BUREAU OF RECLAMATION

Draft Environmental Assessment

Lower Arickaree and Garrett Ridge Piping Project

WaterSMART Program
Water Energy and Efficiency Grant
Upper Colorado Basin: Interior Region 7
Western Colorado Area Office

WCAO-DUR-EA-2025-001

U.S. Department of the Interior

April 2025

Mission Statements

The mission of the Department of the Interior is to protect and manage the Nation's natural resources and cultural heritage; provide scientific and other information about those resources; and honor its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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Prepared for Reclamation by J-U-B ENGINEERS, Inc.

Cover photo: Representative site conditions (J-U-B 2024)

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CHAPTER 1—INTRODUCTION

This Draft Environmental Assessment (Draft EA) has been prepared on behalf of the Montezuma Valley Irrigation Company (MVIC) to disclose and evaluate the potential environmental effects of the Bureau of Reclamation's (Reclamation) proposed Lower Arickaree and Garrett Ridge Piping Project (Proposed Project). The federal action evaluated in this Draft EA is providing federal funding through Reclamation's WaterSMART Program to partially fund the piping of the Lower Arickaree and Garrett Ridge Laterals with approximately 3.3 miles of high-density polyethylene pipe (HDPE) and installation of a solar array (Proposed Action). This document has been prepared in compliance with the National Environmental Policy Act (NEPA) and the Department of the Interior's NEPA regulations at 43 C.F.R. §§ 46.10-46.450. If potentially significant impacts to environmental resources are identified, an Environmental Impact Statement (EIS) would be prepared. If no significant impacts are identified, a Finding of No Significant Impact (FONSI) would be issued.

1.1 Project Location and Legal Description

The Project Area sits within the Montezuma Valley of the Upper McElmo Creek watershed of the McElmo Sub-Basin within the Lower San Juan Basin, approximately 0.2 miles east and 2.4 miles southeast of the City of Arriola in northcentral Montezuma County, Colorado (Figure 1 in Appendix A). The Proposed Project footprint (Project Area) is two linear tracts of private lands, approximately 3.6 miles long, and includes the access roads and temporary staging areas (see Figures 1–5 in Appendix A). The Project Area, approximately 24.4 acres, is located within parts of Sections 23, 26, 27, 33, and 34 of Township 36 North Range 13 West and Sections 4 and 9 of Township 35 North Range 13 West in Montezuma County, Colorado.

Three general physical locations are involved in the Proposed Action: The Lower Arickaree Lateral site (Figure 3 in Appendix A), the Garrett Ridge Lateral site (Figure 4 in Appendix A), and the solar array installation site (Figure 5 in Appendix A). The legal locations are in New Mexico Principal Meridian, in Montezuma County, Colorado:

- Lower Arickaree Lateral site is in Sections 20, 29, and 30, Township 37 North, Range 16 West.
- Garrett Ridge Lateral site is in Sections 33 and 34, Township 37 North, Range 16 West, and Section 4 and 3, Township 36 North, Range 16 West.
- Solar array installation site is in Section 15 Township 36 North, Range 16 West.

The Proposed Action is located on private lands and no public lands are in the Project Area. Current land uses in the vicinity of the Project Area are irrigated crop and pastureland with some adjacent undisturbed rangeland.

The Project Area lies in the Colorado Plateau physiographic region, and has a semi-arid continental climate characterized by low humidity and moderately low precipitation (averaging about 16.9 inches annually). The elevation in the Lower Arickaree Canal ranges from 6,276 feet to 6,374 feet above

mean sea level (AMSL), and the Garrett Ridge Canal elevation ranges from 6,360 feet to 6,481 feet AMSL. The solar array installation site is 6,173 feet AMSL.

1.2 Purpose and Need of the Proposed Action

The purpose of the Proposed Action is to contribute to the WaterSMART Water and Energy Efficiency Projects objective of implementing projects to conserve and use water more efficiently.

The need for the Proposed Action is to conserve approximately 2,253 acre-feet (ac-ft) of water annually that is currently lost due to seepage, evaporation, and excess diversions from the Garrett Ridge and Lower Arickaree Laterals (J-U-B 2022a and 2022b), thereby using water more efficiently during ongoing drought conditions in the Western United States (U.S.). The Proposed Action would eliminate these losses.

1.3 Decision to be Made

The federal decision to be made by Reclamation is whether to authorize the use of federal funds for MVIC to implement the Proposed Action.

J-U-B ENGINEERS, Inc. (J-U-B) prepared this Draft EA on behalf of Reclamation, authorized by the WaterSMART Program to provide funding assistance for the Proposed Action. Reclamation awarded a financial assistance agreement to MVIC for the Proposed Action under Assistance Agreement R23AP00415. As the primary funding entity, Reclamation is the lead federal agency for the NEPA analysis of the Proposed Action. MVIC would fund ongoing operation and maintenance of the constructed project.

1.4 Background

1.4.1 Lower Arickaree and Garrett Ridge Laterals

The MVIC is a privately held 501(c)12 non-profit, mutual ditch and reservoir company in the State of Colorado. At present there are 33,284 shares and 1,529 accounts in total, irrigating up to 37,500 acres of primarily alfalfa (*Medicago sativa*) and grass hay.

MVIC was established in 1880 with the purpose of supplying irrigation water to the Montezuma Valley. The initial works of MVIC included the construction of a tunnel and canal through the Dolores Divide, which was a trans-basin diversion from the Dolores River basin to the San Juan River Basin. Following completion of these projects, MVIC received an absolute decree of 64.6 cubic feet per second (cfs) and a conditional decree of 1,234.4 cfs for a total 1,300 cfs. Of the 1,234.4 cfs of conditional rights, 643 cfs was made absolute. Additionally, MVIC holds storage rights in three reservoirs: Narraguinnep (19,000 ac-ft), Groundhog (26,710 acre-ft), and Totten (3,028 ac-ft). Prior to completion of the Dolores Project, MVIC delivered water through direct flow rights and reservoir storage rights.

In 1977, MVIC entered a contract with the Dolores Water Conservancy District (DWCD) to transfer 505 cfs of their remaining 592 cfs conditional rights, including storage rights, and all their

excess water rights for the benefit of perfecting these conditional rights and receiving supplemental Federal Project Water through the Dolores Project. The Dolores Project allows for late season irrigation that was typically unavailable under MVIC's existing system. Of the 37,500 acres MVIC system water can irrigate, 26,300 acres are defined as irrigable by Reclamation, and can therefore receive Dolores Project water. MVIC's annual Dolores Project water allocation varies from year to year and is calculated by taking the difference between the available non-Dolores Project supply and the supply required to irrigate the 26,300 acres of Dolores Project eligible water at a rate of 4.01 ac-ft per acre. By contract, MVIC must limit their total non-Dolores Project diversions to 150,400 ac-ft, which includes the capacity of Groundhog, Narraguinnep, and Totten reservoirs.

No water rights are associated directly with the Garrett Ridge and Lower Arickaree Laterals; water users on these laterals are delivered shares from MVIC's direct flow rights, storage rights, or Dolores Project water. The Garrett Ridge and Lower Arickaree Laterals typically convey up to 22 and 10 cfs, respectively. The irrigation season typically lasts from April 15 to October 15. Annually, an average of 7,985 and 3,630 ac-ft are conveyed and delivered by the Garrett Ridge and Lower Arickaree Laterals, respectively.

The proposed pipelines would eliminate losses due to seepage, evaporation, and over diversions, totaling 2,253 ac-ft annually (J-U-B 2022a and 2022b). The conserved water would then be held in the reservoirs longer during the irrigation season through periods of drought. Additionally, pressurizing the pipelines would provide the opportunity to implement high-efficiency, on-farm irrigation practices (e.g., sprinklers) in the future, further increasing the overall efficiency of the MVIC system.

The Proposed Action is needed because of ongoing drought conditions in the Western U.S. and particularly in the Dolores River Basin in Southwest Colorado. From 2000 to present day, McPhee Reservoir has only reached its capacity in approximately 50 percent of those years. This has led to shortages among those who receive Dolores Project water (including MVIC). These shortages have led to reduced crop production and impacted local economies tied to agricultural production. The Proposed Action would reduce impacts of long-term drought by conserving water currently lost to seepage, evaporation, and operational inefficiencies.

1.4.2 Relationship to Other Projects

1.4.2.1 *Other Projects*

See Figure 6 in Appendix A for the locations of other projects in relationship to the Project Area.

NRCS Funded Project

The Natural Resources Conservation Service (NRCS) funded the Lower Garrett Ridge Lateral Piping Project, which was completed in 2011. The project piped 1,500 feet of MVIC's Lower Garrett Ridge Lateral with HDPE (Figure 6 in Appendix A). The Proposed Action is a continuation of this project.

Privately Funded Project

MVIC is proposing the Narraguinnep Main Dam Left Abutment Rehabilitation Project, which would be constructed in Spring and/or Fall 2025 (Figure 6 in Appendix A). This rehabilitation project is upstream of the Lower Arickaree and Garrett Ridge Piping Project and located in the

Narraguinnep Canyon-Alkali Canyon and Hartman Canyon sub-watersheds. These are tributary to McElmo Creek. The Narraguinnep Reservoir supplies water to both the Garrett Ridge Canal, via the Lone Peak Lateral and to the Lower Arickaree Canal, via the Upper Hermana Lateral. The purpose of the proposed Narraguinnep Main Dam Left Abutment Rehabilitation Project is to prevent and limit effects of seepage from the reservoir occurring at the left abutment and groin of the dam. The proposed project would treat joints, fractures, shear zones, cracks, and seams along the face of the dam with a surficial concrete grout on an exposed bedrock shelf within the reservoir footprint to reduce seepage. As complete seepage elimination is not anticipated, downstream filtration would be implemented. Additionally, a network of horizontal drains would extend into the dam abutment to filter discrete seepage paths. These drains would outlet into small concrete manholes where seepage can be measured before being collected in a solid wall HDPE pipe that parallels the toe drain. The proposed project would enable dam safety officials to monitor seepage and would provide a controlled means for filtered seepage water to be discharged away from the dam, preventing further erosion.

1.4.2.2 *Other Programs*

Salinity Control Program

Reclamation, under the authority of the Colorado River Basin Salinity Control Act, PL 93-320, provides funding through the Basinwide Salinity Control Program and the Basin States Program to implement cost-effective salinity control projects in the Colorado River Basin. Both the Basinwide Salinity Control Program and the Basin States Program fund salinity control projects with a one-time grant that is limited to an applicant's competitive bid. Once constructed, the facilities are owned, operated, maintained, and replaced by the applicant at their own expense.

San Juan River Basin Recovery Implementation Program

The San Juan River Basin Recovery Implementation Program (Recovery Program), a cooperative agreement established in 1992 between Colorado, New Mexico, U.S. Fish and Wildlife Service (USFWS), Bureau of Reclamation, Bureau of Land Management (BLM), U.S. Bureau of Indian Affairs, the Ute Mountain Ute Tribe, the Southern Ute Indian Tribe, the Jicarilla Apache Nation, and the Navajo Nation, seeks to recover Colorado pikeminnow (*Ptychocheilus lucius)* and razorback sucker (*Xyrauchen texanus)* in concert with new and existing water development projects. The program aims to allow water development and management activities to continue in the San Juan River Basin while protecting and recovering these endangered fish (USFWS 2021). A management action includes providing habitat in the San Juan River, including flow regimes necessary to restore and maintain needed environmental conditions, necessary to provide adequate habitat and sufficient range for all life stages to support a recovered population of razorback sucker in the river. The Lower Arickaree and Garrett Ridge Piping Project is in Upper McElmo Creek watershed that is a tributary to the San Juan River.

1.5 Scoping

Scoping for this Draft EA was completed by Reclamation, in consultation with the following agencies, organization, and Tribes during the planning stages of the Proposed Action to identify the

potential human and environmental concerns associated with the implementation of the Proposed Action and No Action Alternatives:

- BLM, Uncompahgre Field Office, Montrose, Colorado
- Colorado State Historic Preservation Office (SHPO), Denver, Colorado
- Colorado Parks and Wildlife (CPW), Grand Junction, Colorado
- Colorado Department of Transportation (CDOT), Grand Junction, Colorado
- Montezuma County
- Montezuma Valley Irrigation Company Shareholders
- U.S. Fish and Wildlife Service (USFWS), Ecological Services, Grand Junction, Colorado
- U.S. Army Corps of Engineers (USACE), Colorado West Regulatory Branch, Grand Junction, Colorado
- Southern Ute Indian Tribe, Ute Mountain Ute Tribe, and the Navajo Nation

In compliance with NEPA, this Draft EA will be available for public comment for a 30-day period. This Draft EA will be distributed to MVIC shareholders, private landowners adjacent to the Proposed Action, organizations, agencies, and tribes (see Appendix B). This Draft EA will be posted on the Reclamation's webpage for Environmental Assessments produced by Interior Region 7—Upper Colorado Basin at: https://www.usbr.gov/uc/DocLibrary/ea.html. Comments and responses will be included in Appendix B of the Final Environmental Assessment (Final EA).

1.5.1 Resources Considered but Eliminated from Further Analysis

Concerns raised during public comment periods on recent similar projects helped identify potential concerns for the Proposed Action. Issues determined to be of potential significance, and therefore appropriate for further effects analysis under this Draft EA, are discussed in Chapter 3. The following issues identified in Table 1-1 were identified as either ***not present*** or ***not affected*** and are not analyzed in greater detail within this document.[1]

Table 1-1. Resources Considered but Eliminated from Further Analysis

Resource	Rationale for Elimination from Further Analysis
Paleontological Resources	A paleontological resource is any fossilized remains, traces, or imprints of organisms, preserved in or on the Earth's crust, which are of paleontological interest and provide information about the history of life on Earth but do not include items found in an archaeological context or cultural items (43 CFR 49.5). The survey of the Project Area did not find any paleontological resources (Omvig 2024). Therefore, there is no potential for the No Action Alternative or the Proposed Action to affect paleontological resources.
Recreational Resources	The access roads and laterals are located entirely on private lands which are not open for public recreation. Therefore, neither the No Action Alternative nor the Proposed Action would affect public recreation.
Tribal Concerns and Indian Trust Assets	No Indian trust assets were identified within the Project Area. No Native American sacred sites were identified to Reclamation within the Project Area. The Proposed Action would not affect Indian trust assets or Native American sacred sites. To confirm this finding, Reclamation will consult with the Southern Ute Indian Tribe, Ute Mountain Ute Tribe, and the Navajo Nation, and provide the Tribes with a description of the Proposed Action and request written comments regarding any effects on Indian trust assets or Native American sacred sites because of the Proposed Action. Results of consultation with tribes will be included in the Final EA.
Wilderness, Wild and Scenic Rivers, and National Parks Resources	No wild and scenic rivers, lands with wilderness characteristics, Wilderness Study Areas, National Parks, or other ecologically critical areas exist within the Project Area. Therefore, neither the No Action Alternative nor the Proposed Action Alternative, would affect these resources.

[1] "Executive Order 14154, Unleashing American Energy (Jan. 20, 2025), and a Presidential Memorandum, Ending Illegal Discrimination and Restoring Merit-Based Opportunity (Jan. 21, 2025), require the Department to strictly adhere to the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 et seq. Further, such Order and Memorandum repeal Executive Orders 12898 (Feb. 11, 1994) and 14096 (Apr. 21, 2023). Because Executive Orders 12898 and 14096 have been repealed, complying with such Orders is a legal impossibility. Reclamation verifies that it has complied with the requirements of NEPA, including the Department's regulations and procedures implementing NEPA at 43 C.F.R. Part 46 and Part 516 of the Departmental Manual, consistent with the President's January 2025 Order and Memorandum."

CHAPTER 2—PROPOSED ACTION AND ALTERNATIVES

The alternatives evaluated in this Draft EA include a No Action Alternative and the Proposed Action. In accordance with NEPA, a No Action Alternative is presented and analyzed to provide a baseline for comparison to the Proposed Action. The resource analysis contained within this document, along with other pertinent information, will guide Reclamation's decision about whether to fund the Proposed Action for implementation. The Proposed Action is analyzed in comparison to the existing environment and the No Action Alternative to determine potential environmental effects if funding is authorized and the Proposed Action is implemented.

2.1 Alternatives Considered but not Carried Forward

The following alternative was evaluated by MVIC during the conceptual design process for the Proposed Action, but this alternative was not proposed to Reclamation and was eliminated from detailed analysis because it was determined to be infeasible by MVIC. This alternative considered the use of polyvinyl chloride (PVC) instead of HDPE pipe. While PVC pipe has many positive attributes, such as ease of installation with gasketed joints and lower pipe cost, PVC pipe is rigid and requires expensive fittings to follow most curvilinear alignments. Cost data from recent projects verifies this expense. HDPE pipe can be bent to follow curves, based on pipe diameter and wall thicknesses. Given the sinuosity of both the Lower Arickaree and Garrett Ridge Laterals, the potential increase in construction costs due to expensive fittings did not fit MVIC's budget. Therefore, this alternative was eliminated from further study.

2.2 No Action Alternative

Under the No Action Alternative, Reclamation would not authorize funding for the piping of the Lower Arickaree and Garrett Ridge Laterals. The existing laterals would remain as earthen ditches. Operations and maintenance would continue. Irrigation practices and seepage from the unlined open laterals would continue to lose 2,253 ac-ft to annually due to seepage, evaporation, and excess diversions.

2.3 Proposed Action

Under the Proposed Action, Reclamation would provide funding to the MVIC through the WaterSMART Program Water Energy and Efficiency Grant to support the Lower Arickaree and Garrett Ridge Piping Project, including irrigation water infrastructure improvements, 3.3 miles of lateral piping, and associated actions. The details and specific components of the Proposed Action are shown in the following table, in the Figures 2, 3, 4 and 5 in Appendix A, and are discussed below. The total surface disturbance for the Proposed Action would be 24.4 acres.

Table 2-1. Lower Arickaree and Garrett Ridge Piping Project Proposed Activities and Footprint

Proposed Action Component	Total Acres (Feet)
Garrett Ridge Pipeline Inlet Structure	0.1 acres
Garrett Ridge Main Pipeline installation (convert unlined ditch)	3.3 acres (7,100 feet)
Garrett Ridge Spill Pipeline (new alignment)	1.1 acres (2,330 feet)
Garrett Ridge Spill Pipeline Outlet Structure	0.1 acres
Lower Arickaree Pipeline Inlet Structure (convert unlined ditch)	0.1 acres
Lower Arickaree Pipeline installation	3.7 acres (8,100 feet)
Staging areas use and improvement	16.0 acres
Solar Array Installation	0.0 acres
Totals	**24.4 acres**

These proposed activities would improve system efficiency and would prevent the loss of 2,253 ac-ft annually due to seepage, evaporation, and excess diversions (Appendix C). The total length of the final alignment of Garrett Ridge Lateral would be 1.8 miles and the total length of Lower Arickaree Lateral would be 1.5 miles.

For all aspects of the Proposed Action, Best Management Practices (BMPs) would be used to minimize the effects of the project on the human and ecological environment. BMPs and other protective measures are incorporated as part of the Proposed Action, are described, and analyzed as part of the Proposed Action in Chapter 3 (Affected Environment and Environmental Consequences) and are summarized in Chapter 4 (Environmental Commitments). The Proposed Action would be implemented in accordance with the environmental commitments listed in Chapter 4.

2.3.1 Irrigation Pipeline Installation

2.3.1.1 *Garrett Ridge Pipeline Inlet and Spill Structure*

The Garrett Ridge Lateral diverts from the Lone Pine Lateral near its intersection with County Road 22. The proposed Garrett Ridge pipeline would begin approximately 2.1 miles down-ditch from the headgate at the Lone Pine Lateral. As part of the Proposed Action, a concrete inlet and spill structure would be constructed to convey flows into the main pipeline and excess flows into the spill pipeline. Once the main pipeline fills, the spill pipeline would convey excess flows approximately 2,330 feet to the Hermana Lateral, to be used beneficially elsewhere in the MVIC system. The existing concrete check structure and turnout above the inlet structure would remain in place. The proposed pipeline inlet and spill structure would provide screening of inflow into the main and spill pipelines and a slide gate to manage inflow into the main pipeline. The spill pipeline and outlet structure would be installed along a new alignment, requiring construction and permanent Rights-of-way (ROW) easements from two private landowners. The existing two-track/driveway that comes from the west via County Road 22 would also be improved by placing crushed rock along the existing road.

2.3.1.2 *Garrett Ridge Main Pipeline*

For the Proposed Action, MVIC would replace approximately 7,100 feet of open, unlined irrigation conveyance ditch with a HDPE pipeline with diameters ranging from 30 to 18-inches and construct

21 metered turnouts along the course of the pipeline for water delivery to shareholders. The pipeline is designed to convey up to 19.6 cfs. A flow meter would be installed immediately below the inlet structure to meter flows in the main pipeline. The end of the Garrett Ridge Main Pipeline would fuse directly onto the existing Lower Garrett Ridge Pipeline. A pressure reducing valve and an isolation valve would be installed above the connection.

The existing open lateral crosses under Highway 491 via a 36-inch corrugated metal culvert with an inverted siphon profile. Due to its profile, the new pipeline cannot be sleeved through the existing culvert, nor can the highway be open cut. Therefore, the new pipeline would be installed underneath Highway 491 via horizontal auger boring methods (aka "jack and bore"). An additional isolation valve would be installed above the Highway 491 crossing. Where the proposed pipeline crosses County Road S, the road would be open-cut and trenched to install the pipeline. The open cut would then be backfilled and the road surface restored upon pipeline installation.

The pipeline would be installed in the current lateral prescriptive ROW aside from one deviation. The primary purpose of this deviation is to create a straighter pipeline alignment, reduce required pipeline materials, improve flow efficiency, and to preserve natural features (e.g., trees) along the existing lateral alignment at the request of the respective landowner. In the location where the new pipeline leaves the current lateral alignment, the abandoned lateral would be backfilled and reseeded. Based on the new lateral alignment, but also for access as described in Section 2.4.2, construction and permanent easements would be obtained on three separate private land parcels.

2.3.1.3 *Garrett Ridge Spill Pipeline and Outlet Structure*

For the Proposed Action, MVIC would install an approximately 2,330-foot HDPE pipeline from the proposed concrete inlet and spill structure to the Hermana Lateral. This pipeline ranges from 30- to 24-inch diameter through its length and would convey up to 19.6 cfs. This pipeline would follow a new alignment along the northern edge of an irrigated field. Where the pipeline terminates at the Hermana Lateral, a concrete outlet structure would be installed to dissipate energy and reduce the risk of scour in the Hermana Lateral. This outlet structure overflow would also serve as a measuring structure (by means of a rectangular suppressed weir), allowing MVIC to measure and record excess flows diverted into the Hermana Lateral.

2.3.1.4 *Lower Arickaree Inlet Structure*

The Lower Arickaree Lateral diverts from the Hermana Lateral, near the intersection of the Hermana Lateral and County Road 24. Currently, a steel slide gate regulates flows into the Lower Arickaree, which passes through a 36-inch HDPE culvert under the Hermana Lateral embankment and into the existing open ditch. For the Proposed Action, MVIC would install a concrete inlet structure in the Hermana Lateral. The new inlet structure would provide coarse screening of inflow, control the rate of water intake, and would maintain the water surface elevation in the Hermana Lateral. A new headgate would be attached to the new intake structure to control flow entering the proposed irrigation pipeline. The steel slide gate and HDPE culvert would be removed and salvaged by MVIC.

