits would be minor. For Coyote Canal at Site 2, reduction of an estimated 6.76 ac-ft of sedimentation to Brown's Draw Reservoir would have a direct moderate benefit to the canal and downstream irrigation storage reservoir. No measurable impacts are anticipated from O&M activities to maintain the systems. Long-term adverse impacts to sedimentation are not anticipated from alternative measures.

6.1.3 Prime and Unique Farmland

The Project contains prime farmland and farmland of statewide importance. Please refer to Section 4.1.3 for a description of existing farmland of statewide importance within the Project area.

6.1.3.1 No Action Alternative

There would be no change from existing conditions and no disturbance, above what is currently experienced, would occur on soil designated as prime farmland or farmland of statewide importance.

6.1.3.2 Action Alternative

Disturbance would occur on 34.8 acres of soils classified as “prime farmland if irrigated or “prime farmland if irrigated and reclaimed of excess salts and sodium,” and 45.0 acres of soils classified as “farmland of statewide importance.” Table 6-1 below shows the disturbance to these soils for Sites 3 through 7. Sites 1 and 2 do not contain any soils with prime or unique soil classifications. All piping activities would use native soils for backfill and are not anticipated to result in any permanent impacts to soils designated as prime or unique. The direct impacts in these areas would be minor and short-term. Permanent direct impacts to soils with prime or unique soil classifications consist of placement of fill material for construction of access roads. None of the access road improvements are proposed within prime farmland classified soils. Access road improvements within soils designated as “farmland of statewide importance” would occur on 1.6 acres, which is approximately 0.025% of these classified soils within the watershed. Because there are irrigation structures within this area that require access for O&M, the impacts could not be avoided. However, the access road alignments were placed on the edges of fields outside of currently farmed areas and follow existing 2 track roads to minimize and avoid impacts. A farmland conversion impact rating was performed and determined the permanently impacted areas are not subject to provision of the Farmland Policy Protection Act (FPPA) (see Appendix E). Permanent impacts to soils in the watershed classified as “farmland of statewide importance” are anticipated to be negligible based on the avoidance/minimization measures, minimal effected lands at 0.025% of farmland of statewide importance within the watershed, and inapplicability to be covered under the FPPA.

Irrigation capabilities would be restored to approximately 379 acres of soil classified with prime farmland designations at Site 6 (Red Cap Extension Canals/Laterals). This would increase the prime farmland within the watershed because the soils would be irrigated after alternative measures and meet the “if irrigated” qualification for this classification. Additionally, irrigation capabilities would be restored to 248.0 acres of soil classified as “farmland of statewide importance.” This would result in direct minor long-term benefits to production on prime and unique farmlands within the watershed. No measurable impacts are anticipated from operations and maintenance activities to maintain the systems.

Table 6-1. Prime and Unique Farmland Impacts Summary

Site	Prime Farmland		Farmland of Statewide Importance	
	Temporary	Permanent	Temporary	Permanent
Site 3 (South Boneta Canal)	-	-	5.9	-
Site 4 (Dry Gulch Class B Canal System)	-	-	1.1	0.5
Site 5 (Dry Gulch Class C Canal System)	17.6	-	2.3	0.7
Site 6 (Red Cap Extension Canals/Laterals)	16.2	-	34.1	0.4
Site 7 (Gray Mountain Canal)	1.0	-	-	-
Total	**34.8**	**0**	**43.4**	**1.6**

6.2 Water Resources

6.2.1 Surface Water/Groundwater Quality

Please refer to Section 4.2.1 for existing surface water quality conditions for the Project area.

6.2.1.1 No Action Alternative

There would be no change to surface water or groundwater quality conditions for this alternative. Surface water and groundwater quality would continue to be degraded at the same rate it is currently occurring. Canal seepage would continue to contribute TDS to shallow groundwater and streams in the watershed and salinity issues within the natural stream systems downstream of the canals would remain. This direct adverse effect to water quality would remain over the long term. The No Action Alternative is not in line with the goals for the Colorado River Basin Salinity Control Program or Duchesne County Comprehensive Water Resource Master Plan.

6.2.1.2 Action Alternative

Project design elements, including required BMPs, would be implemented to reduce the quantity of sediment (1) entering drainages, and (2) flowing downstream and violating any federal or state water quality rules and regulations. This alternative would also meet Utah antidegradation requirements. Construction BMPs would include, but are not limited to, the following:

- A Storm Water Pollution Prevention Plan (SWPPP) would be required and implemented that contains erosion and sediment control and pollution prevention BMPs, such as, but not limited to, silt fences, fiber wattles, and/or earthen berms.
- Water bodies adjacent to construction and staging areas would be identified, and such measures as straw bales, silt fences, and other appropriate sediment control BMPs would be implemented to prevent the entry of sediment and other contaminants into waters.
- To ensure that accidental spills do not enter waters, the storage of petroleum-based fuels and the refueling of construction machinery would not occur outside of approved designated staging/batch plant areas. Furthermore, the alternative would 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.
- No construction materials would be stockpiled or deposited in or near any water bodies.

Alternative measures would be performed outside of the irrigation season when irrigation canals are not flowing water. Based on implementation of BMPs, restoration of disturbed areas, and construction timing, construction activities would have negligible direct impacts on surface water quality. No measurable impacts are anticipated from O&M activities to maintain the systems.

Long-term adverse impacts to surface water quality are not anticipated from alternative measures. Project alternatives reduce canal erosion, sedimentation, and enclose many open canal systems. A primary source of contamination into surface and groundwater in the watershed is due to high salinity loads from canal seepage, which would be eliminated in the lined/piped segments of the canal systems or in segments no longer flowing water. These measures are in line with the goals for the Colorado River Basin Salinity Control Program and Duchesne County Comprehensive Water Resource Master Plan.

Reduction of salinity loads was estimated for each site based on salinity load reduction estimates per linear foot of canal provided by NRCS and BOR (NRCS 2023 and BOR 2023) and are provided in Table 6-2. Alternative measures are anticipated to reduce salinity loads into surface and groundwater by 5,394 tons annually. This is anticipated to have a direct moderate beneficial effect that would improve surface water and groundwater quality within the watershed and to downstream receiving waters within the Colorado River Basin over the long term.

Table 6-2. Salinity Reduction to Surface and Groundwater

Site No. / Site Name	Length of Canal Piped, Lined, or No Longer Flowing (miles)	Salinity Reduction per Mile of Canal (tons/mile)	Estimated Salinity Reduction (tons)[3]
Site 1 / Yellowstone Feeder Canal	2.64	25[(1)]	66
Site 2 / Coyote Canal	0.84	80[(1)]	67
Site 3 / South Boneta Canal	2.44	80[(1)]	195
Site 4 / Dry Gulch Class B Canal System	17.90	118.7[(2)]	2,127
Site 5 / Dry Gulch Class C Canal System	5.42	80[(1)]	434
Site 6 / Red Cap Extension Canals/Laterals	25.40	80[(1)]	2,030
Site 7 / Gray Mountain Canal	1.98	240[(2)]	475
TOTAL			**5,394**

1 – NRCS 2023
2 – BOR 2023
3 – Rounded to the nearest ton.

6.2.2 Surface Quantity and Flow

Refer to Section 4.2.2 for information on surface water quantity and flow conditions within the Project area.

6.2.2.1 No Action Alternative

This alternative would have no change to surface or groundwater quantities within the Project area. Surface water would continue to be conveyed through open canal systems where water loss through seepage/phreatophyte consumption would continue at an estimated rate of 46,702 ac-ft per year. This direct adverse effect to surface water quantities in the canal systems is

moderate and would occur over the long term. Heightened uncertainties in water availability from climate change would continue to exacerbate the adverse effects.

6.2.2.2 Action Alternative

Alternative measures include canal lining and piping to conserve water resources that would reduce canal seepage by 41,190 ac-ft annually, with 24,714 ac-ft of that being phreatophyte consumptive use. A water budget was completed by JDE to determine the change in consumptive use. A decrease in consumptive use is referred to as accretion and an increase in consumptive use is referred to as depletion. The water budget shows that the Project would result in a net accretion of 5,724 ac-ft of water per year based on an overall reduction in consumptive use (JDE 2024 – Attached in Appendix E). Table 6-3 identifies the net change in consumptive use for the Project. These depletion and accretion amounts were compared to current annual flow volumes to determine the net percent change in annual stream flow volumes (refer to Section D.14 of Appendix D). Table 6-4 identifies the net annual flow volume change for each stretch of river. A map depicting the spatial extents of net flow volume change based on consumptive use changes is provided in Appendix C, Map C8. Depletion and accretion estimates from consumptive use are not anticipated to have a measurable change to daily stream flow conditions. This is based on the minimal annual change in flow volume from consumptive use changes at a fraction of a percent.

Table 6-3. Net Change in Consumptive Use

Site	Annual Volume (ac-ft)			Accretion/ Depletion
	Decreased Phreatophyte Cons. Use	Crop Cons. Use Increase	Net Change in Cons. Use	
Site 1 Yellowstone Feeder Canal	1,115	8,328	(7,214)	Depletion
Site 2 Coyote Canal	182	2,027	(1,845)	Depletion
Site 3 South Boneta	487	424	63	Accretion
Site 4 Dry Gulch Class B Canal System	11,591	2,767	8,824	Accretion
Site 5 Dry Gulch Class C Canal System	2,797	0	2,797	Accretion
Site 6 Red Cap Extension Canals/Laterals	2,870	5,443	(2,573)	Depletion
Site 7 Gray Mountain Canal	5,672	0	5,672	Accretion
TOTAL NET	**24,714**	**18,989**	**5,724**	**Accretion**

Cons. = Consumptive

Table 6-4. Net Percent Change in Annual Flow Volume by Stream Reach

Stream	Reach	Length (miles)	Net Annual Flow Volume Change (%)	Net Depletion/ Accretion
Yellowstone River and Lake Fork River	Yellowstone Feeder Canal Intake to Class B Canal Intake	4.37	(0.90%)	Depletion
Lake Fork River	Class B Canal Intake to Class C Canal Intake	1.47	(0.02%)	Depletion
Lake Fork River	Class C Canal Intake to Duchesne River Confluence	25.51	0.25%	Accretion
Duchesne River	Duchesne Feeder Canal Intake to Gray Mountain Canal Intake	1.47	(0.25%)	Depletion
Duchesne River	Gray Mountain Canal Intake to Lake Fork River Confluence	19.19	0.25%	Accretion
Duchesne River	Downstream of the Lake Fork Confluence	-	0.5%	Accretion

When looking at changes in surface water quantities and flow, there are several other considerations of note that are not included in accretion and depletion calculations. Water savings from metering improvements and canal seepage reduction can result in increased surface water flow conditions.

Metering is not currently provided in the existing irrigation systems. After Project implementation, metering installed at Site 4 (Dry Gulch Class B Canal System) and Site 6 (Red Cap Extension Canals/Laterals) is anticipated to conserve water. Based on a study from Weber Basin Water Conservancy District, residential irrigation volumes were reduced between 20% and 29% due to metering (Great Salt Lake Collaborative 2022). Additionally, metering helps to improve leak detection which allows quick identification and repair of leaks, further conserving water. This water savings would remain in the natural stream systems and reservoirs rather than being withdrawn for irrigation and support natural stream flows.

Canal seepage is estimated at 16,476 ac-ft, after subtracting the phreatophyte consumptive use. This canal seepage would remain in the natural stream system after Project implementation. Most seepage that enters the shallow groundwater aquifer in the Uintah Basin helps support return flow to the existing natural stream systems. However, this extra water would remain in the streams after Project implementation rather than being artificially introduced into the system through canal seepage. This would directly support stream flows rather than supporting it indirectly through the current canal seepage-to shallow groundwater aquifer-to streams conveyance path.

A direct benefit to stream flow is anticipated after implementation of project measures from increases in surface water volumes and flows. These increases would be contributed from canal seepage savings directly supporting stream flows and the conserved water from metering remaining in the natural streams. However, based on unknown variables related to the hydraulic conditions of shallow groundwater aquifer flow and variability in water conservation percentages of metering, quantifying these increases is not reasonable. Post Project flows will be monitored to track diverted irrigation flows and will be reported on the Duchesne Rivers and Tributaries of Utah website (http://www.duchesneriver.org/).

Water conservation and improved irrigation efficiency would allow the irrigation season to be extended for one month during September for Sites 1 through 5. It is anticipated that the Lake Fork River in the watershed would see a minor increase in flow during the month of September. Conserved water from the Project measures would be stored in Moon Lake Reservoir or Big Sand Wash Reservoir and could be released in September to extend the irrigation season. In turn, it could increase the flow volume up to 8.8% during this time in portions of the Lake Fork River in the watershed, depending on the water conditions and water availability from year to year.

Long-term direct benefits are anticipated that would increase surface water quantities and flow in the natural stream systems and irrigation systems during the irrigation season (April through October). Water conservation measures also increase resilience to climate change stressors to better adapt to the projected heightened water variability.

6.2.3 Groundwater Quantity

Refer to Section 4.2.3 for information on groundwater conditions within the Project area.

6.2.3.1 No Action Alternative

This alternative would have no change to groundwater quantities within the Project area. Canal water seepage would continue at the current estimated rates. Recharge for canal seepage to primary groundwater aquifers occurs only for the Yellowstone Feeder Canal and was determined to be negligible at a fraction of a percent of total recharge. Seepage from the canal systems would continue to directly contribute to the shallow groundwater table over the long term which flows downgradient into natural stream systems.

6.2.3.2 Action Alternative

Groundwater recharge for the primary groundwater aquifers of the region appear to occur in areas outside of the Project area canals systems, with the exception of the Yellowstone Feeder Canal at Site 1. Alternative measures at Site 1 would reduce canal seepage by approximately 743 ac-ft of water per year, after subtracting phreatophyte consumptive use. Therefore, only 743 ac-ft per year is anticipated to infiltrate into the ground to contribute to groundwater recharge.

The canal is located along the northern margin of the Unita Basin where groundwater recharge occurs for the Uinta-Animas, Mesaverde, and Dakota-Glen Canyon Aquifers. It is likely that a portion of the Yellowstone Feeder Canal seepage may contribute to recharge of the three primary groundwater aquifers, but any contributions were determined to be negligible at a small fraction of a percent. Therefore, this decrease in seepage to primary aquifer recharge from alternative measures at Site 1 would also be negligible.

Seepage from the canal systems influences shallow groundwater conditions locally around each canal while flowing during the irrigation season (April through October). Piping and lining the canal systems would reduce seepage into the shallow groundwater table along modified canal segments. The shallow groundwater table has return flow to the existing natural stream systems. Reduced canal seepage would result in minor localized lowering of shallow groundwater elevations and decrease the canal seepage-induced groundwater return flows into the natural stream systems. However, water savings from eliminated phreatophyte consumption and canal seepage would remain in the natural stream systems with an overall increase in water contributions to the streams when compared to the indirect flow path through the groundwater table. Increased water in the natural stream systems would similarly continue to recharge shallow groundwater aquifers. Therefore, shallow aquifer recharge is anticipated to remain similar to the existing conditions with negligible effects to recharge amounts and minor direct effects to shallow groundwater recharge areas. No measurable impacts are anticipated from O&M activities to maintain the systems.

