

# Powder Valley Water Control District Infrastructure Modernization Project

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*Draft Watershed Plan-Environmental Assessment*

*Union County, Oregon*

*Powder River Basin Watershed*

*July 2026*



United States Department of Agriculture, Natural Resources Conservation Service—Lead Federal Agency in cooperation with Powder Valley Water Control District

Prepared by the Natural Resources Conservation Service

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## Watershed Plan-Environmental Assessment for the Powder Valley Water Control District– Infrastructure Modernization Project

**Lead Agency:** United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), Oregon.

**Sponsoring Local Organization (SLO):** Powder Valley Water Control District (PVWCD) (sponsor).

**Authority:** This Watershed Plan-Environmental Assessment (Plan-EA) has been prepared under the Authority of the Watershed Protection and Flood Prevention Act of 1954 (Pub. Law No. 83-566). The Plan-EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, PL 91-190, as amended (42 United States Code [U.S.C.] 43221 et seq.).

**Abstract:** This project seeks to improve water conservation and water delivery reliability for irrigation infrastructure, and reduce related agricultural damages, in Oregon’s Powder River Basin. The project would include piping ditches, retiring ditches, installing fish screening, improving fish passage, and upgrading turnouts. Total estimated project costs are \$30,361,000 of which \$7,563,000 would be paid by the sponsors and other non-federal funding sources. The estimated amount to be paid through NRCS Pub. Law No. 83-566 funds is \$22,798,000.

### **Certifying Statement for EA Page Limit and Deadline**

The Responsible Official certifies that this EA:

- Demonstrates the agency has thoroughly considered the factors mandated by NEPA;
- Represents the agency’s good-faith effort to prioritize documentation of the substantive issues and most important considerations required by NEPA within the congressionally mandated page limits;
- Reflects the agency's expert judgment;
- Addressed briefly, or left unaddressed, any issues or considerations that were, in the agency’s judgment, comparatively not of a substantive nature;
- Represents the agency’s good-faith effort to fulfill NEPA’s requirements within the Congressional timeline (or within the minimally extended timeline) and this effort is substantially complete; and
- Contains analysis that is adequate to inform and reasonably explain the responsible official’s final decision regarding the proposed action or selected alternative.

**Comments:** Comments must be submitted during the allotted Draft Public Review Period (within 30 days of the public release of the Draft Plan-EA) and become part of the Administrative Record. Submit comments and inquiries to: Farmers Conservation Alliance, Attention Watershed Plan-EA, 102 State Street, Hood River, OR 97031, or [powdervalley.wcd.comments@gmail.com](mailto:powdervalley.wcd.comments@gmail.com).

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## **Office of Management and Budget (OMB) Fact Sheet**

### **Summary Watershed Plan-Environmental Assessment Document**

for

### **Powder Valley Water Control District Infrastructure Modernization Project**

**Subwatersheds in Planning Area: Lower Anthony Creek, Lower N. Powder River, and  
Lower Wolf Creek**

**Union County, Oregon**

**Oregon 2<sup>nd</sup> Congressional District**

#### **Authorization**

The watershed study was carried out and the plan prepared under the authority of Pub. Law No. 83-566 Stat. 666 as amended (16 U.S.C. Section 1001 et. Seq.) 1954. The works of improvement would be installed under the Pub. Law No. 83-566 authorized purpose of Agricultural Water Management.

#### **Lead Sponsor**

Powder Valley Water Control District

#### **Proposed Action**

The Powder Valley Water Control District (PVWCD) Infrastructure Modernization Project is an agricultural water conveyance efficiency project. The proposed action would install 3.4 miles of the new C-1 pipeline, pipe 3.3 miles of the Carnes ditch, install fish screening and passage improvements at the Carnes Diversion, and retire 6.7 miles open ditches.

#### **Purpose and Need for Action**

The purpose of the proposed project is Agricultural Water Management through improved agricultural water management by making the delivery or irrigation water for agriculture lands in PVWCD more reliable and efficient. Federal assistance is needed to alleviate inefficient and unreliable access to irrigation water which causes agricultural damages for farmers in PVWCD.

#### **Description of the Preferred Alternative**

Under the Preferred Alternative, PVWCD would install the C-1 Project, Carnes Pipeline, and Carnes fish screening and passage. Together, these projects would install 6.7 miles of gravity-pressurized buried pipe, including a 0.1 mile-long siphon, retire 6.7 miles of open ditches, update 12 turnouts, and install fish screening and passage improvements at the Carnes Diversion.

#### **Project Measures**

Under the Preferred Alternative, project sponsors would install 6.7 miles of gravity-pressurized buried pipe ranging from 24 to 66 inches in diameter; retire 6.7 miles of open ditches; update 12 turnouts; install fish screening at the Carnes Diversion; and improve fish passage in North Fork Anthony Creek at the Carnes Diversion. Preferred Alternative construction would occur in three project groups over 5 years.

## Resource Information

Subwatersheds	12-digit Hydrologic Unit Code	Latitude and Longitude	Subwatershed Size & Planning Area (acres)
Lower Anthony Creek	170502030504	45.041926, -118.142921	12,476.9
Lower N. Powder River	170502030505	45.02334, -118.006196	16,643
Lower Wolf Creek	170502030602	45.061471, -117.988548	12,765.1

### Subwatershed Total Size

41,885 acres

### Powder Valley Water Control District Size

217,001 acres

## Climate and Topography

The project area is located within the Powder River Basin at an elevation of approximately 3,500 feet above mean sea level. The climate is dry, characterized by light precipitation, abundant sunshine, low relative humidity, rapid evaporation, and wide fluctuations in temperature and precipitation (ODEQ 2013). Precipitation is influenced by the basin's variable topography. Valleys, which include a majority of the District, receive an average annual precipitation of 10.6 inches, while the nearby Elkhorn and Wallowa Mountains receive an annual average of 35 inches (Reclamation 2008). The majority of this precipitation falls as snow in the winter. The mean annual temperature in the basin is 45.5°F, with extremes of -28°F (February) and 104°F (August) recorded near Baker City (ODEQ 2013).

### Land Use (Planning Area)

Use	Acres
Irrigated Land	15,069
Non-irrigated Land	26,816

### Land Ownership (Planning Area)

Owner	Percentage
Private	70.9%
State-Local	8.3%

Federal	20.8%
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### Population and Demographics

The proposed action would occur with Union County, Oregon. In 2020, the estimated population of Union County was 26,196. The population growth rate between 2010 and 2020 was 1.7 percent. The population of the State of Oregon grew by 10.6 percent in the same time period.

Population and Demographics	Union County	Oregon
Population 2020	26,196 <sup>1</sup>	4,237,256 <b>Error! Bookmark not defined.</b>
Unemployment Rate 2021	6.3% <sup>2</sup>	6.4% <sup>3</sup>
Median Household Income 2021	\$55,227 <b>Error! Bookmark not defined.</b>	\$71,562 <b>Error! Bookmark not defined.</b>

### Relevant Resource Concerns

Resource concerns identified through scoping are water conservation; water usage; water quality; fish and aquatic resources; wildlife resources; and land use.

### Alternatives

#### *Alternatives Considered*

Six action alternatives and one No Action alternative were initially considered. Five action alternatives were eliminated from full analysis because they did not fully meet the purpose and need for the action, did not achieve the Federal Objective and Guiding Principles, or became unreasonable because of cost, logistics, existing technology, or environmental reasons. The No Action Alternative and Modernization Alternative were analyzed in full.

#### *No Action Alternative (Future without Federal Investment)*

Under the No Action Alternative, construction activities associated with the proposed action would not occur and PVWCD would continue to operate and maintain its existing conveyance system in its current condition. This alternative assumes that modernization of the District’s infrastructure would not be reasonably certain to occur, as funding at the scale necessary to modernize District infrastructure is not anticipated from other sources.

<sup>1</sup> U.S. Census Bureau, 2020 Census Redistricting Data (Public Law 94-171)

<sup>2</sup> U.S. Census Bureau, 2021 American Community Survey 5-Year Estimates

<sup>3</sup> U.S. Census Bureau, 2021 American Community Survey 1-Year Estimates

***Proposed Action (Future with Federal Investment)***

Under the Modernization Alternative, PVWCD would make the following improvements:

- Install 6.7 miles of gravity-pressurized buried pipe, including an approximately 0.1-mile long siphon below Dutch Creek
- Retire and leave open 6.2 mi of ditches
- Retire and fill 0.5 mi of ditches
- Install fish screening at the Carnes Diversion and improve fish passage in North Fork Anthony Creek at the Carnes Diversion
- Upgrade 12 irrigation turnouts

The Modernization Alternative has been identified as the Preferred Alternative.

***Mitigation, Minimization, and Avoidance Measures***

Consultation was initiated on June 8, 2023 between the District; the Natural Resources Conservation Service (NRCS), as the lead federal agency; Burns Paiute Tribe; Confederated Tribes of the Colville Reservation; Confederated Tribes of the Umatilla Indian Reservation; Confederated Tribes of the Warm Springs Reservation; Nez Perce Tribe; and Oregon State Historic Preservation Office (SHPO) for compliance with Section 106 of the National Historic Preservation Act. Archaeological surveys in the project area were completed and the cultural resources report was submitted to SHPO and federally recognized tribes on December 10 and December 16, 2025, respectively. SHPO concurred on January 7, 2026 that the cultural resources identified are not eligible for listing in the NHRP and that there will be no historic properties affected.

Ground disturbance would be limited to only those areas necessary to minimize effects on soil, vegetation, and land use. Where possible, construction activities would avoid or minimize effects on agricultural lands by confining construction activities to the existing right-of-way. Stormwater best management practices (BMPs) would be employed during and after construction, and construction would be scheduled to minimize disturbance to wildlife and the public. After construction, disturbed areas would be returned to pre-construction contours and replanted with a mix of native grasses and forbs to reduce the risk of erosion and spread of noxious weeds.

BMPs would also be employed for all in-water work to minimize short-term impacts to species and habitat. These are expected to include measures such as work area isolation, fish salvage, temporary water management, downstream fish passage, and rectification of temporary impacts from trenching, including restoring riparian vegetation and reestablishing preexisting contours of the site.

Analysis of the National Wetland Inventory (NWI) geographic information systems data (USFWS, 2023) and aerial imagery has identified no wetland features in the project area; wetland determinations or delineations have not occurred. Generally, ditches within the project area are not considered wetlands or Waters of the U.S. by state or federal agencies; however, prior to project implementation, consultation with the Oregon Department of State Lands (ODSL) and the U.S. Army Corps of Engineers (USACE) would occur to determine exemption applicability to ditches in the project area. Wetlands would be avoided to the extent practicable.

**Project Costs**

Project costs	Pub. Law No. 83-566 funds		Other funds		Total	
Construction	\$18,214,000	75%	\$6,072,000	25%	\$24,286,000	100%
Engineering	\$547,000	75%	\$182,000	25%	\$729,000	100%
<b>SUBTOTAL COSTS</b>	<b>\$18,761,000</b>	<b>75%</b>	<b>\$6,254,000</b>	<b>25%</b>	<b>\$25,015,000</b>	<b>100%</b>
Technical Assistance	\$2,662,000	100%	\$0	0%	\$2,662,000	100%
Relocation	N/A	N/A	N/A	N/A	N/A	N/A
Real Property Rights	0	0%	\$100,000	100%	\$100,000	100%
Permitting	0	0%	\$751,000	100%	\$751,000	100%
Project Administration	\$1,375,000	75%	\$458,000	25%	\$1,833,000	100%
<b>TOTAL COSTS</b>	<b>\$22,798,000</b>	<b>75%</b>	<b>\$7,563,000</b>	<b>25%</b>	<b>\$30,361,000</b>	<b>100%</b>

**Project Benefits**

Implementation of the Modernization Alternative would improve water delivery reliability and efficiency for PVWCD irrigators, improve crop yields by increasing irrigation water deliveries by an estimated 1,874 acre-feet per year during dry years, improve the District’s drought resiliency, improve streamflow in Anthony Creek by average of 1,739 acre-feet per year, install fish screening at the Carnes Diversion, improve fish passage in Anthony Creek at the Carnes Diversion, reduce operation and maintenance costs for the PVWCD and its patrons, provide pressurized water to C-1 irrigators, reduce discharges of operational spill into natural waterbodies, and improve recreation. The project would support the agricultural resiliency of District patrons, the health and resiliency of the Powder River Basin, and the rural agricultural way of life in the community.

***Number of Direct Beneficiaries***

102 patrons would benefit directly from the proposed project.

***Other Beneficial Effects-Physical Terms***

Implementation of the Preferred Alternative would have long-term, beneficial effects on agricultural water availability, water quality, and fish.

<b>Damage Reduction Benefits</b>	<b>Proposed Project</b>
Reduced District OMR	\$72,000
Reduced Patron OMR	\$37,000
Agricultural Yield Enhancement	\$92,000
Instream Value	\$124,000
Fish Value	Positive, Unquantified Benefits
Recreation Value	Positive, Unquantified Benefits
Discount Rate	3.25%
Total Quantified Benefits	\$325,000
Benefit to Cost Ratio	0.35
Ecosystem Services Multi-Criteria Decision Analysis	66%

The Ecosystem Services Multi-Criteria Decision Analysis shows that the Preferred Alternative has substantive benefits (see Appendix D.7).

### **Period of Analysis**

#### ***Installation Period***

5 years

#### ***Project Life***

100 years

### **Funding Schedule**

<b>Year</b>	<b>Pub. Law No. 83-566</b>	<b>Other Funds</b>	<b>Total</b>
0	\$8,127,000	\$2,681,000	\$10,808,000
3	\$11,871,000	\$3,966,000	\$15,837,000
3	\$2,800,000	\$916,000	\$3,716,000

### **Environmental Effects**

The Preferred Alternative would be planned, designed, and installed to have long-term net beneficial effects on agricultural production, water quality, surface water in Anthony Creek, fish, and ecosystem services.

Implementation of the Preferred Alternative would result in minor, short-term adverse effects such as impacts to vegetation and wildlife along the ditches. Most short-term adverse effects would result from construction activities in the project area. Project sponsors would work closely with partners, contractors, and affected landowners to incorporate measures to avoid and minimize short-term adverse effects. See Section 8.3 for additional information regarding BMPs that would be implemented as part of the proposed project. Minor long-term effects to soils and land use would result where pipelines would follow new alignments outside of the existing ditches. Retirement of ditches and piping would result in minor long-term effects to vegetation, groundwater, and wildlife with changes in water availability, seepage, and plant communities. However, following construction, BMPs for ecological restoration would be followed, and the increase in native, upland vegetation in the project area would return the project area to a more natural state. Project sponsors would implement BMPs and minimization measures to avoid all adverse effects. Alterations to the visual landscape would be negligible to minor and long-term following the elimination of the open ditches and subsequent return to native upland vegetation.

### ***Major Conclusions***

The Preferred Alternative would improve water delivery reliability for PVWCD's farmers; reduce water loss to seepage and evaporation in District-operated infrastructure; improve crop yields within the District; eliminate the threat of fish entrainment at the Carnes Diversion by installing fish screening; enhance fish and aquatic habitat through increased streamflow and improvements in fish passage; and improve operational efficiencies in a manner that would reduce O&M costs for PVWCD and its patrons. The project also meets Oregon state and local priorities by supporting agriculture, the rural economy, and the rural lifestyle in the Powder River Basin.

### ***Areas of Controversy***

No areas of controversy have been identified.

### ***Issues to be Resolved***

None.

### ***Evidence of Unusual Congressional or Local Interest***

Comments on the Preliminary Investigative Report, which was published during the scoping period, were received from local non-governmental organizations and individuals.

### ***Compliance***

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

## 1 Introduction

Aging infrastructure, growing population, shifting rural economies, and climate variability have increased pressure on water resources across the western United States (U.S.). In Oregon's Union County, the Powder Valley Water Control District (PVWCD or District) delivers water to approximately 19,000 irrigated acres through 63 miles of ditches and pipelines. The District is facing prolonged droughts and water shortages that are limiting agricultural production. PVWCD's infrastructure, like many water delivery systems in the western U.S., is aging and increasingly inefficient. Open ditches, outdated headgates, and other aging infrastructure result in significant water losses due to seepage, evaporation, and operational spills. This water is diverted from streams but never reaches farms. These losses reduce the availability of water for farms, cause operational challenges for the District, and reduce water instream for aquatic species.

PVWCD seeks federal funding through the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Watershed Protection and Flood Prevention Act Pub. Law No. 83-566, to implement the proposed irrigation infrastructure modernization project (project) to address the need to alleviate inefficient and unreliable access to irrigation water which causes agricultural damages for farmers in PVWCD.

Agriculture in Union County started in the late 1800s and is an essential part of the rural community and economy. The area receives only about 9 inches of rainfall a year, with approximately 5 inches falling during the growing season (Reclamation 2008; NOAA 2025). Common crops in the area such as hay and pasture require 24 to 30 inches of water to meet their evapotranspiration needs (Reclamation 2015). Because of this, agricultural production in the area relies heavily on irrigation water. PVWCD was formed with the primary purpose of providing irrigation water to local producers. Agriculture now plays a critical role in the area, supporting the local population, economy, and cultural fabric of the region.

The District has made improvements to its infrastructure in recent decades. PVWCD has installed four pipelines and, with NRCS funding support, constructed two reservoirs, Wolf Creek and Pilcher Creek in 1975 and 1983, respectively. Although major improvements have been made to the District's system, multiple water management challenges remain. This Plan-EA builds on previous work in the District and is not part of dam rehabilitation. This Plan-EA focuses on modernizing District infrastructure to reduce water loss, improve efficiency, lower operation and maintenance costs for the District and its patrons, improve instream flows, and improve fish habitat. The project includes measures to increase the efficiency of irrigation water conveyance and maximize the benefits of existing dams constructed with prior NRCS investments in the District, while functioning as a stand-alone project that does not rely on the dam rehabilitation efforts.

The proposed infrastructure modernization project meets USDA, state, and local priorities and objectives. The project would directly support USDA's mission to conserve and protect natural resources and invest in rural development, a top focus for U.S. Secretary of Agriculture Brooke Rollins, and would address NRCS resource concerns of inefficient use of irrigation water, water depletion, water quality issues, and inadequate habitat for fish and wildlife. The project would also enhance the benefits generated by prior NRCS dam investment in the District by improving water conveyance to and from the reservoirs. Additionally, the project aligns with Oregon governor Tina Kotek's priorities to address water availability and water quality; furthers the Oregon Department of Environmental Quality (ODEQ) objectives to attain water quality standards in the Powder River

Basin; and helps to address local water resource concerns while improving agriculture and supporting the local rural economy.

## **1.1 Planning Area**

The District is located within Union County and Baker County, Oregon, within the Powder River Basin at an elevation of approximately 3,500 feet above sea level, near the town of North Powder. The District is 217,001 acres in size, of which 12,649 acres are irrigated land used by 102 patrons. The planning area is based on the irrigation problem area<sup>4</sup> and is identified by the subwatersheds traversed by the proposed project (see Figure B-1 in Appendix B for a map and Table C-1 in Appendix C for Planning Area acreage).

## **1.2 Project Area**

The project area is a portion of the planning area, and lies completely within Union County. The project area describes the area where the PVWCD Infrastructure Modernization Project would occur (Figure 1-1). The project area, making up a portion of the District's total system, consists of District infrastructure to be modernized, areas where new infrastructure would potentially be built, areas where existing infrastructure would be retired, and areas where construction would take place.

## **1.3 Current Infrastructure**

The District owns and operates a total of 62.9 miles of conveyances, plus Pilcher Creek and Wolf Creek reservoirs (see Figure B-2 in Appendix B and Figure C-1 in Appendix C). Of these 62.9 miles, 22 miles are piped and 40.9 miles are open ditches. The District diverts water at the Carnes Diversion on North Fork Anthony Creek at RM 0.1; the Coughanour Diversion on the mainstem of Anthony Creek at RM 3.6; and the Lone Pine Diversion on the mainstem Anthony Creek at RM 2.8. The reservoirs are operated as a single pool, where water is transferred from Pilcher Creek Reservoir to Wolf Creek Reservoir via the Lower Coughanour Ditch. Pilcher Creek Reservoir usually fills first (due to its higher elevation) and then Wolf Creek Reservoir.

## **1.4 Study Authority and Process**

### **1.4.1 Authority**

The NRCS prepared the Draft Plan-EA for the Powder Valley Water Control District Infrastructure Modernization Project under the authority of Section 1001 of the Watershed Protection and Flood Prevention Act (Public Law 83-566 [PL 83-566]) of 1954 (68 Statute 666 as amended; 16 United States Code [U.S.C.] Section 1001 et seq.) in accordance with the National Environmental Policy Act (NEPA). The works of improvement would be installed under PL 83-566 authorized purpose of agricultural water management.

This Plan-EA was prepared in accordance with applicable Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1500-1508), USDA's NEPA regulations (7 CFR 650), the NRCS General Manual Part 410 – Compliance with NEPA, and the NRCS National Environmental Compliance Handbook (Title 190 Part 610). This Plan-EA also meets the NRCS

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<sup>4</sup> The "planning area" referred to in this Plan-EA is equivalent to the term "watershed area" as defined by the National Watershed Program Manual (NWPM) 506.60.TTT (NRCS 2015a). The term "planning area" is used in this Plan-EA in an effort to reduce confusion between the NWPM 506.60.TTT watershed area definition and watershed areas as defined by hydrologic unit codes.

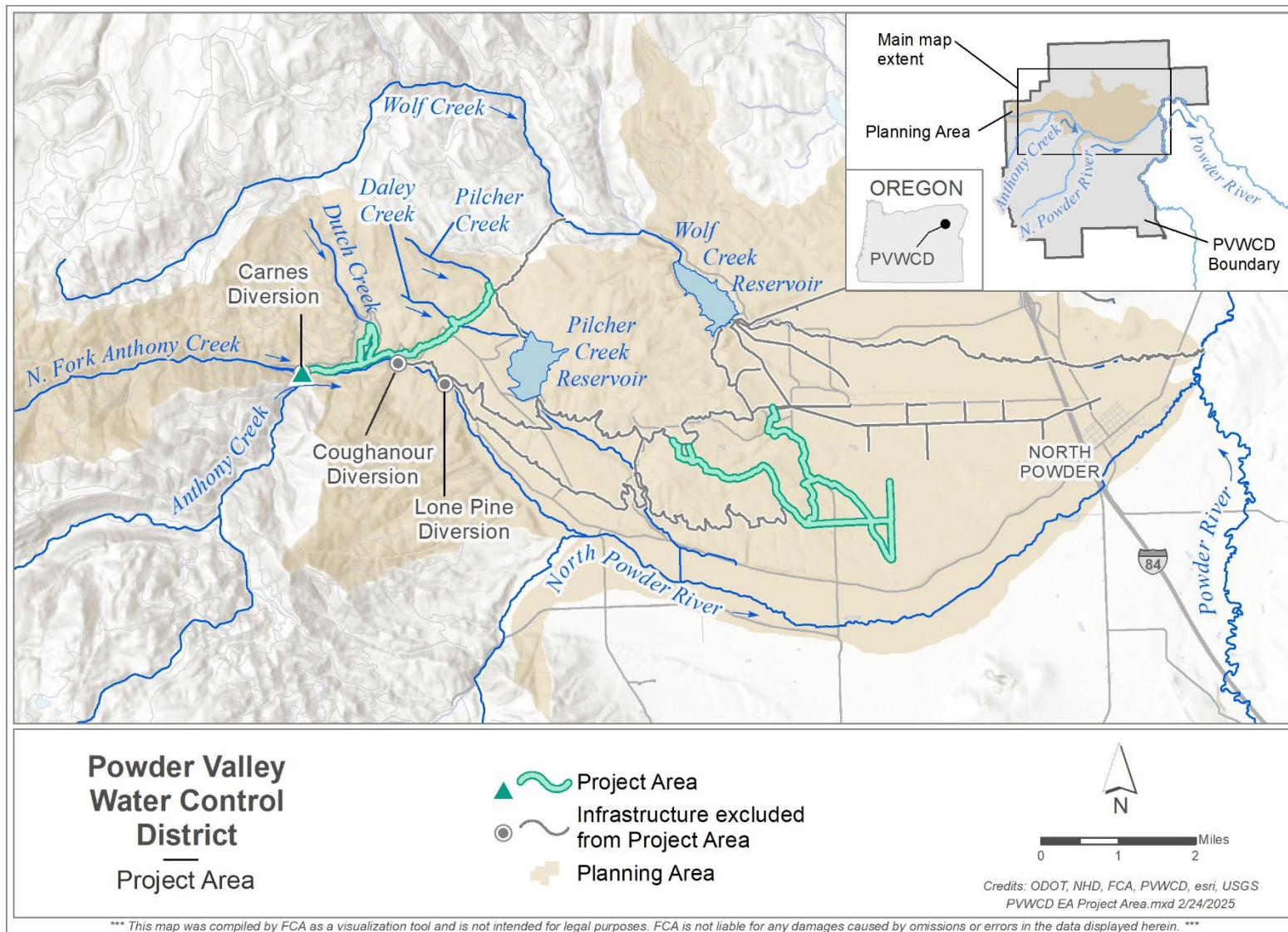


Figure 1-1. Project Area

program policy of the 2015 NRCS National Watershed Program Manual (NRCS 2015) and guidance of the 2014 NRCS National Watershed Program Handbook (NRCS 2014).