2.3.1.5 *Lower Arickaree Pipeline*

For the Proposed Action, MVIC would replace approximately 8,100 feet of open, unlined irrigation conveyance ditch with an HDPE pipeline with diameters ranging from 30 to 18-inches and

construct 18 turnouts along the course of the pipeline for water delivery to shareholders. The pipeline is designed to convey up to 18.3 cfs. A flow meter would be installed immediately below the inlet structure to meter flows. The proposed pipeline would terminate with a manifold serving turnouts LA-13 through LA-17, which are specific water delivery points along the lateral. A drain would be installed near turnouts LA-18 and LA-19, allowing the pipeline to drain at locations where existing open ditch currently drains.

Where the proposed pipeline crosses County Road P, the road would be open-cut and trenched to install the pipeline. The open cut would then be backfilled and the road surface restored upon pipeline installation.

The pipeline would be installed in the current lateral prescriptive ROW aside from two deviations. The primary purpose of these deviations is to create a straighter pipeline alignment, reduce required pipeline materials, improve flow efficiency, and to preserve natural features (e.g., trees) along the existing lateral alignment at the request of the respective landowner. In the locations where the new pipeline leaves the current lateral alignment, the abandoned lateral would be backfilled and reseeded. Based on the new lateral alignment, but also for access as described in Section 2.4.2, construction and permanent easements would be obtained on four separate private land parcels.

2.3.1.6 *General Pipeline Installation Notes*

Installation of each of the three pipelines would require the excavation of a trench within the alignment of the existing lateral with sufficient width and depth to allow for adequate compaction around the pipe haunch and accommodation of the minimum bury depths. Piping installed within the existing ditch prism would require excavation of the ditch bottom and sides.

As the existing open laterals are excavated, approximately four inches of uncompacted bedding material would be placed at the bottom of the trench at the grades and elevations specified in the preliminary construction plans using heavy machinery (J-U-B 2024c; J-U-B 2024d). The pipe would be installed and fused using specialized equipment and placed on the bedding material. Pipeline embedment and backfill material would be placed in the trench and compacted in lifts until the designed grade is attained. The contractor would attempt to use onsite material for embedment and backfill but may use imported aggregate obtained from a commercial source.

Other existing ditch structures located throughout the pipeline alignment (such as culverts, check structures, and flumes) would be removed as they are encountered. All existing concrete ditch splitter boxes and flumes would be removed and replaced with piped, metered turnouts. Air vents, drains, and other pipeline appurtenances would be strategically placed throughout the pipeline alignment.

2.3.2 Solar Array Installation

For the Proposed Action, MVIC would install a 19-kilowatt solar array on the roof of their existing maintenance building to offset 100% of annual electricity needs at the building. This installation would not result in any additional ground disturbance or other impacts. The installation location of the Solar Array is displayed in Figure 5, in Appendix A.

2.3.3 Restoration and Revegetation

All disturbed areas from construction activities would be contoured and reclaimed to match the surrounding areas and restore existing drainage patterns. The MVIC would be responsible for restoration and revegetation following completion of construction activities and would implement restoration and revegetation methods as described below or using other appropriate methods.

Following construction, disturbed ground would be revegetated in one of two ways: the sterile topsoiling and natural recruitment method, or the conventional method.

In non-farmed areas, the sterile topsoiling and natural recruitment method for reclamation would be used to minimize the spread of weeds following construction, unless the underlying landowner specifically requests the conventional reclamation method described below. This method involves applying sterile topsoil—weed-free soil, sourced from the lower layer of soil rather than the topsoil—with no additional planting or seeding, instead allowing the surrounding plant species to recruit and recolonize the disturbed areas. Following sterile topsoil placement, the soil would be mulched and inoculated with mycorrhiza to facilitate germination and growth, ensuring success of the natural revegetation.

Conversely, in irrigated pastures and hayfields, the conventional revegetation method would be used, wherein topsoil retained during construction would be spread on the site, and the site reseeded. Weed-free seed mixes appropriate for the surroundings would be used. For instance, roadsides and the margins of agricultural areas would be reseeded with regionally appropriate drought-tolerant grasses. Where irrigated lands are revegetated, the seed mix would be a weed-free hay mix (or similar mix) acceptable to the landowner. Where the disturbed ground is adjacent to natural vegetation, the weed-free seed mix would include drought -tolerant and locally ubiquitous native grass such as western wheatgrass. Before seeding, the soil would be mulched and inoculated with mycorrhiza to facilitate germination and growth, ensuring success of the reclamation effort.

For either method, revegetation success would be monitored subject to agreements between the MVIC and individual landowners or in accordance with public land permit stipulations. The preliminary construction plans indicate where each reclamation method is to be used, and specify the seed mix, where appropriate (J-U-B 2024c; J-U-B 2024d).

BMPs described in Chapter 4 (Environmental Commitments) would be used to control erosion, minimize harm to wildlife and aquatic species, and minimize the spread of noxious weeds during and following completion of the construction. Noxious weeds would be controlled in disturbed areas according to ROW stipulations and Montezuma County standards (Montezuma County 2023).

2.4 Construction

2.4.1 Equipment

Bulldozers, backhoes, excavators, haul trucks, and various smaller construction vehicles and equipment (such as pipe fusion equipment) would be used to complete the Proposed Action. Installation of the pipeline in the existing ditch alignment would involve using excavators and a bulldozer to grub vegetation and prepare the existing laterals. Any new pipeline alignment would be prepared with the use of an excavator. Front end loaders with pallet forks would be used to handle pipe in the staging areas. Fill and borrow material would be transported in dump trucks loaded with

an excavator or loader. Pipe arriving at the staging areas would be transported on flatbed trucks and fused adjacent to or within the trench. A bulldozer and grader would be used to grade the surface and prepare it for re-vegetation following completion of pipe installation activities. Concrete mixer trucks would be used to transport concrete from a regional ready-mix concrete plant to the proposed concrete structures.

2.4.2 Access

The Proposed Action would take place on private lands, and construction and access footprints would be limited to only those areas necessary to safely implement the Proposed Action.

2.4.2.1 *Garrett Ridge Pipeline Access*

Access to the Garrett Ridge Lateral would occur on a collection of field roads and driveways located along the alignment of the pipeline ROW. Access to the Garrett Ridge inlet structure would occur along a two-track/private driveway, accessed from County Road 22. In preparation for construction activities, crushed rock would be placed along the existing two-track/driveway. Access to the proposed Garrett Ridge spill structure would occur along the existing access road along the Hermana Lateral, via County Road 23. Access to the proposed pipeline between the inlet structure and Highway 491 would occur along the pipeline alignment, via County Road S. Along Highway 491, during pipeline installation, both shoulders of the highway would be closed, but both travel lanes would remain open. Access to the pipeline below Highway 491 would occur from County Road 22.

In addition to the Highway 491 crossing, the Garrett Ridge Lateral crosses County Road S, and during construction, one lane would remain open. The Garrett Ridge Lateral also crosses four private driveways or field roads, and the contractor would coordinate with each landowner when placing those sections of pipe.

2.4.2.2 *Lower Arickaree Pipeline Access*

Access to the Lower Arickaree Lateral would occur on a collection of field roads and driveways located along the alignment of the pipeline ROW. Access to the Lower Arickaree inlet structure would occur along the existing Hermana Lateral access road, via County Road 24. Access to the proposed pipeline would occur through several private driveways and field roads accessed from County Road P, County Road 24, and County Road N.

The Lower Arickaree Lateral crosses County Road P, and during construction, one lane would remain open. The Lower Arickaree Lateral crosses six private driveways and field roads, and the contractor would coordinate with each landowner when placing those sections of pipe.

2.4.2.3 *General Access and Traffic Control*

The county road crossings would each take approximately two days to complete, and most private road crossings would be started and completed within the same day. The Highway 491 crossing may take up to one week to complete. All road and driveway crossings would have a means to pass traffic unless negotiated otherwise with owners. The duration and timing of the road crossing construction would be detailed in a Traffic Control (TC) Plan. All roads would be returned to the same or better conditions per local, county, and state regulations and specifications.

The contractor would submit the TC Plan before any initial project-wide construction to include the roads, staging areas, and construction access which would detail the means, methods and materials used to maintain street traffic surrounding construction and staging areas and to isolate construction and staging areas from the public, and would detail coordination with the CDOT, the Montezuma County and Sheriff departments and emergency services before working in the ROW, and with private landowners when traffic or access would be delayed. The TC Plan would also comply with traffic control requirements stipulated in the CDOT ROW utility permit (pending). Additionally, the TC Plan would require cleaning and repairing any damage caused by installation and restoring existing and permanent facilities used during construction to original conditions.

2.4.3 Staging and Borrow Areas

Five staging areas are strategically located along both the Garrett Ridge and Lower Arickaree pipeline alignments (see Figures 3 and 4 in Appendix A). The total area of the 5 staging areas is approximately 16.0 acres. The staging areas are primarily situated in fallow, previously disturbed agricultural areas that contain a variety of ruderal species on private land holdings of current MVIC shareholders.

No borrow areas are proposed.

2.4.4 Construction Timeframe

Construction would occur from October 16 to April 14 outside of the irrigation season and would take two years to complete. Work that is not disruptive to the delivery of irrigation water (e.g., mobilization and staging area preparation) would be allowed to occur during irrigation season (April 15-October 15).

The timing of certain activities related to the Proposed Action would be subject to limitations as shown in the following tables and described in further detail in the BMPs in Chapter 4 (Environmental Commitments).

Table 2-2. Timing Restrictions and Implementation Instructions for Lower Arickaree and Garrett Ridge Piping Project Implementation

Time Period	Restriction or Implementation Instruction
Daytime Working Hours	Complete all work within the designated Proposed Project footprint and during established daytime working hours.
Extreme Wet Weather Conditions	Do not conduct construction activities during extreme wet weather conditions, if practicable.
Irrigation Season, April 15–October 15	Do not conduct work that is disruptive to delivery of irrigation water.
Fall/Winter-Spring, October 16–April 14	Time construction to occur beginning in fall/winter and ending in the spring of each construction phase. General construction would occur in this timeframe.
March 15–August 15	Ensure a qualified biologist performs a nest survey for migratory birds within seven days before ground disturbance or the removal of trees and shrubs. If nests are located, do not allow project activities until approval is granted.

2.4.5 Rights-of-Way and Land Ownership

MVIC is a privately-owned ditch company, and the Garrett Ridge and Lower Arickaree Laterals are located on private lands. The majority of the proposed activities would occur within the existing easements for Garrett Ridge and Lower Arickaree Laterals. However, even though the Garrett Ridge and Lower Arickaree Laterals are currently maintained irrigation laterals, no roads for operation and maintenance exist along most of the lateral alignments, and eight new permanent ROW easements would be obtained for the new lateral alignments.

2.5 Permits and Authorizations

If the Proposed Action is approved, the following permits, authorizations, and coordination, as listed in Table 2-3, would be required before project implementation.

Table 2-3. Permits, Authorizations, and Coordination

Authorizing Agency or Authority	Purpose of Permit/Authorization	Entity Responsible for Obtaining Permit/Authorization
Private landowners	ROW approvals outside the current ditch easement with land involved in the Proposed Action	MVIC
MVIC; engineer	Traffic Control Plan	Construction contractor
Local utilities	Utility clearances before construction activities	Construction contractor
Montezuma County, including Montezuma County Sheriff; Road and Bridge Department and Floodplain Administrator	Coordination before construction activities; permits for road crossings; compliance with county floodplain development permit due to project location in the 100-year floodplain	MVIC/Construction contractor
Federal Emergency Management Agency (FEMA)	Compliance with National Flood Insurance Program (NFIP) standards for development within the 100-year floodplain.	MVIC/Construction contractor
Cortez Fire Protection District	Coordination before construction activities	Construction contractor
Engineer	Spill prevention, control, and countermeasures (SPCC) plan	Construction contractor
CDOT	Coordination and permitting for pipeline crossing at U.S. Highway 491	MVIC/Construction contractor
Colorado Department of Public Health and Environment (CDPHE)	Stormwater Management Plan (SWMP) submitted before ground disturbance	Construction contractor

Authorizing Agency or Authority	Purpose of Permit/Authorization	Entity Responsible for Obtaining Permit/Authorization
CDPHE	Clean Water Act (CWA) Section 401 (water quality certification), and Section 402 (National Pollutant Discharge Elimination System [NPDES]) obtained before ground disturbance	MVIC/Construction contractor
USACE	CWA Section 404 Regional General Permit 5 (ditch related activities in the State of Colorado)	MVIC

Compliance with all federal laws is required before and during project implementation, including but not limited to:

2.5.1 Natural Resource Protection Laws

- Clean Air Act of 1963 (CAA; 42 U.S.C. § 7401)
- Endangered Species Act of 1973 as amended (ESA; 16 U.S.C. 1531-1544, 87 Stat. 884)
- Clean Water Act of 1972 as amended (CWA; 33 U.S.C. 1251 et seq.)
- Migratory Bird Treaty Act of 1918 (MBTA; 16 U.S.C. 703-712)
- Bald and Golden Eagle Protection Act of 1940 (BGEPA; 16 U.S.C. 668- 668c)

2.5.2 Cultural Resource Laws

- National Historic Preservation Act of 1966 (NHPA; 16 U.S.C. 470 et seq.)
- Archaeological Resources Protection Act of 1979 (ARPA; 16 U.S.C. 470aa-470mm et seq.)
- Native American Graves Protection and Repatriation Act of 1990 (NAGPRA; 25 U.S.C. 3001 et seq.)
- American Indian Religious Freedom Act of 1978 (AIRFA; 42 U.S.C. PL 95-341)
- Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48 FR 44716)

CHAPTER 3—AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

This chapter discusses resources that would be affected by the No Action and the Proposed Action Alternatives. For each resource, the potentially affected area and/or interests are identified, existing conditions described, and potential effects predicted under the No Action and Proposed Action Alternatives. This section is concluded with a summary of effects. Resources are presented alphabetically. Resource analysis timeframes for effects in this document are temporary (0-3 years), short-term (3-10 years), and long-term (15+ years).

3.2 Affected Environment and Environmental Consequences

3.2.1 Access, Transportation, and Public Safety

Access, transportation, and public safety in the region are managed by various local, state, and federal agencies, including the Montezuma County Sheriff, Cortez Fire Protection District, Montezuma County Road and Bridge Department, and the CDOT. The major transportation routes in the vicinity of the Proposed Action are U.S. Highway 491, County Road S, Road U, County Road P, and County Road N. The Garrett Ridge Lateral has two major roadway crossings, and the Lower Arickaree Lateral has one major crossing.

The Proposed Action would take place on private lands and in local and federal transportation corridors. Access to each lateral would occur on proposed staging areas, existing access roads, and a clearly defined construction footprint strategically located along the alignment of the pipeline ROW. Access roads for the Garrett Ridge Lateral includes four major access points. The northernmost access road is an existing road for the Upper Hermana Lateral accessed from Road 23, one access road near the center of the proposed pipeline alignment is from County Road S, a short lateral access from U.S. Highway 491, and Road 22 is located at the tie-in location of the lower pipeline. Additionally, three private driveways to residences are located along the pipeline ROW.

Access roads for the Lower Arickaree Lateral include three major roadway crossings, and three private driveways to residences. The northernmost access road is accessed from County Road U. Road P would be utilized for pipeline ROW and staging area access. The southern end of Lower Arickaree pipeline and staging areas would be accessed from a private driveway off County Road N. Private and county roads generally provide access and mobility for residents traveling in and out of the Project Area. The Montezuma County Sheriff and the Cortez Fire Protection District cover the Project Area. Since the last census, the Cortez population has slightly increased by approximately 3%, which may contribute to a slight increase in traffic volume on local and county roads (US Census Bureau, 2024).

Within the Project Area, safety risks are associated with sources of open, moving water.

No Action Alternative: No effects would occur to public access, transportation, or public safety from the No Action Alternative at the local or regional level. Operation and maintenance activities for the laterals would continue, and personnel would continue to use various private and public roads in the Project Area. No permits or coordination with local, state, or federal agencies would be required under the No Action Alternative. The safety risks associated with sources of open, moving water associated with the Garret Ridge and Lower Arickaree laterals would continue.

Proposed Action: Construction traffic would access the Project Area using existing roads and access roads from U.S. Highway 491, Road 22, County Road S, Road 23, Road P, Road 24, and County Road N. Construction and access footprints would be restricted to only those areas necessary to safely implement the Proposed Action. No new access roads would be constructed, but eight new permanent ROW easements from private landowners would be obtained for the new lateral alignments. Additionally, the existing two-track/private driveway used to access the Garrett Ridge inlet structure would be improved with crushed road. Implementation of the Proposed Action would temporarily cause brief delays for residents and the public using U.S. Highway 491, County Road S, Road P, and County Road N due to construction vehicles entering and exiting the private access roads. Additionally, at the three locations where the Garrett Ridge Lateral and Lower Arickaree Lateral crosses roads, temporary delays would occur during pipe installation. The contractor would prepare and implement a TC plan that would maintain effective traffic control and requires coordination with CDOT, the Montezuma County and Sheriff departments, and emergency services before working in the ROW, and with private landowners when traffic or access would be delayed, consistent with local and CDOT standards. Additionally, the TC Plan would require cleaning and repairing any damage caused by installation and restoring existing and permanent facilities used during construction to original conditions. Traffic on local roads is currently light, and the Proposed Action would only result in a temporary, minor increase in traffic for residents and businesses. Therefore, this impact would not rise to the level of significant.

The Montezuma County Sheriff and the Cortez Fire Protection District would continue to cover the Project Area for emergency response. Coordination efforts with those entities would ensure their response is not hindered by activities associated with the Proposed Action. Active construction areas would be adequately marked and barricaded to prevent public access. Therefore, no temporary significant adverse effects to public safety would occur.

To further minimize local and regional impacts to access, transportation, and public safety from the Proposed Action, MVIC and the contractor would coordinate with utility companies and the Montezuma County Road and Bridge Department and Floodplain Coordinator for necessary construction utility clearances, road crossings, and permits, and would also coordinate with CDOT, and County and Sheriff departments when traffic or access would be delayed (see Table 2-3. Permits, Authorizations, and Coordination and environmental commitments in Table 4-1). Standard industry practices required in the specifications to the contractor would limit any effects to health and safety (e.g., dust abatement, traffic control plans, coordination with local emergency responders, limiting work hours to daytime), and these measures are included in the environmental commitments for the project (see Table 4-1).

Given that no new access roads would be constructed, access routes and road crossings would be returned to the same or better conditions than before construction, and that coordination with local agencies for road crossings and emergency response would occur, the Proposed Action would have no significant adverse impact on access, transportation, or public safety.

The public safety risks associated with sources of open, moving water associated with the Garret Ridge and Lower Arickaree laterals would be reduced when 2.9 miles of unlined ditch is replaced with a HDPE pipeline, and 0.4 miles of new alignment is piped. This would have a long-term beneficial effect in reducing public safety risks.

3.2.2 Agricultural Resources and Soils

The major mapped soil units found in the Project Area and traversed by the Garrett Ridge and Lower Arickaree Laterals are Cahona-Sharps-Wetherill complex (Eolian deposits derived from sandstone) on 52.5% of the Project Area and Zigzag very channery clay loam (alluvium and/or colluvium from sedimentary rocks over residuum derived from Mancos shale) on 14.8% of the Project Area (NRCS 2024). Though numerous other soil units exist along the canals, no other soil type occupies more than 10% of the Project Area. Most of the soil types in the Project Area are derived from sandstone and shale (NRCS 2024). Shale is a sedimentary rock which formed in a marine environment and now contributes salinity and selenium loading in the Colorado River Basin.

Soils within the Project Area are mostly disturbed, and a few areas along the ditch are denuded of vegetation, and show erosion and soil displacement, especially associated with areas used for grazing.

According to the National Agricultural Statistics Survey (NASS) 2022 Agricultural Census, over 36,000 farm operations exist in Colorado, encompassing more than 30.2 million acres (USDA NASS 2022). The USDA NRCS maintains and keeps current "an inventory of the prime farmland and unique farmland of the Nation, with the objective to identify the extent and location of important rural lands needed to produce food, feed, fiber, forage, and oilseed crops" (7 CFR 657.2). Farmlands are categorized into farmlands of national and statewide importance based on soil types and irrigation status. Prime farmland, as defined by the USDA, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available to these uses. It can be cultivated land, pastureland, forestland, or other land, but is not urban or built-up land or water areas. Farmland of statewide importance are lands that nearly meet the requirements for Prime Farmland and have been identified by state agencies. Farmland of Unique Importance has a special combination of soil quality, location, growing season, and moisture supply required to produce high quality crops when properly managed.

Nearly all the soils in the Project Area are not prime farmland; however, 5% of the soils are agriculturally significant since they are classified by NRCS as "prime farmland if irrigated" (NRCS 2024). These prime farmland areas occur in the central portion of the Garrett Ridge Lateral and Lower Arickaree Lateral alignments with other soils along the Project Area alignments.

No Action Alternative: Under the No Action Alternative, no effects to soil resources would occur. Farmlands in the Project Area would continue to produce as in the past. The No Action Alternative would have no effect on agriculturally significant soils. The bare and eroded areas associated with grazing would persist.

Proposed Action: The proposed pipeline installation and improvements to the staging areas, such as the use of heavy machinery to manipulate the soil, would disturb 24.4 acres in the Project Area. The Proposed Action would have minimal adverse effects to soil resources because temporary and long-term soil disturbance would primarily occur in the previously disturbed lateral prism, and the disturbed areas within and outside of the lateral prism would be reclaimed, as described in Section 2.3.3.

The backfilling, contouring, reclaiming, and revegetating of the laterals following installation of the pipeline would remove the bare and eroded banks of the laterals, reducing the erosion from grazing to soils along the laterals. This would result in a beneficial, long-term effect on soils in the Project Area.

The Proposed Action would occur on land adjacent to irrigated agricultural lands, including lands with agriculturally significant soils. Under the Proposed Action, installation of the buried pipe would cause temporary disturbance to soils that are classified as "prime farmland if irrigated"; however, these lands are situated within the existing lateral prism and are not in irrigated agricultural production, so the temporary impact does not rise to the level of significant.

While the existing laterals convey irrigation water to agriculturally significant lands, no change in the configuration of MVIC-irrigated lands would occur from the Proposed Action. The Proposed Action would not temporarily or permanently remove any farmlands from production, and no interruption to agricultural production would occur. No part of the irrigation season would be lost during implementation of the Proposed Action. Therefore, the Proposed Action would have no effect on agriculture or farmlands of statewide importance.

The Proposed Action includes numerous measures to further minimize soil erosion, maintain and restore soil conditions, stabilize and rehabilitate disturbed areas, maintain soil productivity by reducing soil loss from erosion potentially caused by surface disturbing activities and through proper soil handling, and site selection to reduce impacts on soil resources (see Table 4-1). For example, to further minimize soil erosion during implementation of the Proposed Action, all work would be completed from existing roadways, shoulders, and upland areas, where possible. Temporary erosion and sediment controls (TESCs), such as silt fences, fiber wattles, or other erosion control mechanisms would be placed adjacent to or below disturbance areas. Additionally, activities would not occur during extreme wet weather conditions. Following construction, cut vegetation would not be used as fill in the reclaimed laterals, and disturbed ground would be revegetated using either the sterile topsoiling and natural recruitment method or the conventional method, and the soil would be inoculated with mycorrhiza to ensure successful revegetation efforts.