6.2.4 Waters of the U.S. Including Wetlands

Refer to Section 4.2.4 for a list of all waters of the U.S. and wetlands within the Project area.

6.2.4.1 No Action Alternative

This alternative would not change or modify waters of the U.S. including wetlands. Waters of the U.S. in the watershed would continue to experience salinity issues as described in Section 6.2.1.1. Surface water flow in waters of the U.S. would continue to be directly affected by water loss through seepage and phreatophyte consumption as described in Section 6.2.2.1. This direct adverse effect to waters of the U.S. would remain over the long term.

6.2.4.2 Action Alternative

Based on NWI and NHD data, this alternative would result in ground disturbing activities in 23.03 acres of wetland, 0.79 acres of open water pond, and 154,477 linear feet (29.26 miles) of riverine features (Table 6-5). All ground disturbance in wetlands and natural stream channels would be temporary and the areas would be restored after construction completion, with the exception of permanent removal of approximately 0.01 acres of wetland for construction of an access road. Permanent impacts to riverine features are all within the constructed canals from lining or piping measures. Temporary impacts to 1,634 linear feet of natural streams that intersect the canals would occur, but disturbed areas would be restored after construction completion. Impacts for each Site along with avoidance and minimization measures are described below Table 6-5.

Note that impacts are calculated from construction disturbance only. Some wetlands adjoining the modified canals that are supported by canal seepage may transition to upland along segments proposed for lining or piping. It is not practical for this analysis to calculate changes that could occur to wetlands hydraulically connected to canal systems from piping/lining measures, due to unknown and complicated hydraulic systems that cannot be discerned from the NWI data. A wetland delineation would be conducted during final design to identify impacts to support USACE Section 404 permitting that may be required.

Table 6-5. Impacts to Waters of the U.S.

Site No.	Site Name	Impacts							
		Emergent Wetland (ac)		Forested/ Shrub Wetland (ac)		Pond (ac)		Riverine (LF)1	
		Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm[1]
1	Yellowstone Feeder Canal	0.02	-	-		-	-	190	13,926
2	Coyote Canal	-	-	-	0.01	-	-	30	4,890
3	South Boneta Canal	0.04	-	1.94		-	-	80	12,883
4	Dry Gulch Class B Canal System	5.29	-	0.39		0.79	-	782	24,837
5	Dry Gulch Class C Canal System	1.31	-	0.01		-	-	155	31,562
6	Red Cap Extension Canals/Laterals	13.75	-	0.27		-	-	163	54,080
7	Gray Mountain Canal	-	-	-		-	-	234	10,475
TOTAL		**20.41**	**0**	**2.61**	**0.01**	**0.79**	**0**	**1,634**	**152,653**

1 – all permanent riverine impacts occur in constructed canals.

Site 1 (Yellowstone Feeder Canal): Temporary ground disturbing activities may occur in 0.02 acres of emergent wetland, but these areas would be restored after construction completion. Some areas of emergent and forested/shrub wetlands exist both upstream and downstream of the canal along the proposed lined segments. Many of these appear to be hydraulically influenced by intermittent streams that intersect the canal. The existing intersecting stream culverts under the canal would not be modified and would continue to support upstream and downstream wetlands.

Approximately 13,926 linear feet (2.64 miles) of the Yellowstone Feeder Canal would be lined with concrete. Minor temporary disturbance may occur along approximately 190 linear feet of potentially jurisdictional stream channels that intersect the Yellowstone Feeder Canal along the proposed improved segments. These areas would be restored upon construction completion and no long-term impacts to these potentially jurisdictional waters are anticipated.

Site 2 (Coyote Canal): There would be no impacts to wetland from measures at Site 2, except for permanent removal of approximately 0.01 acres of forested/shrub wetland for construction of an access road. Approximately 4,413 linear feet (0.84 miles) of Coyote Canal would be piped and 477 linear feet armored with riprap. Construction of a permanent access road would require grading and fill as necessary to be placed along approximately 30 linear feet of an intermittent stream channel bottom to allow stabilized access for vehicle/equipment access along the canal. This is not anticipated to have measurable long-term impacts to the function of the intermittent stream.

Site 3 (South Boneta Canal): Piping of the canal would temporarily disturb vegetation and soils within approximately 1.94 acres of forested/shrub wetland and 0.04 acres of emergent wetland, but these areas would be restored after construction completion. Approximately 12,883 linear feet (2.44 miles) of canal would be filled for pipe installation. Approximately 45 linear feet of water of the U.S would be temporarily disturbed for improvements to the existing rock diversion in the Lake Fork River and approximately 35 linear feet of stream that intersects the canal may also be temporarily disturbed, but these areas would be restored after construction completion.

Site 4 (Dry Gulch Class B Canal System): Measures to install irrigation pipeline would temporarily disturb vegetation and soils within approximately 5.29 acres of emergent wetland and 0.39 acres of forested/shrub wetland, but these areas would be restored after construction completion. Fill and/or excavation activities would occur for pipe installation in approximately 0.79 acres of open water ponds and 24,837 linear feet (4.70 miles) of canal. Approximately 782 linear feet of streams that intersect the canal may also be temporarily disturbed, but would be restored after construction completion.

Site 5 (Dry Gulch Class C Canal System): Measures to install irrigation pipeline would temporarily disturb vegetation and soils within approximately 1.31 acres of emergent wetland and 0.01 acres of forested/shrub wetland, but these areas would be restored after construction completion. Approximately 31,562 linear feet (5.98 miles) of canal would be filled for pipe installation. Approximately 155 linear feet of streams that intersect the canal may also be temporarily disturbed, but would be restored after construction completion.

Site 6 (Red Cap Extension Canals/Laterals): Measures to install irrigation pipeline would temporarily disturb vegetation and soils within approximately 13.75 acres of emergent wetland and 0.27 acres of forested/shrub wetland, but these areas would be restored after construction completion. Approximately 54,080 linear feet (9.48 miles) of canal would be filled for pipe installation. Approximately 163 linear feet of streams that intersect the canal may also be temporarily disturbed, but would be restored upon construction completion.

Site 7 (Gray Mountain Canal): Ground disturbing activities and vegetation clearing are not anticipated in wetland areas. Approximately 10,475 linear feet (1.98 miles) of canal would be lined with concrete. Approximately 234 linear feet of streams that intersect the canal may also be temporarily disturbed, but would be restored upon construction completion.

Sites 1-7 Waters of the U.S. and Wetland Avoidance, Minimization, and Restoration Measures: For work within waters of the U.S. and wetlands that are not influenced by canal seepage, the following avoidance and minimization measures would be performed in compliance with Nationwide Permit 58 and to restore waters of the U.S. and wetland areas:

- Heavy equipment working in wetlands would be placed on mats, or other measures taken to minimize soil disturbance.
- Temporary fills would be removed in their entirety and the affected areas returned to preconstruction elevations.
- If excavation in wetland areas is necessary, excavated wetland soils would be saved, stockpiled, and replaced after construction completion.
- Disturbed wetland areas would be restored with wetland vegetation appropriate to the surrounding wetland community as approved by NRCS and the Ute Indian Tribe (as applicable), after construction completion.
- Work within canals would be performed in the dry after the irrigation season is over and flows have been turned off.

Moderate direct short-term impacts to waters of the U.S. and wetlands are anticipated from disturbance and removal aquatic features and associated hydraulic connections to aquatic features. Artificial wetlands (wetlands hydraulically connected to the canal systems) would be removed, but disturbed natural wetland areas would be restored. Long-term indirect impacts from reduction of wetlands hydraulically connected to canals are anticipated. However, this would be offset from anticipated improved water quality and water quantities over the long term in the waters of the U.S. natural water systems hydraulically connected to the modified canal segments (refer to Sections 6.2.1.2 and 6.2.2.2). No measurable impacts are anticipated from O&M activities to maintain the piped and lined segments of canal systems.

Proposed activities for Site 1 and Site 7 are anticipated to be exempt from 404 of the CWA based on preliminary coordination with the USACE on permitting requirements (Appendix A). Per USACE and EPA permitting guidelines (USACE and EPA 2020), piping activities would be considered a reduction in the reach of waters of the U.S. and are not exempt from Section 404 of the CWA. Proposed piping activities for Sites 2 through 6 are anticipated to be covered under USACE Nationwide Permit 58 based on review of the 2021 Nationwide Permit Summary (33 CFR Part 330; Issuance of Nationwide Permits dated March 15, 2021).

6.3 Air Resources

6.3.1 Air Quality

Please refer to Section 4.3.1 for existing air quality conditions for the Project area.

6.3.1.1 No Action Alternative

This alternative would have no change to the air quality conditions for the Project area.

6.3.1.2 Action Alternative

Construction activities would temporarily emit several air pollutants. PM10 emissions are associated with the dust created from demolition, land clearing, ground excavation, cut-and-fill operations, and road construction. All other pollutants (PM2.5, CO, sulfur oxides [SOx], nitrous oxides [NOx], mobile source air toxics [MSATs], and greenhouse gases [GHGs]) are generated

from heavy-duty diesel engines used by the construction equipment. Construction emissions are greatest during the earthwork phases because of the dust associated with this activity. Fugitive dust can also be produced by winds blowing through the construction site and by trucks carrying uncovered loads. Additionally, mud tracked onto paved roads leading to and from the construction site creates a source of fugitive dust (i.e., road dust) after it dries.

Fugitive dust, MSAT, and GHG emissions increases associated with construction would be minimized by implementing applicable BMPs. These include the following:

- Spraying the soil on-site with water or other similar approved dust suppressant/soil binder.
- Wetting materials hauled in trucks, providing adequate freeboard (space from the top of the material to the top of the truck), or covering loads to reduce emissions during material transportation/handling.
- Providing a stabilized construction entrance (track-out pad), wheel washers, and/or other similar BMPs at construction site access areas to reduce track-out of site materials onto the adjacent roadway network.
- Removing tracked-out materials deposited onto adjacent roadways.
- Wetting material stockpiles to prevent wind-blown emissions.
- Establishing vegetative cover on bare ground as soon as possible after grading to reduce wind-blown dust.
- Requiring appropriate emission-control devices on all construction equipment.
- Requiring the use of cleaner burning fuels.
- Using only properly operating, well-maintained construction equipment.

Alternative measures would have increases in emissions from trucks and construction equipment powered by heavy-duty diesel engines. These increases would be short-term and concentrated around the construction site. The Project area is within a non-attainment area for O_3. Construction activities are not expected to violate air quality standards and emissions are not expected to exceed the EPA de minimis criteria for the General Conformity[2] regulations, based on the implementation of BMPs, short and seasonal duration of construction, and small scale of the construction activities. Therefore, short-term emission of air pollutants and GHGs would be negligible. Long-term impacts to air quality are not anticipated. No measurable impacts are anticipated from O&M activities to maintain the systems.

6.4 Plant Resources

6.4.1 Vegetation Communities

Please refer to Section 4.4.1 for existing information on vegetation communities within the Project area.

[2] General Conformity ensures that the action taken by federal agencies do not interfere with a State or tribe's ability to attain and maintain the NAAQS for air quality, as required by the Clean Air Act.

6.4.1.1 No Action Alternative

There would be no change to existing plant communities for this alternative.

6.4.1.2 Action Alternative

Alternative measures would disturb approximately 233.83 acres of vegetated lands within the Project area (Table 6-6). Temporarily disturbed vegetation includes 231.60 acres that would be restored upon construction completion with a native weed free NRCS and Ute Indian Tribe approved (as applicable) seed mix to match the existing surrounding plant communities. Additional revegetation information for each vegetation community is described below Table 6-6.

Table 6-6. Vegetation Communities Impacts

Vegetation Type	Acres
Wetland Vegetation	
Emergent	20.41
Shrub	2.62
Subtotal	*20.03*
Riparian Vegetation	
Riparian	4.12
Upland Vegetation	
Crop/Pasture	96.12
Forest	48.00*
Shrub	62.54
Grassland	0.02
Subtotal	*206.68*
TOTAL	**233.83**

** GAP data provides an overestimate of forested land within the Project area because the MRLC 2019 data does not appropriately depict the disturbed cleared unforested canal corridors. Based on aerial photograph review in disturbed areas, forested lands are estimated at less than 20 acres within the disturbance footprint with upland grassland and shrub communities making up the remaining portions.*

Wetland Vegetation: Disturbed wetlands that are not hydraulically connected to piped/lined sections of the canal segments would be reseeded with a native wetland seed mix and/or planted as appropriate to match the surrounding wetland community.

Riparian Vegetation: Disturbed riparian areas that are not hydraulically connected to piped/lined sections of the canal segments would be seeded/hydroseeded with a native riparian seed mix and/or planted as appropriate to match the surrounding riparian community.

Upland Vegetation: Crop and pasture areas would be replanted as preferred by the landowners for continued agricultural use. Grassland and shrub areas would be seeded/hydroseeded with an upland grass or upland grass and shrub seed mix to match the surrounding upland communities. Disturbed upland forested areas would be seeded/hydroseeded with an upland grass or upland grass and shrub seed mix to reduce the risk of root damage to pipelines and canals along the canal system corridors.

Permanent removal of 2.23 acres of vegetation would occur from construction of new access roads. Backfill of open canal segments across all sites is anticipated to convert 19.34 acres of

unvegetated canal areas to vegetated areas after construction completion, creating a net increase of 17.11 acres of vegetated lands.

Direct moderate short-term impacts from lack of vegetative cover are anticipated for the first year until the new vegetation becomes established. Long-term direct impacts would occur from permanent changes to vegetation communities, but would be minor based on revegetation efforts and net increase of vegetated areas within the Project area. No measurable impacts are anticipated from O&M activities to maintain the systems.

6.4.2 Special Status Plant Species

The ESA threatened ULT (*Spiranthes diluvialis*), has suitable habitat and occurs within the Project area. Suitable habitat exists at Site 1, and Sites 3 through 6, with documented occurrence of ULT within Sites 3 and 4. Please refer to Section 4.4.2 for existing information on ULT.

6.4.2.1 No Action Alternative

There would be no change to ULT or their habitat for this alternative.

6.4.2.2 Action Alternative

Alternative actions would result in permanent loss of approximately 205 ULTs and 163.6 acres of suitable ULT habitat (16.3 acres of occupied ULT habitat and 147.3 acres of unoccupied suitable habitat) from construction disturbance and/or dewatering through eliminating canal seepage. Approximately 82.2 acres of suitable habitat would be temporarily impacted during installation of alternative measures. Disturbed areas within wetlands that are not influenced by irrigation flows from the modified canal sections and containing suitable ULT habitat, would be restored as described in the wetland avoidance and minimization measures in Section 6.2.4.2. Additional measures as listed in Section 8.3.6 would be implemented to avoid and reduce impacts to ULT. The unavoidable impacts to ULT and 16.3 acres of occupied suitable habitat would be mitigated through contributions to the ULT Conservation Fund.