This Plan-EA serves to fulfill the NEPA and NRCS environmental review requirements for the proposed action. Note: This environmental document was initiated using the 40 CFR 1500-1508 (April 2022) and 7 CFR 650 regulations, which were recently rescinded and replaced with USDA regulations found under 7 CFR 1b. In a good-faith effort to fulfill NEPA's requirements, the agency decided to continue to use 40 CFR 1500-1508 (April 2022) and 7 CFR 650. This is permissible per the USDA policy guidance issued in the Interim Final Rule's preamble (90 FR 29644 (July 3, 2025)).

### **1.4.2 Process**

For this Plan-EA, the NRCS and the Sponsor, in coordination with the public, Tribes, and other agencies, followed a stepwise but iterative planning approach that identified and refined problems and opportunities, study scope, management measures, and alternatives; evaluated alternatives; and selected a recommended plan. This document presents that process and findings.

This Plan, as with all watershed project plans, is the product of three inter-related planning and evaluation processes, each with its own specific goals and requirements: 1) NRCS planning process; 2) Principles, Requirements, and Guidelines (PR&G) for Federal Investments in Water Resources; and 3) evaluation of alternatives and effects under NEPA. The process also incorporates Clean Water Act (CWA), Endangered Species Act (ESA), and National Historic Preservation Act (NHPA) requirements, among others.

The NRCS planning process consists of nine steps to develop and implement plans that protect, conserve, and enhance natural resources from a social and economic perspective (see NRCS planning policy, including National Planning Procedures and NECHs (NRCS 2016 and NRCS 2021). PR&G watershed planning is an eight-step process analogous to that of the NRCS which ensures that formulation, evaluation, and implementation of agency activities incorporates the Federal Objective, Guiding Principles, and General Requirements within the context of an ecosystem services framework. Ecosystem services analysis is an analysis approach which traces the pathways of natural ecosystem processes to the benefits they grant to society in monetary and non-monetary terms. NEPA evaluation ensures that potential Federal actions consider reasonable alternatives, fairly evaluate the effect of those alternatives upon the human environment, and comply with applicable local, State, and Federal regulations.

Watershed planning, NEPA, and CWA permitting all require that the NRCS follows the Section 106 process as outlined in the NHPA of 1966 and 36 CFR 800. The Section 106 process requires early consultation with the SHPO and Federally Recognized Tribes in the determination of the Area of Potential Effect (APE), identification of historic properties, assessment of effects, and mitigation of adverse effects. This process is separate from NEPA but informs the effects analysis.

This Plan-EA follows NRCS procedures and formatting requirements outlined in the National Watershed Program Manual (NWPM) Part 501 (NRCS 2015) and the National Watershed Program Handbook (NWPH) Part 601 (NRCS 2014). These requirements provide a framework to ensure compliance with NEPA and NRCS procedures for complying with the NEPA at 7 CFR Part 650. The plan also adheres to the Principles and Requirements for Federal Investments in Water Resources (P&R) (Council on Environmental Quality [CEQ] 2013), relying primarily on the NRCS's intended use of the Guidance for Conducting Analyses Under the PR&G for Water and Land Related Resources Implementation Studies and Federal Water Resource Investments. This guidance is described in USDA Departmental Manual (DM) 9500-13 (USDA 2017a), Departmental

Regulation (DR) 9500-13 (USDA 2017b), and the corresponding Interagency Guidelines (CEQ 2014), collectively referred to as the PR&G. Additionally, the Plan aligns with Executive Orders (E.O.), the CFR, and PL 83-566. Updated NWPM manual guidance has been applied where appropriate (NRCS 2024).

## 2 Purpose and Need for Action

The purpose of the proposed project is to improve agricultural water management by making the delivery of irrigation water for agricultural lands in PVWCD more reliable and efficient. The project is needed to alleviate inefficient and unreliable access to irrigation water which causes agricultural damages for farmers in PVWCD.

To meet NRCS requirements for a federal investment in a water resources project, the project must meet the Federal Objective set forth in the Water Resources Development Act of 2007, promote the Federal Objective and Guiding Principles (as identified in the PR&G [NRCS 2017]), and be an authorized project purpose under Sections 3 and 4 of Pub. L. No. 83-566.

Water resources investments shall reflect national priorities, encourage economic development, and protect the environment by: a. seeking to maximize sustainable economic development; b. seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and c. protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems. The project should seek to achieve the Guiding Principles as identified by the Federal Government. Additionally, in accordance with NRCS planning procedures the projects seeks to solve problems, achieving study objects while avoiding study constraints.

The proposed project would be eligible for funding under Pub. Law No. 83-566 requirements under “Authorized Project Purpose (v), Agricultural Water Management,”<sup>”Error! Bookmark not defined.”</sup> due to the proposed project’s focus on irrigation water conservation, improved system operation efficiencies, and more reliable agricultural water supply delivery.

### 2.1 Watershed Problems and Resource Concerns

Federal assistance is needed to address the following watershed problems and resource concerns.

#### 2.1.1 Water Loss in District Conveyance Systems

Water losses due to inefficient conveyance systems reduce the District’s ability to deliver water to its irrigators at the full rate and duty associated with each water right. The District’s Carnes, Ellis, Maharry Blevins, and Lower Lone Pine ditches lose water to seepage and evaporation (PVWCD 2020). Annually during the irrigation season, the Carnes Ditch loses 1,711 acre-feet and the Ellis, Maharry Blevins, and Lower Lone Pine ditches lose 240 acre-feet, 50 acre-feet, and 363 acre-feet, respectively. For the 2022 water year, this would equate to a 21 percent loss rate in the Carnes Ditch.

#### 2.1.2 Water Delivery and Operations Inefficiencies

The District’s aging system is inefficient at conveying water. Open ditches make it difficult to manage water throughout the system and deliver the correct amount of water to patrons. A portion of the water diverted is lost to seepage and evaporation (see Section 2.2.1) and the District must also pass excess water to ensure that adequate water reaches all patrons, which results in operational spill at the ends of some ditches. In order to meet patron water rights each year, the District must fill Pilcher Creek Reservoir and Wolf Creek Reservoir. The ability to fill these reservoirs is dependent

upon the continued operation and reliability of the Carnes Ditch, which conveys the District's primary water right from Anthony Creek to the reservoirs. The open Carnes Ditch is at risk of failure due to age and loses water to seepage, which limits the District's ability to fill the reservoirs.

### **2.1.3 Water Quality**

Low summertime flows negatively impact water quality and water availability for water users and fisheries and future increases in the frequency of droughts will likely exacerbate challenges (Clifton et al. 2018). Within the Powder River Sub-basin, where the planning area is located, ODEQ has identified water flow and quality challenges in Anthony Creek and the North Powder River. Both are included in Oregon's Integrated Report (previously Oregon's 303(d) list) for not meeting state water quality standards for temperature, making them unsuitable for the beneficial use of fish and aquatic life year-round, including fish spawning and rearing. Anthony Creek and the North Powder River are listed for *Escherichia coli* (*E. coli*) year-round (ODEQ 2022b; ODEQ 2022c).

District patrons along the Lower Lone Pine and Maharry Blevins ditches experience water quality challenges due to sand and moss in the ditches. Buildup of moss throughout the season creates water management challenges by blocking turnout screens, requiring frequent maintenance. From July through September, patrons must clear moss several times a day for the screens to remain operational. Sand creates additional challenges for irrigators by clogging screens, reducing the efficiency of irrigation systems on farms, and wearing out irrigation systems.

### **2.1.4 Agricultural Land Productivity**

Currently, low summertime flows negatively impact water quality and water availability for agriculture, livestock, and fisheries. The District experiences water shortages in approximately one-third of water years that result in reduced yields and reduced agricultural income in the District. Currently, data from the District and public sources indicate that water shortages reduce pasture yields by 28 percent in roughly one-third of years and reduce alfalfa and pasture yields by around 35 percent in about 21 percent of years (see Appendix D).

Future increases in the frequency of droughts will likely exacerbate water shortages and water quality concerns and continue to negatively impact crop yields, reducing agricultural production in the District.

### **2.1.5 Instream Flow for Fish and Aquatic Habitat**

Agricultural diversions from Anthony Creek and the North Powder River result in diminished streamflows and habitat for fish and aquatic species. Bull trout are federally listed as threatened under the federal Endangered Species Act (ESA) and is state listed as threatened in Oregon. North Fork Anthony Creek, Anthony Creek, North Powder River, and Wolf Creek are designated as critical habitat for this species by USFWS.

Hydrology within the river systems has been dramatically altered by irrigation withdrawals and the construction of numerous dams (downstream of the project area), generally resulting in lower peak and base flows. Water shortages often occur in mid- to late summer, with large portions of rivers and streams becoming dewatered (Richmond, 1995). Instream water rights exist for Anthony Creek, North Fork Anthony Creek, and the North Powder River to ensure these stream segments have sufficient water for wildlife species that rely on these waterbodies. However, these instream water rights are not always met due to natural fluctuation and diversions by senior water right holders (Reclamation 2011). North Powder River and several of its tributaries are ranked as having the highest priorities in the Powder Basin for flow restoration projects (DEQ, 2013).

Although fish are not currently found in the District's ditches, there is the potential for impacts to ESA-listed species since the Carnes Diversion is unscreened. Additionally, Anthony Creek and the North Powder River are listed in Oregon's Integrated Report as impaired for temperature, which negatively impacts fish and aquatic habitat.

### **2.1.6 Fish entrainment**

During reservoir drawdown and high summer temperatures, fish that have become entrained in PVWCD's may have a significant die-off. PVWCD's Carnes Diversion on North Fork of Anthony Creek is not currently screened. With no screen, fish can pass from the river into the Carnes Ditch and into PVWCD conveyance infrastructure where they can become stranded when diversions cease. Some fish that enter Carnes Diversion may travel down the ditch and become trapped in Pilcher Creek Reservoir.

### **2.1.7 Fish Passage**

Fish passage barriers reduce habitat connectivity and can prevent fish from accessing key habitats that are necessary for each stage of their life history. The Carnes Diversion utilizes a small diversion dam to divert water from North Fork Anthony Creek. The diversion dam acts as a partial barrier to fish passage and is included on ODFW's 2025 Priority Fish Passage Barrier List, which identifies the most critical artificial barriers to fish passage in Oregon (ODFW 2025).

### **2.1.8 Risks to Public Safety**

Open ditches pose a risk to public safety when they carry water. The District has approximately 40.9 miles of open ditch. Although most of these ditches are on private land, they may still be accessed by residents, farmworkers, and in some areas, the public. Although no drownings have occurred in District ditches, a drowning did occur in Wolf Creek Reservoir in 1999 (D. Birdsall, personal communication, April 26, 2022 and July 19, 2022). The Carnes Ditch has had breaches in the past and could result in property damage.

## **2.2 Watershed and Resource Opportunities**

The following resource opportunities would be realized through the implementation of the project.

- Improve irrigation water management and delivery to District patrons by improving conveyance efficiencies and conserving water.
- Improve water supply reliability for District patrons, helping to maintain agriculture and the rural economy and lifestyle.
- Improve irrigation water quality.
- Reduce District and patron operation and maintenance costs.
- Minimize the potential for flooding, injury, and loss of life associated with open ditches.
- Improve instream flow for fish and aquatic habitat.
- Reduce the likelihood of fish entrainment in District-owned infrastructure.
- Improve fish passage in Anthony Creek.
- Obtain maximum benefits for existing NRCS dam investment in the District by improving water conveyance to the reservoirs.
- Meet USDA's mission to conserve and protect natural resources and invest in rural development.

- Meet Oregon governor, ODEQ and local objectives to address water quality and water availability.

### 3 Scope of the Plan-EA

#### 3.1 Agency, Tribal, and Public Outreach

Federal, state, and local agencies and representatives, as well as non-governmental organizations, received an invitation to participate in scoping for the project. Advertisements announcing the scoping period and associated scoping meeting were placed in the LaGrande Observer, on NRCS's website, and oregonwatershedplans.org. Additionally, the District notified all patrons of the scoping comment period and scoping meeting and invited comments on the scope of the Draft Plan-EA.

Consultation and coordination between NRCS, the District, United States Forest Service (USFS), Bureau of Land Management (BLM) and the Oregon State Historic Preservation Office (SHPO) has been completed. In accordance with the National Historic Preservation Act (NHPA) of 1966 as amended, and its subparts, NRCS, as the designated lead federal agency for completing Section 106, has completed consultation and coordination with the Oregon SHPO, USFS, BLM, and federally recognized tribes whose ancestral lands are known to have been in the county of the area of potential effect and incorporated input into the cultural resource surveys (APE; June 8, 2023). See Figure C-2 in Appendix C for a land ownership map showing USFS and BLM-owned lands in the area.

Per Executive Order (EO) 13007, *Indian Sacred Sites*, NRCS coordinated with tribes whose ancestral lands are known to have been in the counties of the undertaking prior to conducting cultural resources surveys. No sacred sites were identified within the APE and no evidence of sacred sites was found in the cultural field surveys.

NRCS met with BLM and USFS on November 9, 2023 to discuss the APE, how cultural resources surveys would be completed, what reviews would occur, and what federal agency would act as lead for Section 106. NRCS sent BLM and USFS letters on June 26, 2025 formally requesting NRCS as the lead federal agency for Section 106. NRCS sent the draft cultural resources report to USFS and BLM for their review on August 28, 2025. BLM concurred with NRCS's determination and finding of effects and provided minor comments on September 30, 2025. USFS did not respond after multiple attempts. NRCS incorporated the BLM comments and sent the final cultural resources report to the Oregon SHPO and Tribal Governments with ancestral lands within the county of the APE on December 10 and December 16, 2025, respectively. SHPO responded with a letter on January 7, 2026 concurring with NRCS's determination that the historic properties identified are not eligible for listing in the NRHP and thus there will be no historic properties affected per 36CFR 800.4(d)(1) and as defined in 36CFR 800.16(1) (see Section 4.1 and 6.1 for more information).

Tribal consultation was conducted in accordance with the NHPA and EO 13175, *Consultation and Coordination with Indian Tribal Governments*, to maintain NRCS's government-to-government relationships. NRCS sent letters regarding the proposed APE to the Oregon SHPO, Confederated Tribes of the Umatilla Indian Reservation, Burns Paiute Tribe, Nez Perce Tribe, Confederated Tribes of the Warm Springs Reservation, Confederated Tribes of the Colville Reservation on June 8, 2023. Colville Reservation indicated that the project is outside of their traditional territory and they do not need to be involved. NRCS sent copies of the Cultural Resources Assessment report to the Confederated Tribes of the Umatilla Indian Reservation, Burns Paiute Tribe, Nez Perce Tribe, and Confederated Tribes of the Warm Springs Reservation on December 16, 2025.

### **3.2 Scoping Meeting**

A scoping meeting was held on October 5, 2022, at the North Powder Rural Fire Protection District in North Powder, Oregon. Gary Diridoni, NRCS; Doug Birdsall, PVWCD; and Kristin Alligood, Farmers Conservation Alliance (FCA) presented at the meeting. The presentations covered the Pub. Law No. 83-566 funding, project purpose and need, Plan-EA process, proposed projects, and ways in which the public could get involved. After the presentations, attendees asked questions and provided public comments. A total of 14 people attended the meeting, excluding staff from PVWCD, NRCS, and FCA.

### **3.3 Scoping Comments**

Scoping comments were accepted from September 20 to October 25, 2022. Comments were submitted at the meeting and via email. See Table E-1 in Appendix E.1 for a list of comments received and where they are addressed in this Plan-EA.

### **3.4 Identification of Resource Concerns**

See Table E-2 in Appendix E.1 for a summary of resource concerns identified through scoping and their relevance to the proposed action. Resources determined not relevant were eliminated from detailed study; resources determined to be relevant were carried forward for analysis.

## **4 Affected Environment**

The following sections describe the existing ecological, physical, biological, economic, and social resources of the project area and areas that could be affected by the operation of the PVWCD system. The project area is defined in Section 1.2. Per requirements of the PR&G, this Plan-EA describes the ecosystem services associated with each resource, where applicable. For this Plan-EA, those resources include land use (Section 4.2), water resources (Section 4.7), and fish and aquatic resources (Section 4.8).

Ecosystem services refer to the benefits that people and their communities derive from the natural environment in which they live. Availability of water for consumption, pollination of crops, and providing places in which people value living are all examples of benefits that flow from nature to people. Because these ecosystem services contribute to people’s “health, wealth, and well-being,” but often cannot be quantified in the same way as services sold in marketplaces, federal investment into projects that could impact ecosystems and natural resources require an ecosystem services assessment to illuminate how management decisions would enhance, sustain, or degrade the benefits that nature provides (USDA 2017; Olander et al. 2018). An assessment of links between ecological function and social well-being helps to ensure that beneficial and detrimental ecological impacts of a project are recognized and that detrimental impacts are minimized to the extent possible (EEA 2019).

Per federal guidance, this Plan-EA assesses ecosystem services based on three of the following four service categories (USDA, 2017a):

1. Provisioning services: tangible goods provided for direct human use and consumption, such as food, fiber, water, timber, or biomass;
2. Regulating services: services that maintain a world in which it is possible for people to live, providing critical benefits that buffer against environmental catastrophe—examples include flood and disease control, water filtration, climate stabilization, or crop pollination;

3. Cultural services: services that make the world a place in which people want to live—examples include spiritual, aesthetic viewsheds, or tribal values; and
4. Supporting services: services that refer to the underlying processes maintaining conditions for life on Earth, including nutrient cycling, soil formation, and primary production.

See Figure E-8 in Appendix E.7 for a concept diagram that highlights the ecosystem services that interact with District operations and provides a baseline for discussion in Section 6. The diagram links an action that would modernize District infrastructure with potentially impacted ecosystem features and the provisioning, regulating, and cultural services that these ecosystems provide to people. Supporting services are not evaluated in this Plan-EA because they give rise to and support the final ecosystem services (Provisioning, Regulating, and Cultural) (EEA, 2019; USDA, 2017).

#### **4.1 Cultural Resources**

NEPA requires federal agencies to consider the effects of federally funded projects on cultural resources (7 CFR Part 1b). While NEPA does not define cultural resources, the term is understood to include “historic properties” as defined by Section 106 of the National Historic Preservation Act (NHPA), as well as sacred sites, archaeological sites not eligible for the National Register of Historic Places (NRHP), and archaeological collections (CEQ Executive Office of the President and Advisory Council on Historic Preservation 2013). Under Section 106 of the NHPA, historic properties are defined as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the NRHP, including artifacts, records, and material remains related to such a property or resource”. Consideration of historic properties under Section 106 supports NEPA consideration of effects on cultural resources but does not encompass all types of cultural resources under NEPA.

The study area for cultural resources consists of the APE, defined in Section 106 of the NHPA as “geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties” (36 CFR 800.16.c). Effects may be direct or indirect, with the former including any type of effect (i.e., physical, visual, auditory, etc.) resulting from an “undertaking at the same time and place with no intervening cause,” and the latter including any type of effect “caused by the undertaking that is later in time or farther in distance but are still reasonably foreseeable” (Advisory Council on Historic Preservation 2019).

As delineated, the project APE (see Figures C-3 to C-7 in Appendix C) considers direct effects that are long-term or permanent, including physical and visual effects, as well as effects from construction that are anticipated to be minor and temporary, such as vibration, noise, and fugitive dust. The horizontal extent of the APE includes the footprint of the areas and/or structures where the proposed project activities will occur. These limits of construction include areas where new pipeline alignments and the Dutch Creek siphon will be installed, as well as within Carnes Ditch (including both the northern Carnes Ditch segment from its head at Anthony Creek to the Pilcher Creek Spillway and the southern Carnes Ditch Segment, known as the C-1 Ditch), the Lone Pine Ditch, and the Maharry Blevins Ditch. The APE also includes a 100-foot buffer around the limits of construction to account for potential visual effects to significant viewsheds of historic properties resulting from alterations to components of the PVWCD. The vertical extent of the APE is defined as the maximum depth of project-related ground-disturbing activities as well as the height of project features in the areas where project-related ground disturbance is proposed. The maximum depth of ground disturbance is anticipated to be 6.5 feet. Reasonably foreseeable effects from the undertaking with the potential to occur at a later time or farther distance are not anticipated to occur outside the

limits of construction or 100-foot buffer. As such, the APE as delineated also considers the potential for indirect effects.

Parametrix archaeologists and architectural historians performed cultural resources surveys of the APE in summer and fall of 2024, including pedestrian surveys of the C-1 Project between August 11- 13, 2024 and additional pedestrian surveys, historic built environment surveys, and shovel probes in the remainder of the APE between September 30 and October 10, 2024.

Pedestrian survey of the APE was conducted and a total of 22 shovel probes were excavated within the APE where subsurface ground disturbance outside of the existing irrigation ditches is proposed. The surveys identified no historic properties within the APE (36CFR §800.4(b)). Historic built environment surveys identified three historic built environment resources in the APE: the Carnes Ditch, Lone Pine Ditch, and Maharry Blevins Ditch.

NRCS sent BLM and USFS letters on June 26, 2025 formally requesting NRCS as the lead federal agency for Section 106 (see Appendix A). The Cultural Resource Identification Report was reviewed by NRCS, as lead federal agency, and BLM (since the project crosses BLM-owned lands). The project also crosses USFS-owned lands and multiple attempts were made to contact USFS staff regarding cultural resources, but no response was received. NRCS sent the report to SHPO and tribes, with whom NRCS has initiated consultation. For purposes of NHPA tracking, SHPO has assigned this project as case number 23-0892, and the bibliographic number 36422 to the final report.

NRCS made Determinations of Eligibility for the three identified ditches in the Cultural Resources Assessment report. The Carnes Ditch, the Lone Pine Ditch and the Maharry Blevins Ditch have been determined not eligible for individual listing in the NRHP and also, not eligible for listing as contributing resources to any historic district. NRCS's Determination of Eligibility letter and Oregon SHPO's concurrence letter can be found with the excerpted Cultural Resources report in Appendix A.

Section 106 consultation was concluded with the Oregon SHPO office with a letter of concurrence on January 7, 2026. Table 7-1 illustrates consultation efforts to date.

## **4.2 Land Use**

The project area is located near the southern boundary of Union County in northeast Oregon, near the town of North Powder. North Powder is a predominantly agricultural community with an estimated 2023 population of 669 people (U.S. Census Bureau 2023).

### **4.2.1 Land Ownership**

Land ownership within the project area varies. Figure C-2 in Appendix C provides detail on private and public land ownership for tax lots within 50 feet of the project area. The uppermost 2.29 miles of the Carnes Ditch and the Carnes Diversion are located on USFS-owned land. An additional 0.28 mile of Carnes Ditch is located on land owned by BLM. Approximately 0.41 mile of Carnes Ditch is located on land owned by ODFW as part of the Elkhorn Wildlife Area. Another 1.45 miles of Carnes Ditch traverses private land. The remaining 8.69 miles of land within the project area are privately owned or District owned. The District currently has no records of existing easements on private land or active permits on public land within the project area.

#### **4.2.2 Land Use and Zoning**

The majority of the project area (approximately 58%) crosses and/or is adjacent to non-cultivated lands (predominantly scrub-shrub and evergreen forest). The remainder of the project area crosses or is adjacent to agricultural land – i.e., cultivated lands and hay/pasture (approximately 38%) or developed and open space uses (approximately 4%) (USGS 2021).

Land use within the project area consists of forest land, grazing lands, state lands designated for fish and wildlife management, and private property characterized by agricultural uses. The primary structures in the project area consist of agricultural buildings and related infrastructure as well as single-family residences associated with farm operations. Crops grown within the Powder Valley Water Control District, as reported by the District in 2023, consist of 40% pasture/range, 32% hay, 15% wheat, 8% corn, 3% potatoes, and 2% other crops (FCA 2023).