Because temporary and permanent soil disturbance would primarily occur in the previously disturbed lateral prism, the disturbed areas outside of the lateral prism would be reclaimed, bare and eroded lateral banks would be removed, and because agriculturally significant soils in production would not be permanently adversely affected by the project, no significant adverse effect would occur to agricultural resources and soils from implementing the Proposed Action.

3.2.3 Air Quality

The National Ambient Air Quality Standards (NAAQS) established by the EPA under the Clean Air Act (CAA) specify limits for criteria air pollutants. If the levels of a criteria pollutant in an area are higher than the NAAQS, the airshed is designated as a nonattainment area. Areas that meet the NAAQS for criteria pollutants are designated as attainment areas. According to the EPA, Montezuma County meets the attainment requirements for the NAAQS, meaning all criteria pollutants are at safe levels and are below specific limits set under the CAA (U.S. EPA 2024). Currently, minor effects to air quality occur from routine maintenance of the Garrett Ridge and Lower Arickaree Laterals including dust and exhaust from occasional travel in light vehicles along the lateral corridors, and occasional canal cleaning and maintenance activities and local ranching and agricultural activities that require heavy equipment.

No Action Alternative: Under the No Action Alternative, no changes in the existing level of air quality would occur in the Project Area. The Garrett Ridge and Lower Arickaree Laterals would continue to operate in its current position and configuration, and dust and exhaust would continue to be generated by vehicles and equipment during routine operation and maintenance activities and local ranching and agricultural activities. Montezuma County and the surrounding areas would continue to meet NAAQS and remain in attainment.

Proposed Action: During construction, the proposed trenching, excavation, and dirt work would produce minimal particulate and diesel emissions from the two to four pieces of heavy equipment operating at the same time during the construction phase, resulting in a temporary, negligible adverse effect to air quality. These effects would be localized and would be similar to occasional local air quality effects associated with ranching and agricultural activities that require heavy equipment or routine lateral maintenance. Therefore, these temporary impacts would not rise to the level of significant. BMPs to employ appropriate dust control measures during project implementation (see Table 4-1) would further reduce the temporary impacts to air quality. Once construction is complete, the amount of required operation and maintenance activities would decrease, resulting in a long-term beneficial effect to air quality. Montezuma County and the surrounding areas would continue to meet NAAQS and remain in attainment.

Because the temporary adverse effects to air quality are negligible, Montezuma County would continue to meet NAAQS and remain in attainment, and any long-term impacts would be beneficial. Therefore, there would be no significant effect to air quality would result from implementing the Proposed Action.

3.2.4 Cultural Resources

Federal statutes and Executive Orders (EOs) guide the protection of historic and cultural resources. Cultural resources are defined as physical or other expressions of human activity or occupation. Such resources include culturally significant landscapes, prehistoric and historic archaeological sites, isolated artifacts or features, traditional cultural properties, Native American and other sacred places, and artifacts and documents of cultural and historical significance. Cultural resources can be found throughout the Lower San Juan and Colorado River Basins.

For the Proposed Action, Alpine Archaeological Consultants, Inc. (Alpine) conducted a Class III cultural resource survey to identify potential historical and cultural resources within the Proposed Project's Area of Potential Effect (APE) in compliance with Section 106 of the NHPA (36 CFR 800.4; Omvig 2024). The APE, approximately 143 acres, consists of a 100-foot buffer around the laterals that are proposed to be piped, around two new access roads, and around four staging areas. The inventory covered areas of proposed ground disturbance, including the staging areas within the APE. The survey identified eight sites or site segments and three isolated finds within the APE, including two supporting segments of the Upper Hermana Lateral, a non-supporting segment of US 491, a prehistoric artifact scatter, a segment of the Garrett Ridge Lateral, and a segment of the Lower Arickaree Lateral, which have been identified as eligible for inclusion in the National Register of Historic Places (NRHP). The sites are shown in Table 3-1 below.

Table 3-1. Summary of Sites Documented within the APE

Site Number	Site Name or Type	NRHP Eligibility Determination	Management Recommendation
5MT18834.6	Upper Hermana Lateral	Eligible, supporting	No further work
5MT18834.7	Upper Hermana Lateral	Eligible, supporting	No further work
5MT22131.10	US 491	Eligible, non-supporting	No further work
5MT25911	Prehistoric Artifact Scatter	Eligible	Avoid
5MT25912.1	Garrett Ridge Lateral	Eligible, supporting	Preserve value
5MT25913.1	Lower Arickaree Lateral	Eligible, supporting	Preserve value
5MT25914	Historic Artifact Scatter	Not eligible	No further work
5MT25915	Prehistoric Artifact Scatter	Not eligible	No further work

No Action Alternative: Under the No Action Alternative, no ground disturbance associated with piping the Garrett Ridge and Lower Arickaree Laterals would occur. The No Action Alternative would not affect cultural resources that exist in the Project Area.

Proposed Action: As a result of the Class III cultural resources inventory of the APE, Reclamation has recommended that the Proposed Action would have no adverse effect to the supporting segments of the Upper Hermana Lateral, would avoid adverse effects on other cultural resources by applying design measures that constrict the construction ROW to avoid the cultural resources (see Table 4-1), and would have adverse effects on segments of the Garrett Ridge Lateral and Lower Arickaree Lateral.

To resolve the adverse effects to the laterals, Reclamation recommended a plan of action to be developed between Reclamation and the Colorado SHPO, with the Applicant participating as an invited party, under and consistent with the Programmatic Agreement Regarding the Management of Water Control Features in the State of Colorado (Reclamation et al. 2022). The plan of action would outline activities designed to conserve the value of the eligible cultural resources. The completed plan of action will be appended to the Final EA (Appendix D). Consultation with SHPO is ongoing, and the results of the consultation will be included in the final EA.

Execution of the plan of action would conserve the value of the eligible cultural resources, ensuring that piping the canal would not result in the loss of knowledge of early irrigation systems, their design, or reduce the ability to gain knowledge of early irrigation systems into the future. Because the value of the cultural resources related to the Proposed Action would be conserved, no significant impacts to cultural resources would occur from implementing the Proposed Action.

Additionally, if inadvertent cultural resources discoveries are made, activities would be suspended, and Reclamation would determine the appropriate course of action. See Table 4-1**Table 4-1** for additional information on cultural resources BMPs.

3.2.5 Grazing

Most of the surrounding areas along the Lower Arickaree and Garrett Ridge Laterals are used for cattle and horse grazing. Upland native vegetation in the project vicinity is grazed, and the fringe of riparian vegetation along the Lower Arickaree and Garrett Ridge lateral prisms show evidence of grazing. Though the laterals do not provide a formal source of stock water, the canals are used as a water source by livestock when water is present. Active grazing and cattle presence contributes to bare and eroded banks along the Lower Arickaree and Garrett Ridge Laterals.

In addition to the laterals, stock tanks are located throughout the project area that provide a reliable and consistent water source for livestock. These stock tanks ensure that water remains available for grazing animals, reducing dependence on open ditches as a secondary water source.

No Action Alternative: The No Action Alternative would not change grazing practices, or the ongoing impacts associated with grazing. Livestock would continue to have access to water when present in the laterals, and existing stock tanks in the project area would remain available as a water source.

Proposed Action: Under the Proposed Action, during construction, the ground disturbance and vegetation removal along the laterals would have minimal effects to livestock grazing because the construction activities would occur in the winter months when livestock grazing is absent in the Project Area. Following the completion of construction, livestock would no longer be able to use the laterals as a source of water. However, existing stock tanks located throughout the project area provide a reliable alternative source of stock water, ensuring continued water availability for livestock. Given that livestock are not solely reliant on the laterals as a source of stock water, the Proposed Action would not have significant impacts on livestock.

As described in Section 3.2.2 Agricultural Resources and Soils, backfilling, contouring, reclaiming, and revegetating the lateral prisms following installation of the pipeline would remove the bare and eroded banks of the laterals, resulting in the beneficial effect of reducing the soil erosion caused by grazing along the laterals.

After construction, the fringe riparian habitat located along the length of the laterals (see Section 3.2.7 Vegetation) would no longer be available to livestock. However, the riparian vegetation would be replaced with upland vegetation which would continue to provide forage for grazing livestock. The long-term loss of the riparian vegetation as a source of forage for grazing livestock would be negligible.

Because stock water and forage would continue to be available to livestock through existing sources, no significant adverse impacts to grazing would occur from implementing the Proposed Action.

3.2.6 Noise

Noise is defined as unwanted sound that may be disturbing or annoying. Various federal, state, and local statutes, regulations, and ordinances regulate noise. The State of Colorado maximum permissible noise level related to this proposed project would apply to industrial zones for the period within which construction is to be completed pursuant to any applicable construction permit issued by proper authority or, if no time limitation is imposed, for a reasonable period of time for completion of project (Colorado Noise Statute 25-12-103). The project should limit the average decibel (db(A)) of 80 from 7:00 a.m. to 7:00 p.m. and 75 db(A) from 7:00 p.m. to 7:00 a.m. In Montezuma County, Nuisance Standards for noise were established in Resolution No. 21–2020 (Montezuma County 2020). The standard is: volume less than 70 decibels at any point on any boundary at any time as established by 25-12-101, et seq. C.R.S., as amended, adjacent to residential areas: not to exceed 55 decibels at any point on the boundary line between 7:00 p.m.-6:59 a.m. and noise from normal agricultural operations is exempt.

The existing noise in the Project Area is linked to traffic noise, farming operations, and residential use, among other sources. Anthropogenic noise in the Project Area is present at detectable levels

due to normal farm activity and machinery operation, traffic on the adjacent Highway 491, County Road S, and Road P, and intermittent heavy machinery operation for road maintenance.

No Action Alternative: Under the No Action Alternative, no change would occur in the existing level of anthropogenic noise at the Project Area or zone.

Proposed Action: Under the Proposed Action, temporary noise effects would occur during construction primarily due to the operation of heavy equipment. The project would meet the State and County noise standards because noise during construction would be less than 70 decibels at any time. Residential buildings are close to the piping activities, and residents in these areas would hear noise associated with the construction activities. The noise associated with the heavy equipment would be similar to the existing rural and agricultural sounds within and around the Project Area. Construction noise would be temporary and minor, as it would not raise the level of noise in the area above the current level of rural and agricultural noise. Noise disturbance from human activity along the lateral alignments would be reduced over the short- and long-term given a decreased need for maintenance, resulting in a beneficial effect to noise.

Because the temporary impacts would not raise the area noise level above the existing level or the State and County standards, and because the short- and long-term impacts are beneficial, no adverse significant impacts to noise associated with implementation of the Proposed Action would occur.

3.2.7 Vegetation

The Garrett Ridge and Lower Arickaree Laterals traverse a mix of agricultural and natural vegetation community types and carries irrigation water seasonally from April 15 to October 15. Due to the 3.3-mile length of the Project Area, vegetation communities vary in presence, dominance, and density, and include a narrow riparian corridor along the length of the laterals, and adjacent pinyon-juniper woodland and agricultural vegetation.

The Garrett Ridge Lateral passes through farm and pastureland. The vegetation along the lateral varies along its length but generally is characterized by open habitat dominated by grasses and common ruderal weeds, sparse Fremont cottonwoods (*Populus fremontii*), pinyon pine (*Pinus edulis*) peachleaf willow (*Salix amygdaloides*), and bare ground where grazing and trampling from the presence of cattle and horses is evident. Seepage induced wetlands occur in some places along the lateral. Where seepage occurs, species like cattail (*Typha latifolia*), common rush (*Juncus effusus*), and woolly sedge (*Carex pellita*), are present. A vegetation midstory is generally not present along the lateral alignment.

The Lower Arickaree Lateral also passes through farm and pastureland, as well as rural residential areas. The landscape flanking the lateral is considerably more arid in the northern half, characterized by dry, open grassland, bare ground, and sparse pinyon pines. In the southern half of the alignment, denser overstory, comprised of Fremont cottonwoods, peachleaf willow, coyote willow (*Salix exigua*), and balsam popular (*Populus balsamifera*) grow adjacent to the lateral. An understory of grasses and herbaceous species like milkweed (*Asclepias* spp.) and chicory (*Cichorium intybus*) is common. The banks of the lateral are steep and incised in many areas. Lateral seepage from the sides of the lateral is not evident along the Lower Arickaree Lateral.

Five acres of low quality (i.e., low diversity and limited stratification) riparian fringe is intermittingly present along both the laterals, ranging from 0 to 40 feet wide. Approximately half of the lengths of each lateral do not have riparian fringe. Mature Fremont cottonwoods, pinyon pines, peachleaf

willow, and mid-story species like coyote willow provide intermittent overstory structure along the laterals within Project Area. Vegetation along the laterals is not regularly maintained (e.g., through system-wide removal and herbicide application), though individual landowners do some sporadic maintenance.

The surrounding areas support a variety of upland vegetation communities. Vegetation in the area is dominated by pinyon-juniper woodlands, sagebrush, and grasses. The Project Area includes agricultural land used to produce grass hay and alfalfa, as well as for cattle and horse grazing. Due to the proximity of the laterals to agricultural fields and grazing areas, the open waterways facilitate the movement of plant material, including seeds, which can contribute to the spread of both native and invasive vegetation along the banks and into adjacent habitats.

The staging areas are situated in fallow, previously disturbed agricultural areas that contain a variety of ruderal grass species.

The MVIC shareholders identified vegetation along the Lower Arickaree Lateral that they would like to be protected, and these areas are identified in the project plans (J-U-B 2023d).

No Action Alternative: No effects would occur to the existing vegetation from the No Action Alternative. The Project Area would continue to support a riparian vegetation community along the laterals due to seepage. The No Action Alternative would not alter vegetation or habitat in the region. Minor ongoing maintenance and vegetation clearing would continue along the Garrett Ridge and Lower Arickaree Laterals.

Proposed Action: Approximately 24.4 acres of temporary disturbance to vegetation would occur due to the Proposed Action. The disturbance would be temporary, as areas disturbed by the Proposed Action would be restored following construction by contouring and implementing the natural vegetation method or by implementing the conventional reseeding with appropriate seed mixes developed in coordination with the wishes of underlying landowners. The temporary effect would be minor, as the impacted upland native vegetation is abundant in the surrounding areas and would continue to be abundant post-project. Reseeding success would be monitored subject to agreements between MVIC and individual landowners.

The Proposed Action would result in the permanent loss of approximately 5 acres of low-quality riparian vegetation associated with the unlined laterals. This loss is not considered significant because the affected vegetation is low in diversity and limited in structure, similar habitat remains abundant in the surrounding landscape, and environmental commitments, such as reseeding and habitat restoration would minimize long-term impacts.

For example, to reduce the impacts to vegetation associated with the Proposed Action, vegetation identified for retention by MVIC would be protected by establishing appropriate buffer zones using marking, flagging, or fencing. The construction activities would minimize disturbance to vegetation, wherever possible, to retain vegetation for erosion control purposes. Native site vegetation and plant communities, including milkweed and riparian vegetation, would be protected, whenever possible. Live cottonwoods and pinyon-juniper habitat along the lower portion of the Lower Arickaree Lateral would be retained based on landowner input. During reclamation, the soil would be inoculated with mycorrhiza and mulched. See Chapter 4 (Table 4-1) for a complete summary of measures to protect vegetation and reclaim disturbed areas during and after project implementation.

3.2.8 Visual Resources

The landscape is characterized by rocky outcrops, mesas, and canyons. The surrounding landscape of the Project Area constitutes a combination of private and state lands. The viewshed along the Garrett Ridge and Lower Arickaree Laterals includes irrigated farm fields and upland grazing areas interspersed with native vegetation. Vegetation directly adjacent to the laterals is the dominant visual component for most of the Project Area and consists of varyingly large cottonwoods, willows, and pinyon pine. Outside of these areas, the landscape is open sagebrush and pinyon-juniper woodland.

Land uses in the surrounding area consist of rural residential and agricultural uses. A relatively high level of existing visual effect has been created by surrounding infrastructure, highway, and access roads, including the Garrett Ridge and Lower Arickaree infrastructure.

Additionally, the landscape includes various linear features such as irrigation ditches, power lines, and fence lines, which contribute to the established visual character of the area. The existing laterals themselves are a prominent part of the viewshed, forming visible linear features that contrast with surrounding natural vegetation.

No Action Alternative: The No Action Alternative would have no effect on visual resources on private lands. Visual resources would remain unchanged, as the vegetation directly adjacent to the laterals would remain in place, and the viewshed along the laterals would continue to consist of irrigated farm fields and upland grazing areas interspersed with native vegetation.

Proposed Action: During construction, temporary, minor visual impacts would occur due to the presence of construction equipment and activities. This impact is not considered significant because it falls within the general existing visual impacts of farming equipment, irrigation infrastructure, and other agricultural activities common in the area, making it consistent with the established visual character of the landscape. During the period between piping the laterals and successful reclamation, a linear scar attributable to the piping and vegetation removal along the laterals would be visible intermittently along Highway 491, County Roads 22, 22 ½, S, P, N, and U, and access roads and driveways. These linear features would create only a minor visual change in the temporary time frame because it would resemble the current condition of the linear lateral features and be strikingly similar to other linear features, such as canal, power, and fence lines in this rural, agricultural setting, and therefore would not rise to the level of significant. After reclamation and vegetation establishment, the visual changes from the Proposed Action would be further reduced, as they would be unnoticeable and not measurably different from current conditions of the surrounding landscape.

Given that the effects to visual resources in the Project Area would be minor and would not attract attention in the long term, the Proposed Action would not have a significant impact on visual resources.

3.2.9 Water Resources

3.2.9.1 *Water Quality*

Surface water features in and around the Project Area include the Upper Hermana, Garrett Ridge, and Lower Arickaree Laterals. Both the Garrett Ridge and Lower Arickaree Laterals are irrigation ditches fed by the Upper Hermana Lateral. The Project Area lies within two sub-watersheds: Hartman Canyon (Hydrologic Unit Code [HUC] 140802020103) and Narraguinnep Canyon-Alkali

Canyon (HUC 140802020105). These sub-watersheds are part of the Upper McElmo Creek Watershed (HUC 1408020201), which is located within the McElmo Sub-Basin (HUC 14080202) of the Lower San Juan Basin (HUC 140802). The entire basin is part of the larger San Juan Sub-Region (HUC 1408) and the Upper Colorado Region (HUC 14).

The Upper McElmo Creek watershed supports irrigation and agricultural activities and has been subject to salinity issues due to contributions from irrigation return flows and unlined canals. The watershed's salinity is a significant concern within the Colorado River Basin, impacting agricultural, municipal, and industrial water users. Implementing salinity control measures, such as piping irrigation canals, have been effective in offsetting the effects of the increased irrigation water provided by the similar Dolores Project (Richards and Leib 2011).In addition to salinity concerns, the open ditches in the Project Area allow livestock to enter or drink from the water, introducing bacteria and nutrients. Current water quality issues include nutrient loading from manure and bacterial contamination, including fecal coliform caused by direct livestock access to the laterals.

Open irrigation canals are also susceptible to sediment and debris inflow during precipitation events. Runoff from surrounding lands introduces suspended sediments, organic material, and other debris into the laterals, affecting water quality and delivery efficiency for shareholders. This sediment accumulation can require additional maintenance and reduce the effectiveness of water distribution for irrigation.

During large storm events, excessive runoff can cause overflows from the laterals, leading to sediment transport and localized erosion. These events can require emergency management efforts to prevent damage to irrigation infrastructure, control sediment deposition, and maintain proper water conveyance.

No Action Alternative*:* Under the No Action Alternative, the existing irrigation system would remain as an open, unlined ditch. This would perpetuate existing water quality and quantity issues, including:

- Negative impacts on regional water quality and inefficiencies in agricultural irrigation practices would continue.
- Salinity contributions would continue from the two canals into the Upper McElmo Creek watershed and downstream users, although the exact annual tonnage is not quantified.
- Potential overflows and sediment transport during large rain events, requiring emergency management.

Proposed Action Alternative: During construction, minimal direct and indirect temporary effects to water quality would occur due to localized soil disturbance at the construction sites. However, these impacts would not rise to the level of significance because BMPs during construction ensure water quality is protected in the temporary timeframe (see BMPs in Table 4-1).

The Proposed Action involves piping the Garrett Ridge and Lower Arickaree Laterals with HDPE pipes and installing related infrastructure. These actions would result in short- and long-term beneficial effects to water quality. For example, piping the canals would reduce nutrient loading from manure and bacterial contamination, including fecal coliform, by preventing direct cattle access to the laterals. Replacing open laterals with pipelines would eliminate this source of contamination, leading to overall improvements in regional water quality. Additionally, by eliminating the canal's contact with sediment and debris inflow during precipitation events, cleaner water would be delivered to shareholders. Piping the 3.3 miles of laterals would also reduce salt loading in the long-

term, though an estimated tonnage was not calculated. Salinity reductions and cleaner water would improve irrigation efficiency, particularly for systems using advanced techniques like drip irrigation or micro sprinklers. The Proposed Action would result in long-term beneficial effects to water quality within the Upper McElmo Creek watershed. By conserving water and improving delivery efficiency, the Proposed Action supports both local agricultural practices and broader regional water management goals. No significant adverse effects to water quality would occur in the Project Area because the Proposed Action reduces water losses, prevents contamination from livestock access, and improves irrigation efficiency without altering overall water availability.

3.2.9.2 *Floodplains*

J-U-B conducted an Aquatic Resource Delineation (ARD) using standardized diagnostic criteria within the Project Area to identify hydrological resources, including floodplains (J-U-B 2024a). The Upper Hermana, Garrett Ridge and Lower Arickaree Laterals are the primary water features identified in the Project Area. A small portion of the Upper Hermana Lateral, which feeds the Garrett Ridge Lateral, is located within FEMA flood zone A, representing an area with a 1 percent annual chance of flooding and no established base flood elevation (FEMA 2024).

No Action Alternative: Under the No Action Alternative, no work would occur within the identified laterals or floodplains, and therefore no effects to floodplains would occur in the Project Area.

Proposed Action: Proposed construction activities along the Garrett Ridge Lateral would temporarily disturb soil in the floodplain associated with the Upper Hermana Lateral within FEMA flood zone A.

Approximately 1.4 acres of floodplain are present within the Project Area, and the installation of the proposed pipeline would directly affect 0.2 acres of this floodplain. The pipeline alignment has been designed to follow previously disturbed areas to minimize impacts to floodplain connectivity, water quality, and other natural resources. However, additional trenching and soil disturbance would be required to accommodate pipeline installation. Despite this, the effect to functional floodplain areas would be minimal, as all disturbed ground would be rehabilitated following construction. Additionally, in the event of a flood, the floodwaters would not be impeded by the buried pipeline, ensuring that floodplain connectivity is maintained, flood elevations would not rise, and stream velocities or erosive forces upstream or downstream of the improvement would not increase.

The net change in floodplain occupation before and after implementation would be negligible because the pipeline trench and work areas would be rehabilitated post-construction, returning the disturbed areas to pre-project conditions. To further reduce the minimal effects of these construction activities, extensive BMPs are incorporated into the Proposed Action (see Table 4-1). For example, all work would be excluded during extreme wet weather conditions.