A BA was completed determining that the alternative **May affect, and is likely adversely affect** ULT (Appendix E). A draft BA was submitted to the USFWS for review on August 6, 2024. The final BA addressing USFWS comments was submitted to the USFWS on January 27, 2025, to comply with Section 7 of the ESA (see Appendix A for the submittal email and Appendix E for the BA). The USFWS issued a Biological Opinion (BO) on January 29, 2025, concurring with the determination (included in Appendix A). The BO concluded that the proposed action is not likely to jeopardize the continued existence of ULT.

Moderate short-term direct impacts to ULT and suitable habitat are anticipated from alternative actions. Long-term direct impacts would be minor based on the avoidance, minimization, and mitigation measures implemented.

6.4.3 Noxious Weeds and Invasive Plants

Please refer to Section 4.4.3 for existing information on N&I weeds and non-native plants.

6.4.3.1 No Action Alternative

There would be no change to N&I weeds for this alternative.

6.4.3.2 Action Alternative

This alternative would have minor direct impacts that would put the Project area at risk for future invasion of N&I weeds. BMPs would be implemented during construction to prevent the spread of N&I plant species and comply with Executive Order 13112. During construction and until restoration areas are fully established, N&I weeds would be maintained on a regular basis to prevent the establishment of N&I plant species. Non-desirable plant species would be controlled by cleaning equipment prior to delivery to the Project site and eradicating these species before the start and during construction as discovered. In addition, a Post Construction Rehabilitation Plan (PCRP) would be developed and would include mechanisms for addressing weed establishment and treatment. Disturbed areas would be restored to preconstruction conditions or better after construction completion. The increased risk for invasion of N&I weeds is anticipated to be short-term and minor. No long-term impacts are anticipated from alternative actions or from O&M activities based on implementation of BMPs, development of a PCRP, and routine weed control measures performed on the canal systems.

6.4.4 Riparian Areas

Riparian areas are present within the Project area. Please refer to Section 4.4.4 for additional information.

6.4.4.1 No Action Alternative

There would be no change to riparian areas for this alternative.

6.4.4.2 Action Alternative

Approximately 4.12 acres of riparian areas would be disturbed from alternative measures. Larger trees would be avoided to the greatest extent possible to preserve mature riparian vegetation. Disturbed riparian areas that are not hydraulically connected to piped/lined sections of the canal segments would be seeded/hydroseeded with a native riparian seed mix and/or planted as appropriate to match the surrounding riparian community. Riparian areas that are hydraulically connected to the modified canal segments (artificial riparian areas) would be seeded or hydroseeded with a native upland grass or grass and shrub mix as appropriate.

Minor direct short-term impacts from removal of riparian vegetation are anticipated until the new vegetation becomes established. No measurable impacts are anticipated from O&M activities to maintain the systems. Long-term direct impacts would occur from permanent changes converting artificial riparian areas to upland vegetated areas. These impacts would be minor to negligible based on restoration efforts, abundant natural higher quality riparian areas available in the watershed, and minimal conversion of artificial riparian areas to upland.

6.5 Animal Resources

6.5.1 Fish and Wildlife

Please refer to Section 4.5.1 for information regarding the presence of fish and wildlife within the Project area.

6.5.1.1 No Action Alternative

There would be no change to existing fish and wildlife habitat or communities within the Project area for this alternative. Degradation of water quantity and quality in the natural stream systems would continue as described in Sections 6.2.1.1 and 6.2.2.2. This would have a direct adverse effect to aquatic species and habitat in the natural stream systems within the watershed and downstream of the watershed over the long term.

6.5.1.2 Action Alternative

Alternative measures would disturb approximately 233.83 acres of terrestrial habitat within the Project area directly affecting wildlife and habitat. Temporarily disturbed habitat includes 231.60 acres that would be restored upon construction completion. Refer to Section 6.4.1.2 for restoration of disturbed vegetation. Wildlife species, if present, may be temporarily disturbed and displaced to adjacent habitats. Once construction is completed, they could return to the area. The Yellowstone Feeder Canal at Site 2 would incorporate wildlife crossings in areas with established wildlife corridors. Minor modifications to habitat types would occur from alternative measures but are not anticipated to have measurable long-term impact to wildlife or wildlife habitat availability, including those areas designated as substantial or crucial habitat for black bear, California quail, chukar, dusky grouse, elk, mule deer, and moose.

Permanent removal of 2.23 acres of terrestrial habitat would occur from construction of new access roads. However, 19.34 acres of new terrestrial habitat would be created from backfilling and revegetating open canal segments. This would result in an overall increase in 17.11 acres of terrestrial habitat for wildlife including those designated as crucial habitat for black bear, California quail, chukar, dusky grouse, elk, mule deer, and moose. Permanent removal of surface water from piping activities would reduce the availability of surface water for wildlife. However, there is an abundance of surface water present in surrounding ponds, wetlands, streams, springs, and irrigation systems (refer to Appendix C – Map C4). Therefore, piping of canals is anticipated to have a negligible long-term impact on wildlife access to water sources.

The canal systems in the project area do not provide permanent aquatic habitat because they are dependent on irrigation flows occurring between April and October. Modification to these canal segments would occur outside of the irrigation season and are not anticipated to have a measurable impact to fish/aquatic species. Artificial aquatic habitat, present when irrigation water is flowing, would no longer be present in piped sections of the canals. This would result in a minor reduction to artificial low-quality habitat. This is not anticipated to have a measurable long-term impact to fish/aquatic species due to abundant and higher quality habitat in the natural stream systems, limited habitat from lack of water flow during the non-irrigation season, and structures/features along the canal systems that impede passage of fish/aquatic species into the systems.

Disturbance along streams intersecting the canals is not anticipated to have measurable impacts to fish/aquatic species because of lack of permanent flowing waters, limited disturbance, and restoration after construction completion. There is only one perennial stream in the Project area which consists of Lake Fork River at Site 3 (South Boneta Canal). Activities proposed in Lake Fork River would have direct short-term and minor impacts to fish/aquatic species based on the limited amount of modification required to the existing structure.

Activities for O&M would be reduced from implementation of alternative measures, which would reduce human presence/disturbance in terrestrial and aquatic habitat over the long term.

However, due to the temporary and limited nature of disturbance from O&M activities in general, no measurable changes to terrestrial/aquatic wildlife or associated habitat from decreased O&M activities are anticipated.

In and downstream of the watershed, long-term direct benefits to fish/aquatic species and habitat are anticipated within the natural stream corridors hydraulically connected to the modified canals. This is due to increased water quantity and improved water quality in the natural stream systems. This benefit is anticipated to offset impacts associated with changes to the artificial habitat along the modified canal corridors.

6.5.2 Special Status Animal Species

Please refer to Section 4.5.2 for information regarding special status species and habitat within the Project area.

6.5.2.1 No Action Alternative

There would be no change to special status animal species or habitat within the Project area for this alternative. Degradation of water quantity and quality in the natural stream systems would continue as described in Sections 6.2.1.1 and 6.2.2.2. This condition has long-term indirect adverse effects to ESA-listed fish species and Utah SGCN in the natural stream systems within the watershed and downstream of the watershed. The species effected include: ESA-listed bonytail chub (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), and razorback sucker (*Xyrauchen texanus*), hereinafter referred to Colorado River fish; and SGCN roundtail chub (*Gila robusta*) and flannelmouth sucker (*Catostomus latipinnis*). Designated critical habitat for Colorado River fish and suitable habitat for SGCN fish species is located downstream of the Project area that is currently adversely affected and would continue to be over the long term.

6.5.2.2 Action Alternative

Preconstruction surveys would be performed for SGCN, as applicable and determined in coordination with UDWR, prior to the commencement of work activities. If the species were found during surveys, avoidance/minimization measures would be implemented in coordination with UDWR. The avoidance measures listed for migratory birds in Section 6.5.3.2 would also be followed for SGCN bird species. Direct short-term impacts to SGCN would be minor to negligible with implementation of preconstruction surveys and avoidance/minimization measures. No measurable long-term impacts to SGCN are anticipated based on restoration of disturbed areas and implementation of avoidance/minimization measures. Additionally, O&M activities are not anticipated to have measurable impacts to SGCN or habitat.

One ESA insect, monarch butterfly (*Danaus plexippus*), is listed as Candidate and has suitable habitat within the Project area. Based on construction timing (October through May), no impacts to the species are anticipated because they would not be present during the construction windows. Direct impacts to monarch butterfly suitable habitat would occur from disturbance to construct alternative measures, but these areas would be restored (refer to Section 6.4.1.2 for restoration measures) upon construction completion and no long-term impacts to the species or suitable habitat are anticipated.

Four ESA fish species and two SGCN fish species have the potential to be impacted from changed water quantity and quality conditions after implementation of alternative measures. This

includes ESA-listed Colorado River fish and associated designated critical habitat located downstream of the Project area. The SGCN fish include roundtail chub (*Gila robusta*) and flannelmouth sucker (*Catostomus latipinnis*). No impacts would occur to ESA and SGCN fish species during construction as none are located in or near the Project area. However, water quality improvements (see Section 6.2.1.2) and increased stream flow (see Section 6.2.2.2) after implementation of the alternative measures would have direct long-term benefits to ESA fish species, SGCN fish species, and associated designated critical habitat and suitable habitat that are located in the downstream receiving waters.

There are no other ESA-listed animal species, suitable habitat or critical habitat that would be impacted because none are present. A BA was prepared with the following determinations to ESA species from alternative actions.

- **Would not likely jeopardize** the continued existence of the monarch butterfly.
- **May affect but is not likely to adversely affect** Colorado River fish.
- **May affect but is not likely to adversely modify** critical habitat for Colorado River fish

A draft BA was submitted to the USFWS for review on August 6, 2024. The final BA addressing USFWS comments was submitted to the USFWS on January 27, 2025, to comply with Section 7 of the ESA (see Appendix A for the submittal email and Appendix E for the BA). The USFWS issued a Biological Opinion (BO) on January 29, 2025, concurring with the determination (included in Appendix A).

6.5.3 Migratory Birds / Golden Eagles

Please refer to Section 4.5.3 for a description of migratory birds/golden eagles and potential occurrence within the Project area.

6.5.3.1 No Action Alternative

There would be no impact to migratory birds, bald eagles, or golden eagles for this alternative.

6.5.3.2 Action Alternative

If present, migratory birds and bald/golden eagles may be disturbed and displaced to adjacent habitats during construction activities. If construction activities occur during migratory bird breeding/nesting periods, the Project area (and surrounding habitats) would be surveyed by a qualified biologist for active nests no more than 5 days prior to the commencement of work. If active nests were found during surveys, spatial buffers would be established around such in coordination with USFWS and NRCS. Construction activities within the buffer areas would be prohibited until a qualified biologist confirmed that all nests are no longer active. Direct impacts of this alternative to migratory birds and associated habitat would be short-term and minor based on implementation of avoidance/minimization measures, preconstruction surveys, restoration of disturbed areas, construction timing (October through May), and abundant suitable habitat in the surrounding area.

Measurable long-term adverse impacts to migratory birds or bald/golden eagles are not anticipated for alternative measures or from O&M activities.

6.6 Human Resources

6.6.1 Social Issues and Economy

Please refer to Section 4.6.1 for existing social issues and economic conditions. Employment and income did not play a substantial role in the evaluation of alternatives and selection. Therefore, regional economic development is assessed qualitatively for the Eastern Duchesne Watershed region.

6.6.1.1 No Action Alternative

There would be no change to socioeconomic or regional economic development conditions for this alternative. The agricultural community would continue to experience pressure deficiencies in their irrigation systems and supplement pressures with pumping at the owner's expense. Canal seepage would continue to decrease water availability for irrigation and costly O&M of the irrigation systems would remain. Inefficiencies in irrigation water delivery, loss of irrigation water from canal seepage, and inconsistencies in water availability related to climate change would continue to adversely affect agricultural productivity in the Eastern Duchesne Watershed. This adverse effect to agricultural productivity makes conserving the agricultural heritage of the community more difficult. No change to regional economic development is anticipated.

Decreased crop production has an adverse ripple effect to regional economic development that would continue to occur over the long term. A minor long-term decrease in income and employment in the Eastern Duchesne Watershed is anticipated based on this ripple effect.

6.6.1.2 Action Alternative

Measures for this alternative improve irrigation systems for the community within the watershed. Improved irrigation systems would provide more reliable water delivery, increase system pressures reducing private pumping requirements, improve water quality, and restore irrigation capabilities to approximately 2,422 acres of Ute Indian Tribe lands. These measures would increase crop production on approximately 90,147 acres of agricultural land and decrease costs associated with private pumping. In addition, O&M costs would be reduced from irrigation system improvements. The measures also reduce salinity in surface water for the downstream receiving waters of the Colorado River Basin, which include seven states (Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming) and Mexico. This reduced salinity in water would benefit several economic sectors of the Colorado River Basin including residential, commercial, industrial, water utilities, groundwater, recycled water/publicly owned treatment works, and agriculture (See section D17.1.3 in Appendix D).

Project measures would have an annual benefit of $7,416,000 ($5,653,000 from increased agricultural productivity and $1,763,000 from reduced salinity) and provide a net annual economic benefit of $6,057,000. This would increase agricultural stability and help to preserve agricultural heritage over the long term for the local agricultural community, which has also been identified as a disadvantaged community (see Section 4.6.1.2). The increased crop yield, decreased private pumping costs, and agricultural stability of the watershed are also anticipated to improve the well-being of the local agricultural community over the long term. Please refer to Table 8-4 in Section 8.7.1 for a detailed breakout of economic benefits associated with each Site.

The economic benefits of increased crop production would have a beneficial ripple effect to regional economic development. A minor long-term increase in income and employment in the Eastern Duchesne Watershed is anticipated based on this ripple effect. In addition, short-term increases to employment and income are anticipated from additional employment requirements that may be necessary during construction.

6.6.2 Historic / Cultural Resources / Native American Religious Concerns

Please refer to Sections 4.6.2 for existing historic and cultural resources within the Project area.

6.6.2.1 No Action Alternative

There would be no impacts to historic or cultural resources for this alternative.

6.6.2.2 Action Alternative

The Action Alternative would pipe or line numerous segments of historic canals that are eligible for the NRHP. Adverse effects to historic properties occur when project measures alter any characteristic that qualifies the property for inclusion in the NRHP. Factors considered in determining whether a proposed project would have adverse effects to historic properties include the extent or degree to which its implementation would result in:

1) Damage to, or loss of, a site of archaeological, tribal, or historical value that is listed, or eligible for listing, in the NRHP.