The middle portion of Carnes Ditch is in mixed farm and forest (Agricultural Forest Use) zoning and the eastern portion of the ditch is zoned Exclusive Farm Use (EFU). The Ellis Ditch is located on private land that is zoned EFU (DLCD 2023).

Water intake facilities, ditches and distribution lines for farm irrigation and ponds are identified as permitted uses within A-3 Agricultural Forest Use zones, per the Union County Zoning, Partition, and Subdivision Ordinance (Zoning Ordinance) Article 4.02.6.

In the A-1 zone (EFU), “Irrigation reservoirs, canals, delivery lines and those structures and accessory operational facilities, not including parks or other recreational structures and facilities, associated with a district as defined in ORS 540.505” may be established via a Planning Director Land Use Decision, per Union County Zoning Ordinance Section 2.03.5. Planning Director Land Use Decisions are subject to an administrative review and a discretionary decision by the Planning Director. Therefore, they require a notice of decision as well as the opportunity for a public hearing if determined necessary.

#### **4.2.3 Ecosystem services**

*Provisioning service: Water available for irrigation:* As described further in Section 6, water is diverted from Anthony Creek, North Fork Anthony Creek, Pilcher Creek, Wolf Creek, and the North Powder River and is delivered to patrons within the District service area. This water allows for the cultivation of crops including alfalfa, hay, and forage, which support livestock production, as well as wheat, barley, potatoes, and other crops for human consumption.

### **4.3 Recreation**

A variety of recreational opportunities are available within the project area and surrounding vicinity. These include camping, hunting, hiking, wildlife viewing, and fishing in the many creeks and rivers located in the area.

Pilcher Creek and Wolf Creek reservoirs are both owned and operated by the District. Maintenance and operation of recreational sites adjoining the reservoirs are provided by the Union County Parks Department with support from the Oregon Parks and Recreation Department and the Oregon State Marine Board. Pilcher Creek Reservoir Campground offers 17 primitive camping sites and a boat ramp and dock on the southwest portion of the reservoir. The reservoir attracts recreational users for camping, boating, fishing, and birdwatching. During the winter, an elk feeding station is nearby. Wolf Creek Reservoir offers several campsites, picnic areas, and a boat ramp and dock. Wolf Creek reservoir is popular for boating, water skiing, jet skiing, and fishing, including ice fishing in the winter (Union County 2023).

The Elkhorn Wildlife Area, located within the boundaries of the District (Figure C-2 in Appendix C), is known for the Rocky Mountain elk and mule deer herds that use it during the winter. The Elkhorn Wildlife Area provides opportunities for hunting, wildlife viewing, hiking, horseback riding, camping, and fishing on the North Powder River and Anthony Creek. Camping is allowed from April 11 – November 30. ODFW operates 10 feeding sites in the area to prevent deer and elk from feeding on private agricultural lands when they migrate into the Powder Valley from higher elevations. The Wildlife Area is closed to public entry from December 1 – April 10 to protect wintering deer and elk. However, wagon-drawn wildlife tours are sometimes offered mid-December – February. The Wildlife Area encompasses a total of 8,574 acres. Approximately 6,566 acres are under ODFW ownership, 1,728 acres are managed by USFS and BLM, and the remaining 380 acres are leased from a private landowner.

#### **4.4 Socioeconomic Resources**

This section describes the socioeconomic conditions of the areas associated with the proposed action; these include Union County and the City of North Powder, Oregon.

##### **4.4.1 Population**

Table E-3 in Appendix E.3 shows the population characteristics for Union County and the City of North Powder. Both areas grew in population from 2018 to 2023. Union County experienced slight growth of approximately 0.6 percent, while North Powder had a 36.5 percent gain in residents.

##### **4.4.2 Area Employment and Income**

Union County and North Powder both have lower labor force participation rates than the state of Oregon as a whole, with Union County's labor force participation rate being the lowest among the three geographies. The unemployment rate for Union County is similar to the state's overall unemployment rate, while North Powder's is lower than both Union County's and the state's (see Table E-4 in Appendix E.3).

The median household income for both Union County and North Powder is below the state median. The poverty rate is also higher in both locales than the state overall, with the town of North Powder having a lower poverty rate than Union County as a whole (See Table E-5 in Appendix E.3).

##### **4.4.3 Agricultural Statistics**

Agricultural information for Union County based on the USDA-NRCS 2017 Census of Agriculture can be found in Table E-6 in Appendix E.3. Hay/forage and grain crops account for the majority of the acreage in crop cultivation in Union County.

#### **4.5 Soils**

The project area is located within the Powder River Basin (Hydrologic Unit Code 8 #18010204). The project area is characterized predominantly by well-drained soils on low alluvial terraces (Powder Basin Watershed Council, 2004). Resource concerns related to soils in the Powder River Basin watershed include soil erosion and increased sediment loads in streams (DEQ, 2013). Within the project area, erosion is not known to be a concern in the Carnes ditch. The Lower Lone Pine Ditch has active erosion, sloughing, and downcutting, which result in sedimentation issues for District patrons.

The predominant soil units along the Carnes ditch are Klicker silt loam and a complex soil unit including Klicker silt loam (60 percent of the project area). These soils are well drained and formed

from basalt. Loess and volcanic ash are present in the surface layer. Other prominent soil types along the Carnes ditch include the Limberjim/Syrupcreek complex and Lookingglass very stony silt loam (USDA, 2023).

The predominant soil unit around the Ellis and Lower Lone Pine ditches is Hutchinson silt loam (38 percent of the project area). These soils are well drained and formed from loess, volcanic ash, colluvium, and mixed alluvium. Other prominent soil types in this area include Coughanour silt loam and Encina silt loam (USDA, 2023).

#### **4.5.1 Farmland Classification**

NRCS developed technical soil groups that are associated with a particular soil type and a soil's rating for agricultural commodity production (USDA, 2023). NRCS soil groupings along the Carnes ditch are 76 percent Farmland of Statewide Importance and 24 percent Not Prime Farmland. Soil groupings around the Ellis and Lower Lone Pine ditches are 22 percent Prime Farmland if Irrigated, 68 percent Farmland of Statewide Importance, and 10 percent Not Prime Farmland.

### **4.6 Vegetation**

#### **4.6.1 General Vegetation**

Common vegetation types found within the project area include cultivated crops, pastures and hay fields, and disturbed areas dominated by weedy species including Scotch thistle (*Onopordum acanthium*), cheatgrass (*Bromus tectorum*), and diffuse knapweed (*Centaurea diffusa*).

Crop species planted within the District include hay, alfalfa, pasture grasses, wheat, corn, and potatoes (FCA 2023). Scattered western juniper (*Juniperus occidentalis*), big sagebrush (*Artemisia tridentata*), rubber rabbitbrush (*Chrysothamnus nauseosus*), and other native plant species commonly found in the arid Oregon steppe environment are present in small, fragmented areas between agricultural fields, ditch berms, and on hillsides (see Figure E-1 and Figure E-2 in Appendix E.4). Emergent herbaceous wetlands interspersed with open water occur along the fringes of reservoirs, streams, and some ephemeral ditches (see Figure E-3 in Appendix E.4). No aquatic vegetation is found within the beds of ditches maintained by the District. The District performs periodic vegetation management along the banks of ditches that is limited to cutting or removal of pine tree sprouts and seedlings. A list of plant species found or likely to be found within the project area is included in Appendix E.4.

#### **4.6.2 Special Status Plant Species**

A list of species protected under the federal ESA or the State's list of threatened, endangered, and candidate plants (Oregon Administrative Rules [OAR] 603-073) that may be present within the project area was compiled using the Information for Planning and Consultation (IPaC) Official Species List (USFWS, 2025), Oregon Biodiversity Information Center (ORBIC) database (2023), and Oregon Department of Agriculture website (2023), and was confirmed by USFWS during early coordination meetings.

One federal and state-listed threatened plant, Howell's spectacular thelypody (*Thelypodium howellii* ssp. *spectabilis*), occurs in moist alkaline meadow habitats and within a fairly narrow elevation range of 3,000 to 3,500 feet. The project area lies within this elevation range, but it lacks alkaline meadow habitat; therefore, this species is not likely to occur within the project area (USFWS, 2023; ORBIC, 2023). Additionally, state-listed threatened Oregon semaphore grass (*Pleuropogon oregonus*) is documented as occurring in Union County (ORBIC 2023). This species occurs in moist meadows and marshland adjacent to natural waterbodies at around 3,300 to 5,600 feet in elevation. It is found

on gravelly silt loam or clay soil inundated by slow-moving water. The seasonally fluctuating hydrology of reservoirs, ditches, and irrigated areas likely prevents suitable habitat for this species within the project area.

A survey for species' presence and presence of suitable habitat was not conducted. Species' occurrence potential was evaluated based on available aerial imagery, background information (USFWS, 2023; ORBIC, 2023), and known habitat types identified during a general site visit in November 2022.

#### **4.6.3 Common and Noxious Weeds**

Common upland weeds that are abundant in the project area include wild rye (*Secale cereale*), tall tumble mustard (*Sisymbrium altissimum*), jointed goatgrass (*Aegilops cylindrica*), Scotch thistle (*Onopordum acanthium*), cheatgrass (*Bromus tectorum*), diffuse knapweed (*Centaurea diffusa*), and other annuals. Noxious weeds are also present. Noxious weeds are defined under OAR 603-052-1200 as those that have been declared a menace to the public welfare because of the environmental and economic degradation that occurs when they become established.

The spread of noxious weeds is regulated at the county and state levels. The Union County Weed Control program is dedicated to protecting and conserving agricultural lands, natural resources, wildlife habitat, and wilderness areas from the spread of noxious weeds and performs the County's required duties under ORS 569.355 to control noxious weeds. Appendix E.4 lists the noxious weeds known to occur in Union County and their corresponding ratings.

### **4.7 Water Resources**

All irrigation water for the PVWCD originates from the Elkhorn Mountains, a sub-range of the Blue Mountains. Water from Anthony Creek, North Fork Anthony Creek, Pilcher Creek, and Wolf Creek is diverted to fill two reservoirs: Pilcher Creek and Wolf Creek Reservoirs. Both reservoirs are connected and act as a singular unit to store and release water for irrigation throughout the District. Water is transported to patrons through ditches and piped conveyance systems. Groundwater is not used for irrigation by the District but is used within the greater Powder Valley.

#### **4.7.1 Water Rights and Operations**

The District delivers water to patrons via 40.9 miles of open ditches and 22 miles of piping that supply 12,649 irrigated acres. The District holds 12 water rights certificates and permit applications to the North Powder River, Pilcher Creek, Wolf Creek, Anthony Creek, North Fork Anthony Creek, and South Fork Anthony Creek (PVWCD 2020). Diverted water is stored within Pilcher Creek and Wolf Creek reservoirs.

The reservoirs are connected by the Lower Coughanour Ditch and act as a singular unit to store and distribute water to District patrons. Pilcher Creek Reservoir is at a higher elevation and usually fills before Wolf Creek Reservoir. The District has 5,910 acre-feet of storage in Pilcher Creek Reservoir for irrigation, water storage, and recreation and 11,100 acre-feet in Wolf Creek Reservoir (10,350 of which are designated for irrigation purposes; the remainder are reserved for minimum pool storage).

Water typically flows through the District's conveyance system during the irrigation season between April 1 and October 31. The Carnes and Coughanour ditches also convey water during the non-irrigation season to fill the two reservoirs. The reservoir filling season in the Carnes and Coughanour ditches occurs between October and mid-July. Exceptionally high winter flows in Anthony Creek can occasionally exceed the maximum capacity of Carnes Ditch (90 cfs). When Carnes Ditch is at its maximum capacity, the District can divert more water (per their water right). The District diverts the

additional water through Coughanour Ditch to Wolf Creek Reservoir. This is an infrequent occurrence that happens only during some years, for a minimal number of days during higher flows. Operational spills from Lower Lone Pine Ditch and flood irrigation tailwater return to the North Powder River via a network of ditches during the irrigation season.

Instream water rights exist for Anthony Creek, North Fork Anthony Creek, and the North Powder River. In-stream water rights vary by month and are generally highest in the spring through the irrigation season and lowest in the fall and winter. All instream water rights are junior to the District's water rights.

District water rights are broken into primary and supplemental. A supplemental water right or permit is used to ensure the full distribution of water to a patron when a primary water right cannot be met due to deficiency in its supply. A supplemental water right or permit is used in conjunction with a primary water right (OAR 690-380-0100 (12)). Appendix E.5 provides summary details on the water rights associated with the project area.

#### **4.7.2 Surface Water Hydrology**

The project area and the waterbodies affected by District operations are within the Powder River Basin (8 digit Hydrologic Unit Code 17050203). The semi-arid climate of the Powder Valley can receive as little as 4.3 to 10.6 inches of precipitation per year. In contrast, the surrounding steep mountain ranges receive large amounts of precipitation as snow, with the highest peak receiving on average 38 inches annually (Nowak, 2004). Thus, the hydrology of local rivers is typically driven by snowmelt; the highest flows occur in late May and early June followed by low flows from summer through winter. Hydrology within the river systems has been dramatically altered by irrigation withdrawals and the construction of numerous dams (downstream of the project area), generally resulting in lower peak and base flows. Water shortages often occur in mid- to late summer, with large portions of rivers and streams becoming dewatered (Richmond, 1995). Instream water rights exist for Anthony Creek, North Fork Anthony Creek, and the North Powder River to ensure these stream segments have sufficient water for wildlife species that rely on these waterbodies. However, these instream water rights are not always met due to natural fluctuation and diversions by senior water right holders (Reclamation 2011). North Powder River and several of its tributaries are ranked as having the highest priorities in the Powder Basin for flow restoration projects (DEQ, 2013).

Irrigation water for the District comes from several sources. Pilcher Creek and Wolf Creek flow directly into the District's two reservoirs. The District diverts water from North Fork Anthony Creek via the Carnes diversion, located immediately downstream from the confluence with Anthony Creek at river mile (RM) 0.1. The Coughanour (RM 3.6) and Lone Pine Diversions (RM 2.8) divert water from Anthony Creek. In addition, Dutch Creek, a small tributary stream of Anthony Creek, and Daley Creek, a tributary of Pilcher Creek, contribute irrigation water to the District via incidental flow into Carnes Ditch. Table E-11 and Figure E-6 in Appendix E.5 identify waterbodies associated with District operations and infrastructure.

##### **4.7.2.1 Anthony Creek, North Fork Anthony Creek, Pilcher Creek, and Wolf Creek**

These waterbodies share similar vegetation, geomorphology, and hydrology and are described together. Headwaters of the streams begin in mountainous forested habitats within the Elkhorn Mountains. The majority of precipitation is derived from snowfall in the winter months, resulting in peak flows of these streams occurring during snowmelt in the spring.

From 1962 to 1978, river gauge #13282400 recorded discharge on Anthony Creek slightly above the Coughanour Diversion (Oregon Water Resources Department [OWRD], 2023a). Flows were

highest during snow melt—April through June—and remained at baseflow through the remainder of the year (see Figure E-4 in Appendix E.5). Current flows are likely lower in Anthony Creek due to increased withdrawals, but the pattern and timing of flows are likely representative of current conditions throughout these stream systems.

#### 4.7.2.2 Dutch Creek

Dutch Creek is a small intermittent tributary to Anthony Creek that flows in May and June during snowmelt, and in the fall in response to rainfall events (D. Birdsall, personal communication, February 4, 2025). A headgate at this same location releases a mix of flows from Dutch Creek and Carnes Ditch into the downslope channel of Dutch Creek. A water loss assessment conducted by FCA (FCA 2019) did not measure flow on Dutch Creek but measured flow in Carnes Ditch upstream and downstream of the Dutch Creek crossing from May 8–11, 2018, during the highest flow period of the year. The change in flow averaged 2.8 cfs. Thus, Dutch Creek is assumed to contribute up to 2.8 cfs to Carnes Ditch. Flows upslope of Carnes Ditch in Dutch Creek can be assumed to be higher than 2.8 cfs. Flows downslope from Carnes Ditch are assumed to be up to 2.8 cfs lower than under natural conditions because the ditch intercepts a portion of streamflow. Flow in Dutch Creek downslope of Carnes Ditch is also supported by groundwater discharge which is assumed to be augmented by ditch seepage.

#### 4.7.2.3 Daley Creek

Daley Creek is a small intermittent tributary to Pilcher Creek whose flows are likely highest during May and June. Daley Creek flows into Carnes Ditch at RM 1, east of Dutch Creek. There is no headgate at this location and the full flow volume of Daley Creek upslope of Carnes Ditch is intercepted by the ditch. The downstream portion of Daley Creek, below Carnes Ditch, forms a channel that is evident on aerial imagery beginning approximately 300 feet downslope from where Carnes Ditch intercepts the creek. The downslope portion of Daley Creek appears to have a higher frequency of flow during the irrigation season as compared with the upslope portion. This is assumed to be attributable to groundwater discharge that is augmented by ditch seepage during the irrigation season. The downslope portion of Daley Creek flows into two private ponds that are likely used as stock ponds and for diverting water for flood irrigation. Daley Creek continues downslope until its confluence with Pilcher Creek.

#### 4.7.2.4 Pilcher Creek and Wolf Creek Reservoirs

Pilcher Creek and Wolf Creek reservoirs act as water storage for the District. The water height within both reservoirs fluctuates dramatically throughout the year due to snowmelt runoff and releases for irrigation. Stream flow into the reservoirs is highest in late spring (May-June) and precedes peak irrigation demand during the summer (June-August). Wolf Creek Reservoir is deeper than Pilcher Creek Reservoir and can hold almost double the amount of water. Pilcher Creek Reservoir is at a higher elevation and usually fills first before Wolf Creek Reservoir. Some artificial irrigation water induced wetlands are present along the reservoir fringes, especially where waterbodies flow into the reservoirs.

#### 4.7.2.5 North Powder River

The portion of North Powder River affected by District operations is a 4<sup>th</sup> order stream located in a broad alluvial valley that is fed by steep low order streams. From 1999 to 2014, river gauge 13282550 recorded discharge on North Powder River below the confluence of Anthony Creek (OWRD, 2023a). Like the upstream gauge #13282400, flows are highest in May and June during snowmelt and then remain at baseflow through the remainder of the year (see Figure E-5 in Appendix E.5).

Figure E-5 in Appendix E.5 is representative of flow conditions throughout the affected portion of North Powder River. Base flow conditions in summer are further reduced due to irrigation withdrawals. Streamflow below gauge #1328550 is likely lower than depicted in Figure E-5 during the irrigation season owing to several private diversions along North Powder River that further reduce flows in the river. Flow in the river is occasionally augmented from water from Pilcher Creek Reservoir for irrigators in the summer months (ODEQ 2013). Instream water rights exist for North Powder River (RM 22.2-12.9) but are not always met owing to seniority of the District's water rights. Flows in North Powder River are occasionally augmented by unused irrigation water and flood return flows from the network of private ditches associated with the Lower Lone Pine Ditch. The contribution of these operational spills from the Lower Lone Pine Ditch system to flow in North Powder River is not measured, and therefore unknown (D. Birdsall, personal communication, February 24, 2025).

#### **4.7.3 Surface Water Quality**

ODEQ maintains lists of all surface waters in the Powder River Basin that are considered impaired because they do not meet water quality standards under Section 303(d) of the Clean Water Act (CWA) (33 U.S.C. 1251 et seq.). Most streams and rivers associated with the District are impaired for temperature. In addition, portions of some rivers are listed for pH and *E. coli*. Table E-12 in Appendix E.5 lists all impaired waterbodies associated with District operations and their associated impairments. On May 23, 2024, ODEQ adopted a Total Maximum Daily Load (TMDL) for *E. coli* within the Powder River Basin (ODEQ 2024). Union County is required to develop a Powder River Basin *E. coli* TMDL Implementation Plan that will include management strategies to reduce *E. coli* loading to waterways. The North Powder River from the USFS boundary to its confluence with Powder River was identified as an initial focus area for *E. coli* reduction strategies (ODEQ 2024).

Water quality within the District's irrigation conveyance system is impacted by runoff from the adjacent lands. Water runoff from grazing and crop lands can import sediment, *E. coli* bacteria, and nutrients into the adjacent ditches. Sediment and nutrient runoff results in sedimentation and moss accumulation that clogs turnout and pivot sprinkler screens, thereby reducing water conveyance efficiency. Operational spills and flood irrigation tailwater from the Lower Lone Pine Ditch system can import these contaminants into North Powder River during the irrigation season.

#### **4.7.4 Groundwater**

The District does not use groundwater. However, groundwater is used throughout the valley by private users for domestic and municipal supply, irrigation, and livestock. Within the Powder River subbasin, approximately 40.6 percent of lands have no principal aquifer (Nowak, 2004). Wells within the District are predominantly found in the valley bottom and adjoining foothills that are able to access the basin-fill aquifer. The valley bottom is composed of alluvium and glacial deposits consisting of sand, gravel, and clay that can yield moderate to large amounts of water to wells (Lystrom et al., 1967). The foothills are composed of terrace gravel and sands that overlay the deeper aquifer.

Groundwater is supported by precipitation in the basin's surrounding mountains. Precipitation within the mountains is transported to the basin-fill aquifer naturally through subsurface flow and infiltration of water in streams. In addition, the aquifer is also supported by infiltration from the District's ditches and from irrigation.

#### **4.7.5 Ecosystem Services**

Waterbodies in the District provide the following ecosystem services.

*Provisioning service, Water available for irrigation (Figure E-8 in Appendix E.7, [E1]):* As described in Section 4.7.2, water from several streams in the Elkhorn Mountains is diverted into the District system and delivered to properties within the District for agricultural purposes, including the production of crops and livestock.

*Provisioning service, Fish Populations (Figure E-8 in Appendix E.7, [E2]):* As described in detail in the following section (6.8), streams and reservoirs associated with District operations provide habitat for a variety of native and non-native fish populations.

## **4.8 Fish and Aquatic Resources**

### **4.8.1 General Fish and Aquatic Species**

Numerous native and non-native species inhabit the reaches of Anthony Creek, North Fork Anthony Creek, Dutch Creek, Wolf Creek, and Pilcher Creek associated with District operations. Native fish in this area of the Powder River Basin include Columbia River redband trout (*Oncorhynchus mykiss gairdnerii*) and current and historical populations of bull trout (*Salvelinus confluentus*). Columbia River redband trout are also stocked into Pilcher Creek and Wolf Creek reservoirs. The non-native brook trout (*Salvelinus fontinalis*) was introduced widely beginning in the 1900s and was previously stocked in local rivers. Stocking of brook trout has ended, but naturally reproducing populations have been established and brook trout is currently the dominant char species in the region. Non-native species in Pilcher Creek Reservoir include black crappie (*Pomoxis nigromaculatus*) and brown bullhead (*Ameiurus nebulosus*). Black crappie is also found Wolf Creek Reservoir.

Other native species that may be present in Anthony Creek and North Fork Anthony Creek include mountain whitefish (*Prosopium williamsoni*), sculpin (*Cottus* spp.), chiselmouth minnow (*Acrocheilus alutaceus*), redband shiner (*Richardsonius balteatus*), and northern pikeminnow (*Ptychocheilus oregonensis*). These species have been documented in the North Powder River.

No fish species are recorded to occur currently or historically in Daley Creek. The stream likely does not contain fish as it is an intermittent stream with private earthen dams that act as complete fish passage barriers. In addition, because Daley Creek within the project area is a small intermittent headwater system, it is likely that it did not historically contain fish.

Anadromous salmonids historically inhabited the Powder River Basin until 1932; construction of Thief Valley Dam prevented upstream travel from the Snake River (DEQ, 2013). Salmonid ranges were further restricted with the construction of three dams on the Snake River associated with the Hells Canyon Project which prevented fish passage upstream along tributaries of the Snake River, including portions of the lower Powder River below Thief Valley Dam.

The District's Lone Pine Diversion and fish screen on Anthony Creek are operated by the state watermaster. Because there is no fish screen at the District's Carnes Diversion on North Fork Anthony Creek, fish may enter the District's irrigation conveyance system and become trapped. In addition, Carnes Diversion utilizes a small diversion dam to divert water from the stream channel and the dam acts as a partial barrier to fish passage. The Carnes Diversion is included on ODFW's 2025 Priority Fish Passage Barrier List, which identifies the most critical artificial barriers to fish passage in Oregon, ranking them based on the amount of quality of habitat blocked, current level of passage, number of species impacted, and other factors (ODFW 2025). Several other irrigation diversion dams along Anthony Creek, including the Coughanour and Lone Pine diversions, act as partial barriers. Earthen dams at Pilcher Creek and Wolf Creek Reservoirs are complete barriers to fish passage. Furthermore, irrigation infrastructure at the interception of Dutch Creek and Carnes

Ditch likely acts as a complete fish passage barrier for Columbia River redband trout. The fish passage barrier at this location currently prevents upstream access to approximately 2.61 miles of stream habitat.