To prevent flooding concerns from erosion and sedimentation when disturbing the soil, erosion and sediment control devices would be placed around the disturbed areas. The required Stormwater Management Plan (SWMP) would ensure flood control measures are in place during implementation. Only minimal vegetation would be removed to install the pipelines (see Table 4-1 and Section 3.2.7, Vegetation), and after construction is complete, all areas of ground disturbance would be rehabilitated, ensuring natural and beneficial floodplain values would be preserved and restored.

Though minor changes in the floodplain would occur, the ability of the Project Area to naturally moderate floods, maintain water quality, and recharge groundwater would remain similar to existing conditions, and therefore these impacts would not rise to the level of significance. The Proposed Action would not contribute to any trends increasing flooding risk in the Project Area or in the basin. The natural and beneficial floodplain values associated with the floodplains in the Project Area would be preserved.

3.2.9.3 *Water Quantity and Use*

The Garrett Ridge and Lower Arickaree Laterals are part of the MVIC system. No water rights are directly associated with these laterals; instead, water users are delivered shares from MVIC's direct flow rights, storage rights, or Dolores Project water. The laterals typically convey up to 22 cfs and 10 cfs, respectively, supporting irrigation activities for approximately 1,130 acres of agricultural land. The irrigation season for these laterals runs from April 15 to October 15. Annually, an average of 7,985 ac-ft of water is conveyed by the Garrett Ridge Lateral, and 3,630 ac-ft by the Lower Arickaree Lateral.

Water is currently conveyed through open, earthen, unlined ditches, which results in significant water losses. A study conducted in 2022 estimated that the Garrett Ridge and Lower Arickaree Laterals lose approximately 2,253 ac-ft of water annually due to seepage, evaporation, and operational inefficiencies (see Appendix C). These losses reduce irrigation efficiency and limit water availability, particularly during the irrigation season.

The Project Area does not have extensive floodplain connectivity, but canal seepage likely contributes to localized groundwater recharge.

No Action Alternative: Under the No Action Alternative, the existing Garrett Ridge and Lower Arickaree Laterals would continue to operate as they have historically, and no effects to water quantity or use would occur. Water losses due to seepage and evaporation would persist at approximately 2,253 ac-ft annually, reducing the overall efficiency of the irrigation system. Water would continue to be allocated as it is currently allocated under MVIC's management.

Proposed Action: Under the Proposed Action, MVIC would have the ability to better manage its allocation of water through efficiencies gained from piping the delivery system and eliminating seepage and evaporation. The upgrades to the water delivery system would ensure more reliable delivery to existing water rights holders. The amount of water diverted into the Garrett Ridge and Lower Arickaree Laterals would not increase from historic use, but the pipeline would eliminate water losses of approximately 2,253 ac-ft annually, increasing the water available to shareholders.

The conserved water would be retained in storage at Narraguinnep Reservoir for more efficient irrigation use within the MVIC system, helping sustain agricultural production during drought conditions.

The pipeline is designed to ensure adequate water delivery to all shareholders, meeting their irrigation needs. Though the Proposed Action would improve the efficiency and reliability of the water delivery system, it would not change the adjudicated water rights managed by MVIC or alter the allocation structure for shareholders along the laterals.

Given that the Proposed Action would have only beneficial effects on water quantity and use, no significant adverse effects to water rights or use would result from the Proposed Action.

3.2.9.4 *Wetlands and Aquatic Resources*

J-U-B conducted an ARD using standardized diagnostic criteria within the Project Area to identify wetlands and aquatic resources, following the methodologies outlined in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987), its Regional Supplement for the Arid West Region (USACE 2010), the National Ordinary High Water Mark Field Delineation Manual for Rivers and Streams (David et al. 2022), and the National Wetland Plant List (USACE 2022).

The ARD identified 6.9 acres of wetlands and 4.4 acres (21,581 linear feet) of linear features within the Project Area (J-U-B 2024a). The wetlands identified include a mix of seepage and irrigation induced wetlands associated with Garrett Ridge and Lower Arickaree Laterals, as well as naturally occurring wetlands. Linear features consist of laterals and ditches, with the Garrett Ridge Lateral, Lower Arickaree Lateral, and Upper Hermana Lateral comprising most of these features.

All wetlands and linear features identified in the ARD are connected to McElmo Creek, a tributary of the San Juan River, and are considered jurisdictional WOTUS under the Clean Water Act (CWA). In 2021, the USACE issued Regional General Permit 5 (RGP-5) for ditch-related activities in the state of Colorado.

No Action Alternative: Under the No Action Alternative, no construction activities would occur within the identified wetlands or aquatic resources. Seepage-induced wetlands would remain dependent on water losses from the Garrett Ridge and Lower Arickaree Laterals, while naturally occurring wetlands and linear features would continue to function under existing hydrological conditions. No changes to the extent or function of these aquatic resources would occur, and they would continue to provide their current level of ecological and hydrological services.

Proposed Action: Construction activities associated with the Proposed Action would temporarily affect aquatic resources, particularly at crossing points where the pipeline installation intersects with ditches or wetland areas. To reduce these effects, extensive BMPs would be implemented, including sediment and erosion controls, spill prevention, and stormwater management measures. All disturbed areas would be stabilized and revegetated post-construction to restore hydrology and minimize long-term impacts.

In the long term, piping the Garrett Ridge and Lower Arickaree Laterals would eliminate seepage, which is the primary contributor to the formation of 1.0 acres of seepage-induced wetlands within the Project Area. While this acreage would diminish or be eliminated, some wetlands may persist due to continued irrigation activities in adjacent fields. Most wetlands identified in the ARD are irrigation or seepage-induced and rely on artificial hydrology rather than natural processes.

Compliance with Section 404 of the Clean Water Act for the discharge of dredged or fill material into WOTUS would be achieved in accordance with USACE RGP 5 (ditch related activities in the State of Colorado). RGP 5 includes terms and conditions which must be complied with by project proponents to ensure their proposed projects will not cause unnecessary environmental impacts. The USACE has the authority to determine if an activity complies with the terms and conditions of an RGP. By authorizing use of RGP 5 for the proposed action, the USACE determines that the proposed action would not cause impacts which rise to the level of significant.

USACE documentation, including any permit verification letter or correspondence, will be included as an Appendix to the Final EA. If the USACE determines that RGP 5 applies and a Pre-Construction Notification (PCN) is not required, written confirmation of this determination will also

be included in the Appendix. Additionally, if the USACE classifies the project as a salinity control effort, documentation reflecting this decision will be appended to ensure regulatory clarity.

Overall, the Proposed Action would have minimal adverse impacts on jurisdictional waters and aquatic resources, with approximately 3.8 acres of the Lower Arickaree and Garrett Ridge Laterals being converted to pipeline. A total of 6.9 acres of wetlands have been delineated within the Project Area. Of these, 1.0 acre of seepage-induced wetlands would be permanently lost as a result of reduced seepage following pipeline installation. An additional 0.7 acre of wetlands would be temporarily affected by construction activities along the pipeline alignment but would be restored to pre-construction conditions upon project completion. The remaining 5.2 acres of wetlands would not be affected by the Proposed Action. These changes would not adversely affect naturally occurring wetlands or other jurisdictional waters, as these features would be preserved to the extent practicable. Furthermore, the permanent reduction of seepage-induced wetlands would be offset by broader benefits to regional water management, including improved water use efficiency, conservation, and reduced salinity loading to the McElmo Creek watershed. The Proposed Action would have no significant adverse impacts to wetlands in the Project Area.

3.2.10 Weeds

The Project Area contains weed species, also known as noxious weeds, occurring in typical background concentrations. Activities on private lands including the movement of livestock, application of contaminated seeds and irrigation water, and use of contaminated equipment continues to create disturbed areas vulnerable to weed infestation and provides transport vectors that allow weeds to reach and colonize those areas. The open canal transports weed seeds downstream.

The Colorado Noxious Weed Act (CNWA) designates undesirable plants considered a threat to Colorado's natural resources (Colorado Noxious Weed Act (Colorado Revised Statutes [CRS] 35-5.5-101-119)). The Montezuma County Weed Plan (MCWP) also provides weed management requirements and prevention measures which were used in the design of the Proposed Action (Montezuma County 2016; Project BMPs in Table 4-1). MVIC is responsible for complying with the Colorado Noxious Weed Act in the Project Area (CRS 35-5.5-104. Duty to manage noxious weeds).

Observed noxious species in the Project Area include Canada thistle, field bindweed (*Convolvulus arvensis*), musk thistle (*Carduus nutans*), and plumeless thistle (*Carduus acanthoides*).

No Action Alternative: No effects would occur to the existing vegetation from the No Action Alternative. Weeds would continue to exist at current levels along the laterals and access roads, and along riparian corridors. Current human activity on private lands would continue to create disturbed areas and provide transport vectors that allow weed infestation and spread, and existing weed seed dispersal processes in the region would continue. Noxious weed seed transport would continue to occur due to the open waterways immediately adjacent to agricultural fields and grazing activity. Minor ongoing maintenance and vegetation clearing would continue along the Garrett Ridge and Lower Arickaree Laterals.

Proposed Action: The Proposed Action would remove segments of open water, a key element of noxious weed seed transport. Certain segments of the laterals would no longer require regular maintenance, lowering the potential for the continued spread and establishment of weeds. Downgradient herbaceous noxious weeds which rely on lateral seepage would no longer be

supported. Despite these beneficial effects to noxious weed presence, ground disturbance associated with construction would create optimal conditions for noxious weeds in the area to establish and spread into the disturbed 24.4-acre construction footprint, and overall noxious weeds would continue to be present throughout the Project Area. The Proposed Action construction BMPs, such as cleaning vehicles before bringing them onsite would help minimize the risk of new weed introduction and recruitment in the Project Area, and the MVIC would continue to be responsible for complying with the MCWP and the Colorado Noxious Weed Act in the Project Area. These definitive actions ensure the Proposed Action would not cause noxious weeds to spread more than the existing condition. Because the 24.4-acre disturbance area is only a small portion of Montezuma County—approximately 0.002 percent—and because noxious weeds are currently present in the Project Area, their ongoing presence within the Project Area would not constitute a long-term effect or significant impact.

3.2.11 Wildlife—General

The Lower San Juan watershed supports a variety of wildlife and provides important wildlife habitat. Wildlife resources within the general area of the Proposed Action include large and small mammals, birds, reptiles, amphibians, and fish. The Garrett Ridge and Lower Arickaree Laterals in the Project Area provides sections of riparian habitat within an overall area of upland, semi-arid vegetation. Vegetation and water resources supported by the existing laterals provide nesting, breeding, foraging, cover, and movement corridors for an array of wildlife.

The Project Area supports mule deer (*Odocoileus hemionus*) year-round, though the Project Area is outside of mule deer severe winter range (CPW 2023). The Project Area is outside of Rocky Mountain elk (*Cervus canadensis nelsoni*) summer and winter concentration areas, including elk severe winter range (CPW 2023).

According to Cooley et al., the biggest threats to big game winter range relevant to the Project Area comes from agriculture, which specifically causes loss of native vegetation (e.g., conversion to cropland, reduced grass and forb diversity, noxious weed establishment); competition from grazing; and movement impediment and injury from livestock fencing (Cooley et al. 2020). The existing pastures and fields offer foraging opportunities for wildlife, but provide minimal cover or vegetative diversity, and the existing fences create barriers to free dispersal and habitat use, including ungulate migration. Additionally, the landscape in the Project Area is fragmented by Highway 491, County Roads, and access roads and driveways. Currently, the Project Area has evidence of livestock use, and wildlife/livestock interactions are occurring. Livestock and wildlife share the canal water when the canal is running water.

The overall range for black bear (*Ursus americanus*) and mountain lion (*Puma concolor*) also lies within the Project Area.

Small mammals and reptiles also inhabit the general Project Area. Small rodents and bats, such as Bottas pocket gopher (*Thomomys bottae*), Gunnison's prairie dog (*Cynomys gunnisonni*), big brown bat (*Eptesicus fuscus*), big free-tailed bat (*Nyctinomops macrotis*), Brazilian free-tailed bat (*Tadarida brasiliensis*), California myotis (*Myotis californicus*), canyon bat (*Parastrellus hesperus*), fringed bat (*Myotis thysanodes*), hoary bat (*Lasiurus cinereus*), little brown myotis (*Myotis lucifugus*), long-eared myotis (*Myotis evotis*), long-legged myotis (*Myotis Volans*), pallid bat (*Antrozous pallidus*), silver-haired bat (*Lasionycteris noctivagans*), spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Corynorhinus townsendii*), Western small-footed myotis (*Myotis ciliolabrum*), and Yuma myotis (*Myotis yumanensis*) may use the

existing open canal and adjacent areas. Other species common in the vicinity of the Project Area are ring-necked pheasant (*Phasianus colchicus*), bullsnake (*Pituophis catenifer sayi*), common sagebrush lizard (*Sceloporus graciosus*), common side-blotched lizard (*Uta stansburiana*), eastern collared lizard (*Crotaphytus collaris*), Hernandez's short-horned lizard (*Phrynosoma hernandesi*), ornate tree lizard (*Urosaurus ornatus*), plateau striped whiptail (*Aspidoscelis velox*), prairie lizard (*Sceloporus undulatus*) and plateau fence lizard (*Sceloporus tristichus*), prairie rattlesnake (*Crotalus viridis viridis*) and western rattlesnake (*Crotalus oreganus*), smooth greensnake (*Opheodrys vernalis*), terrestrial gartersnake (*Thamnophis elegans*), variable skink (*Plestiodon multivirgatus*) and many-lined skink (*Plestiodon multivirgatus*) (CPW 2023). Animal signs observed in the Project Area during field surveys were primarily from mule deer and prairie dogs (J-U-B 2024b).

Within the Project Area, canal operation, maintenance, and system monitoring activities occur, and wildlife are accustomed to these activities. Current salinity loading affects downstream waters and contribute to degradation of wildlife habitat in the Lower San Juan and Colorado River Basins.

Migratory birds protected under the MBTA use the Lower San Juan watershed, including the Project Area, for nesting and migratory habitat. Thirteen bird species protected under the MBTA and the BGEPA have the potential to be present within the Project Area as shown in Table 3-2 below. The inventory and assessment for these species are documented in the Biological Evaluation (J-U-B 2024b).

Table 3-2. Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act Protected Species that May Occur Within the Project Area

Common Name	Scientific Name	Breeding Period	Federal Law Protecting Species*
bald eagle	*Haliaeetus leucocephalus**	Dec 1–Aug 31	BGEPA/MBTA
golden eagle	*Aquila chrysaetos**	Dec 1–Aug 31	BGEPA/MBTA
pinyon jay	*Gymnorhinus cyanocephalus*	Feb 15–Jul 15	MBTA
California gull	*Larus californicus*	Mar 1–Jul 31	MBTA
Lewis's woodpecker	*Melanerpes lewis*	Apr 20–Sep 30	MBTA
Clark's nutcracker	*Nucifraga columbiana*	Jan 15–Jul 15	MBTA
Virginia's warbler	*Leiothlypis virginiae*	May 1–Jul 31	MBTA
olive-sided flycatcher	*Contopus cooperi*	May 20–Aug 31	MBTA
evening grosbeak	*Coccothraustes vespertinus*	May 15–Aug 10	MBTA
Cassin's finch	*Carpodacus cassinii*	May 15–Jul 15	MBTA
broad-tailed hummingbird	*Selasphorus platycercus*	May 25–Aug 21	MBTA
western grebe	*Aechmorphorus occidentalis*	Jun 1–Aug 31	MBTA
lesser yellowlegs	*Tringa flavipes*	Breeds elsewhere	MBTA

*BGEPA= Bald and Golden Eagle Protection Act; MBTA= Migratory Bird Treaty Act

Surveys covered a 0.5-mile buffer around the Project Area in accordance with Yellow-billed Cuckoo survey requirements, which also encompassed potential raptor nesting areas. No active nests, or breeding or nesting behavior for any avian species were observed during the incidental field surveys.

No Action Alternative: Under the No Action Alternative, habitat for large mammals including big game, small mammals, reptiles, fish and riparian wildlife, eagles, and migratory birds would remain in its current condition, and no disturbance or displacement of wildlife would occur. The No Action

Alternative would not alter vegetation and therefore would not affect wildlife or wildlife habitat. The laterals would continue to provide a seasonal water source.

Canal operation, maintenance, and system monitoring activities would continue to occur to which wildlife is accustomed. Salinity loading would continue to affect downstream waters and contribute to degradation of wildlife habitat in the Lower San Juan and Colorado River Basins.

Proposed Action: As described in the subsections below, the Proposed Action would affect large mammals, including big game, small mammals and reptiles, fish and aquatic wildlife, and migratory birds.

Large Mammals

The temporary effects of the Proposed Action on large mammals, including big game, would result from construction activity disturbance and the loss of 24.4 acres of upland and riparian vegetation until the area is reclaimed. In the larger vicinity of the Project Area, farming activity, residential development, and roads already contribute to year-round wildlife disturbance. Once construction is complete, the existing rural agricultural setting would resume, and the Proposed Action would not contribute to short- or long-term regional trends in wildlife habitat disruption. However, the long-term effects include the permanent loss of 5 acres of riparian habitat supported by lateral seepage (see Section 3.2.7 Vegetation) and the loss of an open water source. While deer, bear, mountain lion, and other wildlife species are common in the area, the temporary increase in human activity during construction may disrupt individuals but would not have lasting impacts.

A temporary increase in human activity would occur throughout the Project Area over the winter construction season. Wildlife would be displaced by the increased human presence, though not during critical birthing seasons for large mammals, as construction is timed to occur in the fall and winter season (see Table 4-1). These disruption effects would be limited to the construction phase only, and much of the wildlife in the area is accustomed to farm equipment, agricultural activities, and ongoing operation and maintenance of the irrigation system, similar to the equipment that would be used and activities that would occur to implement the Proposed Action, so the disruptions would be minimal and would not rise to the level of significant.

Although the Project Area overlaps with overall habitat for mule deer, the ongoing agricultural influence and presence has disturbed habitat in the surrounding area. Habitat fragmentation affects ungulate migration and habitat quality within the Project Area. Disruption effects would be minimal from the Proposed Action since the wildlife in the area is accustomed to farm equipment and agricultural activities similar to the equipment and activities associated with the Proposed Action. Additionally, the temporary disturbance on 24.4 acres and the long-term loss of the 5 acres of riparian vegetation along the laterals is a very small proportion of the available 14,147 acres of mule deer habitat in the vicinity of the Project Area (0.2 percent) (CNHP 2023), ensuring significant, population level effects to big game species would not occur.

The Proposed Action would have a minimal impact on black bear in the Project Area during construction because it would occur largely during the season when black bears are denning. Mountain lions in the Project Area would experience temporary displacement during construction activities because their secretive behavior would push them to stay away from the Project Area when human disturbance is present. Effects to these species and their habitat would be minor, as the species and habitat are common throughout the area, the Proposed Action would only temporarily affect 24.4 acres, and significant, population-level impacts would not occur.

Under the Proposed Action, vegetation would be removed from the Project Area during the construction phase across the 24.4 acres of disturbance area, and a subsection of 5 acres of fringe riparian habitat would be lost due to disturbance from construction in the temporary time frame and due to loss of water seepage from the laterals in the long-term time frame (see Section 3.2.7 Vegetation). The loss of the upland and riparian vegetation would affect large mammals by the temporary loss of food and shelter until the area is reclaimed. Additionally, shade provided by the disturbance area, particularly in the fringe riparian habitat, would be temporarily lost until new vegetation is established. These effects would be minor due to the abundance of alternative food and shelter sources in the project vicinity and the small amount of habitat affected. Additionally, because disturbance would be confined to the lateral prisms, limited to only those areas necessary to safely implement the project, native and riparian vegetation would be protected, and the reclamation would replace vegetation disturbed during implementation (Table 4-1), these effects to wildlife habitat would be minimal. For example, native site vegetation and plant communities, including milkweed and riparian vegetation, would be protected, whenever possible.

In the long term, large mammals which use the riparian fringe habitats along the Garret Ridge and Lower Arickaree Laterals would experience the long-term loss of this habitat as described in Section 3.2.7 Vegetation. However, though this riparian vegetation provides food and shelter to large mammals, upland vegetation, which also provides food and shelter, would replace it, and an abundance of alternative food and shelter sources occur in the project vicinity, so the effects to large mammals would be minor. The canal area would look similar to the adjacent habitat in the long term, would not increase the current habitat fragmentation, and may make traversing the Project Area easier for migrating deer. Additionally, the large mammals that are relatively common within and adjacent to the Project Area, would continue to propagate in the area, and the landscape-level vegetation conditions following implementation would be substantially similar to existing habitat conditions in the surrounding area and on a regional landscape scale, ensuring population-level significant impacts would not occur to large mammals.

The loss of the open water source from piping the laterals would affect localized habitat use by large mammals; however, because the Project Area is adjacent to the Upper Hermana Lateral, the effects of piping the open laterals on big game habitat would be minor as a source of open water would continue to persist near the project area. One permanent water source per two and a half miles is a good water source distribution for mule deer and these water source distributions allow deer herds to maintain optimal population densities even during times of drought (Texas A&M Agrilife Extension 2022). Because a source of open water would continue to persist within two and a half miles of the project area, this impact does not rise to the level of significant.

Small Mammals and Reptiles

The minor and temporary effects described for large mammals would also occur for small mammals. In addition, direct effects from construction activities to individual small animals—including burrowing amphibians, reptiles, and small mammals—would include mortality and displacement during piping activities. Though individual animals would suffer mortality or displacement, the species and habitats are common throughout the project and surrounding areas, and the effects from the 24.4 acres of habitat disruption at the landscape-level would be minor, the project would not significantly affect these species at the population level.

The long-term effects to small mammals and reptiles from the Proposed Action include the loss of 5 acres of riparian habitat supported by lateral seepage and the loss of the open water source. Because mobility is limited in small mammals and reptiles, the transition from riparian to upland

habitat and the loss of an open water source would cause mortality to individual animals if they were unable to find a water source nearby. Conversely, because of their small size, the potential exists that individuals would persist with the transition from riparian to upland habitat, as food and shelter would still be available. Similar to large mammals, the small mammals and reptiles that occur in the Project Area are relatively common throughout the project and surrounding areas, which provide alternative riparian habitat and water sources, and effects from the loss of 5 acres of riparian habitat and the open water source would be minor as it would not affect these species at the population level. From a landscape perspective, the habitat conditions following implementation would be substantially similar to existing habitat conditions in the surrounding area and on a regional scale, ensuring significant effects to small mammals and reptiles would not occur.

Fish and Aquatic Wildlife

The temporary effects to fish and aquatic wildlife from construction activities include only minimal direct and indirect effects to water quality during construction activities as described in Section 3.2.9 Water Resources. No new depletions would occur because of the Proposed Action. BMPs would be used to minimize effects to water quality and aquatic habitat within the canals during construction activities (see Table 4-1).

The proposed buried pipelines would eliminate lateral seepage losses and reduce salinity loading to the San Juan and the Colorado River Basins. The Proposed Action along with other regional salinity reduction efforts would improve fish and wildlife habitat within the larger Colorado River Basin.

General Wildlife Impact Summary

Given the minor nature of the effects listed above and the BMPs that would be implemented to minimize water quality impacts, the Proposed Action would not generate effects that would contribute to a significant effect on wildlife resources. Therefore, no significant effects to wildlife resources would occur from the Proposed Action.