2) Loss or degradation of a TCP or sacred site, or if the property or site is made inaccessible for future use.

3) Disturbance to any human remains, including those interred outside formal cemeteries.

4) Isolation of cultural resources from the context considered significant; and

5) An effect to project elements that would be out of character with the property or site and its setting

Two intensive cultural resources surveys were completed by MOAC (MOAC 2021 and 2023) to identify cultural resources in the Project area. Refer to Section 4.6.3 for the survey details, the cultural resources identified, and the eligibility for listing in the NRHP.

Alternative measures would impact 12 historic canals determined by the NRCS to be eligible for the NRHP. Table 6-7 summarizes all eligible sites within the Project area and the determinations of effect.

Table 6-7. Summary of Effects to Historic / Cultural Sites

Site No.	Site Type	NRHP Status	Effects Determination / Association to Project Area
Site 1 (Yellowstone Feeder Canal)			
42DC2793	Yellowstone Feeder Canal	Eligible Criteria A & C	Adverse Effect / Canal will be lined in the Project area
Site 4 (Dry Gulch Class B Canal System)			
42DC3485	F Canal	Eligible Criterion A	Adverse Effect / Canal will be replaced by a buried pipe in the Project area

Site No.	Site Type	NRHP Status	Effects Determination / Association to Project Area
42DC4249	Bluebell Lateral	Eligible Criterion A	Adverse Effect / Lateral will be replaced by a buried pipe in the Project area
42DC4250	North I Ditch	Eligible Criterion A	Adverse Effect / Ditch will be replaced by a buried pipe in the Project area
42DC4251	South I Ditch	Eligible Criterion A	Adverse Effect / Ditch will be replaced by a buried pipe in the Project area
Site 5 (Dry Gulch Class C Canal System)			
42DC1328	Class C Canal	Eligible Criterion A	Adverse Effect / Canal will be replaced by a buried pipe in the Project area
42DC4267	South Lateral Lake Fork Canal	Eligible Criterion A	Adverse Effect / Adjacent to C Canal that would be replaced by a buried pipe in the Project area
Site 6 (Red Cap Extension Canals/Laterals)			
42DC3059	Lateral No. 5	Eligible Criterion A	Adverse Effect / Lateral will be replaced by a buried pipe in the Project area
42DC376	Duchesne Feeder Canal	Eligible Criteria A & C	Adverse Effect / Canal will be replaced by a buried pipe in the Project area
42DC3029	Midview Ditch	Eligible Criterion A	No Adverse Effect / Not impacted by undertaking
42DC3030	Midview Lateral	Eligible Criteria A & C	Adverse Effect / Lateral will be replaced by a buried pipe in the Project area
42DC3081	Red Cap Canal	Eligible Criterion A	Adverse Effect / Canal will be replaced by a buried pipe in the Project area
Site 7 (Gray Mountain Canal)			
42DC375	Gray Mountain Canal	Eligible Criterion A	Adverse Effect / Canal will be lined in the Project area
Other Historic Properties			
42DC3084	Moon Lake Canal	Eligible Criteria A & C	No Adverse Effect / Not impacted by undertaking
42DC3100	Historic Structure and Trash Scatter	Eligible Criterion D	No Adverse Effect / Within Project area, but is 20 feet from proposed undertaking and separated by and existing fence
42DC3112	Abandoned Residence	Eligible Criterion C	No Adverse Effect / Extends 6 feet into the Project area, but will be avoided by a minimum of 15 feet, with avoidance fencing along the boundary intersecting the Project area during construction
42DC3392	Lake Form No. 1 Canal	Eligible Criterion A	No Adverse Effect / Replacement of a non-original diversion structure would be performed

Based on the piping and or lining of 12 historic canals as shown in Table 6-5, which would result in direct damage to the integrity of the canals, the NRCS has determined that the proposed project would result in an “Adverse Effect to Historic Properties.” Consultation was performed to comply with EO 13007, EO 13175, the AIRFA, and the NHPA. The NRCS consulted with the SHPO in two letters dated December 1, 2021, and May 8, 2023 (Appendix A). The SHPO concurred with determinations of project effects in letters dated December 2, 2021, and May 12, 2023 (Appendix A).

Consultation letters were also sent to the Ute THPO requesting concurrence on project effects on November 15, 2021, and May 8, 2023, as the THPO assumed full NHPA authority. Verbal concurrence from the THPO was received on October 9, 2024, and the THPO has indicated that they will provide formal concurrence in writing (Appendix A). Tribal consultation letters were also sent to the BIA, Ute Tribe of the Uintah and Ouray Reservation, Shoshone-Bannock Tribes of the Fort Hall Reservation, Eastern Shoshone Tribe of the Wind River Reservation, Wyoming, and the Northwest Band of the Shoshone Nation on November 15, 2021, and May 8 2023 (Appendix A). Refer to Section 7.1.5 for details on tribal consultation.

To resolve the adverse effects, a Draft Memorandum of Agreement (MOA) has been developed between the NRCS, the Ute THPO, the project Sponsor, canal companies, and other identified consulting parties (Appendix A). The MOA will be executed prior to finalizing the Plan-EA. Refer to Section 8.3.13 for a list of proposed mitigation strategies.

6.6.3 Visual Resources and Scenic Beauty

Please refer to Section 4.6.3 for existing visual resources and scenic beauty conditions within the Project area.

6.6.3.1 No Action Alternative

There would be no change to visual resources and scenic beauty for this alternative.

6.6.3.2 Action Alternative

Short-term direct impacts to visual quality are anticipated due to disturbed lands and construction equipment parked or operating on those lands. Areas disturbed during construction activities would be restored after construction completion by grading to match natural contours and stabilizing through establishment of ground cover. These areas would be restored as described in 6.4.1.2. Impacts would be minor, as disturbance would be short-term and disturbed areas would be restored after construction completion. There would be no long-term measurable impacts to the visual quality of the area from alternative measures or from O&M activities.

6.6.4 Transportation Infrastructure

Please refer to Section 4.6.4 for a description of existing transportation infrastructure with the potential to be impacted.

6.6.4.1 No Action Alternative

There would be no change to conditions impacting transportation infrastructure for this alternative and the direct adverse effects to culvert/bridge crossings would remain. The culvert along Coyote Canal and Boulder Boulevard would continue to experience adverse erosional issues and require regular maintenance/repairs.

6.6.4.2 Action Alternative

Measures for this alternative directly benefit crossings by piping sections of canals that are causing erosional issues at culvert/bridge crossings. This would remove the adverse erosional issues along Coyote Canal over the long term that impact Boulder Boulevard and the culvert.

The installation of alternative measures would require road closures and detours to facilitate

construction. This would result in direct minor short-term effects that could slow down or delay travel times through the corridors. After construction completion the roadways would be reopened to normal vehicle traffic and no long-term adverse impacts are anticipated from alternative measures or from O&M activities.

6.6.5 Noise

Please refer to Section 4.6.5 for existing noise conditions within the Project area.

6.6.5.1 No Action Alternative

There would be no noise impacts for this alternative.

6.6.5.2 Action Alternative

During construction activities, noise could be generated that would constitute a nuisance to nearby rural residences or wildlife populations. This direct effect would be short-term during construction, and noise minimization efforts would be used. Noise control programs (42 U.S.C. 4913) and any appliable noise regulations would be followed. Noise minimization efforts would include avoiding operation of mechanical equipment between the hours of 9:30 pm and 7:00 pm per Duchesne County Code (Duchesne County 2022b), and outfitting construction equipment with noise dampening measures (if needed). Short-term noise impacts would be minor based on the duration of construction, minimal sensitive noise receptors within the rural area, implementation of minimization measures, and adherence to noise programs/regulations. No long-term impacts are anticipated from alternative measures or from O&M activities.

6.7 Cumulative Effects

A list of known past, present, or reasonably foreseeable future actions in the vicinity of the Project area is provided below. The area over which the cumulative effects are evaluated varies by resource, as the nature and range of potential effects vary by resource. A potential for cumulative impact was identified if a relationship exists such that the impacts from the Project might affect or be affected by impacts from another action

- Yellowstone Feeder Canal Lining: In May 2017, approximately 4,222 linear feet of the canal was lined with concrete to reduce water seepage. Water savings were estimated at 5,200 ac-ft per year from implementation of lining measures. An Environmental Assessment was completed for the measures (Bureau of Reclamation 2016) and reviewed to assist in determination of cumulative impacts.
- Future Conversion from Flood Irrigation to Sprinkler Irrigation: It is anticipated that some individual landowners will transition from flood irrigation to sprinkler irrigation after implementation of this Project on irrigated lands within Sites 3 through 6. This is anticipated to occur within approximately 5 years after Project measures are installed. This change in irrigation method could provide 30% to 35% water use reduction. With this conversion, some landowners may change crop types from pasture grass to alfalfa which requires approximately 32.9% increase in water application over the length of the irrigation season. Therefore, a negligible change in water use is anticipated. However, change in irrigation method to sprinkler decreases salinity input from reduction of high salinity return flows.

The short-term impacts from all actions do not occur at the same time and/or place and therefore, do not combine to create cumulative adverse impacts. Therefore, temporary impacts during construction are not included for analysis of cumulative impacts. Resources with negligible or non-measurable long-term impacts are also not included for analysis of cumulative impacts because they would not have a measurable contribution to the level of impact when added to other projects. Only the resources with measurable long-term effects that would also overlap with the long-term effects of the other actions included above, are applicable for cumulative effects. These resources include upland erosion, water quality, groundwater quantity, wetlands, social issues and economy, historic properties.

6.7.1 No Action Alternative

The No Action Alternative consists of continued O&M of the existing irrigation systems. The O&M actions are not anticipated to have a measurable change in effect to any of the resource concerns. Therefore, the O&M actions would not have measurable cumulative impacts when combined with the other actions described in 6.7.

6.7.2 Proposed Action Alternative

The 2017 Yellowstone Feeder Canal lining actions and the conversion from flood to sprinkler irrigation would have cumulative impacts when combined with the Action Alternative as described below.

- Upland Erosion: 2017 canal lining measures and Action Alternative lining measures would cumulatively reduce erosional issues along Yellowstone Feeder Canal benefiting the canal systems over the long term.
- Water Quality: The combined lining measures cumulatively reduce canal erosion resulting in less sediment introduction into the canal. The change from flood to sprinkler irrigation combined with the action alternative cumulatively reduce salinity loads to downstream receiving waters improving the water quality of downstream connected water bodies and aquifers.
- Groundwater Quantity: Combined lining measures reduce groundwater seepage by an estimated 2,823 ac-ft per year, which includes 2,080 ac-ft from the 2017 lining measures (assuming 60% for phreatophyte consumption) and 743 ac-ft for the Action Alternative. The canal is located along the northern margin of the Unita Basin where groundwater recharge occurs for the Uinta-Animas, Mesaverde, and Dakota-Glen Canyon Aquifers. Groundwater recharge for the Uinta-Animas aquifer was reported at 201,000 ac-feet per year (Robson and Banta 1995), but recharge data was not available for the other 2 aquifers. It is likely that a portion of the Yellowstone Feeder Canal seepage may contribute to recharge of the three primary groundwater aquifers, but any contributions would be negligible at a fraction of a percent. Therefore, any cumulative changes to recharge of the primary aquifers from the combined actions would be negligible.
- Wetlands: Some wetlands downstream of the canal are present due to canal seepage. Combined lining measures break the hydraulic connection between the canal and downstream artificial wetlands. A cumulative impact to artificial wetlands is anticipated that transitions hydraulically connected wetlands to upland along the lined segments.

- Social Issues and Economy: The combined lining measures reduce canal seepage and increase irrigation water availability. Conversion of crop types from pasture grass to alfalfa could cumulatively increase economic benefits and help ensure agricultural stability. Cumulative long-term economic benefits for the local agricultural community are anticipated from increased crop production and decreased O&M costs.
- Historic Properties: The Yellowstone Feeder Canal is a historic canal eligible under Criterion A and C for the NRHP. The combined lining measures from the 2017 Bureau of Reclamation project adversely affect the historic site by altering the character of the canal. An MOA with the SHPO was developed for the BOR project and a Draft MOA has been developed for the current project to mitigate adverse effects (Appendix A). There are no known future projects for lining or piping of other canals within the project area.

6.8 Risk and Uncertainty

A 50-year project life was assumed for alternative costs and economic evaluations. Estimating alternative costs and benefits involves a certain degree of risk and uncertainty. During the rehabilitation planning process, decisions are made with information that is uncertain, including errors in measurements and climatic changes that could alter water availability. Assumptions made during the planning process are based on the best available science, technology, and information. Extended delays between the planning process and construction increase the degree of risk and uncertainty. Estimated alternative costs are based on computed work quantities multiplied by the appropriate unit cost for that type of work. Unit costs are based on current market prices of similar projects. Costs can be influenced by economic factors that cannot be predicted between the planning process and construction that could increase the actual cost and decrease the availability of materials.

Economic benefits from projects are based on values of infrastructure, agricultural land, equipment, and services. Such items are expected to become more valuable in the future, but it can be difficult to predict future economic conditions. There is also uncertainty in estimating the social and environmental costs associated with each alternative because interested party values, judgments, and opinions may shift over time. As with all projections of future costs and benefits, there is a degree of uncertainty assumed. Installation costs, O&M costs, usage of conserved resources, yield responses, and commodity and input prices will all fluctuate. This was accounted for as much as possible by assuming yield responses that were conservative, accounting for recent local research. Weather variations can affect benefits as well. For example, If the dry conditions continue out west, the conserved water could be more valuable. While economic estimates are not precise, the intention is that they are reasonably accurate and can assist in making good decisions.

6.9 Irreversible and Irretrievable Resource Commitments

NEPA requires that environmental analysis include identification of "… any irreversible and irretrievable commitments of resource which would be involved in the Proposed Action should it be implemented." Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects this use could have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a

cultural resource).

Implementing the No Action Alternative or Action Alternative would involve a commitment of a range of natural, physical, human, and fiscal resources. Considerable amounts of fossil fuels, labor, and construction materials would be expended. Additionally, large amounts of labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are generally not retrievable. They are not, however, in short supply, and their use would not have an adverse effect upon the continued availability of these resources. Any construction would also require a substantial one-time expenditure of federal and cost-share funds that would not be retrievable.

The commitment of these resources would be based on the premise that residents in the immediate area, the state, and the region would benefit from the improved quality of post-construction conditions. These benefits generally are anticipated to outweigh the permanent commitment of resources.

7.0 Consultation, Coordination, and Public Participation

This section describes the coordination efforts with the public, agencies, tribes, stakeholders, and the SLO for the Project.