Due in part to warming summers, earlier snowmelt, and irrigation diversion withdrawals, North Fork Anthony Creek, Anthony Creek, North Powder River, and Wolf Creek are listed as impaired for temperature on ODEQ's Integrated Report (see Section 4.7.3). Wolf Creek is also listed as impaired for pH and insufficient for dissolved oxygen for spawning on ODEQ's Integrated Report.

A list of fish species potentially present within waters associated with District operations is included in Appendix E.6.

#### **4.8.2 Federally Listed Fish and Aquatic Species**

Fish and aquatic species protected under the ESA (16 U.S.C. 1531 et seq., as amended in 1998), that are known or expected to occur in waterbodies associated with District operations and infrastructure was compiled using IPaC (USFWS, 2025), ORBIC (2023), and the National Oceanic and Atmospheric Administration (NOAA) Fisheries Species and Habitat App (2025). These sources identified bull trout, which is federally listed and Oregon state listed as threatened.

Consultation under Section 12 of P.L. 83-566 was initiated by NRCS on September 22, 2022. See Appendix A for a copy of the consultation request letter.

##### **4.8.2.1 Bull Trout**

Bull trout is federally listed as threatened under the ESA. North Fork Anthony Creek, Anthony Creek, North Powder River, Wolf Creek, and Wolf Creek Reservoir are designated as critical habitat for this species by USFWS (see Figure E-7 in Appendix E.6). Within the Powder River Basin, bull trout are currently only present year-round within the headwaters of the Powder River including North Fork Anthony Creek, Anthony Creek, and Wolf Creek (Howell 2017, ODFW 2024a). Lower portions of Wolf Creek, including Wolf Creek Reservoir, are used for foraging, migration, and overwintering. It is likely that minor number of bull trout are entrained into PVWCD water conveyance system from unscreened diversion points along Anthony Creek such as Carnes Diversion.

Bull trout distribution is confined to the edges of its former habitat due to habitat changes (largely water temperature) and the introduction of brook trout. Brook trout generally outcompete bull trout because they have a broader range of temperature tolerance, may mature earlier, are more aggressive, and grow at a quicker pace (Leary et al., 1993; Selong et al., 2001; McMahon et al., 2007). In addition, brook trout can hybridize with bull trout where their populations overlap, reducing the reproductive potential of bull trout populations (Kanda et al., 2002).

Climate variability is a noted concern for bull trout, as it may increase overall stream temperatures, further restricting the amount of cold-water habitat available for the species. In addition, warmer stream temperatures enable brook trout to move farther upstream which increases species' overlap and could result in the potential extirpation of bull trout (Rieman et al., 2007). Bull trout are extirpated from Anthony Creek below Carnes Diversion and have no documented occurrence within the North Powder River below its confluence with Anthony Creek (ODFW 2024a). Howell (2017) observed that bull trout and brook trout ranges within North Fork Anthony Creek and Anthony Creek, along with stream and air temperature, have not changed significantly within the last 20 years. However, future effects of climate variability remain a concern for bull trout populations in these streams and their tributaries, given their need for cold water habitat.

### 4.8.3 State-Listed Species

ODFW maintains a list of native migratory fish species in Oregon that are determined to be either threatened or endangered according to criteria set forth by rule (OAR 635-100-0125). State-listed fish species that may be present within the waterbodies affected by District operation were identified using the ORBIC data report (2023) and include bull trout.

### 4.8.4 Ecosystem Services

*Provisioning service, Fish populations (Figure E-8 in Appendix E.7, [E2]):* Waterbodies associated with District operations and infrastructure support populations of native bull trout, introduced brook trout, crappie, pikeminnow, whitefish, and other fish species. These fish populations provide fishing opportunities for both recreation and consumption.

*Cultural Service, Culturally important species (Figure E-8 in Appendix E.7, [E4]):* People's values for species conservation may arise from personal use (i.e., enjoying seeing the species and/or its habitat), personal beliefs and moral ethics (i.e., believe protecting a species and its habitat is the right thing to do), altruism (i.e., believing a resource should be protected so that others can use it or benefit from it), and/or a desire to bequest the resource (i.e., believing a resource should be protected for future generations). Some fish species have cultural significance to the Warm Springs, Umatilla, Burns Paiute, and Nez Perce Tribes. These include the threatened bull trout and Columbia River redband trout, both of which were traditionally used by these tribes as a food source and in cultural and spiritual practices. Climate variability is a noted concern for culturally important fish species, as it may increase overall stream temperatures, further restricting the amount of cold-water habitat available for the species.

## 4.9 Wetlands and Riparian Areas

Wetland and riparian areas affected by District operations have the potential to occur within the project area; sporadically along North Fork Anthony Creek, Anthony Creek, Dutch Creek, Daley Creek, Wolf Creek, and North Powder River; and adjacent to Pilcher Creek and Wolf Creek Reservoirs.

Wetlands perform several valuable functions including water storage, water filtration, and biological productivity. They can also support complex food chains that provide sources of nutrients to plants and animals and specialized habitat for a wide variety of aquatic and terrestrial species. Wetlands and waters in the area associated with the proposed action may be subject to federal or state regulations depending on their characteristics. Within the state of Oregon, wetlands are managed under two regulations: Section 404 of the Clean Water Act (CWA), and the Oregon Removal-Fill Law (OAR141-085-0515(9)). Generally, the construction and maintenance of irrigation ditches is considered an exempt activity under Section 404 of the CWA. For more information about Section 404 of the CWA and the state's Removal-Fill Law, see Appendix E.8.

Riparian areas are transition zones between waterbodies and adjacent upland areas that support hydrophytic vegetation that is dependent upon the hydrology of the waterbody. Riparian areas as defined by the EPA are "a vegetated ecosystem along a waterbody through which energy, materials, and water pass. Riparian areas characteristically have a high water table and are subject to periodic flooding and influence from the adjacent waterbody. These systems encompass wetlands, uplands, or some combination of those two landforms." Riparian habitats will sometimes, but not in all cases, have all the characteristics necessary for them to be also classified as wetlands (EPA, 2005).

Wetland and riparian areas affected by District operations are found within and adjacent to natural waterbodies within North Fork Anthony Creek, Anthony Creek, Pilcher Creek Reservoir, and sometimes occurring along irrigation ditches and pipes.

#### **4.9.1 Wetland and Riparian Areas Along the Project Area**

Artificial irrigation water induced wetlands adjacent to irrigation ditches are generally not regulated under Section 404 of the CWA, as long as the ditch was not constructed through previously existing jurisdictional wetlands or other waters. Hydrophytic plants are sometimes found along the banks of irrigation ditches within the project area or in adjacent low-lying downgradient areas outside the project area, as the hydrology provided by the ditches can create favorable growing conditions during a portion of the year.

Water typically flows through the District's ditches during the irrigation season between April 1 and October 31. The Carnes and Coughanour ditches also convey water during the non-irrigation season to fill the two reservoirs. Outside of the irrigation season, standing water can be found in other ditches following rain or snow events.

Analysis of the National Wetland Inventory (NWI) geographic information systems data (USFWS, 2023) and aerial imagery has identified no wetland features in the project area. The NWI data is used as a first step in identifying and evaluating potential wetlands in the project area; however, at the time of writing this Plan-EA, a wetland delineation has not yet been performed.<sup>5</sup> Observations and photos from ditch water loss assessments indicate that hydrophytic vegetation and saturated soils are present along District ditches. Ditch seepage is likely supporting artificial wetlands downslope of ditches. Ditch seepage is an artificial source of hydrology for these wetlands, and it is likely that these areas would revert to upland if seepage from irrigation ditches ceased.

#### **4.9.2 Wetlands and Riparian Areas Along Natural Waterbodies Associated with District Operations and Infrastructure**

Based on the NWI data, aerial imagery, and the district site tour, there are potentially several freshwater herbaceous wetlands found along the fringe of Pilcher Creek Reservoir and some around Wolf Creek Reservoir.

Naturally occurring freshwater wetlands are potentially found along the lower portions of Anthony Creek, Dutch Creek, Daley Creek, Wolf Creek, and the North Powder River. These palustrine wetlands either contain herbaceous vegetation, are forested with quaking aspen and understory shrubs, or consist of dense willow stands and are within floodplains associated with Anthony Creek, Dutch Creek, Wolf Creek, or the North Powder River. According to the Federal Emergency Management Agency Flood Map panel 4102160575B, effective May 15, 1980, no floodplain areas are present within the areas surrounding the Carnes, Lower Lone Pine, Ellis, Redger, or Maharry Blevins ditches, and no floodplains are associated with nearby reaches of Anthony Creek, North Fork Anthony Creek, Dutch Creek, Daley Creek, Pilcher Creek, Wolf Creek, Wolf Creek Reservoir, or Pilcher Creek Reservoir.

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<sup>5</sup> Coordination with ODSL and USACE would occur prior to project implementation to determine whether a wetland determination or wetland delineation would occur.

## 4.10 Wildlife Resources

### 4.10.1 General Wildlife

Wildlife within the project area consists of habitat generalists or edge habitat species that are able to adapt to or exploit the agricultural environment in addition to species requiring large tracts of undisturbed land using the surrounding unpopulated mountainous regions. Large mammals that use habitats in the project area and its vicinity include mule deer (*Odocoileus hemionus*), whitetail deer (*O. virginianus*), Rocky Mountain elk (*Cervus canadensis nelsoni*), black bear (*Ursus americanus*), cougar (*Puma concolor*), bobcat (*Lynx rufus*), and coyotes (*Canis latrans*; ODFW, 2023). The project area is within the winter range of elk and mule deer (ODFW, 2013). Commonly found birds within the area include the ruffed grouse (*Bonasa umbellus*), turkey (*Meleagris gallopavo*), California quail (*Callipepla californica*), and other raptors and songbird species (ODFW, 2023).

Wildlife within the project area use the ditch system as a water source and dispersal corridor. Where not cleared, vegetation along ditches can provide food, cover, and breeding sites for wildlife species throughout the year. In addition, the Pilcher Creek and Wolf Creek reservoirs provide aquatic habitat for a variety of wildlife species. Appendix E.9 contains a list of wildlife species that are likely to occur in the project area.

Portions of the project area are in the Elkhorn Wildlife Area's North Powder Tract (see Figure C-2 in Appendix C). The Elkhorn Wildlife Area is owned by ODFW and is primarily used for overwintering habitat for Rocky Mountain elk and mule deer. To prevent these herds from grazing on private agricultural land, ODFW operates feeding sites to feed about 1,400 elk and 800 deer during the winter months.

### 4.10.2 MBTA/BGEPA Species

The Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) make it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale any migratory bird, or eagle, or the parts, nests, or eggs of such a bird except under the terms of a valid federal permit from USFWS. Migratory birds are known to travel through the project area and its vicinity and may use various habitats in the District including agricultural habitats, interspersed undeveloped uplands, and aquatic habitats associated with streams, seasonally flowing ditches, and reservoirs. Appendix E.9 contains a list of bird species that potentially occur within the project area, including species protected under MBTA/BGEPA.

USFWS maintains a database of known golden eagle (*Aquila chrysaetos*) and bald eagle (*Haliaeetus leucocephalus*) nesting sites. A bald eagle nesting site is located to the east of Pilcher Creek Reservoir, and a golden eagle nesting site is located northeast of Wolf Creek Reservoir (ORBIC, 2023). Nesting eagle pairs may forage throughout the District.

Aquatic habitats associated with summer-irrigated fields, irrigation ditches, and the Pilcher Creek and Wolf Creek reservoirs are used by various species of ducks and mallards, great blue heron (*Ardea herodias*), least sandpiper (*Calidris minutilla*), spotted sandpiper (*Actitis macularius*), snow goose (*Anser caerulescens*), northern rough-winged swallow (*Stelgidopteryx serripennis*), tundra swan (*Cygnus columbianus*), trumpeter swan (*Cygnus buccinator*), and killdeer (*Charadrius vociferus*) (eBird, 2023).

### 4.10.3 Federally Listed Species

A list of federally and state-listed and sensitive wildlife species that may be present in the project area and vicinity was compiled using the USFWS official species list (USFWS, 2025) and the ORBIC data report (2023) (see Table E-16 in Appendix E.9). There are no designated critical habitats for

federally listed terrestrial wildlife in the project area and no federally listed terrestrial wildlife species are currently known to inhabit the project area. Federally listed aquatic species are discussed in Section 4.8.2.

Consultation under Section 12 of P.L. 83-566 was initiated by NRCS on September 22, 2022. See Appendix A for a copy of the consultation request letter.

### **North American Wolverine**

On November 30, 2023, the USFWS listed the distinct population segment of North American wolverine in the contiguous United States as threatened under the ESA (88 FR 83726- 83772). Wolverines have large territories in relatively inaccessible landscapes within high-elevation terrains (5,906 to 11,483 feet) (USFWS 2018). The species is found in naturally low densities throughout the west-northwestern United States and much of Canada and Alaska. Wolverines use a variety of habitat types but generally use habitats in locations away from human development (USFWS 2018). Wolverines occur within mountainous regions of Oregon and have been recorded to occur in the Wallowa Mountains 20 miles east of the project area (USFWS 2018; ODFW 2024b).

The project area is not preferred habitat for North American wolverine, as it is at a lower elevation (<4,200 feet) than typically used by the species and predominantly occurs in an agriculturally developed area fragmented by roads and human settlement. The species may occur within the project area during migrations or dispersal to more suitable habitats (USFWS 2025) likely between the Wallowa Mountains and higher elevation areas in the Elkhorn Mountains.

### **California Condor**

A non-essential experimental population of California condor has been released on Yurok tribal lands in California near the Oregon border. Individual birds have been tracked up to 100 miles from their release sites (Sherriff 2024). The project area is greater than 380 miles from the release site, therefore California condors have not entered the project area at this time. It is assumed that California condors will not be present in the project area during implementation of the Modernization Alternative.

### **Monarch Butterfly**

Monarch butterfly was proposed for federal listing as threatened on December 12, 2024. Designated critical habitat was also proposed, but none was proposed in Oregon (89 FR 100662). No observations of this species or milkweed (*Asclepias* spp.), its preferred host plant, have been recorded in the project area (Xerces Society 2024). However, both monarch butterflies and milkweed have been observed in northeastern Oregon and a small portion of the project area is mapped within modeled suitable habitat for monarch butterfly (McIntrye et al. 2024).

Monarch butterfly overwinters along the California Coast and in Mexico, and migrate out during spring to breed on milkweed plants where it lays its eggs. Monarch butterfly in the west continually breeds and lays eggs from spring to fall before migrating back to its overwintering grounds (USFWS 2021). During breeding and migration season, adult monarch butterflies require blooming nectar plants for nourishment along their migration routes and breeding areas (USFWS 2021). The timing of the monarch butterfly breeding season for a given area varies across the west. Monarch butterfly breeds during the spring and summer within the project area (Xerces Society 2018a), approximately from June 1 to September 30 (Xerces Society 2018b).

### **Suckley's Cuckoo Bumble Bee**

Suckley's cuckoo bumble bee was proposed for federal listing as endangered on December 17, 2024. Observations of Suckley's cuckoo bumble bee have recently been exceedingly rare in Oregon. Only two observations of the species have been recorded in Oregon since 2000, and no individuals have been observed since 2018 (USFWS 2024).

Suckley's cuckoo bumble bee overwinters from fall through spring in areas with loose substrates such as duff, leaf litter, and rotting logs. The species emerges in late spring to feed on nectar and pollen before invading the nests of a suitable host colonies of other bumble bee species (*Bombus* species; USFWS 2024). The species is an obligatory social parasite that usurps the queen of other social bumble bees and uses the nest's workers to collect pollen for reproduction. Host bumble bee nests are in abandoned underground holes in a variety of habitats with sufficient nectar and pollen resources in the vicinity (USFWS 2024). The species' offspring emerge in late summer and mate through fall before overwintering.

#### **4.10.4 State-Listed Species**

A list of species protected by the State of Oregon (OAR 635-100-0105) that may be present within the District was compiled using the ORBIC data report (2023). Table E-16 in Appendix E.9 includes a list of State-protected species that may be present in the project area vicinity. Section 4.8.3 discusses state-listed aquatic species that may be present in the project area.

## **5 Alternatives**

### **5.1 Formulation Process**

Six action alternatives and one No Action Alternative were initially considered during the scoping process, including both structural and nonstructural measures. The formulation of alternatives followed 7 CFR 1b for implementing NEPA as well as the requirements of the PR&G. Scoping comments were also incorporated into the alternatives formulation process.

When formulating an alternative, in addition to considering the Federal Objectives and Guiding Principles, the planners took into consideration the project's purpose and need and identified problems and opportunities (Section 2). These alternatives were then screened based on how well the alternatives met the following four planning criteria: completeness, effectiveness, efficiency, and acceptability (USDA, 2017; Appendix D.5). The alternatives of dryland farming, market-based approaches to include voluntary duty reduction, piping Mansfield and Bulger ditches, modernization with piping of Upper Coughanour Ditch, and the Modernization Alternative without fish screening were initially considered during formulation but were eliminated from further analysis because they did not meet the formulation criteria (Appendix D.5). Ditch Lining and the Modernization Alternative met the formulation criteria and moved to the next stage of screening.

### **5.2 Alternatives Eliminated from Detailed Study**

The following subsection describes alternatives that met the formulation criteria but were not analyzed in detail as a viable alternative after further consideration.<sup>6</sup> After additional consideration

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<sup>6</sup> Alternatives that do not address the purpose and need for action, do not achieve the Federal Objective (Section 2) and Guiding Principles (Appendix D), or become unreasonable because of cost, logistics, existing technology, or environmental reasons may be removed from consideration (NWPM 501.37; NRCS 2015; NRCS 2017).

the Modernization Alternative was moved forward for detailed analysis, therefore it is not discussed in this section, but is discussed in detail in Section 5.3.

### **5.2.1 Ditch Lining**

Ditch lining would involve covering the bottom and sides of the currently open Carnes and Upper Coughanour Ditches with a geotextile liner and shotcrete to prevent water from seeping into the underlying soils and rock. Ditch lining would require subgrade preparation, geotextile liner installation, and application of a layer of shotcrete to protect the geotextile liner across approximately 7.8 miles of open ditches.

Ditch lining would only partially meet the project purpose of conserving water. While lining would reduce water loss from seepage, it would not reduce water loss from evaporation. The lining materials would have an expected lifespan of approximately 33 years before needing to be replaced. Before replacement, as the system aged, it would likely require maintenance with progressively increasing frequency. This would be necessary to address wear and cracks in the lining, which would otherwise result in increased water loss through seepage over time. Additionally, this alternative would require energy use and other pumping costs for farmers similar to their current operations.

NRCS has completed at least five watershed plan-environmental assessments within Oregon<sup>7</sup> over the past five years that evaluated the cost-efficiency of lining against the cost of piping. In all cases, it was determined that the combined capital and operations, maintenance, and replacement (OMR) costs for lining exceeded the cost of piping by two to five times. In all cases, cost was used to justify eliminating the lining alternative from further study. Lining has therefore been shown to be not cost efficient.

Furthermore, ditch lining would not fully meet the project purpose to improve water delivery reliability. An anticipated increase in OMR costs would not meet the project's purpose to improve operation efficiencies. Losses from evaporation and seepage (as the lining aged and cracked) would result in less water conservation compared to the Modernization Alternative, making ditch lining a less effective approach. As a result, the ditch lining alternative was dismissed from further consideration, because it would not meet the project purpose and need as effectively as the Modernization Alternative, would be inefficient, and would not achieve the Federal Objective and Guiding Principles.

## **5.3 Alternatives Description**

Of the project alternatives that were considered for the PVWCD Infrastructure Modernization Project, two were selected for further evaluation and are discussed in the following sections.

### **5.3.1 No Action Alternative (Future without Federal Investment)**

Under the No Action Alternative, the District would continue to operate and maintain the existing delivery system in its current condition. This alternative assumes that modernization of the District's infrastructure would not be reasonably certain to occur, as funding at the scale necessary to

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<sup>7</sup> *Swalley Irrigation District Irrigation Modernization Project, Final Watershed Plan-Environmental Assessment, NRCS, December 2018; Central Oregon Irrigation District, Smith Rock-King Way Infrastructure Modernization Project Final Watershed Plan-Environmental Assessment, NRCS, July 2020; Ochoco Irrigation District Infrastructure Modernization Project Final Watershed Plan-Environmental Assessment, NRCS, March 2021; Arnold Irrigation District Infrastructure Modernization Project Final Watershed Plan-Environmental Assessment, NRCS, December 2022; North Unit Irrigation District Infrastructure Modernization Project Final Watershed Plan-Environmental Assessment, NRCS, January 2023;*

modernize District infrastructure is not anticipated from other sources. The No Action Alternative would be a continuation of the District's current operations and maintenance.

The No Action Alternative would not meet the project purpose and need. There would be no improvements to existing District operational inefficiencies affecting water quantity and delivery reliability for farmers, streamflow and habitat conditions for fish and aquatic species, water quality, and agriculture production. Water delivery and operational inefficiencies would remain the same and could potentially worsen over time. By not modernizing the District's current management of water, the No Action Alternative would fail to achieve the Federal Objective to protect the environment, the Healthy and Resilient Ecosystem Guiding Principle, or the Sustainable Economic Development Guiding Principle.

### **5.3.2 Modernization Alternative (Future with Federal Investment)**

The Modernization Alternative would focus on three priority infrastructure modernization projects: the Project Group 1 (PG1) C-1 Project, PG2 Carnes Pipeline, and PG3 Fish Screen and Passage.

PG1 C-1 Project would include the following actions (see Figure 5-1):

- Pipe the Ellis Ditch (approximately 2.1 miles) and install approximately 1.3 miles of pipeline within a new alignment. The new C-1 pipeline would range from 24 to 48 inches in diameter.
- Install a pressure reducing vault to hold two pressure reducing valves to depressurize the C-1 pipeline before the C-1 pipeline intersects the Lone Pine Ditch. The vault would be cast-in-place concrete with the approximate dimensions of 17 feet long, 10 feet wide, and 8 feet deep (Vault 1 in Figure 5-1).
- Install a junction vault and trash rack to connect the C-1 pipeline with the Lone Pine Ditch outfall. Vault dimensions and type would be the same as described above for the pressure reducing vault (Vault 2 in Figure 5-1).
- Retire and leave open the end of the Lower Lone Pine Ditch (3.4 miles) and all of the Maharry Blevins Ditch (1.6 miles).
- Retire and fill the Redger Ditch (0.5 mile).

PG2 Carnes Pipeline would include the following actions (see Figure 5-1):

- Pipe the Carnes Ditch from the Carnes Diversion to the Pilcher Creek Filling Channel (approximately 3.2 miles; 66-inch diameter pipeline). Following construction, a dirt road approximately 10 ft wide would be maintained above the pipeline for District maintenance access.
- Install an approximately 0.1-mile long siphon (60-inch diameter) to carry the piped Carnes Ditch beneath Dutch Creek, bypassing the existing approximately 1.2-mile section of Carnes Ditch that makes a loop along Dutch Creek.
- Retire the 1.2-mile Carnes Ditch loop along Dutch Creek. This section of ditch would remain open following the project.
- Remove the existing headgate infrastructure where Carnes Ditch currently intercepts Dutch Creek at the northernmost extent of the Carnes Ditch loop. Restore the Dutch Creek stream

channel to natural conditions at this site and reconnect portions of the stream channel upslope and downslope of the current ditch and headgate location.

- Bury the Carnes Ditch pipeline beneath the Daley Creek stream channel where Carnes Ditch currently intercepts Daley Creek. Restore the Daley Creek stream channel to natural conditions at this site and reconnect portions of the stream channel upslope and downslope of the current ditch location.

PG3 The Fish Screen and Passage project would include the following actions (see Figure 5-1):

- Install fish screening and improve fish passage at the Carnes Diversion adjacent to the confluence of North Fork Anthony Creek and Anthony Creek.

The District has determined that this alternative is technically feasible and addresses the project's purpose and need. In addition, this alternative would provide stability and resilience for agriculture, the environment, and local communities as climate variability continues to cause an increasing amount of uncertainty within the Powder River Basin. The project would support existing land use as well as support land use trends in the future. The Modernization Alternative would address the project's problems and opportunities (Section 2), which are discussed below.

Construction of the Modernization Alternative would be expected to occur in three project groups over portions of three years. Construction of PG1 C-1 Project would primarily take place during the non-irrigation season; however, new alignment construction may occur during the irrigation season.