Migratory Birds and Eagles

The majority of construction would occur in winter months outside of the irrigation season and most migratory bird, eagle, and nesting seasons, reducing the likelihood of temporary effects to migratory birds and eagles. The general construction activities would occur from October 16 to April 14. While eagle nesting season begins in early January, no active eagle or raptor nests were identified within the CPW buffer areas during surveys. Therefore, no impacts to eagles or raptors would occur. Pre-construction nesting bird surveys would be conducted seven days prior to construction and the removal of trees and shrubs to confirm no active nests are present between March 15 and August 15. If an active nest is identified, appropriate CPW and USFWS buffer distances would be applied, and work in that area would be restricted as necessary to avoid disturbance. Temporary disturbance from noise related to construction may result in temporary disruption of stopover or foraging habits for resident or migratory birds and raptor species near the Project Area. Avian species utilizing the area are adapted to farming and ranching human activities within the Project Area, and the additional construction activities would not be expected to disrupt normal foraging or roosting activities for birds occupying the area. However, if a species does leave the area due to construction activities, this disturbance would be temporary, and the individual may return to the habitat once construction has concluded.

Five acres of low-quality riparian fringe would be lost due to implementation of the Proposed Action (see Section 3.2.7 Vegetation). Nearby riparian areas, including upstream of Garrett Ridge

Lateral and southeast of the Project Area along the Dolores River, provide alternative high-quality riparian habitat for bird species and other wildlife. The long-term loss of 5 acres of low-quality riparian fringe habitat would not significantly affect the habitat availability at the landscape scale, and the indirect effects on migratory birds and raptors from riparian habitat loss along the canals would be minor.

Project BMPs generally limit vegetation removal to outside of the nesting season of migratory birds (April 20–September 30), and eagles (December 1–August 30). If construction plans change and vegetation removal would occur within these timeframes, nesting bird surveys would be required between March 15 and August 15. Active nests of migratory birds would be flagged, and no work would occur within 50 feet of an active nest, ensuring disturbances to nesting birds would not occur (See Table 4-1). If an active eagle or raptor nest were to be identified within or adjacent to the Project Area, work would be paused and USFWS would be notified immediately to determine the appropriate course of action.

Given the existing human disturbance surrounding the Project Area and the ample alternative riparian habitat nearby to the Project Area, and the construction timing and requirement for surveys to avoid effects to nesting birds, impacts to migratory birds and eagles would not rise to the level of significant.

3.2.12 Wildlife—Threatened, Endangered, and Candidate Species

The ESA protects federally listed endangered, threatened, and candidate plant and animal species and their critical habitats. The Narraguinnep Reservoir, McPhee Reservoir, McElmo Creek, and the Colorado River Basin support a variety of wildlife and provide important wildlife habitat, including for federally protected species. A pedestrian survey for threatened and endangered species was performed, and a Biological Evaluation was developed (J-U-B 2024b).

Five federally listed threatened or endangered species and one proposed threatened species were identified as having the potential to occur in the Project Area, as shown on the official species lists for the Proposed Action from the USFWS Information for Planning and Consultation (IPaC) system (USFWS 2025). These species and designations are listed in Table 3-3 below.

Table 3-3. Endangered Species Act Candidate, Proposed, Threatened, and Endangered Species that May Occur within the Project Area

Common Name	Scientific Name	Listing Status	Critical Habitat Present?	Suitable Habitat Present?
INSECTS				
Monarch butterfly	*Danaus plexippus*	Proposed Threatened	No	Yes
Silverspot butterfly	*Speyeria nokomis nokomis*	Threatened	No	No
Suckley's cuckoo bumble bee	*Bombus nevadensis*	Proposed Endangered	No	Yes
BIRDS				
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	No	No
MAMMALS				
Gray wolf	*Canis lupus*	Experimental Population, Non-Essential	No	No
FISH				
Colorado pikeminnow	*Ptychocheilus lucius*	Endangered	No	No
Razorback sucker	*Xyrauchen texanus*	Endangered	No	No

No Action Alternative: Under the No Action Alternative, no direct disturbance to any threatened, endangered, or candidate species would occur, and there would be no change to any critical, suitable, or potential habitat. Therefore, the No Action Alternative would not affect proposed, threatened, or endangered species in the Project Area or their habitat. The canals would continue to provide a seasonal water source. Salinity loading would continue to affect downstream waters and contribute to degradation of habitat in the Lower San Juan and Colorado River Basins.

Proposed Action: The determination of effects of the Proposed Action to ESA protected species with the potential to occur within the Project Area are summarized in Table 3-4 and details are provided below.

Table 3-4. Effects Determinations for Endangered Species Act Species

Common Name	Scientific Name	Designation	Determination
Monarch butterfly	*Danaus plexippus*	Proposed ESA Threatened	No effect
Silverspot butterfly	*Speyeria nokomis nokomis*	ESA Threatened	No effect
Suckley's cuckoo bumble bee	*Bombus nevadensis*	Proposed Endangered	No effect
Mexican spotted owl	*Strix occidentalis lucida*	ESA Threatened	No effect
Gray wolf	*Canis lupus*	ESA Endangered	No effect
Colorado pikeminnow	*Ptychocheilus lucius*	ESA Endangered	No effect
Razorback sucker	*Xyrauchen texanus*	ESA Endangered	No effect

If additional species are listed or proposed, or if critical habitat is designated before completion of construction, and the species or designated habitat occur within the Project Area or may be affected by the Proposed Action, construction would be paused, and a species evaluation would be prepared (see Table 4-1). Species for which a no effect determination has been previously prepared would not be readdressed.

3.2.12.1 *Monarch Butterfly*

The proposed construction activities are scheduled to occur outside of irrigation usage between October and March, ahead of the adult monarch butterfly migration in March and April. Two milkweed species, narrowleaf milkweed (*Asclepias fascicurlaris*) and showy milkweed (*Asclepias speciosa*), were identified within the Project Area along the Garrett Ridge Lateral and Lower Arickaree Lateral. Vegetation would be disturbed or removed along the laterals during construction. Although the milkweed species would provide a suitable breeding habitat for the butterfly, these areas would be reseeded with a native species mix, including milkweed, upon completion, and because the area is heavily irrigated, enough moisture would be present to sustain these plants. Additionally, implementation of BMPs during construction would include avoidance measures to preserve existing milkweed species. Therefore, the Proposed Action would have no effect to the Monarch butterfly or its habitat within the Action Area.

3.2.12.2 *Silverspot Butterfly*

The Project Area does not contain suitable habitat for the silverspot butterfly. No wet meadow habitat or bog violet (*Viola nephrophylla*/*V. sororia* var. *affinis*), on which silverspot larvae are obligate feeders and adults lay their eggs, were observed during field surveys (J-U-B 2024b). Based on the absence of suitable habitat, no potential exists for the silverspot butterfly to occur within the Project Area and the Proposed Action would have no effect to this species.

3.2.12.3 *Suckley's Cuckoo Bumble Bee*

The Suckley's Cuckoo Bumble Bee could occur within the Action Area, because of the presence of nectarous plants and other bumble bee species. However, no individuals of this species were identified during field surveys on July 30-31, 2024. The Suckley's Cuckoo Bumble Bee is not currently known to occur in Colorado, and USFWS has indicated projects and activities would have no effect to this species. The Proposed Action includes BMPs to protect native vegetation to the best extent practicable. Project BMPs would also rehabilitate disturbed areas with native seed, which would improve habitat for the Suckley's cuckoo bumble bee and its hosts in the long term. Therefore, the Proposed Project would have no effect to the Suckley's cuckoo bumble bee.

3.2.12.4 *Mexican Spotted Owl*

It is possible for the Mexican spotted owl to use the Project Area for foraging or as a stopover, however there is no suitable nesting or roosting habitat, such as mature forest, rocky-canyon, or cliffs, and unlikely to support the species. Noise from construction would be temporary and not significantly amplify current noise levels. Implementation of BMPs would ensure temporal avoidance of the breeding season for the Mexican spotted owl, which is March to September, and no suitable habitat would be impacted. Therefore, the Proposed Action would have no effect on this species.

3.2.12.5 *Gray Wolf*

Although lone and dispersing wolves may occur throughout this part of Colorado, human presence and farming and ranching disturbances make it unlikely for wolves to occupy the Project Area. Additionally, no recent records document wolf occurrence in or around the Project Area. Though temporary noise resulting from construction would most likely deter gray wolves from entering the area, although no recent records documenting any occurrences, the Proposed Action would not affect suitable habitat or the abundance or persistence of prey populations. The Proposed Action does not include a predator management program. Given that wolves are unlikely to occupy the Project Area, and no destruction to suitable or critical habitat would occur, the Proposed Action would have no effect on gray wolf.

3.2.12.6 *Colorado Pikeminnow and Razorback Sucker*

No habitat for Colorado pikeminnow or razorback sucker exists within the Project Area, Narraguinnep Reservoir, downstream within the Garrett Ridge Lateral, or the Lower Arickaree Lateral. The nearest designated critical habitat area for the species is approximately 33 miles southwest of the Project Area. Historic depletions for all water from the Dolores Project, which includes these laterals, were previously consulted on in the Gunnison Programmatic Biological Opinion (PBO). Therefore, any historic depletions associated with the Proposed Project are covered under the Gunnison PBO, and no new depletions to the Upper Colorado River would result from the Proposed Action. The Upper Colorado River Endangered Fish Recovery Program serves as the mechanism that ensures these historic depletions do not jeopardize the continued existence of the Colorado pikeminnow or razorback sucker. Construction activities would take place outside of irrigation season and canal use, and BMPs would be implemented to minimize effects to water quality and aquatic habitat. Because there is no habitat within the Project Area, and no effects to fish upstream or downstream of the Project Area, the Proposed Action would have no new effect to Colorado pikeminnow or razorback sucker.

3.3 Summary of Effects

Table 3-7 provides a summary of the environmental consequences for the resources evaluated in detail in this Draft EA. Resource effects are outlined for both the No Action and the Proposed Action Alternatives. As described throughout Chapter 3, environmental effects from the Proposed Action were determined to be not significant.

Table 3-5. Summary of Effects for the No Action and Proposed Action Alternatives

Resource	No Action Alternative Effects	Proposed Action Alternative Effects
Access, Transportation, and Public Safety	No effect	Implementation of the Proposed Action would temporarily cause brief, insignificant traffic delays along public roadways adjacent to the Proposed Action and locations during pipe installation road crossings. The Garrett Ridge Lateral has two road crossings and Lower Arickaree has one road crossing. Once each lateral segment is placed in pipe, the safety risks associated with sources of open, moving water would no longer occur within the Project Area, resulting in a beneficial effect to public safety.
Agricultural Resources and Soils	No effect	The total Project Area soil disturbance would be 24.4 acres. The Proposed Action would have minimal adverse effects to soil resources because temporary and permanent soil disturbance would primarily occur in the previously disturbed lateral prisms, and the disturbed areas outside of the lateral prism would be reclaimed. The pipeline installation and reclamation would remove the bare and eroded banks of the laterals, which would have the beneficial effect of reducing erosion from grazing to soils along the laterals. Installation of the buried pipe would cause temporary disturbance to soils that are classified as "prime farmland if irrigated however, these lands are situated within the existing lateral prism and are not in irrigated agricultural production, so the temporary impact does not rise to the level of significance.
Air Quality	No effect	During construction, the proposed trenching, excavation, and dirt work would produce minimal particulate and diesel emissions from the two to four pieces of heavy equipment operating at the same time during the construction phase, resulting in a temporary, negligible adverse effect to air quality. Once construction is complete, the amount of required operation and maintenance activities would decrease, resulting in a long-term beneficial effect to air quality. Montezuma County and the surrounding areas would continue to meet NAAQS and remain in attainment.

Resource	No Action Alternative Effects	Proposed Action Alternative Effects
Cultural Resources	No effect	The Proposed Action would have no adverse effect to the supporting segments of the Upper Hermana Lateral. The project would avoid adverse effects to other cultural resources in the Project Area. The Proposed Action would have an adverse effect on segments of the Garrett Ridge Lateral and Lower Arickaree Lateral. To resolve the adverse effects to the laterals, Reclamation recommended a plan of action between Reclamation and the Colorado SHPO, with the Applicant participating as an invited party, which would outline stipulations designed to conserve the value of the eligible cultural resources. Because the value of the cultural resources related to the Proposed Action would be conserved, no significant impacts to cultural resources would occur. Consultation with SHPO is ongoing, and the results of the consultation will be included in the final EA.
Grazing	No effect	The Proposed Action would have minimal effects to livestock grazing because the construction activities would occur in the winter months when livestock grazing is absent in the Project Area. Following the completion of construction, livestock would no longer be able to use the laterals as a source of water. Given that livestock are not solely reliant on the laterals as a source of stock water, the Proposed Action would not have significant impacts on livestock. Backfilling, contouring, reclaiming, and revegetating the lateral prisms following installation of the pipeline would remove the bare and eroded banks of the laterals, resulting in the beneficial effect of reducing the soil erosion caused by grazing along the laterals. After construction, the fringe riparian habitat located along the length of the laterals would no longer be available to livestock. However, the riparian vegetation would be replaced with upland vegetation, and therefore the long-term loss of the riparian vegetation as a source of forage for grazing livestock would be negligible.
Noise	No effect	Construction noise would be temporary and minor, as it would not raise the level of noise in the area above the background level of rural and agricultural noise. The project would meet the State and County noise standards during construction. In the long-term, there would be a beneficial effect to noise as noise disturbance from human activity along the lateral alignments would be reduced over the long-term given a decreased need for maintenance.
Vegetation	No effect	Approximately 24.4 acres of temporary disturbance to vegetation would occur due to the Proposed Action. The disturbance would be temporary, as areas disturbed by the Proposed Action would be restored following construction using one of two reclamation methods. The temporary effect would be minor, as the impacted upland native vegetation is abundant in the surrounding areas and would continue to be abundant post-project. The Proposed Action would result in the permanent loss of approximately 5 acres of riparian vegetation associated with the unlined laterals. This loss is not considered significant because the affected vegetation is low in diversity and limited in structure, similar habitat remains abundant in the surrounding landscape, and environmental commitments such as reseeding and habitat restoration would minimize long-term impacts.

Resource	No Action Alternative Effects	Proposed Action Alternative Effects
Visual Resources	No effect	During construction, temporary, minor visual impacts would occur due to the presence of construction equipment and activities. A linear scar attributable to the ditch piping and vegetation removal along the laterals would be visible intermittently along area roads. These linear features would create only a minor visual change in the temporary time frame because it would resemble the current condition of the linear lateral features and be strikingly similar to other linear features, such as canal, power, and fence lines in this rural, agricultural setting. After reclamation and vegetation establishment, the visual changes from the Proposed Action would not rise to the level of significance, as they would be unnoticeable and not measurably different from current conditions of the surrounding landscape.
Water Resources—*Water Quality*	No effect	During construction, minimal direct and indirect temporary effects to water quality would occur due to localized soil disturbance at the construction sites. However, these impacts would not rise to the level of significance because BMPs during construction ensure water quality is protected in the temporary timeframe. Piping the canals would reduce nutrient loading from manure and bacterial contamination, including fecal coliform, by preventing direct cattle access to the laterals. Replacing open laterals with pipelines would eliminate this source of contamination, leading to overall improvements in regional water quality. Additionally, by eliminating the canal's contact with sediment and debris inflow during precipitation events, cleaner water would be delivered to shareholders. Piping the laterals would also reduce salinity loading and improve water quality in the long term. No significant adverse effects to water quality would occur in the Project Area because the Proposed Action reduces water losses, prevents contamination from livestock access, and improves irrigation efficiency without altering overall water availability.
Water Resources—*Floodplains*	No effect	Construction activities would temporarily disturb approximately 0.2 acres of floodplains within the Project Area. These activities would occur in previously disturbed areas and during low flows, minimizing potential impacts. Post-construction, the floodplain would be restored to pre-existing conditions, and no permanent reduction in floodplain size or function would occur. To further reduce the minimal effects of these construction activities, extensive BMPs are incorporated into the Proposed Action (see Table 4-1). Following implementation, the ability of the Project Area to naturally moderate floods, maintain water quality, and recharge groundwater would remain similar to existing conditions, and therefore these impacts would not rise to the level of significance. The Proposed Action would not contribute to any trends increasing flooding risk in the Project Area or in the basin. The natural and beneficial floodplain values associated with the floodplains in the Project Area would be preserved.

Resource	No Action Alternative Effects	Proposed Action Alternative Effects
Water Resources—*Water Quantity and Use*	No effect	The Proposed Action would enable MVIC to manage its water more efficiently by reducing losses from seepage and evaporation within the Garrett Ridge and Lower Arickaree Laterals. These efficiency improvements would increase the amount of water available to shareholders without altering the adjudicated water rights or the overall volume of water diverted within the MVIC system. The pipeline would enhance water delivery reliability and conserve approximately 2,253 ac-ft of water annually, benefiting agricultural use and regional water management. The conserved water would be retained in storage at Narraguinnep Reservoir for more efficient irrigation use within the MVIC system, helping sustain agricultural production during drought conditions. The Proposed Action would not change the adjudicated water rights managed by MVIC or alter the allocation structure for shareholders along the laterals. Given that the Proposed Action would have only beneficial effects on water quantity rights and use, no significant adverse effects to water rights or use would result from the Proposed Action.
Water Resources—*Wetlands and Aquatic Resources*	No effect	Overall, the Proposed Action would have minimal adverse impacts on jurisdictional waters and aquatic resources, with approximately 3.8 acres of the Lower Arickaree and Garrett Ridge Laterals being converted to pipeline. Additionally, 0.7 acres of wetlands would be temporarily impacted by the pipeline alignment but would be restored following construction. The Proposed Action would potentially reduce 1.0 acres of seepage-induced wetlands, as they are dependent on water losses from unlined Garrett Ridge and Lower Arickaree laterals. However, some wetlands may persist due to continued irrigation, and the broader benefits of improved water efficiency and conservation offset the potential loss, ensuring no significant adverse effects to jurisdictional wetlands would occur.
Weeds	No effect	The Proposed Action would remove segments of open moving water, a key element of noxious weed seed transport, when 2.9 miles of unlined ditch would be replaced with a HDPE pipeline. Certain segments of the laterals would no longer require regular maintenance, lowering the potential for the continued spread and establishment of weeds. Downgradient herbaceous noxious weeds which rely on lateral seepage would no longer be supported. Despite these beneficial effects to noxious weed presence, ground disturbance associated with construction would create optimal conditions for noxious weeds in the area to spread into the disturbed construction footprint, and noxious weeds would continue to be present throughout the Project Area. The Proposed Action construction BMPs, such as cleaning vehicles before bringing them onsite would help minimize the risk of new weed introduction and recruitment in the Project Area, and the MVIC would continue to be responsible for complying with the MCWP and the Colorado Noxious Weed Act in the Project Area. Because noxious weeds are currently present in the Project Area, their ongoing presence within the Project Area would not constitute a significant impact.

Resource	No Action Alternative Effects	Proposed Action Alternative Effects
Wildlife— *General Wildlife*	No effect	***Large Mammals*** Temporarily, large mammals would be displaced by the increased human presence during construction activities. Disruption effects would be limited to the construction phase only, and much of the wildlife in the area is accustomed to farm equipment, agricultural activities, and ongoing operation and maintenance of the irrigation system, similar to the equipment and activities during implementation of the Proposed Action, so the disruptions would be minimal. Although the Project Area overlaps with overall habitat for mule deer, the temporary disturbance on 24.4 acres and the long-term loss of the 5 acres of riparian vegetation along the laterals is a very small proportion of the available 14,147 acres of mule deer habitat in the vicinity of the Project Area (CNHP 2023), ensuring significant, population level effects to big game species would not occur. The Proposed Action would have a minimal impact on black bear in the Project Area during construction because it would largely occur during the season when black bears are denning. Mountain lions in the Project Area would experience temporary displacement during construction activities because their secretive behavior would push them to stay away from the Project Area when human disturbance is present. Effects to these species and their habitat would be minor, as the species and habitat are common throughout the area, the Proposed Action would only temporarily affect 24.4 acres, and significant, population-level impacts would not occur. The loss of the upland and riparian vegetation due to construction disturbance would affect large mammals by the temporary loss of food and shelter until the area is reclaimed. Because disturbance would be limited to only those areas necessary to safely implement the project and would protect native and riparian vegetation, these effects to wildlife habitat would be minimal as they would be confined to the lateral prisms and the reclamation would replace vegetation disturbed during implementation.

Resource	No Action Alternative Effects	Proposed Action Alternative Effects
Wildlife— *General Wildlife*	No effect	***Large Mammals (Continued)*** In the long term, large mammals which use the riparian fringe habitats along the Garrett Ridge and Lower Arickaree Laterals would experience the long-term loss of this habitat. However, though this riparian vegetation provides food and shelter to large mammals, upland vegetation, which also provides food and shelter, would replace it, so the effects to large mammals would be minor. Additionally, the large mammals are relatively common within and adjacent to the Project Area, would continue to propagate in the area, and the landscape-level vegetation conditions following implementation would be substantially similar to existing habitat conditions in the surrounding area and on a regional landscape scale, ensuring population-level significant impacts would not occur to large mammals. The loss of the open water source from piping the ditch would affect localized habitat use by large mammals; however, because the Project Area is adjacent to the Upper Hermana Lateral, the effects of piping the open canal on big game habitat would be minor.
Wildlife— *General Wildlife*	No effect	***Small Mammals and Reptiles*** Direct effects from construction activities to individual small animals—including burrowing amphibians, reptiles, and small mammals—would include mortality and displacement during ditch piping activities. Though individual animals would suffer mortality or displacement because the species and habitats are common throughout the project and surrounding areas, and the effects from the 24.4 acres of habitat disruption at the landscape-level would be minor, the project would not significantly affect these species at the population level. The long-term effects to small mammals and reptiles from the Proposed Action include the loss of 5 acres of riparian habitat supported by lateral seepage and the loss of the open water source. Because mobility is limited in small mammals and reptiles, the transition from riparian to upland habitat and the loss of an open water source would cause mortality to individual animals if they were unable to find a water source nearby. Conversely, because of their small size, adequate alternative water sources can occur in microhabitats, and there is the potential that individuals would persist with the transition from riparian to upland habitat as food and shelter would still be available. Similar to large mammals, the small mammals and reptiles that occur in the Project Area are relatively common throughout the project and surrounding areas, which provide alternative riparian habitat and water sources, and effects from the loss of 5 acres of riparian habitat and the open water source would be minor and would not affect these species at the population level. From a landscape perspective, the habitat conditions following implementation would be substantially similar to existing habitat conditions in the surrounding area and on a regional scale, ensuring significant effects to small mammals and reptiles would not occur.