7.1 Consultation

7.1.1 U.S. Fish and Wildlife Service

A formal request to be a cooperating agency on the Project was submitted to USFWS on May 20, 2022 (Appendix A), but no response was received. USFWS was invited to comment on the Project during the scoping period, but no comment was received. In accordance with Section 12 of PL 83-566, a letter was sent to the USFWS on May 15, 2024 to welcome their participation in preparation of the Plan-EA (Appendix A), but no response was received. A draft BA was completed for the Project and submitted to the USFWS for review on August 6, 2024. The final BA addressing USFWS comments was submitted to the USFWS on January 27, 2025, to comply with Section 7 of the ESA (see Appendix A for the submittal email and Appendix E for the BA). The USFWS issued a Biological Opinion (BO) on January 29, 2025 concurring with the Project determination of effects (included in Appendix A).

7.1.2 Bureau of Indian Affairs

A formal request to be a cooperating agency on the Project was submitted to BIA on May 20, 2022 (Appendix A). The BIA declined cooperating agency status and recommended to be a participating agency instead. The BIA determined that they would need to make a decision or prepare a FONSI to respond to future applications for encroachments or easements on reservation lands. The BIA indicated they would review the Plan-EA to make sure the BIA needs are addressed (Appendix A). Before issuing the Draft Plan-EA to the public, the BIA was provided copies of the preliminary report for review. Agency report comments or concerns were addressed and/or corrected prior to issuance of the Draft Plan-EA to the public. Consultation with the BIA will continue during the Draft Plan-EA review period, and the results will be documented in the Final Plan-EA.

A letter of support was provided by the BIA dated June 1, 2020 for the proposed irrigation improvements at Site 6 Red Cap Extension Canals/Laterals (Appendix A). The BIA indicated they are ready to move forward on design and construction of the Project within the next five years and will work diligently to obtain any new ROWs that may be required.

7.1.3 Utah State Historic Preservation Office

Utah SHPO was invited to comment on the Project during the scoping period, but no comment was received. Two Class III Cultural Resources Surveys were completed by MOAC (MOAC 2021 and 2023). As part of the NHPA Section 106 process, those reports were submitted to the Utah SHPO for concurrence on site eligibility and project effects. The two reports were submitted in letters dated December 1, 2021 and May 8, 2023, respectively (Appendix A). The SHPO concurred with the NRCSs' determinations of site eligibility and "Adverse Effect to Historic Properties" determination on December 2, 2021 and May 12, 2023 (Appendix A). The Ute THPO has taken over all NHPA responsibilities within the exterior boundaries of the Ute Reservation, and as such the Utah SHPO will not be involved with the development of the MOA. A Draft MOA has been developed between the NRCS, the Ute THPO, and other consulting parties to resolve the adverse effects (See Section 7.1.6).

If undocumented cultural/archaeological resources are found during construction activities, construction would stop, and the appropriate agencies would be notified, per procedures described in the NRCS Prototype Programmatic Agreement.

7.1.4 U.S. Environmental Protection Agency

A formal request to be a cooperating agency on the Project was submitted to EPA on May 20, 2022 (Appendix A). EPA declined cooperating agency status in an email dated June 14, 2022 (Appendix A). Consultation with the EPA will continue during the Draft Plan-EA review period, and the results will be documented in the Final Plan-EA.

7.1.5 THPO/Tribal Consultation

Tribes who hold ancestral land, traditional use, and/or traditional cultural property claims in and near the Project area were identified using the former NPS Native American Graves Protection and Repatriation Act Native American Consultation Database (NACD), a database through which any federally recognized tribe could identify those counties in Utah where they had consultation interests. The U.S. Department of Housing and Urban Development Tribal Directory Assessment Tool (TDAT), the BIA website, and the Utah Division of Indian Affairs (UDIA) website were used as supplemental sources to identify tribes with consultation interests. The assembled list of tribes identified from the NACD, TDAT, BIA website, and UDIA website are included in Table 7-1.

Tribes were consulted to comply with EO 13007, 13175, the AIRFA, and the NHPA for the assembled list of tribes (Appendix A). During the scoping process, the NRCS reached out to the assembled list of tribes regarding known historic properties or places of traditional religious and cultural importance near the Project area. Tribes were also asked about any additional tribes that should be contacted. A reasonable and good faith effort was made per 36 CFR pt. 800.4(b)(1) to consult with these tribes via letter, email, and telephone. Refer to Appendix A for all consultation correspondence. Table 7-1 summarizes tribal consultation for the cultural resource report and effects determinations. A detailed tribal consultation table is included in Appendix A. No tribal concerns have been identified during the current consultation process.

Table 7-1. Tribal Consultation Summary

Tribe	Consultation Package Sent	Follow Up #1	Follow Up #2	Response
Eastern Shoshone Tribe of the Wind River Reservation	11/15/2021 & 5/8/2023	9/19/2023	10/3/2023 & 11/1/2023	No Response Received
Northwest Band of the Shoshone Nation	11/15/2021 & 5/8/2023	9/19/2023	10/3/2023	Deferred to Ute Tribe
Shoshone-Bannock Tribes of the Fort Hall Reservation	11/15/2021 & 5/8/2023	9/19/2023	-	Deferred to Ute Tribe
Ute Indian Tribe of the Uintah & Ouray Reservation, Utah	11/15/2021 & 5/8/2023	9/19/2023	10/3/2023	Continue coordination for MOA

Summary responses received from the tribes are included below and detailed communication documentation is provided in Appendix A.

- Northwest Band of the Shoshone Nation: If the project was located on the north side of the Uinta Mountains, then the Northwest Band of the Shoshone Nation would be interested. Since the Project is located on the south side of the Uinta Mountains the Band will defer to the Ute Tribe.
- Shoshone-Bannock Tribe of the Fort Hall Reservation: We will defer to the Ute Tribe, especially if they are within the exterior boundaries of the Uinta and Ouray Reservation and surrounding locales.
- Ute Indian Tribe of the Uintah and Ouray Reservation: The THPO will look at the cultural resources report that was provided. The tribe is open to pursuing an MOA and would prefer to develop it via email rather than through in-person meetings.

The tribes will also be offered a chance to review and comment on the Draft Plan-EA, and the results will be documented in the Final Plan-EA.

7.1.6 Ute Tribal Historic Preservation Office

A formal request to be a cooperating agency on the Project was submitted to the Ute Indian Tribe of the Uintah and Ouray Reservation on May 20, 2022 (Appendix A), but no response was received. The tribe was also formally consulted as part of the Section 106 process, as described in Section 7.1.5. The tribe adopted a resolution on May 11, 2019 for approval and support of the proposed irrigation improvements for Site 6 Red Cap Extension Canals/Laterals (Appendix A).

In the early stages of the Plan-EA development, the Ute THPO deferred to the Utah SHPO for Section 106 NHPA consultation, and as such, consultation letters were sent to the Utah SHPO (see Section 7.1.3). During the development of this Plan-EA, the Ute Tribe of the Uintah and Ouray Reservation established a THPO and associated officer to assume historic and cultural preservation authority over reservation lands, including the exterior boundaries. As such, the THPO officer certification will allow the tribe's Cultural Rights and Protection Department (CRPD) to exercise cultural and historic preservation authorities that were previously exercised by the Utah SHPO.

In consultation with the Ute THPO, the Project Sponsor, canal companies, and other consulting parties, the NRCS has developed a Draft MOA to mitigate adverse effects to twelve historic canals. The draft MOA and current correspondence between the NRCS, Ute THPO, and other signatories regarding the Draft MOA, is included in Appendix A. Mitigation measures proposed in the draft MOA are listed in Section 8.3.13. The MOA will be executed prior to finalizing the Plan-EA.

7.1.7 U.S. Army Corps of Engineers

USACE has jurisdiction over work in waters of the U.S. under Section 404 of the CWA. A formal request to be a cooperating agency on the Project was submitted to USACE on May 20, 2022 (Appendix A), but no response was received. The USACE was invited to comment on the Project during the scoping period, but no comment was received. Consultation with the USACE will continue during the Draft Plan-EA review period, and the results will be documented in the Final Plan-EA.

7.1.8 Advisory Council on Historic Preservation

In accordance with 36 CFR 800.6(a)(1)(i), NRCS notified the Advisory Council on Historic Preservation (ACHP) of the adverse effects associated with the Project and invited the ACHP to participate in the Project on October 27, 2023. The ACHP declined to participate in the Project in a letter dated November 13, 2023. All correspondence with the ACHP is included in Appendix A.

7.2 Coordination

7.2.1 Sponsoring Local Organizations

Financial assistance for the Project was requested by the SLO (DCWCD) from NRCS through Standard Form 424-Application for Federal Assistance. Initial coordination was conducted with the SLO regarding the Project and the proposed measures. Meetings were conducted throughout the planning and engineering process to discuss the Project measures and identify potential concerns. The SLO was provided copies of the preliminary Plan-EA for review prior to issuance of the Draft Plan-EA to the public. SLO report comments or concerns were addressed and/or corrected prior to issuance of the Draft Plan-EA to the public.

7.2.2 Canal Company Stakeholders

The MLWUA, South Boneta Canal Company, DGIC, and UIIP are stakeholders in the Project. Coordination with these canal companies was completed throughout the planning and engineering process to discuss/develop the alternative measures and identify areas needed for irrigation improvements. The canal company stakeholders were also included in development of the MOA to mitigate adverse effects to historic canals (Appendix A).

7.2.3 Landowner Stakeholders

Coordination was conducted with private landowners having a stake in the Project due to proposed alternative measures being conducted on their lands. Easements would need to be obtained to facilitate alternative measures on private lands. Consultation with landowners will continue throughout the planning process.

7.2.4 Agency Plan-EA Reviews

Agency Plan-EA reviews included appropriate NRCS reviews prior to issuance of the Draft Plan-EA to the public. The sequential review process included the following.

1) NRCS Utah review
2) NRCS National Water Management Center (NWMC) review
3) NRCS Headquarters review
4) Issue the Draft Plan-EA for public review

7.3 Public Participation

7.3.1 Public Participation Plan

A Public Participation Plan (JDE 2019) was prepared to provide effective procedures that define outreach to the general public, recreationists, local businesses, associations, stakeholders, tribes, affected landowners, and affected government agencies (Appendix E). The main goal of public participation is to involve a diverse group of public and government agency participants to solicit input and provide timely information throughout the NEPA review process. As part of the public participation process, the plan seeks to meaningfully engage minority, low-income, and traditionally under-represented populations during the NEPA review process.

7.3.2 Project Scoping

The participation of the public is a vital component of the Project so that those who are interested in or potentially affected by proposed alternatives have an opportunity to share their concerns and provide input regarding the Plan-EA during the initial stages of the process. The Project Scoping Report (Appendix A) outlines the scoping efforts and comments received from the agencies, tribes, and public during the scoping process.

Project scoping questions, comments, and concerns were requested from the public and government agencies during the preliminary scoping period, both orally at public meetings and via written submittal of comments.

7.3.3 Public Outreach

Table 7-2 lists the Project's public outreach activities. The public, agencies, tribes, and/or organizations were notified of activities as described below and provided with opportunities to comment on the Project.

Table 7-2. Public Outreach Activities

Date	Item
August 15, 2019	Project Kickoff Meeting with NRCS and the SLO to Identify Watershed Problems
October 15, 2019	Scoping – Public Comment Period Open Scoping Notice, Meeting Announcements, and Scoping Notice Posted in the Uintah Basin Standard Newspaper
October 22, 2019	Scoping Announcement – Scoping Notice Posted in the Uintah Basin Standard Newspaper
October 30, 2019	Scoping Public Meeting Held
November 14, 2020	Scoping – Public Comment Period Closed
April 23, 2025	Draft Plan-EA Open Comment Period and Notice of Availability (NOA)
May 12, 2025	Draft Plan-EA Public Meeting
May 23, 2025	Draft Plan-EA Comment Period Closed
Estimated July 2025	Final Plan-EA and NOA

7.3.4 Agency and Organization Involvement

During the development of the Plan-EA, agencies were contacted to request input and participation in the Project. Agencies were provided letters of the scoping announcement, which notified them of the Project, public meeting time and locations, and open comment period, and also requested their input. See Section 11.0 for a list of all agencies that were included in the distribution list for Project information announcements. Consultation with agencies and organizations will continue during the Draft Plan-EA review period, and the results will be documented in the Final Plan-EA.

7.3.5 Tribal Involvement

Concurrent with the scoping period, and as part of Section 106 of the NHPA, Executive Order 13007, 13175, and the AIRFA, the NRCS reached out to four Tribes/THPOs regarding known historic properties or places of traditional religious and cultural importance near the project area (Appendix A). The four tribes consulted were the Ute Tribe of the Uintah and Ouray Reservation (Ute Tribe), the Shoshone-Bannock Tribes of the Fort Hall Reservation, the Eastern Shoshone Tribe of the Wind River Reservation, Wyoming, and the Northwest Band of the Shoshone Nation. The tribal scoping letters were submitted on October 8, 2019, as documented in the Scoping Report included in Appendix A.

Two Cultural Resources Survey Reports were completed. The reports were submitted to the same four tribes/THPOs as above for concurrence on site eligibility and project effects (see Sections 4.6.2, 6.6.2.2, 7.1.5, and 7.1.6). The NRCS initiated consultation for the first report in a letter dated November 15, 2021. The NRCS initiated consultation for the second report in a letter dated May 8, 2023. Refer to Section 7.1.5 for responses received to date.

The Ute Tribal Historic Preservation Office was established and assumed all responsibilities under Section 106 of the NHPA during the development of this EA, and as such has taken over historic

preservation duties from the Utah SHPO on tribal lands. Consultation with tribes will continue during the Draft Plan-EA review period, and the results will be documented in the Final Plan-EA.

7.3.6 Draft Plan-EA Public Comment

This portion will be completed in the Final Plan-EA to document the Draft Plan-EA public comment process. Comments and responses on the Draft Plan-EA will be included in Appendix A of the Final Plan-EA.

7.3.7 Final Plan-EA and FONSI Public Comment

When the Final Plan-EA and FONSI are issued, a Notice of Availability will be published locally to notify the public of the finding and copies made available on the Project website.

8.0 Proposed Action Alternative (Preferred Alternative)

8.1 Rationale for Preferred Alternative Selection

Alternatives were formulated following procedures outlined in the NWPM (NRCS 2015), NWPH (NRCS 2014), PR&G (CEQ 2014), and other NRCS watershed planning policies. Several alternatives were formulated for each of the seven sites for improvement as documented in Section 5.4. The NEE and preferred alternative for each site was selected based on the best option determined from the comparison of alternatives developed. The alternative selected for each site provided the greatest cost-benefit, met the guiding principles, provided the greatest benefits for ecosystem services, and was in line with the federal objective and PL 83-566 general purposes. The NEE Alternative was determined to be the locally preferred, environmentally preferred, and socially preferred alternative. Non-structural measures were also considered, but there were no reasonable non-structural measures that could meet the purpose and need of the Project. Refer to the PR&G Analysis Report (AEP and Long Watershed Planning Economics 2023) included in Appendix E for documentation of the alternative decision-making process.