The Carnes Diversion is typically shut off in July. Therefore, construction of PG2 Carnes Pipeline and Carnes siphon, PG3 Carnes Diversion fish screen and fish passage improvements, and associated ditch retirement actions could take place anytime from late summer through the non-irrigation season.

### 5.3.2.1 Construction Means and Methods

#### 5.3.2.1.1 Piping

In general, the existing ditches would be trenched for subgrade preparation prior to pipe installation using excavators, with excavated material being side-cast adjacent to the ditch. A geotextile liner would be installed in the trench, followed by pipe bedding and the pipe. The side-cast excavated material would then be returned to the trench as pipe cover. Trench design would follow NRCS Conservation Practice Standard for Irrigation Pipeline (Code 430-CPS-1). Pipeline installation within new alignments, including the Dutch Creek Siphon and approximately 1.3 miles of new pipeline alignment on PG1 C-1 Project, would incorporate similar approaches. This would include the pipe crossing of Daley Creek through the cut-and-cover approach. Excess material that could not be reused as backfill following construction of the new pipeline alignments would be used to fill in the nearby Redger Ditch. Specific details regarding construction materials, means, and methods would be determined during final design.

Construction of the Modernization Alternative would include mobilizing and staging construction equipment; delivering pipe to construction areas; excavating trenches; fusing pipelines; placing pipe in trenches, which in some cases are below the grade of the ditch; compacting backfill; and restoring and reseeding disturbed areas. Appropriately sized construction equipment would be used to minimize disturbance in the construction area. All activities incorporate by reference applicable general, species specific, and activity-specific conservation measures described within the Oregon and Washington NRCS Aquatic Habitat Conservation (ORWAC) Programmatic Consultations

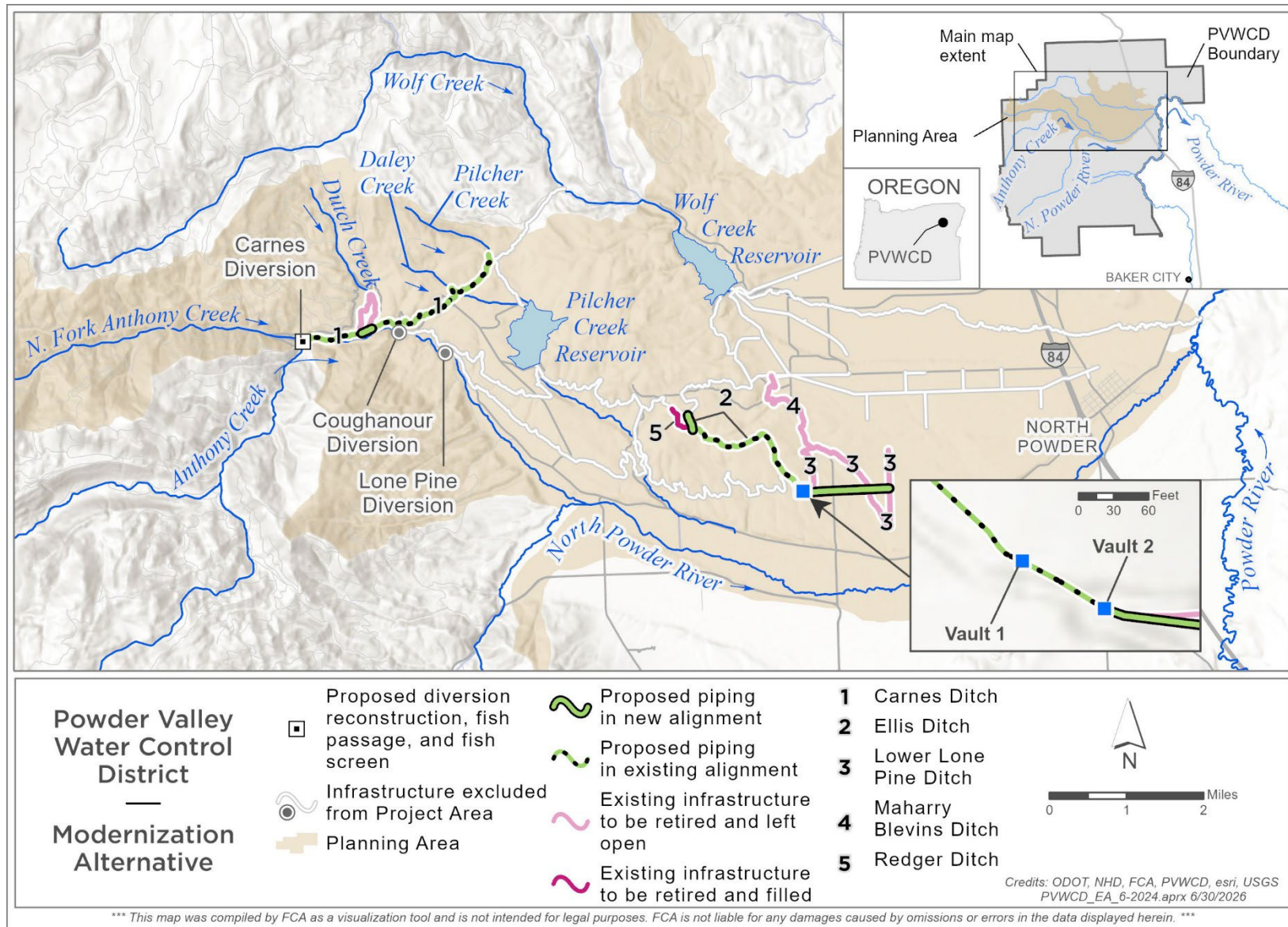


Figure 5-1. Overview of the Modernization Alternative.

(USFWS, 2017), (NRCS, 2024). NRCS, through the incorporation of ORWAC, is ensuring ESA Section 7 obligations for potential impacts to bull trout will be met as part of conservation actions associated with the Preferred Alternative.

Pipe installation would require staging and storage areas for pipe, other construction materials, and construction equipment. Fill material may be needed to backfill the trench surrounding the pipelines if insufficient native material is available from excavation projects. Cost estimates account for imported fill.

During construction, vegetation clearing would be minimized to the extent practicable, and locations for vehicle and equipment access, staging, and storage would be selected to avoid trees and other slow-growing vegetation. Trees would only be removed if there was no other alternative to access the construction site or if they posed a safety threat to construction crews working in the ditch trench. Vegetation clearing before construction, vegetation and weed management during construction, and reseeding after construction would be completed according to current PVWCD vegetation management practices and the NRCS Oregon and Washington Guide for Conservation Seedings and Plantings (NRCS 2000).

Ditches identified for piping would be accessed from existing PVWCD maintenance roads when possible. Any work needed to create equipment access would occur prior to, or concurrently with, piping. During piping of the Carnes Ditch, pipe construction would begin at the Pilcher Creek filling channel and proceed in an upstream direction toward the diversion, completing the fish screen and passage improvements last. Construction equipment would proceed along the access route created by the piped-and-backfilled sections of the ditch alignment, accessing construction areas by driving atop the buried sections of pipe. Following construction, this dirt access road above the pipeline, estimated at 10 feet in width, would be maintained by the District for access and maintenance activities.

Existing maintenance roads and overland access routes commonly used for O&M may require some improvements for use during construction. Any improvements to roads or access routes would be paid for entirely by the Sponsor. In some cases, temporary overland travel routes within existing PVWCD easements may be necessary to access certain ditches associated with the proposed action that do not have established maintenance roads. To facilitate restoration, temporary travel routes would be left in their natural condition with only minimal alterations when necessary to allow for travel during construction. The most direct route possible would be used to access the construction area.

#### *5.3.2.1.2 Retirement of Ditches*

There is currently no NRCS standard or guideline for retiring irrigation ditches. Following implementation of the Modernization Alternative, all retired ditches (approximately 6.2 miles) would remain open and dewatered except the Redger Ditch. Redger Ditch (0.5 miles) would be filled with soils excavated from trenching along nearby new alignments and/or with imported fill.

#### *5.3.2.1.3 Dutch Creek Siphon*

Siphons are used to cross streams or other drainage features by placing the irrigation pipeline under the streambed such that the stream's functionality as a watercourse is maintained. This is an alternative to using elevated channels, such as a viaduct or a flume, to pass irrigation water over a natural drainage feature. The Dutch Creek Siphon would be installed by cut-and-cover trenching and would be 60 inches in diameter and approximately 0.1 mile in length. The siphon would be installed

during the ODFW in-water work window to minimize impacts to important fish, wildlife, and habitat resources (July 1 through August 31).

#### *5.3.2.1.4 Drainage Restoration*

Following installation of the Dutch Creek siphon, the headgates would be removed at the current Carnes Ditch interception of Dutch Creek. Carnes Ditch would also be piped beneath the Daley Creek drainage interception by cut-and-cover trenching. Both stream channels would be recontoured to restore connectivity between the portions of the drainages that are up and downslope of Carnes Ditch and the stream banks would be replanted with riparian vegetation after pipeline construction. The restored drainage channels would be composed of natural streambed materials underlain by erosion resistant material to prevent scouring and ensure the integrity of the pipeline. Dutch Creek would maintain its hydraulic connection to Anthony Creek and Daley Creek would maintain its hydraulic connection to Pilcher Creek (as described in Table E-11 in Appendix E.5). Drainage crossing design for fish passage at Dutch Creek would be determined through future coordination with ODFW.

#### *5.3.2.1.5 PG3 Fish Screening and Passage at Carnes Diversion*

The District has completed preliminary designs for fish screening and passage at the Carnes Diversion. Preliminary designs includes two horizontal fish screens and a conical fish screen, a spillway structure, a diversion dam and other wall structures, flow-control gates and valves, instrumentation and controls, trash racks, fish ladder or other fishway, and other related appurtenances. Following authorization of this Plan-EA, the District, in coordination with NRCS, ODFW, and USFWS, would complete designs for fish screening and passage. The project would comply with all requirements, including the USFWS SLOPES design criteria and would receive ODFW fish passage plan approval. Native migratory fish are present at the Carnes Diversion and a request for a fish passage waiver would be submitted to ODFW to obtain approval prior to construction for net beneficial actions of screening and passage at the Carnes Diversion (ORS 509.585(4)).

Construction of PG3 Fish Screen and Passage would include mobilization and staging of construction equipment, delivery of materials to construction areas, temporary isolation of the work area, excavation of trenches, fish passage barrier removal, installation of a fish screen, compaction of backfill, channel reconstruction, and restoration and reseeded of disturbed riparian areas. An excavator and track mounted forklift would be needed to install the screens and would be appropriately sized to minimize disturbance in the construction area. Vegetation removal would be avoided to the extent practicable but would likely involve the removal of small shrubs and several mature trees. Borrow material may be needed to backfill the trench surrounding the screens unless suitable material exists onsite. Site access would be provided by driving along the newly buried Carnes Pipeline.

The in-water work areas would be isolated from flowing water and streamflow would be diverted through the work area in accordance with SLOPES V and ODFW's work area isolation requirements. Temporary cofferdams would be installed at the upstream and downstream work area limits and streamflow would be diverted around the area by a diversion pipe. The stream channel would be reconstructed to its natural gradient and streambed composition after the removal of the fish passage barrier. Sediment control practices, such as biofilter bags and sediment fences and runoff control practices, would be implemented around the construction site.

5.3.2.1.6 Vault Construction

Two belowground vaults would be built at the intersection of the Lower Lone Pine Ditch and new C-1 pipeline to combine water in the open ditch and water in the pipeline using cast-in-place concrete techniques. Each vault would require approximately 60 cubic yards of soil excavation. Excavated soil that could not be reused as backfill following construction of the new vaults would be used to fill in the nearby Redger Ditch.

**5.4 Summary and Comparison of Alternatives**

Table 5-1 below provides a comparison of the No Action Alternative (Future without Federal Investment) and the Modernization Alternative (Future with Federal Investment). The table summarizes measures addressed, as well as environmental, social, cultural, and economic effects.

**Table 5-1- Summary and Comparison of Alternatives**

<b>Alternative Plans</b>	<b>No Action Alternative (Future without Federal Investment)</b> All ditches remain open and operational; no fish screening or passage improvements at Carnes Diversion	<b>Modernization Alternative (Future with Federal Investment)</b> Install C-1 Project, Carnes Pipeline, and Carnes Fish Screening and Passage
Locally Preferred	No	Yes
National Economic Development	No	Yes
Socially Preferred	No	Yes
Environmentally Preferred	No	Yes
<b>Guiding Principles</b>	<b>No Action Alternative (Future without Federal Investment)</b> All ditches remain open and operational; no fish screening or passage improvements at Carnes Diversion	<b>Modernization Alternative (Future with Federal Investment)</b> Install C-1 Project, Carnes Pipeline, and Carnes Fish Screening and Passage
Healthy and Resilient Ecosystems	No	Yes
Sustainable Economic Development	No	Yes
Floodplains	No	Yes
Public Safety	No	Yes
Watershed Approach	No	Yes
<b>Provisioning Services – Trade-Offs</b>	<b>No Action Alternative (Future without Federal Investment)</b> All ditches remain open and operational; no fish screening or passage improvements at Carnes Diversion	<b>Modernization Alternative (Future with Federal Investment)</b> Install C-1 Project, Carnes Pipeline, and Carnes Fish Screening and Passage
Irrigation water	No	Yes
Instream fish species	No	Yes

	<b>No Action Alternative (Future without Federal Investment)</b>	<b>Modernization Alternative (Future with Federal Investment)</b>
<b>Regulating Services – Trade-Offs</b>	All ditches remain open and operational; no fish screening or passage improvements at Carnes Diversion	Install C-1 Project, Carnes Pipeline, and Carnes Fish Screening and Passage
Water quality	No	Yes
<b>Cultural Services – Trade-Offs</b>	All ditches remain open and operational; no fish screening or passage improvements at Carnes Diversion	Install C-1 Project, Carnes Pipeline, and Carnes Fish Screening and Passage
Culturally important species	No	Yes
<b>Installation Costs</b>	All ditches remain open and operational; no fish screening or passage improvements at Carnes Diversion	Install C-1 Project, Carnes Pipeline, and Carnes Fish Screening and Passage
Federal Pub. Law No. 83-566	\$0	\$22,798,000
Local only or Matching Pub. Law No. 83-566	\$0	\$7,563,000
Total	\$0	\$30,361,000
Average Annual Cost		
Installation <sup>1</sup>	\$0	\$931,000
OM&R <sup>2</sup>	\$0	\$2,000
Total	\$0	\$933,000
Annual Benefits <sup>3</sup>	\$0	\$325,000
Annual Costs	\$0	\$933,000
Annual Net Benefits <sup>4</sup>	\$0	-\$608,000
<b>Regional Economic Impacts</b>	All ditches remain open and operational; no fish screening or passage improvements at Carnes Diversion	Install C-1 Project, Carnes Pipeline, and Carnes Fish Screening and Passage
Annual Jobs from Recreation	0	Magnitude/direction not estimated, so no RED benefits quantified

Local jobs during construction (including direct/indirect/induced)	0	40
Change in Annual Jobs from agriculture (including direct/indirect/induced)	0	5
<b>Beneficial Effects Annualized (2024\$)</b>	<b>No Action Alternative (Future without Federal Investment)</b> All ditches remain open and operational; no fish screening or passage improvements at Carnes Diversion	<b>Modernization Alternative (Future with Federal Investment)</b> Install C-1 Project, Carnes Pipeline, and Carnes Fish Screening and Passage
Region <i>Construction</i> <sup>5</sup>	Not Applicable	\$400,000
Region <i>Agriculture</i> <sup>6</sup>	Not Applicable	\$200,000
Rest of Nation	Not Applicable	Some ripple income/employment effects expected, but not estimated.
<b>Adverse Effects Annualized (2024\$)</b>	<b>No Action Alternative (Future without Federal Investment)</b> All ditches remain open and operational; no fish screening or passage improvements at Carnes Diversion	<b>Modernization Alternative (Future with Federal Investment)</b> Install C-1 Project, Carnes Pipeline, and Carnes Fish Screening and Passage
Region <sup>7</sup>	\$0	\$0
Rest of Nation	\$0	\$1,000,000

<sup>1</sup> The average annual cost is the additional average annual installation costs above the No Action Alternative.

<sup>2</sup> Operation, maintenance, and replacement (OM&R) includes maintenance of flow meters and radio systems. A decrease in O&M costs was included in the benefits, rather than the costs.

<sup>3</sup> Includes agricultural damage reduction, reduced patron O&M cost, reduced district O&M costs, instream flow benefits, fish and wildlife benefits, and avoided damage from failure of the open ditches.

<sup>4</sup> Modernization Alternative annual net benefits are the additional net benefits compared to the No Action Alternative.

<sup>5</sup> This assumes that Project-related construction income is similar to the local income generated from typical construction spending in the region as estimated by IMPLAN regional economic modeling software.

<sup>6</sup> Modernization Alternative includes agricultural damage reduction benefits and reduced damages from ditch failure.

<sup>7</sup> Grants are expected to cover the regional share of installation costs; most of these costs are expected to be from sources outside the region, so all installation costs are allocated to the Rest of the Nation.

## 6 Environmental Consequences

### 6.1 Cultural Resources

Cultural resources and historic properties were reviewed and the effects were taken into account for this federal undertaking under Section 106 via the regulations at 36CFR800.1. The initiation of the Section 106 process was made by NRCS as they were providing the source of federal funding for the project. Thus, NRCS took the role of Lead Federal Agency for the Section 106 process. Next, the extent of the project APE was determined, followed by consultation with Indian Nations for whom this project crosses ancestral lands. Consultation on the project APE was also undertaken with

SHPO and other federal agencies and consulting parties (per 36CFR 800.2 and 800.3). The identification of historic properties for the APE was completed by professional archaeologists and architectural historians, qualified under the Secretary of Interior's Standards, and following the regulations at 36CFR 800.4 and documentation standards at 36CFR Part 800.11 (an excerpted technical report is available in Appendix E.2). A determination of eligibility for identified historic properties was made by NRCS (per 800.4 (c)(1)(2)). Three historic properties were determined to be not eligible for the National Register of Historic Places. NRCS determined a finding of no historic properties affected per regulations at 36CFR 800.4(d)(1) and 800.16(i) as there were no historic properties that qualify for inclusion in the National Register.

### **6.1.1 No Action Alternative (Future without Federal Investment)**

The No Action Alternative would maintain existing conditions and activities in the study area. As such, the potential for impacts on cultural resources from the No Action Alternative is limited. However, impacts on unknown cultural resources remain possible through the inadvertent disturbance of these resources from current irrigation and agricultural activities in the study area.

### **6.1.2 Modernization Alternative**

Cultural resources consultation under Section 106 of the NHPA has been completed for this project. Surface and subsurface investigations including pedestrian surveys and 22 shovel probes identified no archaeological deposits in the APE. Based on the absence of archaeological deposits, no additional archaeological studies are proposed. Impacts on unknown cultural resources remain possible through the inadvertent discovery of subsurface archaeological finds during project construction. An Inadvertent Discovery Plan is included in Appendix E.2.

Since the Carnes Ditch, Lone Pine Ditch, and Maharry Blevins Ditch were determined not eligible for listing in the NRHP and no historic properties will be affected by the undertaking, the Modernization Alternative will have no effect on archaeological or historic built environment resources. As a result, recommendations in the cultural resources and historic properties assessment include a finding of No Historic Properties Affected under Section 106 of the NHPA. See Appendix E.2. for an excerpt from the assessment.

## **6.2 Land Use**

### **6.2.1 No Action (Future without Federal Investment)**

Overall, the No Action Alternative would have no effect on land use. Existing patterns of land use and ownership would remain the same. The extent of open ditches and other District infrastructure would not change. Ditches and control structures (i.e., headgates and turnouts) located on private lands would remain in their current state with no easements or agreements in place. Ditches and diversions located on USFS, BLM, and ODFW lands would likewise remain in their current location and condition without permits.

#### **6.2.1.1 Land Ownership**

Under the No Action Alternative, there would be no effect on existing land ownership. The District would continue to provide irrigation to patrons within and adjacent to the project area.

#### **6.2.1.2 Land Use**

Under the No Action Alternative, land use on uncultivated lands, which make up the majority of the project area, would not be affected. Land use on cultivated lands would likewise not be affected.

However, water would continue to be lost to seepage and evaporation in District infrastructure. Water delivery reliability for District patrons would not be improved.

#### 6.2.1.3 Ecosystem Services

*Provisioning service: Water available for irrigation (Figure E-8 in Appendix E.7, [E1]):* Existing District infrastructure is subject to water seepage and evaporation. Because of this, under the No Action Alternative water losses could adversely affect crops relying on District irrigation.

### **6.2.2 Modernization Alternative (Future with Federal Investment)**

#### 6.2.2.1 Land Ownership

Overall, the Modernization Alternative would have a minor long-term effect on land ownership because the project would require new easements and/or agreements in some areas. Prior to authorization of this Plan-EA, the District will acquire written agreements from all private landowners where the project area crosses private lands (see Figure C-2 in Appendix C). The agreements would provide assurance that the project could be constructed if the Plan-EA is authorized. Where the project area crosses USFS, BLM, and ODFW-owned lands (see Figure C-2 in Appendix C), the District would acquire all necessary permit authorizations and/or easements prior to construction. The District has communicated with USFS, BLM, and ODFW about the project and is coordinating with the agencies to determine the required permits and/or easements. All permitting and easement costs would be the responsibility of the District and are included in project costs.

##### *Pipe Carnes Ditch, Install Fish Passage and Screening, Install Dutch Creek Siphon*

The section of pipeline located on USFS- and BLM-owned land, including the fish passage and screening improvements at the Carnes Diversion on USFS land, would require easements, permits, and/or agreements with the agencies prior to implementation of the Modernization Alternative. Similarly, piping the section of Carnes Ditch located on the Elkhorn Wildlife Area immediately upstream of the Pilcher Creek filling channel would require the appropriate easements, permits, and/or agreements with ODFW (see Figure C-2 in Appendix C).

##### *Retire Carnes Ditch Loop along Dutch Creek, Leave Open*

No easements are currently in place for the Carnes Ditch loop around Dutch Creek; therefore, no effects on land ownership would result from its retirement.

##### *Pipe Ellis Ditch*

Agreements with private landowners along the Ellis Ditch and the C-1 pipeline new alignment would be acquired before authorization.

##### *Retire and Fill Redger Ditch*

There would be no effect on land ownership from retiring and filling the Redger Ditch.

##### *Retire Maharry Blevins Ditch and Lower Lone Pine Ditch, Leave Open*

There would be no effect on land ownership from retiring the Maharry Blevins Ditch and the Lower Lone Pine Ditch.

#### 6.2.2.2 Land Use

Overall, implementation of the Modernization Alternative would have minor long-term effects to land use. Minor long-term effects would result from installing the Dutch Creek Siphon and piping

new alignment sections along the Ellis Ditch because current land use would change from existing agricultural and forest uses, respectively, to buried, piped water conveyance. Similarly, retiring ditches would have minor long-term effects because current land use would change from open irrigation ditches to upland habitat or agricultural production. Minor, temporary effects on land use within the project area would consist of potential disruptions to adjacent landowners during construction activities. In the long term, the Modernization Alternative would be consistent with existing zoning designations and compatible with existing agricultural land use. The project would not affect any projected land use trends in the long term and would support the agricultural land uses that are prevalent in the project area.

*Pipe Carnes Ditch, Install Fish Passage and Screening, Install Dutch Creek Siphon*

Piping Carnes Ditch would convert an open irrigation ditch to piped conveyance overlain by upland habitat and a pipeline and fish screen maintenance access route. The Carnes Pipeline would include a new, approximately 788-foot-long siphon beneath Dutch Creek on USFS land downstream from the existing Carnes Ditch intercept of Dutch Creek. Installation of the siphon would not change the surface land use at this location in the long term. Installation of the Carnes diversion fish screen and passage improvements would have no effects on land use, as the site would continue to be used as an irrigation diversion.

*Retire Carnes Ditch Loop along Dutch Creek, Leave Open*

With the new siphon, the District would retire the Carnes Ditch loop along Dutch Creek and leave it open. The existing Carnes Ditch intercept of Dutch Creek would be decommissioned, headgate infrastructure would be removed, and the stream channel of Dutch Creek would be restored to natural conditions. This action would convert an existing section of ditch from water conveyance to upland habitat, except for the area where the existing ditched conveyance and headgate infrastructure would be replaced by a restored stream channel.

*Pipe Ellis Ditch*

Piping Ellis Ditch within new alignments would change current agricultural use to a water conveyance use. The piped conveyance would support associated farming activities by providing water for irrigation.

*Retire and Fill Redger Ditch*

Retiring and filling Redger Ditch would change its current use from water conveyance to agricultural production. The patron would be able to irrigate the land formerly occupied by the ditch and cultivate it.