Resource	No Action Alternative Effects	Proposed Action Alternative Effects
Wildlife— *General Wildlife*	No effect	***Fish and Aquatic Wildlife*** The temporary effects to fish and aquatic wildlife from construction activities include only minimal direct and indirect effects to water quality during construction activities as described in Section 3.2.9 Water Resources. No new depletions would occur because of the Proposed Action. BMPs would be in place to minimize effects to water quality and aquatic habitat within the canals during construction activities. The Proposed Action would eliminate lateral seepage losses and reduce salinity loading to the San Juan and the Colorado River Basins, having the beneficial effect of improving fish and wildlife habitat within the larger Colorado River Basin. ***Migratory Birds and Eagles*** In the temporary timeframe, the majority of construction would occur in winter months outside of the irrigation season and most migratory bird, eagle, and nesting seasons, reducing the likelihood of temporary effects to migratory birds and eagles. While eagle nesting season begins in early January, no active eagle or raptor nests were identified within the CPW buffer areas during surveys. Therefore, no impacts to eagles or raptors would occur. Additionally, pre-construction nesting bird surveys would be conducted seven days prior to construction and vegetation removal to confirm no active nests are present. Five acres of low-quality riparian fringe is intermittingly present along the laterals; approximately half of the lengths of each canal do not have riparian fringe. Under the Proposed Action, the open laterals would be piped, removing a source of hydrology that helps to sustain this vegetation. Eventual loss of some mid and overstory vegetation is expected in these areas, because of project activities. Nearby riparian areas, including upstream of Garrett Ridge Lateral and southeast of the Project Area along the Dolores River, provide alternative high-quality riparian habitat for bird species and other wildlife as riparian vegetation in the Project Area decreases. In the long-term, restoration activities, including native seed planting, would restore vegetation within the site as feasible with remaining water sources. The loss of 5 acres would not significantly affect the habitat availability at the landscape scale, and the indirect effects on migratory birds and raptors from riparian habitat loss along the canals would be minor.

Resource	No Action Alternative Effects	Proposed Action Alternative Effects
Wildlife—*Threatened, Endangered, and Candidate Species*	No effect	The Proposed Action would have no effect to any proposed or listed ESA threatened or endangered species within the Proposed Project Area. • For the Monarch butterfly, implementation of BMPs during construction would include avoidance measures to preserve existing milkweed species, and areas of disturbed or removed vegetation that serve as potential habitat would be reclaimed and reseeded with a native species seed mix upon construction completion, ensuring no effects to the Monarch butterfly. • No suitable habitat exists within the Proposed Project Area for the silverspot butterfly; therefore, no effects would occur to this species. • The Suckley's Cuckoo Bumble Bee could occur within the Action Area, because of the presence of nectarous plants and other bumble bee species. However, no individuals of this species were identified during field surveys and the Proposed Action includes BMPs to protect native vegetation to the best extent practicable. Suckley's Cuckoo Bumble Bee is not currently known to occur and USFWS has indicated that project and activities would have no effect on the species. BMPs would also rehabilitate disturbed areas with native seed, which would improve habitat for the Suckley's cuckoo bumble bee and its hosts in the long term. Therefore, the Proposed Project would have no effect to the Suckley's cuckoo bumble bee. • Implementation of BMPs would ensure temporal avoidance of the breeding season for the Mexican spotted owl, which is March to September, and no suitable habitat would be impacted. Construction activities would occur outside of migratory bird breeding season, ensuring effects to potential foraging Mexican spotted owls would be avoided. Therefore, the Proposed Action would have no effect on this species. • Though temporary noise resulting from construction would most likely deter gray wolves from entering the area, although no recent records documenting any occurrences, the Proposed Action would not affect suitable habitat or the abundance or persistence of prey populations. Given that wolves are unlikely to occupy the Project Area, and no destruction to suitable or critical habitat would occur, the Proposed Action would have no effect on gray wolf. • No habitat for Colorado pikeminnow or razorback sucker exists within the Project Area, and construction activities would occur outside of irrigation season and canal use, ensuring no effects to Colorado pikeminnow and razorback sucker from the Proposed Action. Historic depletions for all water from the Dolores Project, which includes these laterals, were previously consulted on in the Gunnison Programmatic Biological Opinion (PBO). Therefore, any historic depletions associated with the Proposed Project are covered under the Gunnison PBO, and no new depletions to the Upper Colorado River would result from the Proposed Action. The Upper Colorado River Endangered Fish Recovery Program serves as the mechanism that ensures these historic depletions do not jeopardize the continued existence of the Colorado pikeminnow or razorback sucker.

CHAPTER 4—ENVIRONMENTAL COMMITMENTS

This section summarizes the environmental commitments developed to decrease the potential adverse insignificant effects of the Proposed Action. The cooperative agreement (R23AP00415) between Reclamation and MVIC requires that MVIC be responsible for implementing and/or complying with the environmental commitments contained in the NEPA documents.

The actions in Table 4-1 would be implemented as an integral part of the Proposed Action (as described in Section 2.3) and would be included in the contractor bid specifications.

Note that in the event the Proposed Action description changes, or any construction activities are proposed outside of the inventoried Project Area, or the planned timeframes outlined in this EA, additional environmental review by Reclamation would be required to determine if the existing surveys and information are adequate to evaluate the changed project scope. Additional NEPA documentation may be required.

Table 4-1. Environmental Commitments

Environmental Commitment	Affected Resource	Authority
Obtain ROW easements based on the access needs for operation and maintenance and at the new lateral alignments as described in Section 2.4.5 Rights-of-Way and Land Ownership. Obtain and meet all required permits, licenses, clearances, and approvals as described in Section 2.5 Permits and Authorizations	Access Transportation Water Soils Cultural Resources	MVIC Local Utilities Montezuma County CDOT CWA NHPA ARPA NAGPRA AIRFA 48 FR 44716
Ensure the contractor submits a Traffic Control (TC) Plan before any initial project wide construction to include the roads, staging areas, and construction access which would detail the means, methods and materials used to maintain street traffic surrounding all construction and staging areas, and to isolate construction and staging areas from the public, and would detail coordination with CDOT, Montezuma County and Sheriff departments, and with private landowners when traffic or access would be delayed. TC Plan would require cleaning and repairing any damage caused by installation and restoring existing and permanent facilities used during construction to original condition.	Access Transportation Public Safety	MVIC CDOT Montezuma County

Environmental Commitment	Affected Resource	Authority
Post-construction, comply with the Montezuma County Weed Plan (MCWP) (Montezuma County 2023) for the eradication or management of noxious weeds on private property.	Vegetation Weeds	MCWP CNWA
Best Management Practices Associated with Water Quality Protection and Erosion Prevention		
Complete all work within the designated Proposed Project footprint and during established daytime working hours.	Water Soils Vegetation Weeds Cultural Resources	CWA CNWA MCWP ARPA PRPA
Contain all work activities, including those within staging areas, to upland areas to minimize potential impacts to surface water quality, whenever feasible.	Water	CWA
Ensure all applicable local or state water quality permits are in place, and where applicable, obtain an EPA Construction General Permit for the Proposed Project. Meet associated permit conditions during construction operations.	Water	CWA
Ensure the contractor develops and follows an approved Stormwater Management Plan (SWMP) and a Spill Response Plan (SRP) or other similar plans, as required. Comply with all measures in the associated SWMP and SRP plan when fueling, performing cleaning and maintenance, and storing or disposing of hazardous materials.	Water	CWA
Comply with all measures in the associated SWMP or similar document for implementing temporary erosion and sediment controls (TESCs), covering, and storing materials, and other erosion prevention measures.	Water Soils	CWA
Do not perform construction activities during extreme wet weather conditions, whenever practicable. If heavy precipitation is predicted to occur within 24 hours, respond appropriately to cover up any stockpiles and check that temporary erosion and sediment controls (TESCs) are functioning.	Water Soils	CWA
Dispose of excavated sediment and debris at a pre-approved area more than 200 feet from any surface water feature.	Water Soils	CWA
Maintain adequate response equipment (i.e., spill kits and cleanup materials) onsite at all times to avoid chemical contamination in the event of a spill. Clean all spills immediately.	Water	CWA
Do not allow uncured concrete or form materials to enter the active stream channel.	Water	CWA
Locate borrow areas outside the 100-year floodplain or greater than 200 feet from any identified waters within the Action Area, whichever is greater.	Water Soils	CWA

Environmental Commitment	Affected Resource	Authority
Use vegetable-based hydraulic fluid in equipment operating in or near a waterbody.	Water	CWA
Employ appropriate dust control measures during project implementation.	Air Quality Water Soils	CAA CWA
Construct project outside the irrigation season (April 15–October 15) and during periods of low flow, minimizing the potential for short-term downstream impacts. Specific erosion control measures, including temporary sediment traps, filter fabric fences, and vegetative buffers, will be used to prevent significant sediment transport during construction.	Water	CWA
Best Management Practices Associated with Reclaiming Abandoned Segments of Garrett Ridge and Lower Arickaree Laterals		
Establish appropriate buffer zones to protect vegetation as identified by MVIC. Clearly mark, flag, or fence areas where vegetation is to be protected. Leave standing any live cottonwoods within the Project Area associated with the reclaimed ditch.	Water Soils Vegetation	CWA MVIC
Do not use cut vegetation as fill in the reclaimed ditch.	Vegetation Weeds Water Soils	CNWA MCWP CWA
Best Management Practices Associated with Vegetation		
Clearly identify areas where vegetation is to be protected (i.e., native riparian vegetation and as identified by MVIC).	Vegetation Water Resources	MVIC CWA
Limit disturbances to only those areas necessary to safely implement the project to ensure retention of vegetation for erosion control and to protect native vegetation, including milkweed and riparian vegetation, whenever practicable. Confine vegetation removal to the smallest portion of the Project Area as necessary to complete the work.	Vegetation Water Resources Wildlife	MVIC CWA ESA

Environmental Commitment	Affected Resource	Authority
Following construction, revegetate disturbed ground using either: 1) the sterile topsoiling and natural recruitment method, or 2) the conventional revegetation method, as identified in the construction plans and described in Section 2.3.3 Restoration and Revegetation. When using the conventional revegetation method, use weed-free seed mixes appropriate for the surrounding areas. For roadsides and the margins of agricultural areas, use regionally appropriate drought-tolerant grasses. For irrigated lands, use a weed-free hay mix acceptable to the landowner. For areas surrounded by natural vegetation, use a weed-free seed mix that includes drought-tolerant and locally ubiquitous native grasses, such as western wheatgrass.	Vegetation Weeds Water Soils	CNWA MCWP CWA
Mulch and inoculate the soil with mycorrhiza for either reclamation method to ensure success of the reclamation effort.	Vegetation Weeds Water Soils	CNWA MCWP CWA
All construction equipment will be power-washed and free of soil and debris prior to entering the construction site to reduce the spread of noxious and invasive weeds.	Water Soils Vegetation Weeds	CWA CNWA MCWP
Best Management Practices to Avoid and Minimize Effects to Wildlife and Fish Species, and Including Bald Eagles and Migratory Birds		
Time construction to occur beginning in fall/winter and ending in the spring of each construction phase.	Wildlife-Fisheries	MBTA
Ensure a qualified biologist performs a nesting bird clearance survey between March 15 and August 15 within seven days before ground disturbance and the removal of trees and shrubs. If nests are located, do not allow project activities until approval is granted.	Wildlife	MBTA BGEPA
If additional threatened or endangered species are listed or proposed, or if critical habitat is designated before completion of construction, and the species or designated habitat occur within the Project Area or may be affected by the Proposed Action, pause construction, and prepare a species evaluation. Do not readdress species for which a no effect determination has been previously prepared.	Wildlife Wildlife-Fisheries	ESA
If threatened or endangered species are discovered during construction, construction activities will halt until consultation is completed with the U.S. Fish and Wildlife Service and protection measures are implemented. Additional surveys may be required if construction plans, or proposed disturbance areas are changed.	Wildlife Threatened & Endangered Species	ESA

Environmental Commitment	Affected Resource	Authority
Flag active nests of migratory birds, and do not perform work within 50 feet of an active nest, ensuring disturbances to nesting birds would not occur.	Wildlife	MBTA
Best Management Practices to Avoid and Minimize Effects to Cultural Resources		
Avoid Site 5MT25911 by limiting all project work and vehicles to the portion of the APE east of the existing property fence.	Cultural Resources	NHPA
For segments of the Garrett Ridge Lateral and Lower Arickaree Lateral, resolve adverse effects by following the stipulations in the Cultural Resources plan of action.	Cultural Resources	NHPA
In the event of inadvertent cultural resources discovery, immediately suspend all activities in that area and contact Reclamation.	Cultural Resources	NHPA

CHAPTER 5—CONSULTATION AND COORDINATION

5.1 Introduction

Reclamation's public involvement process presents the public with opportunities to obtain information about a given project and allows interested parties to participate in the project through written comments. This chapter discusses public involvement activities taken to date for the Proposed Action. The key objective is to facilitate a well-informed public that actively assists decision makers through the process, culminating in the implementation of an alternative.

5.2 Public Involvement

The Lower Arickaree Lateral Piping Project was first proposed in the 2018 Dolores Project Drought Contingency Plan, while the Garrett Ridge Lateral Piping Project is a continuation of a previous project that piped a portion of the Lower Garrett Ridge Lateral. In 2022, MVIC submitted a request for funding for the Proposed Action from Reclamation through the WaterSMART Program. Since then, informal coordination with MVIC shareholders, interested landowners, Reclamation, and J-U-B has occurred. Informal coordination has led to the Proposed Action as presented in this Draft EA.

In compliance with NEPA, the Draft EA will be released for a 30-day public review period. Notice of the public review period and availability of the Draft EA will be distributed to private landowners adjacent to the Project Area, MVIC shareholders and the organizations and agencies listed in Appendix B. This Draft EA will be available on Reclamation's website (https://www.usbr.gov/uc/DocLibrary/ea.html). The publicly available electronic versions of the Draft and Final EA will meet the technical standards of Section 508 of the Rehabilitation Act of 1973, so that the documents can be accessed by people with disabilities using accessibility software tools. Comments received on the Draft EA and responses will be included in Appendix B of the Final EA.

CHAPTER 6—PREPARERS

The Reclamation, J-U-B ENGINEERS, Inc., and Alpine Archaeological Consultants, Inc. personnel involved in the preparation of this Draft EA are identified in the following table.

Table 6-1. Reclamation Team, Environmental Preparers

Name	Agency/ Organization	Title	Areas of Responsibility
Lucas Kline	Reclamation	Natural Resource Specialist	NEPA
Jennifer Ward	Reclamation	Environmental Group Chief	EA Review
Zachary Nelson	Reclamation	Regional Archeologist	Cultural Resources
Ian Rogers	J-U-B	Project Engineer II	Alternative Development/Plans
Rebecca Hendricks Miller	J-U-B	Environmental Specialist/Biologist	Biological Evaluation
Jason Lewis	J-U-B	Senior Environmental Specialist/Biologist	Aquatic Resources Delineation (ARD)/General Authorship
Lexie Conley	J-U-B	Lead Environmental Specialist	General Authorship
Jovonna Kirkling	J-U-B	Senior Environmental Specialist	General Authorship
Jennie Fischer	J-U-B	Senior Environmental Specialist	General Authorship
Suzanne Acton	J-U-B	Senior NEPA Specialist	General Authorship
Jeremy Omvig	Alpine	Principal Investigator	Cultural Inventory and Report

CHAPTER 7—REFERENCES

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CHAPTER 8—ACRONYMS AND ABBREVIATIONS

Table 8-1 identifies acronyms and abbreviations used in this document and their definitions.

Table 8-1. Definitions for Acronyms and Abbreviations

Acronym or Abbreviation	Definition
ac-ft	Acre-feet
ACS	American Community Survey
AIRFA	American Indian Religious Freedom Act
Alpine	Alpine Archaeological Consultants, Inc.
AMSL	Above mean sea level
APE	Area of potential effect
ARD	Aquatic Resource Delineation
ARPA	Archaeological Resources Protection Act
BE	Biological Evaluation
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
CAA	Clean Air Act
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CNWA	Colorado Noxious Weed Act
CPW	Colorado Parks and Wildlife Department
CRS	Colorado Revised Statutes
CRSP	Colorado River Storage Project
CWA	Clean Water Act
DWCD	Dolores Water Conservancy District
EA	Environmental Assessment
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
GIS	Geographic information system
HDPE	High-density polyethylene
HUC	Hydrologic Unit Code
IPaC	Information for Planning and Consultation
J-U-B	J-U-B ENGINEERS, Inc.
MBTA	Migratory Bird Treaty Act
MCWP	Montezuma County Weed Plan

Acronym or Abbreviation	Definition
MOA	Memorandum of Agreement
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NASS	National Agricultural Statistics Survey
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
PL	Public Law
PVC	Polyvinyl chloride (a type of pipe)
RCPP	Regional Conservation Partnership Program
Reclamation	U.S. Bureau of Reclamation
RGP	Regional General Permit
ROW	Rights-of-way
SHPO	Colorado State Historic Preservation Officer
SPCC	Spill prevention, control, and countermeasures plan
SWMP	Stormwater management plan
TESC	Temporary erosion and sediment controls
TC	Traffic Control
U.S. or US	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
MVIC	Montezuma Valley Irrigation Company
WOTUS	Waters of the United States

APPENDICES

Appendix A—Figures

Appendix B—Comment Letters, Comment Responses

Appendix C—Water Loss Studies–Lower Arickaree and Garrett Ridge

Appendix D—Cultural Resources Compliance Documentation (*Pending*)

Appendix A—Figures

- Figure 1. Project Vicinity Map
- Figure 2. Project Area Map
- Figure 3. Lower Arickaree Lateral Site Map
- Figure 4. Garrett Ridge Lateral Site Map
- Figure 5. Solar Array Installation Site Map
- Figure 6. Relationship to Other Projects