The Action Alternative was selected as the preferred alternative and NEE alternative for this Project based on the evaluation of alternatives. It provides long-term benefits for irrigation systems and for the local agricultural community, including minority and low-income populations. The alternative conserves water, reducing water lost to canal seepage by 41,190 ac-ft annually and improves water quality and quantity of the Eastern Duchesne Watershed over the long term. The measures increase resilience to climate change stressors to better adapt to the projected heightened water variability. They also improve agriculture profitability to support sustainability for agriculture over the long term.

8.2 Measures to be Installed

A summary of the preferred alternative measures is provided below and depicted in Appendix B – Maps B4.1 through B4.6. Refer to Section 5.5.2 for a detailed description of measures.

- Site 1 (Yellowstone Feeder Canal): Line ten sections of the Yellowstone Feeder Canal with concrete, totaling approximately 13,926 linear feet (2.64 miles).

- Site 2 (Coyote Canal): Pipe approximately 4,413 linear feet (0.84 miles) of open channel, replace the headgate at the pipe intake, and install a dissipation structure at the pipe outfall. Grade and place riprap as needed for grade stabilization along approximately 477 linear feet of open canal.
- Site 3 (South Boneta Canal): Pipe approximately 12,883 linear feet (2.44 miles) of open canal, modify an existing diversion and headgate as needed, and install a new pipe intake at the headgate.
- Site 4 (Dry Gulch Class B Canal System): Install approximately 79,293 linear feet (15.02 miles) of HDPE pipe to replace open canal systems, construct three pipe inlets structures, and install a new control structure.
- Site 5 (Dry Gulch Class C Canal System): Install approximately 33,292 linear feet (6.31 miles) of HDPE pipeline to replace the open canal system and install an inlet structure at the pipe intake.
- Site 6 (Red Cap Extension Canals/Laterals): Install approximately 106,161 linear feet (20.11 miles) of HDPE pipeline to replace open canal systems, install a new pipe inlet structure at the pipeline intake, and reconstruct the wasteway adjoining the intake.
- Site 7 (Gray Mountain Canal): Line 3 sections of the Gray Mountain Canal with concrete, totaling approximately 10,475 linear feet (1.98 miles).

8.3 Avoidance, Minimization, and Mitigation

Compensatory mitigation would be required for the preferred alternative. The general mitigation, avoidance, and minimization measures proposed are described in Sections 8.3.1 through 8.3.15 below.

8.3.1 Erosion

Proper BMPs would be installed during and after construction to prevent and control soil erosion. Areas disturbed during construction activities would be restored and stabilized through the establishment of ground cover.

8.3.2 Surface Water Quality

Construction activities may temporarily affect surface water quality, but Project design elements, including BMPs, would be implemented to reduce the quantity of sediment (1) entering drainages, and (2) flowing downstream and violating any federal or state water quality rules and regulations. Construction BMPs would include, but are not limited to, the following:

- A SWPPP would be required and implemented that contains erosion and sediment control and pollution prevention BMPs, such as, but not limited to, silt fences, fiber wattles, and/or earth berms.
- Construction and staging areas would be assessed for the feasibility of such measures as straw bales, silt fences, and other appropriate sediment control BMPs, which would be implemented to prevent the entry of sediment and other contaminants into downstream drainages.

- To ensure that accidental spills do not enter waters, the storage of petroleum-based fuels and other hazardous materials and the refueling of construction machinery would not occur outside of approved designated staging/batch plant areas. Furthermore, the Project would comply with federal and state water quality standards and toxic effluent standards to minimize any potential adverse impacts from discharges to waters of the U.S. or wetlands.

8.3.3 Wetlands

For work within wetlands that are not influenced by canal seepage the following avoidance and minimization measures would be performed in compliance with Nationwide Permit 58 and to restore wetland areas:

- Heavy equipment working in wetlands would be placed on mats, or other measures taken to minimize soil disturbance.
- Temporary fills would be removed in their entirety and the affected areas returned to preconstruction elevations.
- If excavation in wetland areas is necessary, excavated wetland soils would be saved, stockpiled, and replaced after construction completion.
- Disturbed wetland areas would be restored with wetland vegetation appropriate to the surrounding wetland community as approved by NRCS and the Ute Indian Tribe (as applicable), after construction completion.

8.3.4 Air Quality

Construction activities would temporarily emit air pollutants. Fugitive dust, MSAT, and GHG emission increases associated with construction would be minimized through implementation of the following applicable BMPs:

- Spraying the soil on-site with water or other similar approved dust suppressant/soil binder.
- Wetting materials hauled in trucks, providing adequate freeboard (space from the top of the material to the top of the truck), or covering loads to reduce emissions during material transportation/handling.
- Providing a stabilized construction entrance (track-out pad), wheel washers, and/or other similar BMPs at construction site accesses to reduce track-out of site materials onto the adjacent roadway network.
- Removing tracked-out materials deposited onto adjacent roadways.
- Wetting material stockpiles to prevent wind-blown emissions.
- Establishing vegetative cover on bare ground as soon as possible after grading to reduce wind-blown dust.
- Requiring appropriate emission-control devices on all construction equipment.
- Requiring the use of cleaner-burning fuels.
- Using only properly operating, well-maintained construction equipment.

8.3.5 Vegetation

Disturbed vegetated areas would be restored as described for each vegetation community below.

Wetland Vegetation: Disturbed wetlands that are not hydraulically connected to piped/lined sections of the canal segments would be reseeded with a native wetland seed mix and/or planted as appropriate to match the surrounding wetland community.

Riparian Vegetation: Disturbed riparian areas that are not hydraulically connected to piped/lined sections of the canal segments would be seeded/hydroseeded with a native riparian seed mix and/or planted as appropriate to match the surrounding riparian community.

Upland Vegetation: Crop and pasture areas would be replanted as preferred by the landowners for continued agricultural use. Grassland and shrub areas would be seeded/hydroseeded with an upland grass or upland grass and shrub seed mix to match the surrounding upland communities. Disturbed upland forested areas would be seeded/hydroseeded with an upland grass or upland grass and shrub seed mix to reduce the risk of root damage to pipelines and canals along the canal system corridors.

8.3.6 Special Status Plant Species

Permanent impacts to ULT individuals and occupied habitat will be offset through a monetary contribution to the ULT Conservation Fund, held for USFWS by the National Fish and Wildlife Foundation. The calculation is 16.3 acres of occupied habitat lost multiplied by $3,971, resulting in a voluntary contribution of $64,727 to the fund. Contribution to the fund will occur prior to initiation of construction.

The following measures would be implemented to avoid and minimize impacts to ULT and suitable habitat.

- Three years of protocol surveys would be completed where possible, prior to any ground disturbing activity. Areas without three years of survey will be assumed occupied.
- Project design will minimize impacts to occupied and suitable habitat as much as practicable while still accomplishing Project purposes. Staging would not occur within suitable ULT habitat.
- Where individuals occur within 300 feet of ground disturbance, Project activities will occur outside of the flowing season to avoid negative effects from dust, vibration, and weed introduction.
- In areas of pipeline installation through ULT suitable or occupied habitat during conditions when the ground is wet, geotextile matting (or similar product) would be used as a barrier between heavy equipment and the soil surface to reduce rutting from the equipment.
- In areas of buried pipeline installation through ULT suitable or occupied habitat that will not be directly dewatered, topsoil would be excavated and stockpiled separately from subsoil in a manner to maintain vegetation and restored to preconstruction conditions as soon as practicable. Stockpiled topsoil will be prevented from drying out and killing the vegetation by spraying with water, covering with we permeable material, or other similar methods to maintain viable plant stock.
- Soil will not be stockpiled or disposed of in ULT suitable or occupied habitat.

- Pipelines may be installed by boring under the surface of occupied ULT habitat if necessary to avoid disturbance during the flowering season.
- To avoid unnecessary disturbance to suitable habitat, flagging or machine control technology will be used to assist in navigation of equipment.
- All Project personnel would be educated about the sensitive nature of the ULT habitat, instructed to stay within the authorized Project limits, and instructed on the specific avoidance and minimization measures implemented.
- Areas of surface disturbance will be monitored for noxious weeds for three years post-construction. Noxious weeds discovered in suitable habitat within and adjacent to the disturbed areas will be controlled with herbicides or manual treatments. The following restrictions apply to the use of herbicides: no herbicide shall be applied within 2,500 feet of suitable or occupied ULT habitat during the blooming period (July-September); a Pesticide Use Permit shall be approved through authorizing federal or State agency; no aerial or broadcast herbicide treatments shall be applied for vegetation management within 2,500 feet of suitable or occupied ULT habitat; for noxious weed control within 2,500 feet of suitable or occupied ULT habitat, manual spot treatments (i.e. backpack sprayers) shall be used; treatments shall not be done when wind speeds exceed 6 miles per hour; drift reducing agents shall be used when practical; a reduced application rate shall be used; pump pressure shall be reduced, per label instructions; droplet size shall be increased to the largest size possible while still effectively covering the target vegetation. This could be accomplished using larger nozzles or reduced pressure; herbicides shall be stored in spill proof containers away from special status plant habitats; herbicide containers, such as backpack sprayers, will be filled offsite and with secondary spill containment in place (such as a plastic bucket or tray).
- Revegetation of disturbed areas will use only a native seed appropriate for the habitat type, or USFWS approved seed mix.

The following general avoidance measures will also be implemented.

- Disturbed areas will be seeded with a native seed mix appropriate for the respective land use and soil conditions.
- Equipment will be cleaned to remove noxious weeds, seeds, and petroleum products prior to accessing the Project sites.
- Fueling of machinery will occur in confined, designated upland areas to prevent spillage into waterways and wetlands. All fueling areas would have spill cleanup kits available.
- Fill materials will be free of waste, pollutants, and noxious weeds/seeds.
- Disturbed areas will be monitored for noxious and undesirable plant species during construction, post-construction revegetation, and will be controlled using approved methods and materials to prevent spread.
- Only water (no chemicals, reclaimed production water, or oil field brine) will be used for dust abatement measures within suitable habitat.

8.3.7 Noxious Weeds and Invasive Plants

BMPs would be implemented during construction to prevent the spread of N&I species. During construction and until restoration areas are fully established, BMPs would be maintained on a

regular basis to prevent the establishment of N&I species. Non-desirable plant species would be controlled by cleaning equipment prior to delivery to the Project site, eradicating these species before the start and during construction as discovered, and routinely monitoring after construction completion. A PCRP would be developed that would include mechanisms for addressing weed establishment and treatment. Long-term negative impacts would be managed with replanting and various methods of weed control. See Section 8.3.6 for additional measures required within ULT suitable habitat.

8.3.8 Riparian Areas

Larger trees would be avoided to the greatest extent possible to preserve mature riparian vegetation. Disturbed riparian areas that are not hydraulically connected to piped/lined sections of the canal segments would be seeded/hydroseeded with a native riparian seed mix and/or planted as appropriate to match the surrounding riparian community. Riparian areas that are hydraulically connected to the modified canal segments (artificial riparian areas) would be seeded/hydroseeded with a native upland grass or grass and shrub mix as appropriate.

8.3.9 Wildlife and Wildlife Habitat

Construction activities would be limited to the smallest extent practicable within the Project area. Disturbed areas would be restored after construction completion as described in Section 8.3.5.

8.3.10 Special Status Animal Species

Refer to Section 8.3.11 for sensitive species that are also migratory birds or bald/golden eagles for avoidance and minimization measures. Preconstruction surveys would be performed as applicable by a qualified biologist prior to the commencement of work activities. If the species were found during surveys, avoidance/minimization measures would be implemented in coordination with UDWR.

8.3.11 Migratory Birds/Bald Eagles

Construction activities would be limited to the smallest extent practicable within the Project area. Disturbed areas would be restored after construction completion. If construction activities occur during migratory bird breeding/nesting periods, the Project area (and surrounding habitats) would be surveyed by a qualified biologist for active nests no more than 5 days prior to the commencement of work. If active nests are found during surveys, spatial buffers would be established around them in coordination with USFWS and NRCS. Construction activities within the buffer areas would be prohibited until a qualified biologist confirms that all nests are no longer active. The result of the survey will dictate any timing and spatial stipulation to be implemented per the Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances (Romin and Muck 2002).

8.3.12 Hazardous Materials

NRCS requires that contractors comply with all federal, state, and local laws and regulations pertaining to pollution and contamination of the environment to prevent pollution of surface water, groundwater, soil, and air with any hazardous materials. If any hazardous materials/sediment or suspect hazardous materials/sediment are encountered during ground disturbing activities, the contractor shall follow all applicable state and federal regulations for handling, disposing, and reporting of hazardous materials.

8.3.13 Historic / Cultural Resources/Native American Religious Concerns

Consultation pursuant to Executive Order 13007, 13175, and the AIRFA did not identify Native American religious concerns and/or Traditional Cultural Properties within the Project area. Refer to Section 7.1.5 for tribal consultation details.

The NRCS has determined that the project will result in “Adverse Effect to Historic Properties.” In consultation with the Ute THPO, the Project Sponsor, canal companies, and other identified consulting parties, the NRCS has developed a Draft MOA to mitigate adverse effects to twelve historic canals (Appendix A). Mitigation measures proposed in the draft MOA include the following:

- Historical context of the canals in relation to their involvement in the early settlement of the region.
- An aerial video recording of the canals, where permitted, including aerial photos at select structures.
- Additional historical photographs, design drawings, etc. associated with the canals, where applicable.
- Re-evaluation of each canal's eligibility to the NRHP after completion of project, submitted to SHPO and the Ute THPO with formal determinations.
- Public outreach pamphlet or posting of select aerial videography footage on Utah SHPO public outreach webpage.

The following would be implemented in the event of unanticipated discoveries:

- In the event of an unanticipated archaeological discovery during construction, the NRCS shall follow procedures outlined in the Prototype Programmatic Agreement with the Utah SHPO. If significant discoveries requiring longer-term work stoppage for consultation and mitigation are encountered, the NRCS will consult per 36 C.F.R. 800.6 to develop a plan to further mitigate the adverse effect.
- If human remains are discovered under any circumstance, the remains will be treated in accordance with the requirements of the Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. 3001 et seq.) and its implementing regulations (43 C.F.R. 10). All construction activities within 100 feet of the remains shall cease immediately and the NRCS shall consult pursuant to 43 C.F.R. 10.5, to develop a written plan of action to manage the discovery. Construction in the area of the remains may need to be halted throughout the review process. Continuation of work following a discovery will be contingent upon approval by the NRCS Area Cultural Resource Specialist in consultation with the Utah SHPO, tribes, and other consulting parties that the approved plan has been satisfactorily completed.

8.3.14 Visual Resources

Areas disturbed during construction activities would be restored after construction completion by grading to match natural contours and stabilizing through establishment of ground cover. These areas would be reestablished as described in Section 8.3.5.