*Retire Maharry Blevins Ditch and Lower Lone Pine Ditch, Leave Open*

Retiring the Maharry Blevins Ditch and Lower Lone Pine Ditch would convert these areas from water conveyance to upland habitat.

### 6.2.2.3 Ecosystem Services

*Provisioning service: Water available for irrigation (Figure E-8 in Appendix E.7, [E1]):* Ecosystem services of water for irrigation would be supported through the improvement of water delivery through infrastructure improvements under the Modernization Alternative. In addition, the project would improve water conveyance efficiency and result in increased water levels in Pilcher Creek and Wolf Creek reservoirs, improving stored water supply, which would benefit all PVWCD patrons. Lastly,

water conserved from the project would enhance irrigation water supply and reduce agricultural damages.

## **6.3 Recreation**

### **6.3.1 No Action (Future without Federal Investment)**

Under the No Action Alternative, there would be no effect on existing recreation. Current recreational activities taking place within and near the project area, and the timing of these activities, would continue unchanged.

### **6.3.2 Modernization Alternative (Future with Federal Investment)**

Overall, the Modernization Alternative would have a beneficial effect on recreation. Pilcher Creek and Wolf Creek reservoirs would fill earlier in the season and there would be an increased likelihood that more water would remain in the reservoirs at the end of the irrigation season. This would benefit resident fish populations and improve recreational fishing and boating opportunities. Additional streamflow in Anthony Creek would benefit fish populations, enhancing recreational fishing opportunities. Earlier filling of Wolf Creek Reservoir would increase water releases over the spillway, thereby increasing flows within Wolf Creek downstream from the reservoir and benefiting fish habitat and fishing opportunities. Construction activities could have minor, temporary effects on recreation due to construction noise, traffic, and potential area closures.

#### *Pipe Carnes Ditch, Install Fish Passage and Screening, Install Dutch Creek Siphon*

Construction activities along Carnes Ditch and at the location of the Dutch Creek siphon crossing could result in construction area closures or wildlife avoiding the area due to construction noise and disturbance. This could have short-term effects on fall hunting and late summer wildlife viewing opportunities in the Elkhorn Wildlife Area and on USFS lands.

Following piping, reduction in current water losses to seepage and evaporation would contribute to more water in the District's system. Pilcher Creek and Wolf Creek reservoirs would be expected to have more water, benefiting resident fish populations and improving fishing opportunities. Earlier filling of the reservoirs could potentially allow earlier access to recreational boating opportunities.

Installation of fish passage and screening improvements at the Carnes Diversion would provide access to fish habitat above current fish passage barriers and prevent entrapment of fish in District irrigation infrastructure. This would result in long-term benefits to fish populations and associated recreational fishing opportunities in Anthony Creek.

#### *Retire Carnes Ditch Loop along Dutch Creek, Leave Open*

Retiring the Carnes Ditch loop along Dutch Creek would contribute to more water within streams and reservoirs elsewhere in the District's system and affected waterbodies. Benefits to recreation resulting from increased water within the District's system would be similar to those described for piping Carnes Ditch.

Retiring Carnes Ditch, removing the existing headgate, and restoring the stream channel of Dutch Creek where it is currently intercepted by Carnes Ditch would restore the hydrology of Dutch Creek to a more natural state and improve habitat connectivity within the creek. Removal of the irrigation infrastructure would eliminate a current fish passage barrier and allow access to approximately 2.61 miles of in-stream habitat for native migratory fish upstream from the current interception of Dutch Creek by Carnes Ditch. These changes would result in beneficial effects on fish, and therefore potentially on recreational fishing opportunities in Anthony Creek as well.

*Pipe Ellis Ditch; Retire and Fill Redger Ditch; Retire and Leave Open Maharry Blevins Ditch and end of Lower Lone Pine Ditch*

Piping Ellis Ditch and retiring the Redger Ditch, Maharry Blevins Ditch, and the end of Lower Lone Pine Ditch would improve streamflow in Anthony Creek below the Lone Pine Diversion, benefitting fishing and other recreation along the creek. Since the Ellis, Redger, and Maharry Blevins ditches are on private land, there would be no direct effect on recreation along the ditches.

## **6.4 Socioeconomic Resources**

To estimate the total economic effects of the No Action Alternative and Piping Alternative in terms of jobs and income supported, this analysis used an IMPLAN (2017) economic impact model of Oregon's Union County.

### **6.4.1 No Action (Future without Federal Investment)**

There is no construction expenditure associated with the No Action alternative, and therefore no construction or other economic development benefits.

### **6.4.1 Modernization Alternative (Future with Federal Investment)**

The Modernization Alternative total project expenditures of \$30.4 million would support construction sector jobs and income, as well as economic ripple effects increasing jobs and income in other economic sectors in Union and Baker County. Economic ripple impacts would result from the construction sector spending more on labor, materials, and services, which would spur increased sales and economic activity in other sectors (such as hardware stores and construction equipment businesses supplying construction businesses). Impacts of construction sector spending in these other sectors are known as indirect impacts. As household income rises in construction and indirectly impacted economic sectors, household spending will also increase and generate increased economic activity in such sectors as retail, wholesale trade, personal services industries, and real estate (known as induced impacts). Total job and income impacts of the economic activity supported by the proposed Project are the sum of the direct impacts (construction sector) and the indirect/induced impacts (in other economic sectors).

The \$30.4 million in construction expenditure is spread over 5 years. Spread over 5 years, construction of these project groups is expected to support approximately 40 jobs and \$2.8 million in average income over the 5-year construction period (annualized over 105 years<sup>8</sup> this equates to approximately \$0.4 million in annualized average income benefits, as presented in the table above).<sup>9</sup> The conserved water from the project is expected to increase the agricultural output of the region. The increased output is expected to result in total economic impact of approximately 5 jobs and \$0.1 million in labor income annually (including direct, indirect, and induced effects) in all sectors of the local economy. An additional \$0.1 million in increased income in the agricultural sector (for a total

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<sup>8</sup> Note that each project has a 100-year life, but that since construction takes 5 years, benefits extend from year 0 to year 142, so the analysis period across all project groups is 105 years.

<sup>9</sup> This estimate includes the economic ripple impacts that would result from the construction sector spending more on labor, materials, and services, which would spur increased sales and economic activity in other sectors (such as hardware stores and construction equipment businesses supplying construction businesses). Impacts of construction sector spending in these other sectors are known as indirect impacts. As household income rises in construction and indirectly impacted economic sectors, household spending will also increase and generate increased economic activity in such sectors as retail, wholesale trade, personal services industries, and real estate (known as induced impacts). Total job and income impacts of the economic activity are the sum of the direct impacts (construction sector) and the indirect/induced impacts (in other economic sectors).

of \$0.2 million in the agricultural sector, as shown in the table above) is expected to accrue due to production efficiencies related to OMR savings from the Modernization Alternative.

The Modernization Alternative would also result in a slight decrease in Operations, Maintenance, and Repair (OM&R) expenses for PVWCD and its patrons. However, there are little to no anticipated effects on District wages and employment. As such, there are expected to be limited RED effects of this reduced expenditure (i.e., less than the rounding margin of error) so effects are not quantified in this RED analysis. To the extent that conserved water enhances recreation and supports additional recreation visitation and spending in the area, the long-term, positive regional economic contribution of the project would be larger, and vice versa.

## **6.5 Soils**

### **6.5.1 No Action (Future without Federal Investment)**

Under the No Action Alternative, long-term effects on soils would be minor. Erosion and sedimentation would continue within the limited areas of the District's system where it presently occurs. Continued operation of the District's system would not be expected to measurably affect prime farmlands.

### **6.5.2 Modernization Alternative (Future with Federal Investment)**

Actions proposed under the Modernization Alternative would result in soil disturbance, including soils classified as Farmland of Statewide Importance and Prime Farmland if Irrigated. Overall, the Modernization Alternative would have minor effects on soil resources because effects would occur within limited portions of the project area. In project areas where the soil profile has been previously disturbed, such as along the Carnes Pipeline, and existing Ellis Ditch, effects would be minor and short-term. At new alignment sections, the effects would be minor because effects would be localized and BMPs would be implemented; however, these effects would be long-term because the soil profile has not yet been disturbed in these areas. Following ground-disturbing construction activities, disturbed areas would be revegetated with NRCS-approved grasses and forbs to stabilize soils and minimize effects from erosion and sedimentation in the long term.

Minor, short-term effects would occur along retired ditches, which would be left open on the landscape and allowed to revegetate naturally. Exposed soils would be susceptible to erosion from precipitation and wind until vegetation establishes within the former ditch alignments.

Long-term benefits would result from piping open ditches because water savings would support irrigated agriculture on soils classified as Prime Farmland if Irrigated and Farmland of Statewide Importance. Utilizing flow meters to increase water measurement accuracy will facilitate the adoption of advanced levels of on-farm Irrigation Water Management which supports long term sustainable agriculture.

#### *Pipe Carnes Ditch, Install Fish Passage and Screening, Install Dutch Creek Siphon*

Piping Carnes Ditch, installing fish passage and screening, and installing the Dutch Creek siphon would involve excavation, trenching, vegetation clearing, backfilling, and grading, along with associated construction vehicle and equipment operation. Trenching and post-construction restoration would take place within the Dutch Creek stream channel where the siphon crossing would be installed. Trenching and channel restoration would also take place within Daley Creek at the pipe crossing. These activities could potentially mobilize soils and sediments into streams in the short term. Clearance, compaction, and soil disturbance from vehicle and equipment operation would temporarily increase erosion and sedimentation potential in upland areas.

Prior to construction, pre-engineering feasibility studies would be conducted to determine if soils require any unique construction considerations. BMPs would be implemented to minimize erosion and contain runoff on site. In upland areas, these could include installing silt fencing, straw wattles, and geotextile filters and applying water to disturbed soils to prevent wind erosion. Work within Dutch Creek and Daley Creek would take place during the ODFW approved in-water work window. Work area isolation would be installed to prevent mobilization of soils and sediment into the stream during construction, and BMPs would be incorporated to stabilize stream banks until riparian vegetation can become established.

Existing PVWCD maintenance access routes would be used whenever possible to avoid new ground disturbance. Vehicle and equipment access, staging, and storage locations would be selected to avoid trees and other slow-growing vegetation. After construction, new pipelines would be covered with backfill soils. Disturbed areas would be re-contoured and planted with an NRCS-approved seed mix.

#### *Retire Carnes Ditch Loop along Dutch Creek, Leave Open*

Retiring and leaving open approximately 1.2 miles of the Carnes Ditch loop along Dutch Creek would result in soils being susceptible to erosion from precipitation and wind until vegetation establishes naturally within the retired former ditch alignment. Removing the existing headgate infrastructure and restoring the Dutch Creek stream channel where the creek is currently intercepted by Carnes Ditch could potentially mobilize soils and sediments into the stream in the short term. BMPs would be implemented to isolate the work area during construction and to minimize erosion along the streambank after construction until riparian vegetation plantings can become established.

#### *Pipe Ellis Ditch*

The area of the proposed new Ellis Ditch pipe is classified as Farmland of Statewide Importance. Construction of this portion of the project would involve soil disturbance on land adjacent to existing crop fields as well as backfilling and grading after piping is in place. Effects on soils, and related avoidance and minimization measures, are expected to be the same as those described for piping Carnes Ditch.

#### *Retire and Fill Redger Ditch*

Redger Ditch would be retired and filled with soils excavated from trenching of nearby alignments or with imported fill. Although Redger Ditch is located in an area that is not categorized as Prime Farmland, the alignment runs through an existing irrigated crop field. The filled ditch would thus become cultivable land. It is expected that the former ditch alignment would be used for crop cultivation following retirement.

#### *Retire Maharry Blevins Ditch and end of Lower Lone Pine Ditch, Leave Open*

Retiring and leaving open the Maharry Blevins Ditch and the end of Lower Lone Pine Ditch would result in similar effects to those described for retiring the Carnes Ditch loop along Dutch Creek.

## **6.6 Vegetation**

### **6.6.1 No Action (Future without Federal Investment)**

Under the No Action Alternative, there would be no effect on vegetation associated with open irrigation ditches or adjacent native upland vegetation. The District would continue periodic vegetation management, which consists of pulling or cutting pine seedlings along ditch banks to prevent their establishment.

## **6.6.2 Modernization Alternative (Future with Federal Investment)**

### 6.6.2.1 General Vegetation

Overall, construction of the Modernization Alternative would have minor, short-term effects on vegetation because changes to vegetation would be localized to the project area where disturbance would occur. Minor, long-term effects would result from the conversion of riparian to upland plant communities due to changes in water availability along ditches that are retired or piped and backfilled. Minor localized long-term effects would result from the restoration of riparian vegetation where Carnes Ditch currently intercepts Dutch Creek and Daley Creek. Construction access would prioritize the use of existing roads in order to minimize temporary effects on vegetation.

#### *Pipe Carnes Ditch, Install Fish Passage and Screening, Install Dutch Creek Siphon*

Vegetation would be disturbed during construction activities, including clearing, trenching, and ground disturbance adjacent to the ditch during pipe installation; clearing, excavation, and trenching within riparian areas and stream channels at Dutch Creek and Daley Creek; removal of existing District irrigation infrastructure and installation of fish screening and passage improvements at Carnes Diversion; and construction vehicle/equipment access and staging of equipment and materials. Short term, minor direct impacts to vegetation would result from all of the above activities, but would be localized to the project area. Vegetation removal would be minimized by accessing the site via established forest roads where possible. Tree removal would be avoided to the extent practicable, but the site conditions and the area required for construction would likely require the removal of several mature trees.

In the long term, riparian vegetation adjacent to the piped portion of Carnes Ditch would convert to dry upland plant communities following installation of the pipe. Following construction, disturbed areas would be re-contoured, planted, and maintained based on a site-specific restoration plan developed in consultation with NRCS. In the long term, native terrestrial vegetation would be gained because 3.2 miles of open ditch would be piped, backfilled, and seeded with an NRCS-approved mix. Over the project's life, planted vegetation within the District's easements would be maintained according to the NRCS Oregon & Washington Guide for Conservation Seedings and Plantings (NRCS 2000).

Riparian areas along the banks of Anthony Creek, North Fork Anthony Creek, and the fish screen bypass side channel, as well as riparian areas adjacent to Dutch Creek and Daley Creek, would be replanted with NRCS-approved species as part of site restoration and stream channel recontouring following fish passage and screening, piping, and siphon installation. In the long term, the Modernization Alternative would contribute to the establishment of herbaceous riparian vegetation communities at the site of the fish screen improvements and along the banks of the reconnected stream channels. This would be expected to result in a net increase in riparian area at these locations. The restored Daley Creek channel would convey water downslope that otherwise flowed into Carnes Ditch. This conveyance of water downslope is anticipated to result in conversion of upland vegetation downslope of Carnes Ditch to stream, wetland, and riparian habitat due to increased hydrologic input.

#### *Retire Carnes Ditch Loop along Dutch Creek, Leave Open*

No direct impacts to vegetation would result from retiring the Carnes Ditch loop along Dutch Creek. Vegetation along the retired ditch would be affected by the altered hydrologic regime due to the lack of available water in the ditch. Riparian vegetation adjacent to the ditch and other vegetation communities relying upon seepage from the ditch would likely convert to dry upland plant

communities in the long term. New habitat for upland plant communities would become available within the open former ditch.

Short term, minor direct impacts to vegetation may result from ground disturbance and removal of District irrigation infrastructure where Carnes Ditch currently intercepts Dutch Creek. In the long term, riparian vegetation would be established along the restored Dutch Creek channel and adjacent disturbed upland areas would be reseeded and replanted. This would be expected to result in a net increase in vegetated area. Over the project's life, planted vegetation within the District's easements would be maintained according to the NRCS Oregon & Washington Guide for Conservation Seedings and Plantings (NRCS 2000).

#### *Pipe Ellis Ditch*

Effects on vegetation and related avoidance and minimization measures for installation of the new pipe within Ellis Ditch would be similar to those described above for piping Carnes Ditch.

#### *Retire and Fill Redger Ditch*

Vegetation along the banks of the ditch would be disturbed during the filling of Redger Ditch. Effects on vegetation would be localized to the project area. Redger Ditch would be filled and converted to agricultural land. The conversion of 0.5 miles of ditch and associated vegetation to agricultural crops would result in a minor long-term effect on vegetation.

#### *Retire Maharry Blevins Ditch and end of Lower Lone Pine Ditch, Leave Open*

Effects on vegetation from retiring and leaving open the Maharry Blevins Ditch and the end of Lower Lone Pine Ditch are expected to be similar to those described for retiring and leaving open the Carnes Ditch loop.

### 6.6.2.2 Noxious Weeds

During construction, exposed soils would be susceptible to weed invasion. The movement of construction vehicles could provide opportunities to spread weeds by transporting their seeds to new locations. During construction, the contractor would use BMPs such as avoiding unnecessary ground disturbances, minimizing ground disturbance, and ensuring that erosion control measures such as straw wattles are free of weeds and weed seeds. Any disturbed areas would be reseeded with a native erosion control seed mix. With the use of BMPs during construction, the Modernization Alternative would have a negligible short-term effect on noxious weeds.

Over the long term, piping of open ditches removes habitat for aquatic noxious species and reduces the spread of weeds through the irrigation systems. However, retired ditches that would remain open would provide unvegetated soil that could be susceptible for weed invasion.

## **6.7 Water Resources**

### **6.7.1 No Action (Future without Federal Investment)**

#### 6.7.1.1 Water Rights

Under the No Action Alternative, there would be no effect on water rights, and the District would maintain existing water rights. Water would continue to seep through the open ditches before reaching irrigation users. Junior water rights, including instream, may continue to receive less than their full allocation during dry years. Approximately 3 cfs of streamflow from Dutch Creek and Daley Creek would continue to enter Carnes Ditch.

#### 6.7.1.2 Surface Water Hydrology

Under the No Action Alternative, there would be no effect on water resources in waterbodies associated with district operations and infrastructure (see Table E-11 in Appendix E.5). Water would continue to be diverted at rates and in volumes that account for water loss from seepage and evaporation in the open ditches. There would be no improvements to reservoir volumes or streamflow.

#### 6.7.1.3 Surface Water Quality

The No Action Alternative would have no change in adverse effect on surface water quality within the waterbodies associated with District operations and infrastructure (see Table E-12 in Appendix E.5).

#### 6.7.1.4 Groundwater

The No Action Alternative would have no effect on groundwater within the District and within the Powder River Basin. Water would continue to infiltrate from the District's ditches into the basin's aquifer.

#### 6.7.1.5 Ecosystem Services

The No Action Alternative would not affect ecosystem services associated with water resources.

### **6.7.2 Modernization Alternative (Future with Federal Investment)**

Overall, the Modernization Alternative would have beneficial long-term effects on water resources. The Modernization Alternative would result in increased water volumes and improved water quality in Dutch Creek, Anthony Creek, North Powder River, Pilcher Creek, Wolf Creek, Pilcher Creek Reservoir and Wolf Creek Reservoir. The Modernization Alternative would result in approximately 2,364 acre-feet of water savings per year from the piping and retiring of open ditches (Table 6-1). During normal water years with no water shortages (estimated to occur two-thirds of years), all of the 2,364 acre-feet of conserved water would be restored instream in Anthony Creek. During dry years with water shortages (estimated to occur one-third of years), the District would dedicate an estimated 490 acre-feet to augment instream flow and would use the remainder of water savings (1,874 acre-feet) to augment irrigation water supplies for PVWCD's existing patrons, helping to fulfill existing water rights, alleviate water supply shortages across the District, and increase resiliency of the District to environmental changes. See Appendix D.2.2.1.3 for more information.

#### 6.7.2.1 Water Rights

In all water years, the District would reduce diversions from the Lone Pine Diversion by 490 acre-feet per year and permanently protect that water instream Anthony Creek below the Lone Pine Diversion through the Allocation of Conserved Water (ACW) program run by OWRD. The District would work with OWRD during the ACW application to determine the rate and timing of water instream. The District would work with OWRD to determine the best mechanism for leaving additional water savings instream Anthony Creek during years with no water shortages (estimated at 1,874 acre-feet per year).

#### 6.7.2.2 Surface Water Hydrology and Water Quality

Effects on waterbodies associated with construction of the Modernization Alternative are identified below.

**Table 6-1. Water Savings with the Modernization Alternative per Project Action.**

<b>Project</b>	<b>Action</b>	<b>Estimated Water Savings (acre-feet per year) <sup>1</sup></b>
PG1 C-1 Project	Pipe Ellis Ditch	240
PG1 C-1 Project	Retire end of Lower Lone Pine Ditch	363
PG1 C-1 Project	Retire Maharry Blevins Ditch	50
PG1 C-1 Project	Retire Redger Ditch	Unknown
PG2 Carnes Pipeline	Pipe Carnes Ditch	1,711
PG3 Fish Screen and Passage	Install fish screening and passage	0
<b>Total Project</b>	<b>N/A</b>	<b>2,364</b>

<sup>1</sup>Water savings estimated from water loss studies conducted by FCA (FCA 2019, FCA 2022, GSI 2025).

6.7.2.2.1 Dutch Creek, North Fork Anthony Creek, Anthony Creek, and North Powder River

*Surface Water Hydrology*

The project would result in increased hydrology in these waterbodies (Table E-13 in Appendix E.5) by restoration of flows in Dutch Creek and reduced diversions from the Carnes and Lone Pine diversions.

As a result of the project, water from Dutch Creek at RM 0.6 would no longer be diverted into Carnes Ditch. The previously diverted water, estimated at up to 2.8 cfs based on measurements taken during one year in the month of May, would increase flows within Dutch Creek downslope of Carnes Ditch and in Anthony Creek (below RM 4) and North Powder River (below RM 9.7) during May and June in all years.

In years with no water shortages (two-thirds of years), the District would reduce diversions at the Carnes Diversion on North Fork Anthony Creek (RM 0.1) by 1,711 acre-feet per year. The previously diverted water, estimated at 3.2 cfs assuming 1,711 acre-feet were allocated at a flat rate from October through June, would increase flows in North Fork Anthony Creek (below RM 0.1), Anthony Creek (below RM 4.7), and North Powder River (below RM 9.7) from October through June when the Carnes Diversion typically diverts water. In addition, the District would reduce diversions at the Lone Pine Diversion (RM 2.8) by 653 acre-feet per year (2.2 cfs if allocated at a flat rate from May through September), increasing flows in Anthony Creek (below RM 2.8) and North Powder River (below RM 9.7) from May through September.

In dry water years (one-third of years), the District would reduce diversions at the Lone Pine Diversion on Anthony Creek (RM 2.8) by 490 acre-feet per year and permanently protect that water instream Anthony Creek below the Lone Pine Diversion through the ACW program. The District would work with OWRD during the ACW application to determine the rate and timing of water instream. If allocated at a flat rate from May through September, the 490 acre-feet per year equates to an estimated 1.6 cfs and would increase flows in Anthony Creek (below RM 2.8) and North

Powder River (below RM 9.7) from May through September. The remaining 1,874 acre-feet of saved water would be retained by PVWCD to fulfill patron water rights.

Overall, reconnection of Dutch Creek and reduced diversion rates from the Carnes and Lone Pine diversions would have a moderate, long-term, beneficial impact on hydrology within Dutch Creek, Anthony Creek, and North Powder River and a minor, long-term, beneficial impact on hydrology within North Fork Anthony Creek. On average, 1,739 acre-feet of water would be restored instream Anthony Creek and North Powder River over the course of the 105-year project life. There is no information on hydrology within Dutch Creek and North Fork Anthony Creek, so the exact degree of impact is unknown. Based on historical flow data, during non-water shortage years, flows in Anthony Creek and North Powder River could increase by up to 17 to 23% during the winter and by up to 11 to 24% during the summer. During water shortage years, flows in Anthony Creek and North Powder River would not change during the winter but would still increase by up to 11 to 24% during the summer. Although the C-1 Project would minimize operational spills and would thereby reduce return flow into North Powder River, the Modernization Alternative is anticipated to increase flow in the river owing to the magnitude of restored instream water and the likely minor contribution of return flow.