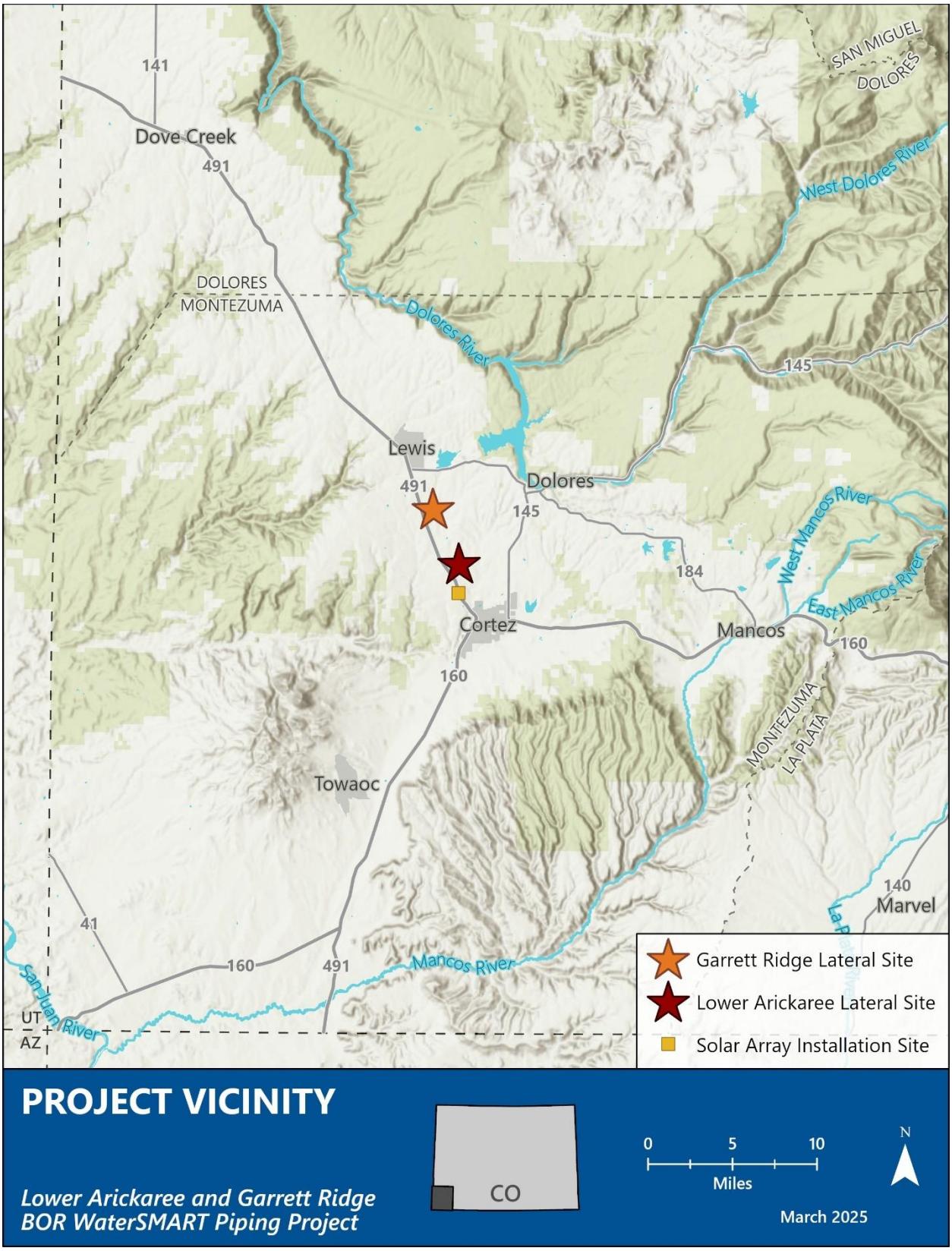

Figure 1. Project Vicinity Map

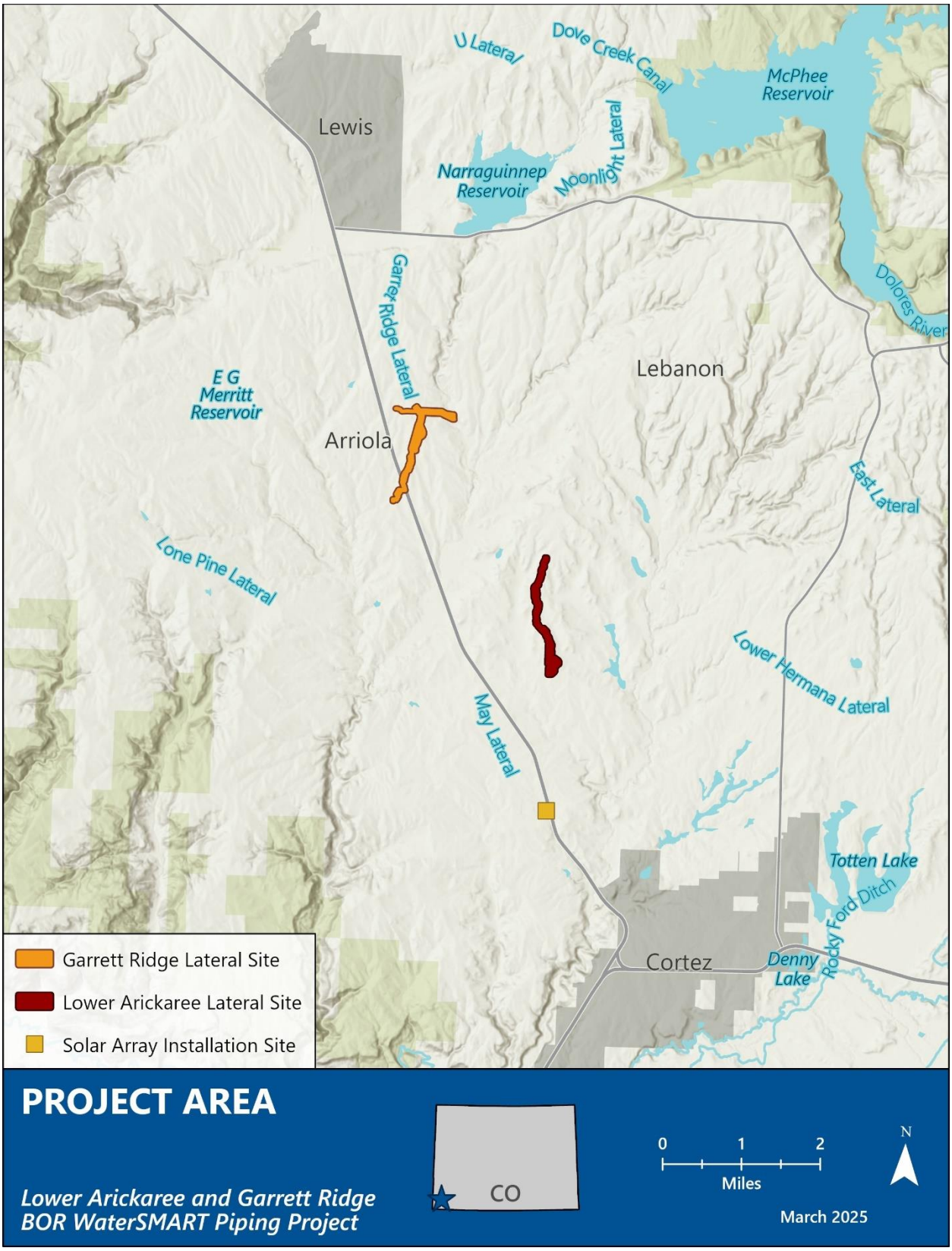

Figure 2. Project Area Map

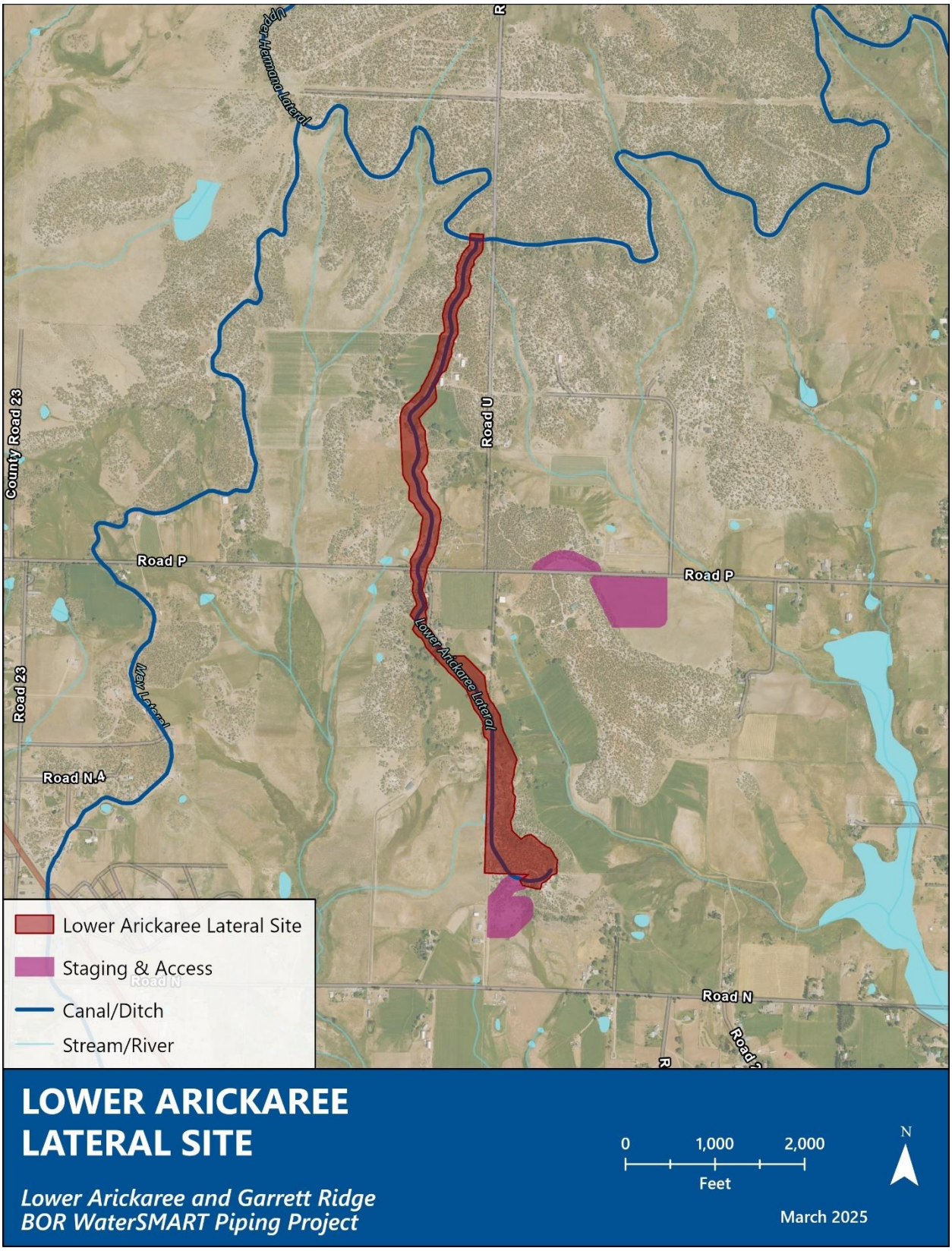

Figure 3. Lower Arickaree Lateral Site Map

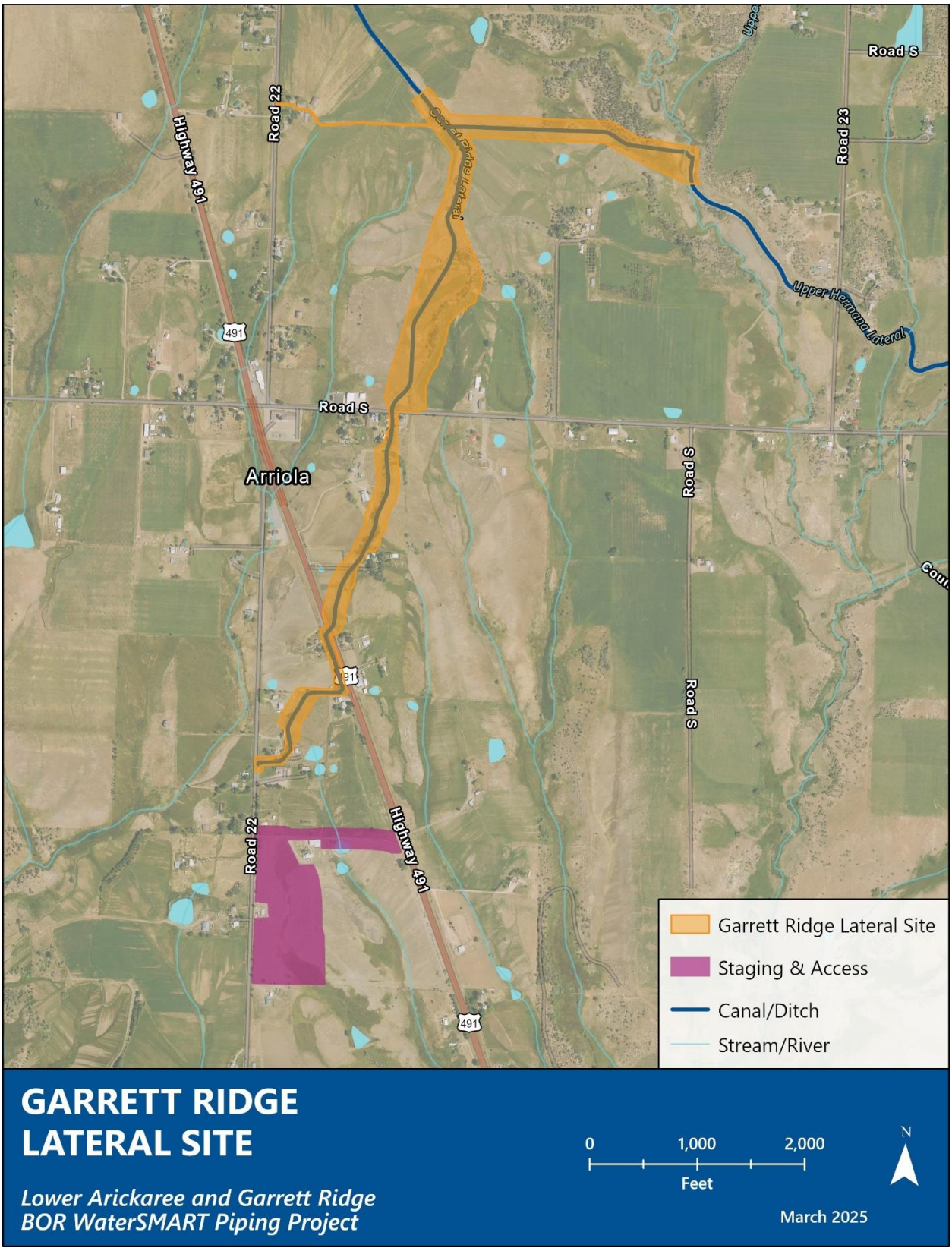

Figure 4. Garrett Ridge Lateral Site Map

Figure 5. Solar Array Installation Site Map

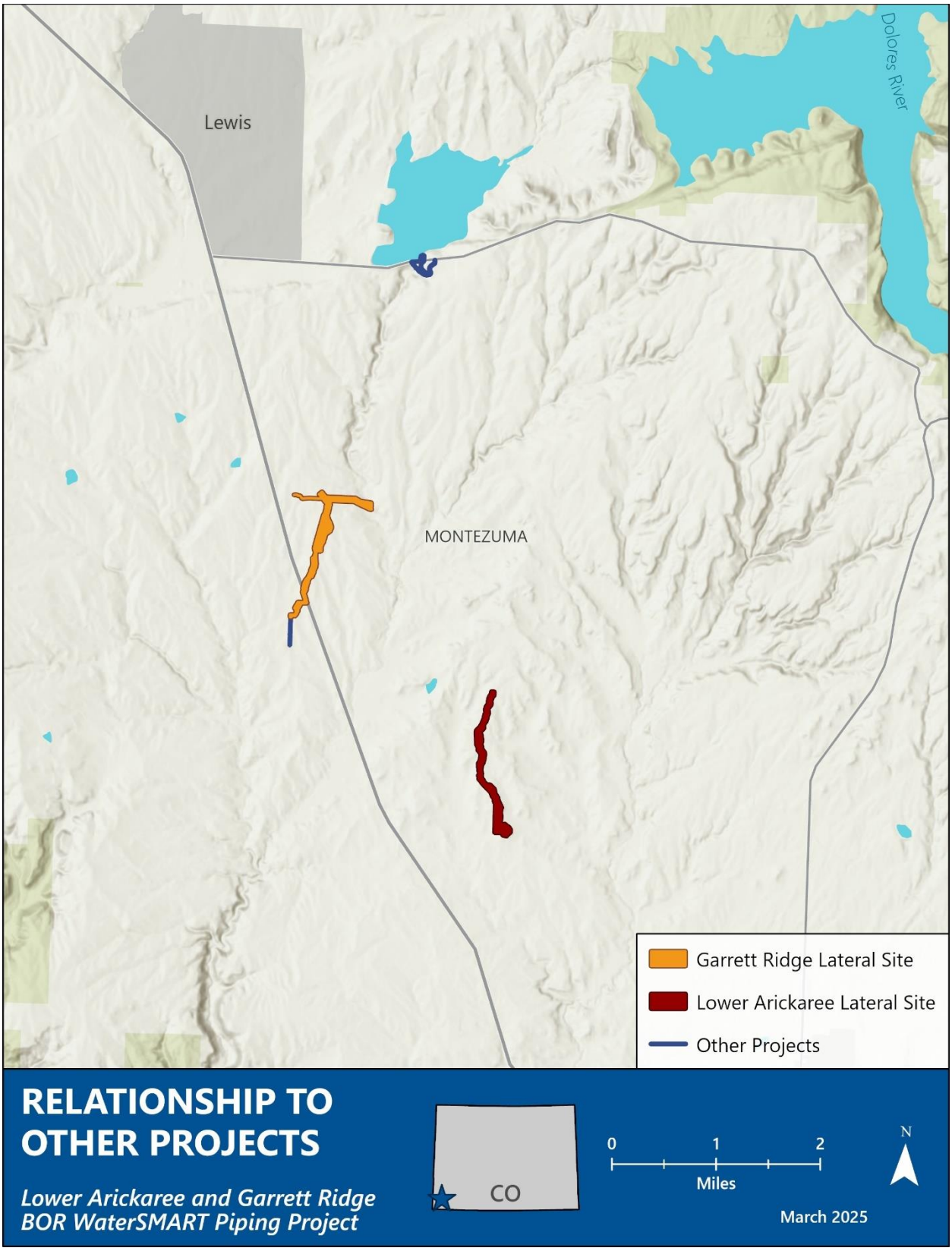

Figure 6. Relationship to Other Projects

Appendix B—Comment Letters, Comment Responses, and Distribution List

Distribution List for the Draft EA:

- Private landowners adjacent to the Project Area
- Organizations
- BLM, Uncompahgre Field Office, Montrose, Colorado
- Colorado State Historic Preservation Office (SHPO), Denver, Colorado
- Colorado Parks and Wildlife (CPW), Grand Junction, Colorado
- Colorado Department of Transportation (CDOT), Grand Junction, Colorado
- Montezuma County
- Montezuma Valley Irrigation Company Shareholders
- U.S. Fish and Wildlife Service (USFWS), Ecological Services, Grand Junction, Colorado
- U.S. Army Corps of Engineers (USACE), Colorado West Regulatory Branch, Grand Junction, Colorado
- Southern Ute Indian Tribe, Ute Mountain Ute Tribe, and Navajo Nation

Comment Letters—*Pending*

Comment Responses—*Pending*

Appendix C—Water Loss Studies–Lower Arickaree and Garrett Ridge

Lower Arickaree—Water Loss Study

DATE: July 2022

TO:

CC:

FROM: Ian Rogers, P.E.

SUBJECT: Lower Arickaree—Water Loss Study

This memorandum is intended to describe the water loss study conducted on the Lower Arickaree Canal (Lower Arickaree, the Canal) on June 24, 2022. This memo details the field measurement methods, calculations, and assumption made in order to quantify the rate of water loss in the Lower Arickaree.

Current Conditions and Study Locations

Montezuma Valley Irrigation Company's (MVIC) releases water from Narraguinnep Reservoir to the Upper Hermana Lateral which supplies water to the Lower Arickaree Canal. Flow into the Lower Arickaree is managed by a headgate and is measured immediately downstream by a three-foot Parshall flume. The Lower Arickaree flows for approximately 8,350 feet, serving 19 headgates ranging in size from six to 36 inches. Flows in the Canal beyond the final headgate are considered operational and spill overland, eventually into McElmo Creek.

On June 24, 2022, J-U-B personnel conducted in-ditch flow measurements at two points comprising the limits of the water loss study area. Flowrates were measured at the upper end of the study area just downstream of the Upper Hermana Lateral (LowAri1) and at the existing Parshall flume just beyond the final turnout headgate (LowAri2). The study area was approximately 8,170 feet in length. Turnout flows on the day of the study were provided by MVIC personnel.

Ditch Flow Measurement Procedure

Flow measurement point LowAri1 is located approximately 100 feet downstream of an existing three-foot Parshall flume. The throat width of the existing Parshall was 37 inches, or slightly larger than the designed three feet. Additionally, weeds and stones in the approach section of the flume appeared to affect its stage-flow relationship. Due to these factors, the stage reading

and associated discharge in the flume was not used in this water loss study. Therefore, discharge at the upper end of the study (LowAri1) was measured using the velocity-area method.

The velocity-area method calculates discharge as the product of area and velocity within subsections of the cross section. The total discharge of the Canal at the cross section is then computed by summing the discharges of all subsections. The velocity-area method can be expressed by Equation 1:

$$Q = \sum_{i=1}^{n} a_i \, v_i$$

(Eq. 1)

where Q = total discharge at cross section (cubic feet per second)

a_i = cross section area, for the *i*th segment of the *n* segments into which the cross section is divided (square feet)

v_i = the corresponding mean velocity of the flow normal to the *i*th segment (feet per second)

J-U-B personnel used a Hach FH950 Portable Velocity Meter and Data Logger with an electromagnetic velocity sensor to measure velocity and a USGS top setting wading rod to measure depth. At the flow measurement location, care was taken to select an appropriate cross section described in detail by Turnipseed and Sauer (2010). Once an appropriate cross section was selected, a tape measure was anchored in place on either bank, perpendicular to flow.

Starting from the left bank, the depth was measured using the wading rod and recorded in the data logger. Because the maximum depth of the Canal was less than 2.5 feet at LowAri1, the 0.6 depth average velocity approximation method was used. Velocity was then measured and recorded at 0.6 depth at each station along the profile. A minimum of 20 stations were recorded at LowAri1.

The flowrate at the end of the study area (LowAri2) was measured using an existing two-foot Parshall flume past the final turnout headgate. The throat section of the flume was measured and verified to be two feet. At the time of measurement, upper head in the flume was 0.42 feet

which corresponds to a flow rate of 2.09 ft^3/s. Flow rates at both measurement points within the study area are summarized below in Table 1.

Table 1: Lower Arickaree Flowrates

Location			Distance from Canal Start (ft)	Flow Rate (ft^3/s)
Name	Latitude	Longitude		
LOWARI1	37° 25' 22.94" N	108° 36' 38.81" W	180	12.47
LOWARI2	37° 24' 13.62" N	108° 36' 27.01" W	8,350	2.09

Turnout Flow Rates

On the day of measurement, all turnout flows were assumed to be equal to the discharge rates provided by MVIC personnel. A total of 19 turnouts occur between the two measurement stations and the total turnout flow rate was utilized in the water loss calculation. The total turnout flow rate for June 24, 2022, was 8.88 ft^3/s. Turnout data are included in Attachment 2.

Evaporative Losses

Due to the large total surface area of the Lower Arickaree, evaporative losses were approximated using a method described by Jensen (2010). This method relates evaporation in shallow water bodies to local crop evapotranspiration data. Evaporative losses from the Ditch were estimated using Equation 2:

$$E = ET_{ref} \times K_W$$

(Eq. 2)

Where E = Evaporative loss from a water body (in/day)

ET_{ref} = Reference crop evapotranspiration (in/day)

K_W = 1.1, coefficient relating evaporation in shallow water bodies to reference crop evapotranspiration (unitless).

The reference evapotranspiration rate (ET_{ref}) was approximated by averaging the daily ET_{ref} values from the Colorado State University's CoAgMET database during the 2021 irrigation season (4/15/2021-10/15/2021) at the Cortez Station. The average ET_{ref} for that period was 0.243 in./day, which multiplied by $K_{W\,yielded}$ an evaporative loss rate E of 0.267 in./day (0.022

ft./day). The total surface evaporation rate for the length of the study area was approximated by the product of evaporative loss rate E and the total surface area. Table 2 summarizes the evaporation loss calculations in the Canal.

Table 2: Evaporation Loss Calculations

Study Segment	Start Station	End Station	Distance (ft)	Average Top Width (ft)	Total Area (ft^2)	Evaporative Loss (ft/day)	Total Surface Evaporation Rate (ft^3/s)
Study Area	LOWARI1	LOWARI2	8,170	8	65,360	0.022	0.017

Seepage Loss Calculations

Seepage loss in the Lower Arickaree is considered any difference in flows between two measurement points that is not accounted for in turnouts or evaporation. Losses were assumed to be seeps through the earthen embankment. Seepage water losses within each segment can be expressed by equation 3:

$$Q_S = (Q_{Dn} - Q_{Dn+1}) - E - Q_T$$

(Eq. 3)

Where: Q_S = Total seepage water loss rate within segment (ft^3/s)

Q_{Dn} = Flow at upstream measurement point within segment (ft^3/s)

Q_{Dn+1} = Flow at downstream measurement point within segment (ft^3/s)

E = Total surface evaporation rate within segment (ft^3/s)

Q_T = Total turnout flow within segment (ft^3/s)

Table 3 summarizes the calculated seepage water losses in the Ditch.

Table 3: Seepage Water Losses

Segment	Segment Length (ft)	Start Station	Flow at Start (ft^3/s)	End Station	Flow at End (ft^3/s)	E (ft^3/s)	Q_T (ft^3/s)	Q_S (ft^3/s)
Study Area	8,170	LOWARI1	12.47	LOWARI2	2.09	0.017	8.88	1.48

Operational Water

The operational water in the Lower Arickaree is defined as the water required to maintain adequate water surface elevation needed to deliver turnout flows. The operational water flows through the length of the Canal, spills overland, and eventually travels to McElmo Creek. If the Canal were piped, operational water would not be required and is considered water savings. Operational water was considered equal to the flowrate measured at point LowAri2 (2.09 ft^3/s), using the two-foot Parshall flume past the final turnout headgate.

Total Water Savings

The total losses in the Lower Arickaree are the sum of the evaporative losses (E), the seepage losses (Q_S), and the operational water (Q_{op}). The losses would be considered water savings if the Canal were piped. The annual water savings are calculated by multiplying the total losses in the Canal by the duration of the irrigation season (184 days). Approximately 1,310 acre-feet of water would be saved each year if the Lower Arickaree were piped. Table 4 shows the total water savings if the Canal were piped.