8.3.15 Noise

Noise minimization efforts would be used and noise control programs (42 U.S.C. 4913)/appliable noise regulations would be followed. Noise minimization efforts would include avoiding operation of mechanical equipment between the hours of 9:30 pm and 7:00 pm per Duchesne County Code (Duchesne County 2022b), and outfitting construction equipment with noise dampening measures (if needed).

8.4 Permits and Compliance

The federal, state, BIA, tribal, and local permits and compliance actions described in this section would be required for construction of the Action Alternative. A Watershed Agreement and a Memorandum of Understanding shall be completed and signed by the NRCS and SLO prior to the obligation of construction funds for the Project. Proposed measures on tribal lands are outside of the county jurisdiction and county permitting requirements would not apply.

8.4.1 Federal

USACE: Section 404 permitting would be required for work in jurisdictional waters of the U.S. It is anticipated that the following permits would be needed for each Site, based on the amount and type of activities to be completed.

- Site 1 (Yellowstone Feeder Canal): Exempt
- Site 2 (Coyote Canal): Nationwide Permit 58
- Site 3 (South Boneta Canal): Nationwide Permit 58
- Site 4 (Dry Gulch Class B Canal System): Nationwide Permit 58
- Site 5 (Dry Gulch Class C Canal System): Nationwide Permit 58
- Site 6 (Red Cap Extension Canals/Laterals): Nationwide Permit 58
- Site 7 (Gray Mountain Canal): Exempt

USFWS: Section 7 Consultation has been completed as described in Section 7.1.1. No further Section 7 consultation is required for the Project unless the proposed action changes or ESA-listed species designations change within the Project area.

BIA: The BIA has a trust responsibility to protect and preserve the Tribe's land, assets, and resources while promoting tribal self-governance pursuant to 25 U.S.C. §§ 323-328 and its implementing regulations at 25 CFR Part 169. The BIA would decide whether to conditionally approve grants of easement and associated ROW agreements between the Ute Tribe and the applicant (Sponsor) for the portion of the Project where measures are located on the Reservation. Such conditional approval does not supplant other applicable requirements under 25 CFR Part 169. Final approval is conditioned upon consent to the ROW by the Ute Tribe; this condition will uphold the Ute Tribe's authority to develop terms and conditions surrounding the use and occupation of Reservation lands.

8.4.2 State

SHPO/THPO: Section 106 consultation has been completed as described in Section 7.1.3.

Utah Division of Oil, Gas and Mining: Tribal lands are not subject to Utah mining regulations. If plans call for obtaining riprap or other materials from a source that does not have an existing mining permit, a mining operations permit would be required in order to mine those materials.

Utah Department of Environmental Quality: Tribal lands are not subject to UDEQ air quality regulations. A Utah Pollutant Discharge Elimination System Construction General Permit is required for construction activities that disturb more than 1 acre and discharge pollutants to surface waters. A SWPPP would be developed, including submitting a Notice of Intent to UDEQ. A 401 Water Quality Certification Application may also need to be completed for project measures.

Utah Division of Water Rights: Written authorization from the State Engineer would need to be obtained to comply with the state Stream Alteration Program before any stream bed or banks could be altered for alternative measures.

Utah Department of Transportation: An encroachment permit would need to be obtained for any construction activity with the UDOT ROW.

8.4.3 Local

Any additional required city or county permits, including permits for work in county road ROWs and utility installation.

8.4.4 Tribe

The Ute Indian Tribe of the Uintah and Ouray Reservation (Ute Tribe) is a federally recognized tribe and has tribal approval authority on the reservation. This Plan-EA will also serve as the necessary environmental documentation of actions located on Ute Tribe land and requiring Ute Tribe administration approval.

Permits on Ute Indian Tribe lands would require BIA ROW permits for utility ROWs and road ROW permits for any work within Tribe/BIA maintained roadways.

8.5 Installation and Financing

8.5.1 Planned Sequence of Installation

The SLO would complete all approvals and permits for the Project prior to the start of construction; these may take up to 1 year to obtain. The major construction elements for the preferred alternative would be sequenced to complete the critical path items first. Construction would take place between October and April (outside of the irrigation season) over two seasons. Refer to Section 5.5.2 for specific timing of construction for each Site.

8.5.2 Responsibilities

This Watershed Work Plan sets forth the responsibilities of NRCS and the SLO. The roles and responsibilities for NRCS and the SLO would be in accordance with this Plan-EA, the Watershed Agreement, MOU, and the O&M Agreement. NRCS is responsible for leading the planning efforts and providing engineering support, the SLO is responsible for environmental permits and construction implementation, and NRCS or the SLO is responsible for the Project design. NRCS would assist the SLO during construction by providing oversight and certifying completion of the Project.

8.5.3 Contracting

Rehabilitation improvements installed from NRCS funding mechanisms would be procured using contracts awarded. The SLO would oversee and administer construction of the Project in coordination with NRCS.

8.5.4 Real Property and Relocations

Relocations would not be required for alternative measures. Real property rights would be obtained and consist of easements along proposed pipe segments that are outside existing canal ROWs. This includes 85.40 acres at Site 4 (Dry Gulch Class B Canal System). 6.34 acres at Site 5 (Dry Gulch Class C Canal System), and 66.47 acres at Site 6 (Red Cap Extension Canals/Laterals). Lands within these areas are owned by private individuals and the Ute Indian Tribe. Maps depicting locations of proposed pipeline easements are depicted in Appendix C – Maps C7.1 through C 7.4.

8.5.5 Financing

The watershed plan must be authorized before funding may be made available for Project operations. NRCS would provide 75% of the total construction cost and 100% of engineering/technical assistance cost for agriculture water management measures of the preferred alternative. This funding would be made available through the WFPO Program authorized by Flood Control Act of 1944 (Public Law [PL] 78-534) and the provisions of the Watershed Protection and Flood Prevention Act of 1954 (PL 83-566) Stat. 666 as amended (16 U.S.C. Section 1001 et seq.). The SLO is responsible for providing the remaining non-federally funded portions of the Project which include 25% of the construction cost, and costs associated with permitting, Sponsor administrative time, and real property rights. Funding for O&M of facilities after construction would be derived from normal revenues of the SLO. This O&M cost would be budgeted annually so that the facilities are kept in good condition.

8.6 Operation and Maintenance

Operation of facilities includes the administration, management, and performance of non-maintenance actions needed to keep the facilities safe and functioning as designed. Maintenance includes performance of work, measuring the recording instrumentation data, preventing deterioration of facility components, and repairing damage or replacing the facility components as needed. Repairing damage to completed facilities caused by normal deterioration, droughts, flooding, or vandalism is considered maintenance. Maintenance includes both routine and as needed measures.

The SLO and irrigation company/association entities would be responsible for the operation, maintenance, and future modifications to facilities. Estimated annual O&M cost are included in Section 5.5.2. A specific O&M Plan would be prepared by NRCS and the SLO in accordance with the NRCS National Operation and Maintenance Manual (NRCS 2003). This plan and agreement would be entered into prior to the start of construction activities and would be in place for the 50-year 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 83-566 (as amended by PL 106-472) assistance.

8.7 Economic and Structural Tables

8.7.1 Economic Tables

Economic tables have been included to present information relevant to the costs and benefits of the preferred alternative and NEE Alternative. The installation cost estimate for the preferred alternative is $41,049,000, as identified in Table 8-1. The costs for the preferred alternative are conceptual-level cost estimates only, with a level of detail judged appropriate for the purpose of identifying the NEE Alternative. Detailed structural designs and construction cost estimates would be prepared for the Project during the final design phase and prior to the start of the competitive bidding process. The final cost of the Project would be the price received from the winning construction bid plus or minus the amount of contract modifications. Assessments, considerations, and calculations are based on a 50-year project life using the NRCS FY 2024 discount rate of 2.75 percent. The economic analysis for the preferred alternative was completed by AECOM and is provided in Section D17 of Appendix D.

The estimated installation cost in Table 8-1 (Economic Table 1) documents land status upon which the Project structures reside, as well as federal and non-federal funding sources, respectively. NRCS is the only federal agency participating in the installation of works of improvement.

Table 8-1. Economic Table 1 - Estimated Installation Cost

Eastern Duchesne Watershed, Utah

(Dollars) [1]

Works of Improvement	Unit	Number			PL 83-566	Other Funds	Total
		Federal Land (BIA)	Non-Federal Land	Total			
Site 1 (Yellowstone Feeder Canal) Canal Lining	Feet	0	13,926	13,926	$2,411,500	$670,500	$3,082,000
Site 2 (Coyote Canal) Irrigation Piping and Canal Stabilization	Feet	0	4,890	4,890	$1,409,000	$394,000	$1,803,000
Site 3 (South Boneta Canal) Irrigation Piping	Feet	0	12,883	12,883	$623,500	$179,500	$803,000
Site 4 (Dry Gulch Class B Canal System) Irrigation Piping	Feet	0	79,293	79,293	$4,618,000	$1,323,000	$5,941,000
Site 5 (Dry Gulch Class C Canal System) Irrigation Piping	Feet	0	33,292	33,292	$12,382,500	$3,410,500	$15,793,000
Site 6 (Red Cap Extension Canals/Laterals) Irrigation Piping	Feet	0	106,161	106,161	$7,226,000	$2,032,000	$9,258,000
Site 7 (Gray Mountain Canal) Canal Lining	Feet	0	10,475	10,475	$3,423,500	$945,500	$4,369,000
			Total	**260,920**	**$32,094,000**	**$8,955,000**	**$41,049,000**

[1] Price base: 2022

Prepared October 2022

Table 8-2 (Economic Table 2) shows the various items of installation cost for individual works of improvement between NRCS (PL 83-566 funds) and the SLO (other funds).

Table 8-2. Economic Table 2 - Estimated Cost Distribution

Eastern Duchesne Watershed, Utah

(Dollars)[1]

Works of Improvement	Installation Cost - Public Law 83-566				Installation Cost - Other Funds					Total
	Construction	Engineering	Project Admin	Total Public Law 83-566	Construction	Permits	Project Admin	Real Property Rights	Total Other	Installation Costs
Site 1 (Yellowstone Feeder Canal) Canal Lining	$1,874,000	$500,000	$37,500	$2,411,500	$625,000	$8,000	$37,500	$0	$670,500	**$3,082,000**
Site 2 (Coyote Canal) Irrigation Piping and Canal Stabilization	$1,095,000	$292,000	$22,000	$1,409,000	$365,000	$7,000	$22,000	$0	$394,000	**$1,803,000**
Site 3 (South Boneta Canal) Irrigation Piping	$484,000	$130,000	$9,500	$623,500	$162,000	$8,000	$9,500	$0	$179,500	**$803,000**
Site 4 (Dry Gulch Class B Canal System) Irrigation Piping	$3,608,000	$962,000	$48,000	$4,618,000	$1,202,000	$25,000	$48,000	$48,000	$1,323,000	**$5,941,000**
Site 5 (Dry Gulch Class C Canal System) Irrigation Piping	$9,626,000	$2,566,000	$190,500	$12,382,500	$3,208,000	$8,000	$190,500	$4,000	$3,410,500	**$15,793,000**
Site 6 (Red Cap Extension Canals/Laterals) Irrigation Piping	$5,630,000	$1,502,000	$94,000	$7,226,000	$1,876,000	$25,000	$94,000	$37,000	$2,032,000	**$9,258,000**
Site 7 (Gray Mountain Canal) Canal Lining	$2,660,000	$710,000	$53,500	$3,423,500	887,000	$5,000	$53,500	$0	$945,500	**$4,369,000**
Total	$24,977,000	$6,662,000	$455,000	**$32,094,000**	$8,325,000	$86,000	$455,000	$89,000	**$8,955,000**	**$41,049,000**

[1] Price base: 2022 Prepared October 2022

Note: Construction costs include $135,000 for resource mitigation ($69,000 for cultural and $66,000 for ULT). Due to rounding, ULT mitigation costs do not match the exact cost presented in Section 8.3.6. See Section D7.2 of Appendix D for a breakout of resource mitigation for each site.

Table 8-3 (Economic Table 4) shows the average annual Project costs per evaluation unit. Each Site is tied to a separate canal system which are considered individual evaluation units for this analysis. The total annual cost for the alternative measures for all Project sites is $1,489,900.

Table 8-3. Economic Table 4 - Estimated Average Annual Costs

Eastern Duchesne Watershed, Utah

(Dollars)[1]

Item	Project Outlays Amortization of Installation Cost	Project Outlays O&M and Replacement Cost[2]	Total
Site 1 (Yellowstone Feeder Canal)	$117,000	-$16,000	$101,000
Site 2 (Coyote Canal)	$67,000	-$16,000	$51,000
Site 3 (South Boneta Canal)	$30,000	-$7,000	$23,000
Site 4 (Dry Gulch Class B Canal System)	$225,000	-$14,000	$211,000
Site 5 (Dry Gulch Class C Canal System)	$597,000	-$60,000	$537,000
Site 6 (Red Cap Extension Canals/Laterals)	$351,000	-$30,000	$321,000
Site 7 (Gray Mountain Canal)	$165,000	-$50,000	$115,000
Total	**$1,552,000**	**-$193,000**	**$1,359,000**

Prepared October 2024

1 Price base: 2022. Calculations based on based on a 50-year project life using FY 2024 Water Resources Discount Rate (2.75%). Refer to Section D17.2.1 of Appendix D for cost calculations.

2 – O&M is calculated as the difference between the No Action Alternative and preferred alternative. The preferred alternative O&M is less than the No Acton Alternative, therefore, the preferred alternative O&M is shown as a negative cost.

Table 8-4 (Economic Table 5a) summarizes the results of the benefits calculated for this alternative by Project site. Monetary benefits include maintaining productivity due to water savings and salinity reduction, and sediment damage reduction for Coyote Canal. The alternative provides $5,653,000 of annual benefit from maintaining agricultural productivity onsite (within the watershed) and $1,763,000 of annual benefit from reduction in salinity of surface water offsite (downstream of the watershed), for a Project total of $7,416,000 in annual benefits. Refer to Table 8-4 for a breakout of benefits by Project site. While two options were evaluated for a determination of benefits (assumed canal failure at Sites 5 and Site 6, and no canal failure), the benefits reported in Table 8-4 include the more conservative estimates of no canal failure. If the canals at Site 5 and Site 6 were to fail, the calculated annual benefit from implementation of the preferred alternative would be much higher at $13,168,000 (see Section D17.3 of Appendix D).

Non-monetary benefits for the project include: reduced erosion; improved water quality and quantity along natural streams that also benefit ESA and SGCN fish species; increased resilience to climate change stressors to better adapt to projected heightened water variability; adding new irrigation capabilities to lands classified as “prime farmland if irrigated; improved peace and sustainability for the agricultural community; improved community well-being; and preservation of agricultural heritage (refer to Section 6.0 Environmental Consequences).