#### *Surface Water Quality*

Higher flows within Dutch Creek, North Fork Anthony Creek, Anthony Creek, and the North Powder River would have a minor, long-term beneficial impact on water quality as they could result in colder water temperatures and higher dissolved oxygen concentrations within these waterbodies. Furthermore, reducing operational spills would have a minor, long-term beneficial impact on water quality in North Powder River as it would likely reduce the import of irrigation water that has elevated turbidity, temperature, nutrients, and *E.coli* concentrations. The import of irrigation water in North Powder River may be further reduced by patrons shifting from flood irrigation to sprinkler systems as a result of the C-1 Project's pressurization of the water conveyance system. Short term impacts on water quality may occur within Dutch and Anthony Creek due to the construction of the Carnes Siphon crossing and replacement of Carnes Diversion. Erosion within these construction areas could result in runoff to Dutch Creek and Anthony Creek, increasing turbidity and sediment load within those systems. Sediment and erosion BMP's would be employed to prevent and minimize runoff into waterbodies. Work area isolation, temporary water management, and restoration of disturbed vegetation and streambanks would minimize water quality impairments from trenching.

#### 6.7.2.2.2 Daley Creek

##### *Surface Water Hydrology*

Piping of Carnes Ditch and establishment of a reconnected stream channel would hydrologically connect the upstream and downstream portions of Daley Creek. This may increase the length of Daley Creek by up to 300 feet downstream of Carnes Ditch. In addition, this may increase flows within Daley Creek downslope of Carnes Ditch during the spring as upstream flows would not be intercepted by the ditch. However, the loss of Carnes Ditch seepage may reduce flows in Daley Creek downslope of the ditch during the early summer.

##### *Surface Water Quality*

Reconnection of Daley Creek could increase flows in the creek downslope of the current Carnes Ditch alignment during the spring, which may minorly decrease temperature and increase dissolved oxygen concentrations within this portion of the stream. Conversely, reduced ditch seepage into the

downslope portion of Daley Creek may result in lower flows during early summer, which could minorly increase temperature and reduce dissolved oxygen concentrations within this portion of the stream.

#### 6.7.2.2.3 *Pilcher Creek*

##### *Surface Water Hydrology*

Piping of Carnes Ditch would minimize water loss leading to a greater volume of water reaching Pilcher Creek which is used to fill Pilcher Creek Reservoir. This would increase flow within Pilcher Creek from RM 4.3 to its outflow into Pilcher Creek Reservoir (RM 3.4).

##### *Surface Water Quality*

Higher flows within Pilcher Creek could result in colder water temperatures and higher dissolved oxygen concentrations within the creek.

#### 6.7.2.2.4 *Pilcher Creek and Wolf Creek Reservoirs*

##### *Surface Water Hydrology*

Piping and retiring of ditches would minimize water loss within the District's water conveyance system and reduce the frequency of operational spills, leading to a greater volume of water reaching the reservoirs and more efficient allocation of water from these storage facilities. Overall, reservoirs would be expected to fill earlier in the season and there would be an increased likelihood of having more water in the reservoirs at the end of the irrigation season, resulting in an overall increase in stored volume throughout the irrigation season. This would improve water delivery reliability for patrons and increase operational flexibility for PVWCD should the District need the water during dry water years to fulfill patron water rights.

##### *Surface Water Quality*

Increased water available for storage would lead to colder temperatures and improvements in water quality within these reservoirs.

#### 6.7.2.2.5 *Wolf Creek*

##### *Surface Water Hydrology*

Wolf Creek receives water from Wolf Creek Reservoir both for conveyance of water for irrigation and from the dam's spillway when the reservoir is full. With the Modernization Alternative, Wolf Creek Reservoir would fill earlier in the year and more often, resulting in increased water spills over the spillway, thereby increasing flows within Wolf Creek below the Reservoir.

##### *Surface Water Quality*

Increase in flow volumes within Wolf Creek would benefit water quality by decreasing stream temperatures and increasing dissolved oxygen concentrations.

#### 6.7.2.3 *Irrigation Water Quality*

Overall, the Modernization Alternative would have moderate, long-term improvements to the water quality of the District's irrigation water by eliminating sources of pollution from adjacent land uses. The Modernization Alternative would prevent contaminants, such as sediment, nutrients, and *E. coli*, from entering 6.7 miles of open ditches by piping and retiring ditches. Furthermore, shading provided by piping would prevent the accumulation of moss within these reaches and reduce water temperatures. Reduction in contaminant load in the District's irrigation water and shading provided

by piping would improve the efficiency of water management and irrigation by reducing the clogging of turnout and pivot sprinkler screens with sediment and moss in addition to improving water quality of irrigation water to agricultural fields.

#### 6.7.2.4 Groundwater

The Modernization Alternative would have minor long-term effects on groundwater resources. Piping and ditch retirement would prevent seepage from ditches to groundwater, reducing the supply of water to the aquifer in the valley. However, groundwater seepage would continue to occur within Pilcher Creek and Wolf Creek reservoirs, in addition to waterbodies such as Dutch Creek, Anthony Creek, and North Powder River that will have increased flows as a result of the Modernization Alternative. In addition, infiltration of water from irrigation would continue to supply the underlying aquifers.

A reduction in groundwater seepage could result in negligible to minor long-term effects on private groundwater wells due to declines in the groundwater table height. The effect may be undetectable because of overall ongoing declines in water level observed within the aquifers (OWRD 2023b).

#### 6.7.2.5 Ecosystem Services

The Modernization Alternative would affect the ecosystem services provided by water resources in the following ways:

*Provisioning service, Water available for irrigation (Figure E-8 in Appendix E.7, [E1]):* Piping and retiring of ditches would improve the efficiency of the District's water conveyance system, improve irrigation water quality, and reduce water loss, resulting in increased resiliency of agricultural production with climatic fluctuations and alterations in seasonal water availability.

*Provisioning service, Fish Populations (Figure E-8 in Appendix E.7, [E2]):* Increased flow and water storage volumes in Anthony Creek, Dutch Creek, North Powder River, Pilcher Creek, Wolf Creek, Pilcher Creek Reservoir, and Wolf Creek Reservoir would improve habitat availability and habitat quality for resident fish species.

*Regulating service, Water Quality (Figure E-8 in Appendix E.7, [E3]):* Increases in water volume within waterbodies would moderate temperature extremes and increase dissolved oxygen concentration within streams. Reduction in operational spills and prevention of contaminant loading into 6.7 miles of open ditches would improve water quality within North Powder River and for the District's irrigation water.

## 6.8 Fish and Aquatic Resources

### 6.8.1 No Action (Future without Federal Investment)

#### 6.8.1.1 General Fish and Aquatic Species

The No Action Alternative would have no effect on fish and aquatic species in the project area. The Carnes Diversion and the interception of Dutch Creek by Carnes Ditch would continue to function as fish passage barriers.

The No Action Alternative would have no effect on fish and aquatic species within waterbodies associated with District operations and infrastructure because reservoir water levels and streamflow would not change. Water diverted from North Fork Anthony Creek and Anthony Creek would continue to be conveyed through open ditches, and a portion would be lost to seepage and evaporation. District operations of Pilcher Creek and Wolf Creek reservoirs would continue to

release water to their receiving waterbodies at the current rate. Habitat availability, fragmentation, and entrainment for fish and aquatic species would not change from current conditions (Section 4.8).

#### 6.8.1.2 Federally Listed Fish and Aquatic Species

The No Action Alternative would have no direct or indirect effects on listed bull trout or their habitat in North Fork Anthony Creek, Anthony Creek, Wolf Creek, and the North Powder River. No changes to stream flow or reservoir levels would occur, and habitat would not likely change from current conditions.

#### 6.8.1.3 Ecosystem Services

*Provisioning service: Fish populations (Figure E-8 in Appendix E.7, [E2]):* Harvest of resident fish would not be affected.

*Cultural service: Culturally important species (Figure E-8 in Appendix E.7, [E4]):* There would be no effect on habitat supporting populations of culturally important fish species.

### 6.8.2 Modernization Alternative (Future with Federal Investment)

#### 6.8.2.1 General Fish and Aquatic Species

Overall, the Modernization Alternative would have moderate long-term benefits and short-term construction impacts to fish and aquatic species. Increased water volumes in Dutch Creek, Anthony Creek, North Powder River, Pilcher Creek, Wolf Creek, Pilcher Creek Reservoir and Wolf Creek Reservoir would result in long-term improvements to habitat quality and quantity for fish and aquatic species in those waterbodies. Construction of the Modernization Alternative would result in short-term impairments to habitat quality and quantity in Anthony Creek and Dutch Creek as a result of ground disturbance adjacent to these waterbodies and in-water work. Impacts would be temporary and localized and would overall have a negligible effect on fish and aquatic species populations in those waterbodies.

##### 6.8.2.1.1 Piping and Retiring Ditches

Piping and retiring ditches would have moderate long-term benefits to fish. The project would reconnect Dutch Creek by removing a fish passage barrier and restore the creek's flow by no longer intercepting water from this waterbody into the ditch. The elimination of the fish passage barrier at Dutch Creek would allow upstream access to approximately 2.61 miles of stream habitat for fish in Dutch Creek including Columbia River redband trout. The restoration of flows within Dutch Creek would increase water volumes in Dutch Creek, North Fork Anthony Creek, Anthony Creek, and North Powder River. In addition, on average, 1,739 acre-feet of water would be restored instream Anthony Creek and North Powder River (see Section 6.7.2.2.1 for more information) over the course of the 105-year project life. Increased flows within these waterbodies would benefit resident fish species by increasing the volume of available in-stream habitat and would improve water quality by reducing temperatures and increasing dissolved oxygen concentration. Enhanced habitat availability and quality would support healthier, more productive fish populations in the region.

Water savings retained by the District would result in higher water delivery to Pilcher Creek below RM 0.9, thereby increasing habitat availability and quality within that waterbody for resident fish species. Water savings would also result in Pilcher Creek and Wolf Creek reservoirs filling earlier in the year and may reduce reservoir drawdown. Increased water volumes within Pilcher Creek and Wolf Creek reservoirs would increase habitat availability and water quality for resident fish. Increases

in water spills over the Wolf Creek Reservoir spillway would increase flows within Wolf Creek below the reservoir and benefit resident fish by increasing habitat availability and improving water quality for resident fish and aquatic species.

In the short-term, piping and retiring ditches would have minor temporary impacts on fish and aquatic species due to impacts to water quality during construction and in-water work. Temporary effects on water quality during construction adjacent to waterbodies would be minimized by temporary erosion and sediment control measures. In-water work for piping and retiring ditches would be required for trenching to construct the Carnes Siphon crossing underneath Dutch Creek and stream restoration at the interception of Carnes Ditch and Dutch Creek. BMPs would be employed to minimize short-term impacts to species and habitat. These are expected to include measures such as work area isolation, fish salvage, temporary water management, downstream fish passage, and rectification of temporary impacts from trenching, including restoring riparian vegetation and reestablishing preexisting contours of the site.

#### *6.8.2.1.2 Installation of a Fish Screen and Passage Improvements at Carnes Diversion*

Installation of a fish screen and passage improvements at Carnes Diversion would ensure that fish are not entrained in the Carnes ditch and would allow for unimpeded upstream and downstream fish passage at the confluence of North Fork Anthony Creek and Anthony Creek. A fish screen would prevent entrainment of fish into District infrastructure via Carnes Diversion, thereby preventing excess mortality within the local populations. Removal of the fish passage barrier in North Fork Anthony Creek would enhance connectivity, allowing fish to better access critical habitats needed for each stage of their life history. The Carnes Diversion dam is identified as a priority barrier for removal by ODFW, and passage improvements would have significant benefits to local populations of bull trout, Columbia River redband trout, and important game fish. During agency coordination, ODFW and USFWS were strong proponents of the fish screen and passage improvements at Carnes Diversion due to its benefits to local fish populations. Eliminating the entrainment risk and fish passage barrier at Carnes Diversion would have moderate long-term benefit on resident fish species.

Temporary construction effects on fish and aquatic species and related avoidance and minimization measures for replacing Carnes Diversion would be similar to those described above for in-water work associated with piping and retiring ditches.

#### *6.8.2.2 Federally and State Listed Fish and Aquatic Species*

In coordination with USFWS, it was determined the Modernization Alternative's actions fit under the ORWAC Programmatic Consultations. Applicable conservation measures would be employed for design and construction to ensure NRCS obligations for ESA Section 7 obligations would be met. Fish screen design would be submitted to USFWS and the National Marine Fisheries Service for an engineering review and a project notification form would be submitted to the state lead for ORWAC prior to project implementation.

##### *6.8.2.2.1 Piping and Retiring Ditches*

Piping and retiring ditches would result in moderate long-term benefits for bull trout critical habitat. Bull trout likely only use habitats below Carnes Diversion for migration during the winter and are unlikely to be directly affected by increased flow volumes in Dutch Creek, Anthony Creek, and North Powder River during the spring and summer. During non-water shortage years, increased flows in Anthony Creek and North Powder River during the winter would provide improved migration conditions and would allow bull trout greater ease of travel between subpopulations.

Bull trout in Wolf Creek would benefit from higher water levels in Wolf Creek Reservoir. Increased water levels would maintain colder water temperatures within the reservoir and provide increased habitat for the species. Increased water within Wolf Creek would help alleviate listed water quality impairments (temperature and dissolved oxygen, see Table E-12 in Appendix E.5) and thereby benefit bull trout.

Construction of the Carnes Siphon crossing is not anticipated to impact bull trout. In-water work in Dutch Creek would occur during the in-water work window (July 1 through August 31) which is when bull trout are not anticipated to be present in the creek (Howell, 2017). Furthermore, during trenching within Dutch Creek, construction BMPs such as temporary water management, erosion and sediment control structures, downstream fish bypass, and fish salvage within the isolated work area would occur. Disturbed vegetation, streambanks, and streambeds within the work area would be restored to initial condition following construction.

#### 6.8.2.2.2 Installation of a Fish Screen and Passage Improvements at Carnes Diversion

Installation of a fish screen and passage improvements at Carnes Diversion would result in moderate long-term benefits to bull trout by eliminating the threat of entrainment at that diversion, preventing excess mortality within the local populations, and removing a barrier to migration in Anthony Creek. Bull trout are not recorded to rear in the vicinity of Carnes Diversion, but they likely migrate through this area. Removal of this barrier and entrainment risk would better facilitate the species' connectivity with other local populations in the headwaters of the North Powder River system. Fish passage improvements at Carnes Diversion would also benefit bull trout by opening up habitat that was previously closed off, allowing them greater access to habitat within the river system.

Construction at Carnes Diversion is not anticipated to impact bull trout. In water work would occur during the in-water work window which is when bull trout are not anticipated to be present in the vicinity of Carnes Diversion. Construction would temporarily impact bull trout critical habitat. Construction BMPs would be employed and work areas would be isolated from the active channel. Disturbed vegetation, streambanks, and streambeds within the work area would be restored following construction of the screen and passage improvements. Passage improvements and addition of the fish screen would result in moderate long-term benefits to bull trout critical habitat.

#### 6.8.2.3 Ecosystem Services

*Provisioning service: Fish populations (Figure E-8 in Appendix E.7, [E2]):* Over the long term, conserved water for instream and agricultural uses, reconnection of Dutch Creek, restoration of flows within Dutch Creek, and removal of a fish passage barrier and installation of a fish screen at Carnes Diversion under the Modernization Alternative would improve habitat for resident fish species in Anthony Creek, Dutch Creek, Pilcher Creek, North Powder River, Wolf Creek downstream from the reservoir, and Pilcher Creek and Wolf Creek reservoirs. Installation of the Carnes fish screen would benefit fish populations in the planning area by preventing their entrainment in the PVWCD system. Improvements in river habitat conditions may contribute to more consistent fishing for harvest and consumption.

*Cultural service: Culturally important species (Figure E-8 in Appendix E.7, [E4]):* Some fish species have cultural significance to the Warm Springs, Umatilla, Burns Paiute, and Nez Perce Tribes. These include the threatened bull trout and Columbia River redband trout, both of which were traditionally used by these tribes as a food source and in cultural and spiritual practices. Columbia River redband trout and bull trout, including designated critical habitat for bull trout, would benefit from the

Modernization Alternative due to increases in streamflow in Anthony Creek, which would moderate temperature extremes and increase dissolved oxygen concentration.

## **6.9 Wetland and Riparian Areas**

### **6.9.1 No Action (Future without Federal Investment)**

Under the No Action Alternative, there would be no effect on wetlands and riparian areas. Wetlands near the ditches and reservoirs would remain in their current condition. Wetland and riparian vegetation associated with District infrastructure and operations would persist in addition to wetland and riparian features adjacent to District infrastructure that are supported by seepage.

### **6.9.2 Modernization Alternative (Future with Federal Investment)**

Overall, the Modernization Alternative would have minor long-term benefits to wetland and riparian areas due to increased water volumes in Dutch Creek, Anthony Creek, North Powder River, Pilcher Creek, Wolf Creek, Pilcher Creek Reservoir and Wolf Creek Reservoir. Minor long-term impacts to wetlands and riparian areas would occur adjacent to ditches that would be piped or retired. These areas would lose access to artificial hydrology provided by irrigation water conveyance and would be converted from wetland and riparian to upland plant communities.

#### 6.9.2.1 Effects on Wetland and Riparian Areas along the Project Area

An analysis of the NWI and examination of aerial imagery indicated no potential wetland sites within areas that would be directly affected by the Modernization Alternative. Irrigation ditches are generally not considered wetlands or waters of the United States by state or federal agencies (see Appendix E.8). Consultation with DSL and USACE would occur to determine potential exemption of ditches in the project area from jurisdiction.

Overall, the Modernization Alternative could have minor long-term effects on seepage-supported wetland and hydrophytic plant communities along the project area. Loss of seepage from the retiring and piping of ditches could reduce water availability to wetland or hydrophytic plant communities adjacent to and downgradient of the project area.

The Modernization Alternative would not occur within the 100-year floodplain. Therefore, no effects to floodplains would result.

#### *Pipe Carnes Ditch, Install Fish Passage and Screening, Install Dutch Creek Siphon*

Trenching, pipe placement, backfill, and other construction activities would result in removal or burying of hydrophytic vegetation within and adjacent to Carnes Ditch. Disturbed areas would be revegetated as uplands. Trenching to construct the siphon crossing would result in short-term impacts to wetlands and riparian vegetation within the floodplain of Dutch Creek. Disturbed wetlands and riparian vegetation would be replanted and restored to natural conditions following construction of the Carnes Siphon.

Short term, minor direct impacts to riparian areas may result from ground disturbance, removal of District irrigation infrastructure, and installation of fish screen and passage improvements at Carnes Diversion. In the long term, riparian vegetation would be reestablished along the banks of Anthony Creek and North Fork Anthony Creek and the fish passage bypass side channel. This would be expected to result in a net increase in riparian area.

In the short term, minor direct effects on wetlands and riparian areas at the Carnes Ditch intercept of Daley Creek would be similar to those described for installation of the Carnes Siphon. In the long

term, a community of herbaceous riparian vegetation would become established along the bank of the restored Daley Creek stream channel, which would convey streamflow above the buried conveyance pipe. The reconnected Daley Creek would convey water downslope that otherwise flowed into Carnes Ditch. This conveyance of water may convert upland vegetation downslope of Carnes Ditch to stream, wetland, and riparian habitat through natural processes and increases in hydrologic input.

*Retire Carnes Ditch Loop along Dutch Creek, Leave Open*

Retiring Carnes Ditch Loop and leaving it open would result in a loss of sufficient hydrology to support wetland and hydrophytic vegetation. This would be expected to cause a transition from wetland and riparian plant communities to upland vegetation within the retired ditch.

Short term, minor direct impacts to wetlands and riparian areas may result from removal of District irrigation infrastructure and ground disturbance during restoration of Dutch Creek at the Carnes Ditch intercept. Disturbed areas adjacent to the reconnected stream channel would be replanted with NRCS-approved species. In the long term, piping the ditch and restoring the stream channel at this location would result in a net increase in riparian vegetation. Restoration plantings would be maintained according to the NRCS Oregon & Washington Guide for Conservation Seedings and Plantings (NRCS 2000).

*Pipe Ellis Ditch*

Piping Ellis Ditch would have similar effects on wetland or hydrophytic vegetation to those described for piping Carnes Ditch, due to the elimination of ditch seepage.

*Retire and Fill Redger Ditch*

Retiring and filling Redger Ditch would result in the removal or burial of existing hydrophytic vegetation on the ditch banks. The filled area would be converted to agricultural land.

*Retire Maharry Blevins Ditch and the end of Lower Lone Pine Ditch, Leave Open*

Effects from retiring Maharry Blevins Ditch and the end of Lower Lone Pine Ditch and leaving them open would be the same as described for retiring the Carnes Ditch Loop above.

#### 6.9.2.2 Wetland and Riparian Areas along Waterbodies Associated with District Operations and Infrastructure

The Modernization Alternative would result in Pilcher Creek and Wolf Creek reservoirs filling earlier in the year and may result in reduced drawdown within the reservoirs. Earlier filling of the reservoir would result in water spills into Wolf Creek occurring earlier in the year and more frequently, increasing flow volumes within Wolf Creek. Fringe wetlands and riparian areas associated with Pilcher Creek and Wolf Creek reservoirs would benefit from increases in water supply in these systems as reservoir levels would remain higher for longer, providing riparian vegetation communities longer access to hydrology. In addition, wetlands and riparian areas associated with Dutch Creek, Anthony Creek, Pilcher Creek, North Powder River, and Wolf Creek would benefit from increased flow volumes.

#### 6.9.2.3 Permitting and Compliance

A wetland and waters delineation would be conducted within the vicinity of potential impacts to jurisdictional wetlands and waters prior to implementation of the Modernization Alternative. Limits

of Waters of the United States and Waters of the State would be determined. Concurrence on jurisdictional determinations from USACE and DSL would be obtained.

Coordination with USACE, DSL, and DEQ would be conducted prior to implementation of each site-specific action where wetland and water impacts would occur, to ensure that the Modernization Alternative either meets exemption criteria (see Appendix E.8) or that the proper permitting is completed. Work in waters and wetlands would require permits from USACE and DSL, consultation with ODFW, and a Section 401 Water Quality Certification from DEQ to meet federal and state regulatory requirements. During construction, contractors would be required to follow strict BMPs to avoid and minimize impacts to wetlands and waters.

## **6.10 Wildlife Resources**

### **6.10.1 No Action (Future without Federal Investment)**

The No Action Alternative would have no effect on wildlife resources. Wildlife that use the District's open ditches would continue to do so. There would be no effect on the manner in which wildlife use the reservoirs and streams associated with District operations.

### **6.10.2 Modernization Alternative (Future with Federal Investment)**

#### 6.10.2.1 General Wildlife

Overall, the Modernization Alternative would have minor short- and long-term effects on wildlife using habitat in and adjacent to ditches in the project area because piping and retiring open ditches would permanently convert aquatic and riparian habitats to dry upland. Beneficial effects on wildlife could result from increased streamflow and reservoir levels elsewhere in the District, which would benefit wetland and riparian wildlife habitat adjacent to Anthony Creek, North Powder River, Dutch Creek, Daley Creek, the reservoirs, and Wolf Creek downstream from the reservoir. Temporary construction effects on wildlife could include noise disturbance, habitat removal from vegetation clearing, or injury due to collisions with construction machinery.

Piped areas would be reseeded and vegetation reestablished within one to two growing seasons. Therefore, effects on upland wildlife habitat are generally expected to be minor and temporary to short-term. In the long term, the Modernization Alternative could reduce human presence due to lower O&M demands and fewer visits to maintain District infrastructure, resulting in fewer human-wildlife interactions and beneficial effects to wildlife.

#### *Pipe Carnes Ditch, Install Fish Passage and Screening, Install Dutch Creek Siphon*

Piping Carnes Ditch, including the installation of the Carnes Siphon, would permanently convert aquatic and riparian habitats to dry upland. Temporary, localized effects to wildlife would result from construction noise and disturbance. Piping the open ditch would permanently remove a water source for terrestrial wildlife species; however, wildlife would be expected to have sufficient time and mobility to locate alternate water sources. Open ditches can also pose a barrier to terrestrial wildlife movement, and piping Carnes Ditch would make it easier for wildlife to move through the landscape, as they would be able to cross over buried piped areas without risk of injury or drowning (Beier et al. 2008).

Temporary, localized effects to wildlife would result from construction noise and disturbance associated with pipe construction and installation of fish screening and passage improvements at Carnes Diversion. These effects would be negligible in this portion of the project area because construction activities would be confined to the Carnes Ditch pipeline alignment and the immediate

vicinity of the Carnes Diversion. Access to construction areas along the pipeline and at the diversion would be via an access route located atop the completed sections of the piped and buried ditch, thereby minimizing the duration and extent of disturbance.

Piping Carnes Ditch would contribute in part to increased streamflows and reservoir levels elsewhere in the District (See Section 6.7). Pilcher Creek and Wolf Creek reservoirs would fill earlier in the season and there would be an increased likelihood of having more water in the reservoir at the end of the irrigation season, resulting in increases in available habitat within and adjacent to the reservoirs as well as adjacent to Wolf Creek downstream from the reservoir.