Table 4: Annual Water Savings

Study Segment	E (ft^3/s)	Q_S (ft^3/s)	Q_{op} (ft^3/s)	E + Q_S +Q_{op} (ft^3/s)	Water Savings (ac-ft)	
					Daily	Annual
Study Area	0.017	1.48	2.09	3.59	7.12	1310

Enclosed:

- Study area site map (Attachment 1)
- Flow measurement field data (Attachment 2)
- MVIC turnout orders for June24, 2022 (Attachment 3)

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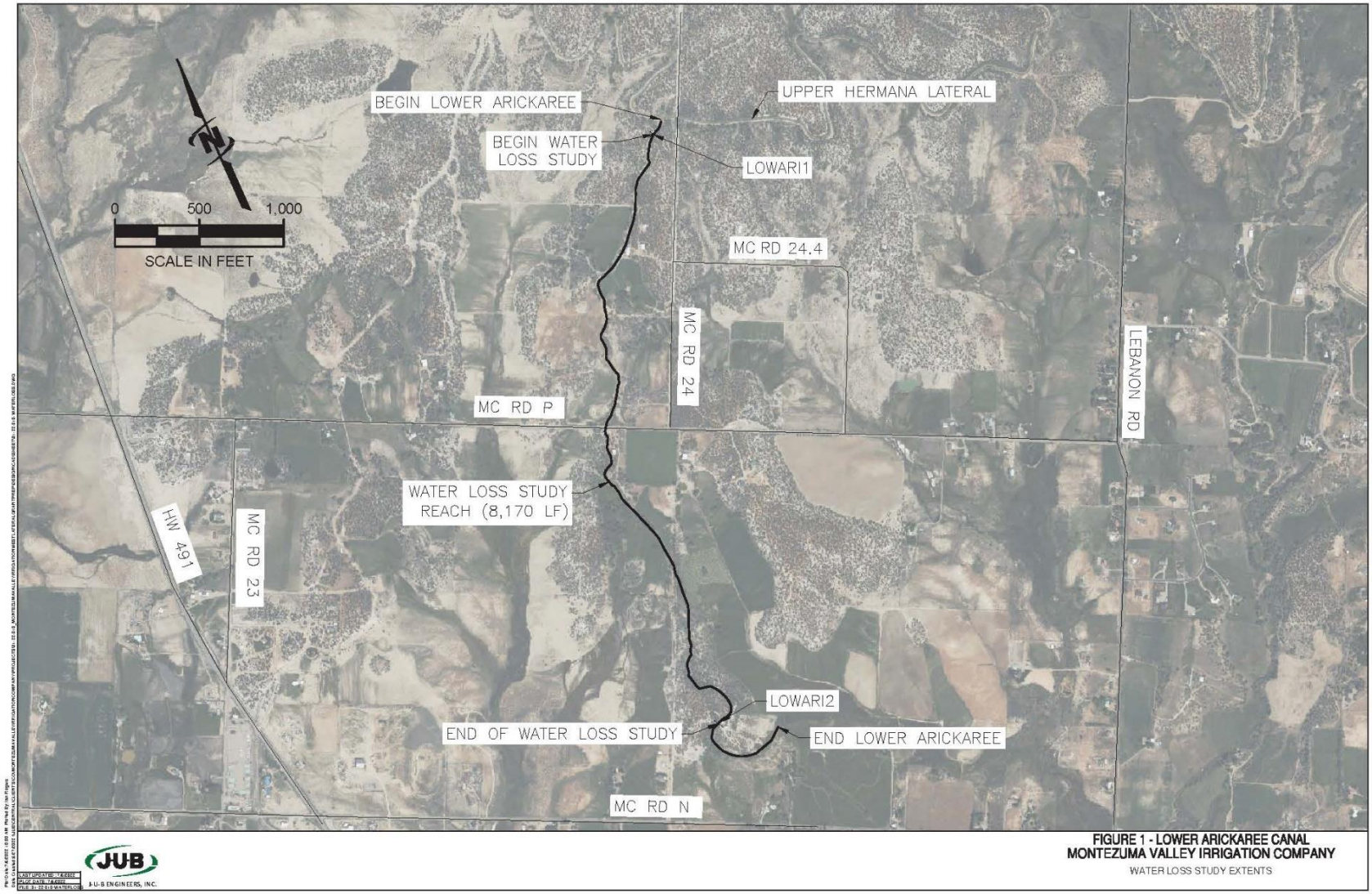

FIGURE 1 - LOWER ARICKAREE CANAL
MONTEZUMA VALLEY IRRIGATION COMPANY
WATER LOSS STUDY EXTENTS

Profile Name: LOWARI1
Operator Name: IAN
12:10:06 06.24.2022

Stage Reference: 0.00 ft

Model: FH950
s/n: 191091004316
Boot: v1.00
Application: v1.06

Sensor Type: Velocity Only
s/n: 191000338867
Boot: v1.00
Application: v1.02

Filter: FPA Parameter: 10 s
Pre-filter: On Rank: 5
EMI: 60Hz.

Station Entry: Non-fixed
Flow Calculation: Mid-section
Start Edge: Right edge water
# of Stations: 26
Stream Width: 10.50 ft
Total Discharge: 12.47 ft^3/s
Total Area: 8.73 ft^2
Mean Depth: 0.83 ft

Lat: N037° 25' 22.94"
Long: W108° 36' 38.81"

Time	Station	Location (ft)	Method	Depth (ft)	Edge	Fact	Surface (ft/s)	0.2 (ft/s)	0.4 (ft/s)
11:46:16	1	1.9	0 point	0	-		0	0	0
11:55:02	2	2	1 point	0.7	-		0	0	0
11:55:40	3	2.5	1 point	0.78	-		0	0	0
11:56:30	4	3	1 point	0.74	-		0	0	0
11:57:06	5	3.5	1 point	0.9	-		0	0	0
11:57:36	6	4	1 point	0.8	-		0	0	0
11:58:08	7	4.5	1 point	0.8	-		0	0	0
11:58:36	8	5	1 point	0.8	-		0	0	0
11:59:07	9	5.5	1 point	0.87	-		0	0	0
11:59:42	10	6	1 point	0.94	-		0	0	0
12:00:11	11	6.5	1 point	0.94	-		0	0	0
12:00:45	12	6.8	1 point	0.95	-		0	0	0
12:01:25	13	7	1 point	0.93	-		0	0	0
12:02:11	14	7.2	1 point	0.93	-		0	0	0
12:02:49	15	7.5	1 point	0.9	-		0	0	0
12:03:25	16	7.8	1 point	0.88	-		0	0	0
12:03:56	17	8	1 point	0.88	-		0	0	0
12:04:43	18	8.5	1 point	0.88	-		0	0	0
12:05:11	19	9	1 point	0.97	-		0	0	0
12:05:41	20	9.5	1 point	0.91	-		0	0	0
12:06:11	21	10	1 point	0.85	-		0	0	0
12:06:37	22	10.5	1 point	0.93	-		0	0	0
12:08:05	23	11	1 point	0.84	-		0	0	0
12:08:39	24	11.5	1 point	0.8	-		0	0	0
12:09:23	25	12	1 point	0.63	-		0	0	0
12:09:49	26	12.4	0 point	0	-		0	0	0

0.6 (ft/s)	0.8 (ft/s)	Bed (ft/s)	Average Velocity (ft/s)	Area (ft^2)	Flow (ft^3/s)
0	0	0	0	0	0
0.07	0	0	0.07	0.21	0.01
0.35	0	0	0.35	0.39	0.14
0.93	0	0	0.93	0.37	0.34
0.78	0	0	0.78	0.45	0.35
1.42	0	0	1.42	0.4	0.57
1.54	0	0	1.54	0.4	0.62
1.83	0	0	1.83	0.4	0.73
1.92	0	0	1.92	0.43	0.83
1.96	0	0	1.96	0.47	0.92
1.97	0	0	1.97	0.37	0.74
2.19	0	0	2.19	0.24	0.52
2.09	0	0	2.09	0.19	0.39
1.94	0	0	1.94	0.23	0.45
2.14	0	0	2.14	0.27	0.58
1.99	0	0	1.99	0.22	0.44
1.91	0	0	1.91	0.31	0.59
1.69	0	0	1.69	0.44	0.74
1.81	0	0	1.81	0.48	0.88
1.82	0	0	1.82	0.45	0.83
1.59	0	0	1.59	0.42	0.68
1.17	0	0	1.17	0.46	0.54
0.81	0	0	0.81	0.42	0.34
0.48	0	0	0.48	0.4	0.19
0.14	0	0	0.14	0.28	0.04
0	0	0	0	0	0

Turnout Orders Starting: Friday, June 24, 2022

Lateral	Location	Order#	Gate ID		CFS	Shares	On date	Off date	Note
Lower Arickaree									
	LA-R-041								
		5359	LA-1		0.14	11	6/23/2022		-John N. & Kimberly A. Schalk
		CFS Total #######	**0.14**	<<		11			
		CFS Total #######	**0.14**						
	LA-R-072								
		5029	LA-3		0.06	5	5/19/2022		-Thomas Carl Scheuerman
		CFS Total #######	**0.06**	<<		5			
		CFS Total #######	**0.06**						
	LA-R-091								
		4324	LA-4		0.04	3	5/4/2022		-Thomas Carl Scheuerman
		CFS Total #######	**0.04**	<<		3			
		CFS Total #######	**0.04**						
	LA-P-011								
		5110	LA-5		0.19	15	5/25/2022		- Rogers Ranches, LLC
		CFS Total #######	**0.19**	<<		15			
		CFS Total #######	**0.19**						
	LA-P-012								
		5369	LA-6		0.25	20	6/24/2022		-Jeffry D. & Deborah J. Jones
		CFS Total #######	**0.25**	<<		20			
		CFS Total #######	**0.25**						
	LA-P-013								
		3825	LA-7		0.31	25	5/2/2022		- Fisher Revocable Living Trust
		CFS Total #######	**0.31**	<<		25			
		CFS Total #######	**0.31**						
	LA-P-014								
		5344	LA-8		0.08	6	6/21/2022		-Jeffry D. & Deborah J. Jones
		CFS Total #######	**0.08**	<<		6			
		CFS Total #######	**0.08**						
	LA-P-032								
		3826	LA-10		0.13	10	5/2/2022		- Fisher Revocable Living Trust
		CFS Total #######	**0.13**	<<		10			
		CFS Total #######	**0.13**						
	LA-P-033								

Turnout Orders Starting: Friday, June 24, 2022

Lateral	Location	Order#	Gate ID		CFS	Shares	On date	Off date	Note
Lower Arickaree									
	LA-P-033								
		4642	LA-11		0.60	48	5/11/2022		-Michael F. & Wanda M. Graves
		CFS Total #######	**0.60**	<<		48			
		CFS Total #######	**0.60**						
	LA-P-051								
		4132	LA-12		0.09	7	5/2/2022		-Matt & Cassie Sturdevant
		4906	LA-12		0.10	8	5/18/2022		-Earl & Vicki Broderick-Earl & Vicki Broderick
		CFS Total #######	**0.19**	<<		15			
		CFS Total #######	**0.19**						
	LA-P-071								
		3596	LA-13		0.01	1	5/2/2022		-Kenneth & Ila Randolph
		3922	LA-13		0.44	35	5/2/2022		- Fisher Revocable Living Trust
		CFS Total #######	**0.45**	<<		36			
		CFS Total #######	**0.45**						
	LA-P-073								
		4939	LA-14		0.06	5	5/18/2022		-Edde L. & Mary Lou German & April F. Buck/Jason Shafer
		4937	LA-14		0.13	10	5/18/2022		-Thomas W. Ewy Revocable Trust/Jason Shafer
		4935	LA-14		0.06	5	5/18/2022		-Lawrence P. & Deborah L./Jason Shafer
		4952	LA-14		0.06	5	5/20/2022		-Cindy Lichliter & Laci Kibel/Jason Shafer
		4947	LA-14		0.15	12	5/20/2022		-Adam R. & Sarah M. Kackstetter/Jason Shafer
		4936	LA-14		0.01	1	5/20/2022		-Christopher Joel & Kristy Dale Duran/Jason Shafer
		4967	LA-14		0.08	6	5/20/2022		-Kit A. Schmidt & Charlotte A. Jones/Jason Shafer
		4963	LA-14		0.06	5	5/20/2022		-Jacquelin F. Proffit/Jason Shafer
		4929	LA-14		0.04	3	5/20/2022		-Steven A. & Cherrie L. Brock/Jason Shafer
		4969	LA-14		0.06	5	5/20/2022		-D.J. & Stanna Wilson/Jason Shafer
		4959	LA-14		0.08	6	5/20/2022		-John E. Patton/Jason Shafer
		4962	LA-14		0.06	5	5/20/2022		-Vicki Porter/Jason Shafer
		4951	LA-14		0.18	14	5/20/2022		-Charles Lichliter/Jason Shafer

Turnout Orders Starting: Friday, June 24, 2022

Lateral	Location	Order#	Gate ID	CFS	Shares	On date	Off date	Note
Lower Arickaree								
	LA-P-073							
		4948	LA-14	0.10	8	5/20/2022		-Joshua Andrew Kane/Jason Shafer
		4956	LA-14	0.05	4	5/20/2022		-Matthew C. & Kenna J. Messier/Jason Shafer
		4950	LA-14	0.06	5	5/20/2022		-Blair & Marjory Leist/Jason Shafer
		4931	LA-14	0.13	10	5/20/2022		-Jeffrey L. & Tina M. Calliham/Jason Shafer
		4926	LA-14	0.06	5	5/20/2022		-Amanda BlacowJason Shafer
		4934	LA-14	0.50	40	5/20/2022		-Benjamin A. Castillo/Jason Shafer
		4958	LA-14	0.08	6	5/20/2022		-Arthur J. & Elva M. Norte/Jason Shafer
		4933	LA-14	0.06	5	5/20/2022		-Gustavo Casillas/Jason Shafer
		4945	LA-14	0.03	2	5/20/2022		-Pamela & Lyle Hood/Jason Shafer
		4966	LA-14	0.06	5	5/20/2022		-Mickey B. Rule/Jason Shafer
		4953	LA-14	0.06	5	5/20/2022		- Lichliter Subdivision Water Assoc./Jason Shafer
		4941	LA-14	0.10	8	5/20/2022		-Susan L. Grabbe/Jason Shafer
		4924	LA-14	0.13	10	5/20/2022		-Ottoma Marie Cwiek/Jason Shafer
		4965	LA-14	0.08	6	5/20/2022		-Michael R. & Jeri M. Rivas/Jason Shafer
		4938	LA-14	0.04	3	5/20/2022		-LaRay Garcia & Patches Garcia-Flatos/Jason Shafer
		4943	LA-14	0.25	20	5/20/2022		-Dennis R. Hight/Jason Shafer
		4944	LA-14	0.05	4	5/20/2022		-Robert D. & Nancy E. Hill/Jason Shafer
		4925	LA-14	0.03	2	5/20/2022		-Carol Anderson/Carol Shafer
		4940	LA-14	0.16	13	5/20/2022		-Sue E. Gosnell & Brendee L. Whitney/Jason Shafer
		4954	LA-14	0.15	12	5/20/2022		-Jose Jesus Lopez/Jason Shafer
		4942	LA-14	0.25	20	5/20/2022		-Thelma J. Gregory,/Jason Shafer
		4957	LA-14	0.09	7	5/20/2022		-Lorri S. Morgan Revocable Trust/Jason Shafer
		4968	LA-14	0.04	3	5/20/2022		-Brian & Amy Stiegelmeyer/Jason Shafer
		4946	LA-14	0.23	18	5/20/2022		-Wayne E. & Pamela J. Johnson/Jason Shafer
		4955	LA-14	0.04	3	5/20/2022		-Walter K. & Carolyn D. Mathies/Jason Shafer
		4930	LA-14	0.04	3	5/20/2022		-John K. & April F. Buck/Jason Shafer

Turnout Orders Starting: Friday, June 24, 2022

Lateral	Location	Order#	Gate ID	CFS	Shares	On date	Off date	Note
Lower Arickaree								
	LA-P-073							
		4964	LA-14	0.04	3	5/20/2022		-Charles David & Kelly Prude/Jason Shafer
		4961	LA-14	0.09	7	5/20/2022		-Michele Pitts/Jason Shafer
		CFS Total #######	**3.99**	<<	319			
		CFS Total #######	**3.99**					
	LA-P-074							
		4922	LA-15	0.24	19	5/19/2022		-Dianne Marie Sluder
		CFS Total #######	**0.24**	<<	19			
		CFS Total #######	**0.24**					
	LA-P-075							
		3845	LA-16	0.06	5	5/2/2022		-Teri & Keve Goodall sold to Susanna Delapena
		3651	LA-16	0.10	8	5/2/2022		-Colby & Gayle Earley-Colby & Gayle Earley
		5063	LA-16	0.38	30	5/23/2022		- Bent Ridge Ranches Water Users Association
		CFS Total #######	**0.54**	<<	43			
		CFS Total #######	**0.54**					
	LA-P-076							
		5231	LA-17	0.75	60	6/7/2022		-The Gary & Gwen Tanner Family Trust
		CFS Total #######	**0.75**	<<	60			
		CFS Total #######	**0.75**					
	LA-P-081							
		4799	LA-18	0.44	35	5/13/2022		-Dale H. & Nelda F. Rawson
		CFS Total #######	**0.44**	<<	35			
		CFS Total #######	**0.44**					
	LA-P-082							
		5265	LA-19	0.50	40	6/13/2022		-Juan S. Sanchez
		CFS Total #######	**0.50**	<<	40			
		CFS Total #######	**0.50**					
Canal CFS Total for 6/24/2022	**8.88**			<<	710			
Canal CFS Total for 6/25/2022	**8.88**							

Garrett Ridge—Water Loss Study

DATE: July 2022

TO:

CC:

FROM: Ian Rogers, P.E.

SUBJECT: Garrett Ridge—Water Loss Study

This memorandum is intended to describe the water loss study conducted on the Garrett Ridge Canal (the Garrett Ridge, the Canal) on June 24, 2022. This memo details the field measurement methods, calculations, and assumption made in order to quantify the rate of water loss in the Garrett Ridge.

Current Conditions and Study Locations

Montezuma Valley Irrigation Company (MVIC) releases water from McPhee Reservoir to the Lone Pine Lateral which supplies water to the Garrett Ridge Canal. MVIC manages flow into the Garrett Ridge by a headgate and measures the flow rate approximately 19,720 feet downstream in a flow meter. 18,240 feet of the Garrett Ridge flow in an open ditch, while the final 1,480 feet of the Garrett Ridge are currently piped in 18-inch HDPE.

Proposed Conditions

MVIC is proposing to pipe the final 7,130 feet of open ditch with 36-inch HDPE and tie into the existing 18-inch HDPE pipe. An intake structure would divert water from the open ditch to the 36-inch pipe. The intake structure would also contain a spill-over weir that would divert any excess water into an additional 36-inch HDPE pipe that flows to MVIC's Upper Hermana Lateral. With this system in place, any operational water could be recaptured in MVIC's system and put to beneficial use.

Water Loss Measurement

On June 24, 2022, J-U-B personnel conducted in-ditch flow measurements at one point: GarRid1. Flow at the end of the study area was then recorded from the existing flow meter at turnout GR-37. However, due to variations in flow in the Canal during the day of measurement, seepage losses could not be determined by field measurement methods (the flow at the GR-37 flow meter was greater than the measured flow at GarRid1 minus the total turnout flows). MVIC

personnel verified that flow rates in the Garrett Ridge had been fluctuating throughout the day of June 24, 2022, and maintaining steady flow rates in the Canal had been an ongoing difficulty. Due to the inability to measure the seepage losses by field measurement methods, seepage losses were approximated using published seepage rate data detailed below.

Evaporative Losses

Due to the large total surface area of the proposed piped section of the Garrett Ridge, evaporative losses were accounted for using a method described by Jensen (2010). This method relates evaporation in shallow water bodies to local crop evapotranspiration data. Evaporative losses from the Ditch were estimated using Equation 2:

$$E = ET_{ref} \times K_W$$

(Eq. 4)

Where E = Evaporative loss from a water body (in/day)

ET_{ref} = Reference crop evapotranspiration (in/day)

K_W = 1.1, coefficient relating evaporation in shallow water bodies to reference crop evapotranspiration (unitless)

The reference evapotranspiration rate (ET_{ref}) was approximated by averaging the daily ET_{ref} values from the Colorado State University's CoAgMET database during the 2021 irrigation season (4/15/2021-10/15/2021) at the Cortez Station. The average ET_{ref} for that period was 0.243 in./day, which multiplied by $K_{W\ yielded}$ an evaporative loss rate E of 0.267 in./day (0.022 ft./day). The total surface evaporation rate for the Garrett Ridge was approximated by the product of evaporative loss rate E and the total surface area of the Canal. Table 1 summarizes the evaporation loss calculations in the Garrett Ridge.

Table 1: Evaporation Loss Calculations

Distance (ft)	Average Top Width (ft)	Total Area (ft^2)	Evaporative Loss (ft/day)	Total Surface Evaporation Rate (ft^3/s)	Total Surface Evaporation Rate (acre-ft/year)
7,130	6	4,780	0.022	0.011	4.0

Seepage Loss Calculations

Because of non-steady flow rates encountered in the Garrett Ridge during the field investigation, seepage water loss in the Garrett Ridge was calculated using values from Appendix A of the Dolores Project Drought Contingency Plan (Appendix A). Appendix A lists a published range of canal seepage rates for the Garrett Ridge that were developed by the Bureau of Reclamation in 1988. The total seepage values in Appendix A were calculated using equation 3:

$$Q_S = P_w * L * K_s$$

(Eq. 5)

Where: Q_S = Total seepage water loss rate within segment (ft^3/d)

L = Length of segment (ft)

P_w = Wetted perimeter of segment (ft)

K_S = Seepage rate ($ft^3/(day/ft^2)$)

The seepage rate, K_S, of 0.200 $ft^3/(day/ft^2)$ was selected from the middle of the range of values given in Appendix A. Table 2 summarizes the calculated seepage water losses in the Garrett Ridge.

Table 2: Seepage Water Losses

Wetted Perimeter (ft)	Segment Length (ft)	Seepage Rate ($ft^3/(day/ft^2)$)	Q_S		
			(ft^3/d)	(ft^3/s)	(acre-feet/year)
8	7,130	0.200	11,408	0.13	48

Operational Water

When the water surface elevation fluctuates in the Lone Pine Lateral, flows in the Garrett Ridge change. These changes in flow rate cannot be observed until the water reaches the flow meter upstream of turnout GR-37, approximately 3.7 miles downstream from the Lone Pine Lateral. Therefore, it can take several hours before excess water in the Garrett Ridge can be identified and corrected for by raising or lowering the headgate at the Lone Pine Lateral. Any excess water that reaches the flow meter at GR-37 is considered operational water. Additionally, a minimum

amount of operational water is required to maintain an adequate water surface elevation needed to deliver turnout flows. For the Garrett Ridge, operational water was considered equal to the flow meter reading above turnout GR-37 minus the total flow required at turnout GR-37. When the existing piped section of the Garrett Ridge is full, operational water is then wasted through a spill structure just above the beginning of the piped section.

During the June 24, 2022, field investigation, the flow meter reading was 2281 gpm (5.09 ft^3/s). The total flow to turnout GR-37 was 1187 gpm (2.65 ft^3/s). Therefore, at that time there was 2.44 ft^3/s of operational water. Assuming this value is typical, there is approximately 890 acre-feet of operational water wasted during an irrigation season lasting from 4/15 to 10/15 (184 days). If the Garrett Ridge were a partially piped system with a spill structure diverted to the Upper Hermana Later, this operational loss would be eliminated.

Table 3: Operational Water Losses

Flow at Flow Meter (ft^3/s)	Flow to Turnout GR-37 (ft^3/s)	Operational Water (ft^3/s)	Annual Operational Water (ac-ft)
5.09	2.65	2.44	890

Total Losses in West Lateral Ditch

The total losses in the Garrett Ridge are sum of the evaporative losses, the seepage losses, and the operational water ($E + Q_S + Q_{op}$). These losses would be considered the total water savings if the Canal were piped. The annual water savings are calculated by multiplying the total losses in by the duration of the irrigation season (184 days). Table 4 shows the total water savings if the Garrett Ridge were piped.

Table 4: Annual Water Savings

E (ft^3/s)	Q_S (ft^3/s)	Q_{op} (ft^3/s)	$E + Q_S + Q_{op}$ (ft^3/s)	Water Savings (ac-ft)	
				Daily	Annual
0.011	0.13	2.44	2.58	5.12	943

Enclosed:

- Water Loss Study Area Site Map (Attachment 1)
- MVIC turnout orders for the Garrett Ridge on June 24, 2022 (Attachment 2)

References:

Dolores Water Conservancy District, 2018, Dolores Project Drought Contingency Plan, "Appendix A Mitigation Actions Support Documents". Retrieved from http://doloreswater.com/wp-content/uploads/2018/01/Final-Draft-DPDCP-with-Reclamation-Comments-Addressed.pdf

Jensen, M.E., 2010, Estimating Evaporation from Water Surfaces. Paper Presented at the CSU/ARS Evapotranspiration Workshop, Fort Collins, CO, 15-Mar-2010. Retrieved from https://coagmet.colostate.edu/ET_Workshop/ET_Jensen/ET_water_surf.pdf

Appendix D—Cultural Resources Compliance Documentation (*Pending*)