Table 8-4. Economic Table 5a - Estimated Average Annual Benefits

Eastern Duchesne Watershed, Utah

(Dollars)[1]

Item	Estimated Average Annual Benefit		Total
	Agriculture Related	Non-Agriculture Related	
Site 1 (Yellowstone Feeder Canal)			
Maintaining Productivity Increased Water (Onsite)	$255,000	$0	$255,000
Maintaining Productivity Reduced Salinity (Offsite)	$11,000	$11,000	$22,000
Site 2 (Coyote Canal)			
Maintaining Productivity Increased Water (Onsite)	$42,000	$0	$42,000
Maintaining Productivity Reduced Salinity (Offsite)	$11,000	$11,000	$22,000
Sediment Reduction (offsite/public)	$6,000	$0	$6,000
Site 3 (South Boneta Canal)			
Maintaining Productivity Increased Water (Onsite)	$111,000	$0	$111,000
Maintaining Productivity Reduced Salinity (Offsite)	$32,000	$32,000	$64,000
Site 4 (Dry Gulch Class B Canal System)			
Maintaining Productivity Increased Water (Onsite)	$2,648,000	$0	$2,648,000
Maintaining Productivity Reduced Salinity (Offsite)	$347,500	$347,500	$695,000
Site 5 (Dry Gulch Class C Canal System)			
Maintaining Productivity Increased Water (Onsite)	$639,000	$0	$639,000
Maintaining Productivity Reduced Salinity (Offsite)	$71,000	$71,000	$142,000
Site 6 (Red Cap Extension Canals/Laterals)			
Maintaining Productivity Increased Water (Onsite)	$656,000	$0	$656,000
Maintaining Productivity Reduced Salinity (Offsite)	$331,500	$331,500	$663,000
Site 7 (Gray Mountain Canal)			
Maintaining Productivity Increased Water (Onsite)	$1,296,000	$0	$1,296,000
Maintaining Productivity Reduced Salinity (Offsite)	$77,500	$77,500	$155,000
Total	**$6,534,500**	**$881,500**	**$7,416,000**

Prepared October 2024

[1] Price base: 2022. Calculated using FY 2024 Water Resources Discount Rate (2.75%), annualized over 50 years, and 52-year period of analysis (period of analysis = 50-year project life plus 2 years for installation).

Table 8-5 (Economic Table 6) summarizes the benefits and costs of the Project and documents the benefit to cost ratio of the proposed improvements.

Table 8-5. Economic Table 6 - Comparison of Annual Benefits and Costs

Eastern Duchesne Watershed, Utah

(Dollars)

Item	Average Annual Costs[1]	Average Annual Benefits[2]	Benefit Cost Ratio	Net Economic Benefits
Site 1 (Yellowstone Feeder Canal)	$101,000	$277,000	2.7	$176,000
Site 2 (Coyote Canal)	$51,000	$70,000	1.4	$19,000
Site 3 (South Boneta Canal)	$23,000	$175,000	7.6	$152,000
Site 4 (Dry Gulch Class B Canal System)	$211,000	$3,343,000	15.8	$3,132,000
Site 5 (Dry Gulch Class C Canal System)	$537,000	$781,000	1.5	$244,000
Site 6 (Red Cap Extension Canals/Laterals)	$321,000	$1,319,000	4.1	$998,000
Site 7 (Gray Mountain Canal)	$115,000	$1,451,000	12.6	$1,336,000
Total	**$1,359,000**	**$7,416,000**	**5.5**	**$6,057,000**

Prepared October 2024

[1] From Table 8-3

[2] Total annual benefits from Table 8-4

8.7.2 Structural Tables

Table 8-6 identifies the structural data for canal channel work that will performed at Site 1, Site 2, and Site 7. Stream reaches for Table 8-6 are depicted in Figure 8-1, Figure 8-2, and Figure 8-3.

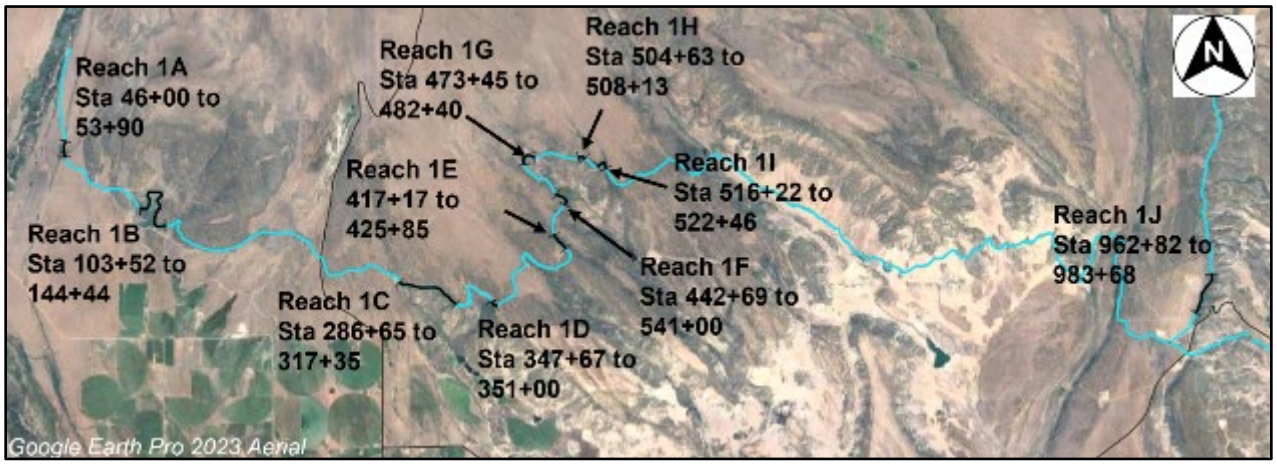

Figure 8-1. Channel Reaches Site 1 Yellowstone Feeder Canal (Reaches 1A-1J)

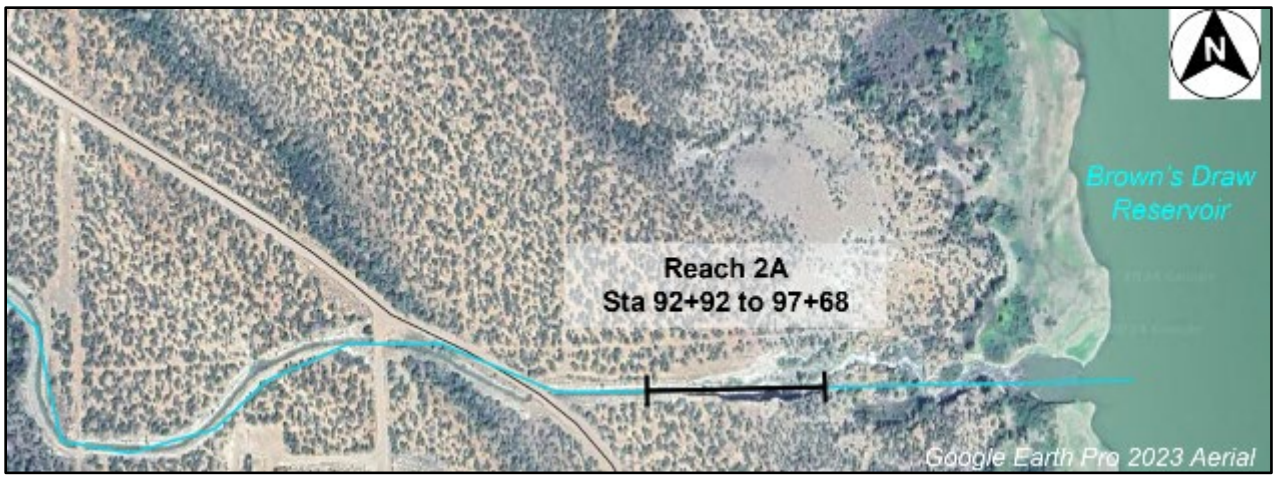

Figure 8-2. Channel Reaches Site 2 Coyote Canal (Reach 2A)

Figure 8-3. Channel Reaches Site 7 Gray Mountain Canal (Reaches 3A-3C)

Table 8-6. Structural Data - Channel Work

Eastern Duchesne Watershed, Utah

Channel Reach	Station	Design Discharge (cfs)	Water Surface Elevation (ft)	Channel Dimensions					*n* Value		Velocities (ft/s)		Excavation Volume (yd^3)	Type of Work[1]	Existing Channel Type[2]	Present Flow Condition[3]
				Gradient (ft/ft)	Bottom Width (ft)	Elevation Start (ft)	Elevation Finish (ft)	Side Slope (H:V)	Aged	As Built	Aged[4]	As-Built[4]				
1A	46+00 to 53+90	90	1.94	0.0063	4	7160	7155	2:1	0.035	0.023	3.82	5.81	NA	V	M	I
1B	103+52 to 144+44	90	2.68	0.0017	4	7156	7149	2:1	0.035	0.023	2.36	3.6	NA	V	M	I
1C	286+65 to 317+35	90	2.85	0.0013	4	7136	7132	2:1	0.035	0.023	2.14	3.25	NA	V	M	I
1D	347+67 to 351+00	90	1.66	0.0120	4	7131	7127	2:1	0.035	0.023	4.85	7.37	NA	V	M	I
1E	417+17 to 425+85	90	2.49	0.0023	4	7127	7125	2:1	0.035	0.023	2.64	4.02	NA	V	M	I
1F	442+69 to 541+00	90	2.91	0.0012	4	7124	7123	2:1	0.035	0.023	2.08	3.16	NA	V	M	I
1G	473+45 to 482+40	90	2.27	0.0034	4	7122	7119	2:1	0.035	0.023	3.05	4.65	NA	V	M	I
1H	504+63 to 508+13	90	2.38	0.0029	4	7117	7116	2:1	0.035	0.023	2.89	4.4	NA	V	M	I
1I	516+22 to 522+46	90	2.76	0.0016	4	7116	7115	2:1	0.035	0.023	2.33	3.55	NA	V	M	I
1J	962+82 to 983+68	90	2.36	0.0029	4	6657	6651	2:1	0.035	0.023	2.88	4.38	NA	V	M	I
2A	92+92 to 97+68	90	0.55	0.1618	8	6221	6144	2:1	0.035	0.02	10.45	18.28	1000	V	M	I
3A	108+00 to 129+00	250	2.7	0.0019	16	5349	5345	1.5:1	0.035	0.023	3.04	4.62	NA	V	M	I
3B	167+00 to 208+50	250	3.93	0.0005	16	5347	5345	1.5:1	0.035	0.023	1.91	2.91	NA	V	M	I
3C	390+00 to 416+00	250	3.07	0.0012	16	5333	5330	1.5:1	0.035	0.023	2.59	3.94	NA	V	M	I

Notes: Hydraulic Gradient is the same as the gradient listed for the Channel Dimensions and was removed from the table to avoid duplicating information. Drain area is not applicable to the canals and was therefore removed from the table.

1 – V = Stabilization as primary purpose (by continuous treatment or localized problem areas – present capacity adequate).

2 – M = Manmade ditch.

3 - I = Intermittent (artificially introduced irrigation flow).

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10.0 List of Preparers

Table 10-1 lists the people who participated in the preparation of this document.

Table 10-1. List of Preparers

Name	Title (Years of Experience)	Education	Other
NRCS - Utah	**(Review and Coordination)**		
Norm Evenstad (Ret.)	Water Resources Specialist (30+)	B.S. – Geology	Utah P.G.
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Jonathan Bingham	Watershed Engineer (13+)	M.S. – Civil Engineering	Utah P.E.
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Greg Allington	Senior Biologist (18+)	B.S. – Wildlife Ecology	
Long Watershed	**Planning and Economic, LLC**	**(Preliminary Economic Analysis)**	
John Long	Economist (20+)	B.S. – Agricultural Economics	
AECOM	**(Economic Analysis)**		
Jason Weiss	Economist (25)	M.S. – Resource Economics and Policy	
JDE (Engineering and Public Involvement)			
Erik Rube	Project Engineer (2.5)	B.S. – Civil Engineering	Utah P.E.
Eric Major	Project Manager (10+)	M.E. – Civil Engineering & Hydraulics	Utah P.E.
Jenna Jorgensen	Environmental Coordinator (14+)	M.S. – Conservation Biology	
FCE (Engineering and Public Involvement			
Eric Franson	Project Manager (26+)	B.S. – Civil Engineering	Utah P.E.
Kyle Devaney	Project Engineer (5+)	B.S. – Civil Engineering	Utah P.E.

11.0 Distribution List

Table 11-1 lists the government agencies and organizations that are included on the Project distribution list for scoping notice and/or notice of availability for the Draft Plan-EA.

Table 11-1. Distribution List

Federal Government	
BIA	USACE
EPA	USFWS
State Government	
Utah Department of Agriculture	Utah Division of Wildlife Resources
Local Government	
Altamont Town	Duchesne County Water Conservancy District
Ballard City	Myton City
Business and Organizations	
Dry Gulch Irrigation Company	South Boneta Irrigation Company
Lake Fork Western Canal Company	Uintah Basin Irrigation Company
Moon Lake Water Users Association	Uintah Indian Irrigation Project O&M Company
Tribes	
Eastern Shoshone Tribe of the Wind River Reservation, Wyoming	Shoshone-Bannock Tribe of the Fort Hall Reservation
Northwest Band of the Shoshone Nation	Ute Indian Tribe of the Uintah and Ouray Reservation
Private Parties	
The names of private parties receiving notice are not listed in this section for privacy.	

12.0 Acronyms, Abbreviations, and Short Forms

ac	acre
ac-ft	acre-feet
AIRFA	American Indian Religious Freedom Act
BA	Biological Assessment
BIA	Bureau of Indian Affairs
BMPs	Best Management Practices
Census Bureau	U.S. Census Bureau
CFR	Code of Federal Regulations
cfs	cubic feet per second
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
ft	feet
GHG	greenhouse gas
IPaC	Information for Planning and Consultation
MBCC	Migratory Birds of Conservation Concern
MBTA	Migratory Bird Treaty Act
MOA	Memorandum of Agreement
MSAT	Mobile Source Air Toxics
N&I	Noxious and invasive weeds
NAAQS	National Ambient Air Quality Standards
NEE	National Economic Efficiency Alternative
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPS	National Park Service
NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWSRS	National Wild and Scenic River System
O&M	Operations and Maintenance
PCRP	Post Construction Rehabilitation Plan
PL	Public law
Plan-EA	Watershed Plan and Environmental Assessment
PM	particulate matter
ROW	Right of Way
SHPO	State Historic Preservation Office
SITLA	Utah School and Institutional Trust Lands Administration
SWPPP	Storm Water Pollution Prevention Plan

THPO	Tribal Historic Preservation Office
UDAF	Utah Department of Agriculture and Food
UDAQ	Utah Division of Air Quality
UDNR	Utah Department of Natural Resources
UDWR	Utah Division of Wildlife Resources
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WFPO	Watershed and Flood Prevention Operations