Reconnecting the Daley Creek stream channel over the buried pipe would have long-term beneficial effects on wildlife. The restoration of more natural stream morphology, hydrology, and riparian vegetation conditions would result in increased availability of riparian and stream habitat.

#### *Retire Carnes Ditch Loop along Dutch Creek, Leave Open*

Retiring Carnes Ditch Loop along Dutch Creek would convert aquatic and riparian habitats to dry upland due to the loss of hydrology within the ditch. Wildlife using these habitats would be expected to have sufficient time and mobility to seek water from nearby streams. Open ditches can also pose a barrier to terrestrial wildlife movement. Retiring the ditch would make it easier for wildlife to move through the landscape, as they would be able to cross over the dry ditch without drowning (Beier et al. 2008).

Removal of District infrastructure and restoration of Dutch Creek at the site of the existing Carnes Ditch intercept would improve wildlife habitat by increasing the availability of riparian vegetation and stream habitat.

Temporary, localized effects to wildlife would result from construction noise and disturbance. These effects would be negligible in this portion of the project area because construction is only proposed at the intercept of Carnes Ditch and Dutch Creek. The adjacent maintenance road would be used for construction access, thereby minimizing disturbance.

#### *Pipe Ellis Ditch*

Piping Ellis Ditch would have similar effects to wildlife and their habitat as described for piping Carnes Ditch above.

#### *Retire and Fill Redger Ditch*

Retiring and filling Redger Ditch would have similar effects to wildlife and their habitat as described for piping Carnes Ditch.

#### *Retire Maharry Blevins Ditch and Lower Lone Pine Ditch, Leave Open*

Retiring the Maharry Blevins Ditch and the end of Lower Lone Pine Ditch and leaving them open would have similar effects to wildlife and their habitat as described for retiring the Carnes Ditch Loop.

### 6.10.2.2 MBTA/BGEPA Species

Migrating or wintering birds would be minimally affected by construction activities due to their ability to move from disturbed areas to other suitable habitats. No effects on breeding migratory songbirds or waterbirds are expected because construction activities would occur outside the nesting season. Coordination with USFWS on effects to birds covered under the MBTA is ongoing. Site-specific analysis would occur prior to implementation of each project construction phase.

The District would follow USFWS guidelines to ensure minimal disturbance to bald or golden eagles nesting near the project area. The critical nesting period for bald and golden eagles is January 1 through August 31. One known bald eagle nesting site is located east of Pilcher Creek Reservoir, approximately 1.5 miles from the proposed Carnes Ditch pipe and 2 miles from the proposed Ellis Ditch pipe. Clearance surveys would be completed prior to construction activities. Coordination with USFWS is ongoing.

#### 6.10.2.3 State and Federally Listed Species

Northern goshawk, ferruginous hawk, and Swainson's hawk are State-listed sensitive species that are known to occur within the project area and vicinity. These species are protected under the MBTA. The effects of the Modernization Alternative and related minimization measures are the same as those discussed in Section 6.10.2.2.

North American wolverines may occur within the project area during migrations or dispersal. Construction activities would occur within the vicinity of preexisting development and would not impede migration of the species between more suitable habitats. Thus, the Modernization Alternative would have negligible to no effects on North American Wolverine.

California condor is not expected to occur within the project area by the time of project implementation, and thus the Modernization Alternative would have no effect on the species. Suckley's cuckoo bumble bee is also not expected to occur within the project area during construction due to unsuitable overwintering habitat and low quality nectar and pollen resources. The Modernization Alternative would have negligible to no effect on Suckley's cuckoo bumble bee.

The Modernization Alternative would have negligible to no effect on impact monarch butterfly. The majority of the project area occurs outside of modeled monarch butterfly suitable habitat (McIntyre et al. 2024) and individuals of the species are not expected to be impacted by project activities in those areas. Project activities that occur within modeled monarch butterfly suitable habitat would occur during the non-irrigation season when the species is absent from the region. Therefore, monarch butterflies would not be impacted directly by construction of the Modernization Alternative. Furthermore, the Modernization Alternative is not anticipated to impact habitat availability for the species as disturbed areas would be reseeded or replanted.

### 6.11 Cumulative Effects

Cumulative effects are defined as the “impact on the environment which results from the incremental impact of the [proposed] action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.”

Cumulative effects may be additive or interactive. Additive effects are the sum of the effects on a resource; for example, diversions from surface water sources for agricultural irrigation and domestic consumption contribute incrementally and additively to surface water flow reductions. Interactive effects may be either countervailing – where the net adverse cumulative effect is less than the sum of the individual effects – or synergistic – where the net adverse cumulative effect is greater than the sum of the individual effects. This section includes a description of past, current, and reasonably foreseeable future actions, and cumulative effects organized by resource.

### **6.11.1 Past Actions**

Past actions are summarized as land development activities that include irrigated agriculture (consisting of construction of the ditch system, previous piping projects, reservoirs, and diversions), rural development, transportation infrastructure, and development and management of public recreational facilities. The nature and extent of these past actions and how they have influenced the existing environment are described for each resource in Section 4.

Powder Valley Water Control District was formed in 1962. The District constructed the Wolf Creek and Pilcher Creek reservoirs in 1975 and 1983, respectively. Sections of PVWCD's infrastructure have been improved over time. The District's existing pipelines were built from 1975 to 2019.

### **6.11.2 Current and Reasonably Foreseeable Future Actions**

Current actions are those projects, developments, and other actions that are presently underway either because they are under construction or are occurring on an ongoing basis. Reasonably foreseeable future actions generally include those actions formally proposed or planned or highly likely to occur based on available information. Various sources including local, state, and federal websites and District staff were consulted to obtain information about current and potential future development in the project area. Because no specific projects or actions other than the proposed action are known to be planned by the District or by others within the project area, reasonably foreseeable future actions are assumed to consist of continuation of currently ongoing actions.

#### **6.11.2.1 Land Use and Development**

Ongoing agricultural activities in the project area are not expected to change from current conditions. Land use and development in the project area is managed according to the Union County zoning regulations and is implemented by the associated County Planning Department. Land development activities are expected to continue into the future and include agricultural, accessory residential, and transportation-related land uses.

#### **6.11.2.2 Planned and Proposed District Actions**

Aside from the modernization improvements proposed as part of this Plan-EA, no other actions are planned or proposed by the District at this time.

### **6.11.3 Cumulative Effects by Resources**

#### **6.11.3.1 Cultural Resources**

Past, ongoing, and future actions in the surrounding area that affect cultural resources include agricultural uses, land development, and water management activities, and visual impacts. Based on the recommendation in the cultural resources report of No Historic Properties Affected, it is anticipated that cultural resources would not be adversely affected by the proposed action. The proposed action would therefore have no contribution to adverse cumulative effects on cultural resources.

#### **6.11.3.2 Land Use**

The project area has been altered by a variety of human activities including agriculture, rural development, construction of District irrigation infrastructure, road construction, and recreational facility development. Implementation of the project would support existing agricultural land uses, contributing beneficially to overall cumulative effects on land use.

#### 6.11.3.3 Recreation

Past actions affecting recreation in the project area have included the designation of the Elkhorn Wildlife Area and establishment of camping and wildlife viewing areas within the wildlife area; construction of Pilcher Creek and Wolf Creek reservoirs; and construction and maintenance of developed campground and boating facilities on the reservoirs. Ongoing and reasonably foreseeable future actions would include continuation of current management and maintenance of these areas. The proposed action may support enhanced recreational opportunities for some users such as anglers or boaters but would overall be expected to have a minor contribution to overall cumulative effects.

#### 6.11.3.4 Socioeconomic Resources

Past actions, including agricultural and other rural development, have established the socioeconomic setting of the project area. Current and reasonably foreseeable future actions would continue to support agriculture through improved infrastructure and economic development. Since the proposed action would also support socioeconomics through construction expenditures and improved agricultural production, it would contribute to a cumulative benefit to socioeconomic resources in the area.

#### 6.11.3.5 Soils

Past and ongoing actions in the surrounding area that affect soils include agricultural uses, land development, recreation, and water management activities. The amount of soil affected by the proposed action is small compared to the area affected by other past, and present, and reasonably foreseeable future actions in the area. The proposed action would therefore have a minor contribution to cumulative effects on soils.

#### 6.11.3.6 Vegetation

Agricultural activities, vegetation control along roads and highways, and rural development are responsible for most of the past and ongoing effects on vegetation in the project area and surrounding vicinity. The amount of vegetation that would be affected by the proposed action is small compared to the area affected by past and ongoing actions. Effects of past and ongoing actions are not expected to change in character in the foreseeable future. Additional effects from the proposed action would result in a minor contribution to cumulative effects on vegetation.

#### 6.11.3.7 Water Resources

Past actions that have affected water resources include agricultural activity, development and maintenance of irrigation infrastructure, rural development, road construction, road maintenance, and recreational use. The proposed action would improve streamflow and water quality in Dutch Creek, Daley Creek, Wolf Creek, Anthony Creek, and the North Powder River and improve water levels in Pilcher Creek and Wolf Creek reservoirs. Effects from the proposed action would result in a beneficial contribution to cumulative effects on water resources.

#### 6.11.3.8 Fish and Aquatic Species

Past and ongoing land uses, water diversions, dam construction, and reservoir operations are responsible for most of the past and ongoing direct and indirect changes in water availability, seasonality, and access to habitat that has cumulatively affected aquatic species and habitat in the project area and surrounding vicinity. Past and ongoing land use activities in the project area are not expected to change in character for the foreseeable future. Implementation of the proposed action

when combined with other future actions is anticipated to have a beneficial cumulative effect on fish, aquatic species, and available habitat for these species.

#### 6.11.3.9 Wetland and Riparian Areas

Past actions that have affected wetlands and riparian areas, in the project area and vicinity include land development, agricultural activities and infrastructure, water diversions, and reservoir operations. These activities are expected to continue into the future. Effects on wetlands from the proposed action and any effects from other current and reasonably foreseeable irrigation modernization projects are anticipated to be localized and minor. Because wetlands occur infrequently within or adjacent to the project area, implementation of the proposed action would have a minor contribution to cumulative impacts on wetlands in the project area and vicinity.

#### 6.11.3.10 Wildlife

Past and ongoing land use activities including agriculture, rural development, transportation system development, and development of irrigation infrastructure have affected wildlife and wildlife habitat in the project area. Effects on wildlife from implementation of both the proposed action and past, current, and future actions in the project area would be minor and localized. The effects on wildlife from the proposed action would be expected to happen over a period of time during which animals would be able to adapt; therefore, implementation of the proposed action would have a minor contribution to overall cumulative effects on wildlife in the project area.

## 7 Consultation, Coordination, and Public Participation

In the development of the Draft Plan-EA, the District and its partners planned and conducted a public scoping meeting; issued press announcements; and had correspondence with federal, state, and local resource agencies; agriculture interests; and other interest groups and individuals. The project development process was designed to work collaboratively with partners, agencies, Tribes, and stakeholders to ensure transparency and cooperation towards a solution that fits within the framework of the purpose and need for action.

A Preliminary Investigation Findings Report (FCA 2022) was prepared to provide sponsors, local partners, agencies, and the public with information to evaluate the goals and objectives of the project. During the development of the Preliminary Investigation Findings Report, project sponsors conducted initial coordination with agencies and stakeholders in the Powder River Basin.

### Public Announcements

Three public notices were placed in the La Grande Observer and Baker City Herald (September 20, 2022, September 27, 2022, and October 4, 2022); a postcard was mailed to patrons (September 19, 2022); and NRCS posted a news release to their website (September 20, 2022).

### Public Involvement Website

Project information was added to Oregonwatershedplans.org, including overview of Pub. Law No. 83-566 funding program; overview of NEPA and EA public participation process; frequently asked questions about the EA process; PVWCD background, news release, Scoping document, and scoping meeting presentation; contact information and how to submit scoping comments; and email signup for more information.

### Public Scoping Meeting

A public scoping meeting was held October 5, 2022 at North Powder Rural Fire Protection District. Participants had an opportunity to learn more about the proposed project and discuss their comments and concerns. Public scoping comments were accepted from September 20 through October 25, 2022.

## 7.1 List of Persons and Agencies Consulted

Table 7-1 describes communications with agency personnel that were consulted during development of this Plan-EA. The list complies with the required element found at 7 CFR 1b.5(c)(4) providing a succinct list of consultation agencies. This includes agencies that provided formal or required consultation, or individuals who were conferred with and who provided substantial input. Coordination with state and local agencies has been ongoing since project inception.

**Table 7-1 Agency Consultation and Communication Record**

Date	Contact, Agency	Communication
September 22, 2022	Craig Rowland, USFWS	NRCS sends letter requesting consultation under the provisions of Section 12 of P.L. 83-566.
August 3, 2022	Danette Faucera, Joe Lemanski, Chandra Ferrari, ODFW	Proposed project and feedback on resources to consider.
April 14, 2023	Jon Paustian, Dan Marvin, Jordan Smith, Danette Faucera, ODFW	Proposed alternatives; land ownership, potential mitigation measures for effects to wildlife and effects to water, potential project benefits to fish and wildlife.
April 19, 2023	John Rademacher, BLM	Proposed alternatives and BLM land ownership within the project area. BLM NEPA requirements for the project and existing right of ways.
May 11, 2023	Dan Marvin and Keith Kohl, ODFW	Potential effects to Elkhorn Wildlife Area from the Plan-EA projects.
June 8, 2023	SHPO, Burns Paiute Tribe, Confederated Tribes of the Colville Reservation, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Reservation, Nez Perce Tribe	NRCS sent letter to initiate consultation and coordination with SHPO, Burns Paiute Tribe, Confederated Tribes of the Colville Reservation, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Reservation, and Nez Perce Tribe.
June 29, 2023	Danette Faucera, Katherine Nordholm, Chuck Simpsons, ODFW	Project's fish screen and passage improvements.

Date	Contact, Agency	Communication
July 5, 2023	Carmen Leguizamon, USFWS	Project's fish screen and passage improvements.
August 24, 2023	Danette Faucera, ODFW	Project's point of diversion changes and potential mitigation.
September 27, 2023	Joel Watts, ODFW	Fish screen design options for low flow winter bypass at Carnes Diversion
October 12, 2023	Kendall Cikanek, USFS	Project and special use permit.
November 9, 2023	Kendall Cikanek, Cassy Albush, USFS John Rademacher, Sandy Tennyson, Rob Gomulak, Katie Coddington, Sarah Sherman, BLM	Cultural resources coordination.
July 16, 2024	John Rademacher, Sarah Sherman, BLM	Project and coordination
January 22, 2025	Carmen Leguizamon, USFWS	Project, potential effects on federally protected species, and fish screening at Carnes Diversion.
January 23, 2025	Jeremy Aujero, USFS	Project, special use permit, and coordination.
March 18, 2025	Kate Fent, USFS	Special use permit
April 8, 2025	Katherine Nordholm, Chuck Simpson, Ethan Brandt, Greg Apke, Joel Watts, ODFW	Fish screening and passage
May 7, 2025	Sarah Sherman, Shelli Pence, BLM	Confirm permits required for the project

Date	Contact, Agency	Communication
June 26, 2025	Shane DeForest, BLM Jeremy Aujero, USFS	In accordance with NHPA regulations for Section 106, NRCS sent letters to agencies requesting that they designate NRCS as the Lead Federal Agency. See Appendix A.
August 19, 2025	Carmen Leguizamon, USFWS	Section 12 coordination for Carnes Diversion fish screening/passage. USFWS recommends a roughened riffle approach be considered.
August 21, 2025	Carmen Leguizamon, USFWS	Section 12 coordination for Carnes Diversion fish screening/passage coordination. USFWS recommends 5 sq ft per cfs for fish screen minimum effective surface area.
December 10, 2025	SHPO	NRCS submitted the Cultural Resources Report to SHPO (see Appendix E.2 for an excerpt of the report).
December 16, 2025	Kirsten Lopez, Confederated Tribes of the Umatilla Indian Reservation; Keith Baird, Nez Perce Tribe; Lawrence Squiemphen, Confederated Tribes of the Warm Springs; R & C Team, Burns Paiute Tribe	NRCS submitted the Cultural Resources Report to Tribes (see Appendix E.2 for an excerpt of the report and Appendix A for accompanying letters sent to Tribes).
January 7, 2026	SHPO	SHPO concurred that the cultural resources identified are not eligible for listing in the NRHP and that there will be no historic properties affected (see Appendix A for the letter).
May 14, 2026	Carmen Leguizamon and Laura Navarette, USFWS	Section 12 coordination, including discussion of ORWAC and existing Monarch habitat models.

## 7.2 Review of Draft Plan-EA

*[To be completed after public review of the Draft Plan-EA.]*

## 8 Preferred Alternative

### 8.1 Selection and Rationale for the Preferred Alternative

NRCS and the District agree that the Modernization Alternative is the Preferred Alternative. NRCS has selected the Modernization Alternative based on its ability to meet the purpose and need for the

project, best address the Federal Objective and Guiding Principles, and provide the most beneficial effects on environmental, social, and economic resources.

Section 6 of this Plan-EA describes effects on resources in detail. In summary, the Preferred Alternative would have minor effects ranging in duration from temporary to long-term on land use (Section 6.2.2); minor temporary effects on recreation (Section 6.3.2); minor short-term effects to wetland and riparian areas (Section 6.9.2) and minor short- and long-term adverse effects to soils, vegetation, water, fish and aquatic resources and wildlife (Section 6.5.2, Section 6.6.2, Section 6.7.2, Section 6.8.2, and Section 6.10.2). All adverse effects would be mitigated through BMPs and other compliance measures.

In the long term, the Preferred Alternative would have many benefits. As analyzed in the economic analysis (Appendix D.1), this alternative would yield economic benefits including increased agricultural yield, reduced District and patron O&M costs, additional instream flow, fish screening, improved fish passage, and recreational benefits. Also, when considering trade-offs of the effects to ecosystem services, the Modernization Alternative would have more beneficial effects than the No Action Alternative (see Table 5-1). As discussed throughout Section 6, the Modernization Alternative would support the ecosystem service categories of provisioning services, regulating services, and cultural services by improving water availability for irrigation and instream fish species, water quality, and conditions for culturally important fish species. Additionally, there would be significant and substantial improvements to other ecosystem service value types such as relational and intrinsic values, expressed through economic, environmental, and socio-cultural public benefits (see the Ecosystem Service Multi-Criteria Decision Analysis in Appendix D.7). When compared to the No Action Alternative in the face of current conditions and anticipated future environmental changes, the Modernization Alternative would support agricultural resiliency of District patrons and the ecosystem health and resiliency of the Powder River Basin.

Although the benefit cost ratio is not greater than one, the project would help address many watershed problems and resource concerns. Currently, PVWCD farmers experience water shortages that reduce crop yields. The project would improve agricultural water management and delivery by improving conveyance efficiencies, increase operating efficiency, and conserve water. Project improvements would enhance irrigation water supply and reduce agricultural damages. The project would also reduce agricultural damages by piping open ditches and eliminating irrigation water interruptions during ditch failures (see Appendix D.2). Water conserved would increase streamflow in Dutch Creek, North Fork Anthony Creek, Anthony Creek, and the North Powder River. Operation and maintenance costs for PWCD patrons would be reduced through energy savings associated with pumping water onto fields and eliminating maintenance associated with open ditch screens. Installation of fish screening and passage at the Carnes Diversion would prevent fish from becoming entrained in the irrigation system and provide fish passage in North Fork Anthony Creek. While this benefit cannot be quantified due to lack of data and uncertainties in fish populations, it is strongly supported by USFWS and ODFW and would provide ecosystem service benefits to fish species. As discussed throughout Section 6 and Appendix D.7, the Preferred Alternative would support multiple categories of ecosystem services, resulting in a range of public benefits to communities and natural systems.

The project meets USDA's mission to conserve and protect natural resources and invest in rural development, and address NRCS resource concerns of inefficient use of irrigation water, water depletion, water quality issues, and inadequate habitat for fish and wildlife. In addition, the project would enhance the benefits generated by a prior NRCS dam investment in the District by improving water conveyance to and from the reservoirs. The project also meets Oregon state and local

priorities by supporting agriculture, the rural economy, and the rural lifestyle in the Powder River Basin.

## 8.2 Measures to be Installed

The Preferred Alternative includes three priority infrastructure modernization projects: the C-1 Project (PG1), Carnes Pipeline (PG2), and Fish Screen and Passage (PG3). These projects would include the following improvements to the PVWCD system.

PG1: Implementation of the C-1 Project would include the following (see Figure 8-1):

- Pipe the Ellis Ditch (approximately 2.1 miles) and install approximately 1.3 miles of pipeline within a new alignment. The new C-1 pipeline would range from 24 to 48 inches in diameter.
- Install a pressure reducing vault to hold two pressure reducing valves to depressurize the C-1 pipeline before the C-1 pipeline intersects the Lone Pine Ditch. The vault would be cast-in-place concrete with the approximate dimensions of 17 feet long, 10 feet wide, and 8 feet deep.
- Install a junction vault to connect the C-1 pipeline with the Lone Pine Ditch outfall. Vault dimensions and type would be the same as described above for the pressure reducing vault.
- Retire and leave open the end of the Lower Lone Pine Ditch and all of the Maharry Blevins Ditch (approximately 5.0 miles total).
- Retire and fill the Redger Ditch (approximately 0.5 mile)

PG2: The Carnes Pipeline would include the following actions (see Figure 8-1):

- Pipe the Carnes Ditch, proceeding from the Pilcher Creek Filling Channel to the Carnes Diversion (approximately 3.2 miles; 66-inch diameter pipeline). Following construction, a dirt road approximately 10 ft wide would be maintained above the pipeline for District maintenance access.
- Install an approximately 0.1-mile long siphon (60-inch diameter) to carry the piped Carnes Ditch beneath Dutch Creek, bypassing the existing approximately 1.2-mile section of Carnes Ditch that makes a loop along Dutch Creek.
- Retire the 1.2-mile Carnes Ditch loop along Dutch Creek. This section of ditch would remain open following the project.
- Remove the existing headgate infrastructure where Carnes Ditch currently intercepts Dutch Creek at the northernmost extent of the Carnes Ditch loop. Restore the Dutch Creek stream channel to natural conditions at this site and reconnect portions of the stream channel upslope and downslope of the current ditch location.
- Bury the Carnes Ditch pipeline beneath the Daley Creek stream channel where Carnes Ditch currently intercepts Daley Creek. Restore the Daley Creek stream channel to natural conditions at this site and reconnect portions of the stream channel upslope and downslope of the current ditch location.

PG3: The Carnes fish screening and passage would include the following actions (see Figure 8-1):

- Install fish screening and improve fish passage at the Carnes Diversion at the confluence of North Fork Anthony Creek and Anthony Creek.

The Preferred Alternative would be implemented in three project groups with construction occurring over portions of 5 years. Table D-25 in Appendix D summarizes the project components to be installed. All activities incorporate by reference applicable general, species specific, and activity-specific conservation measures described within the ORWAC Programmatic Opinions (USFWS, 2017), (NRCS, 2024). Sections 8.7 and 8.8 provide additional details about construction and O&M of the Preferred Alternative. Appendix D.6 includes a detailed breakdown of project costs.

## **8.3 Minimization, Avoidance, and Compensatory Mitigation Measures**

### **8.3.1 Temporary Access**

Prior to construction, the District would contact adjacent landowners to discuss the project and if applicable, approve an easement agreement at the site of the proposed project. Adjacent landowners would be provided a construction schedule before construction begins. Construction limits would be clearly flagged to preserve existing vegetation and private property. Access to residences and farms would be maintained during construction. Construction would occur during the daytime to minimize disturbance to landowners or other individuals in the construction area vicinity. Following project completion in an area, temporary construction access routes would be decommissioned, restored to original contours, and reseeded.

### **8.3.2 Staging, Storage, and Stockpiling**

Mechanized equipment and vehicles would be selected, operated, and maintained in a manner that minimizes adverse effects on the environment. Construction staging areas would be selected and used to minimize effects on vegetation and avoid tree removal. Construction equipment and vehicles would be parked a minimum of 150 feet away from streams, wetlands, ditches, and other waterbodies at the end of each workday. Fueling and maintenance operations would be performed on flat surfaces, away from moving equipment, and at least 150 feet away from any water source.

### **8.3.3 Roads and Traffic Control**

Standard construction safety procedures and traffic control measures would be employed to reduce the risk of collisions between construction vehicles and other vehicles and pedestrians while construction is ongoing. Lane closures on roadways would be avoided during peak travel periods to the greatest extent possible to reduce potential traffic delays from construction vehicles.

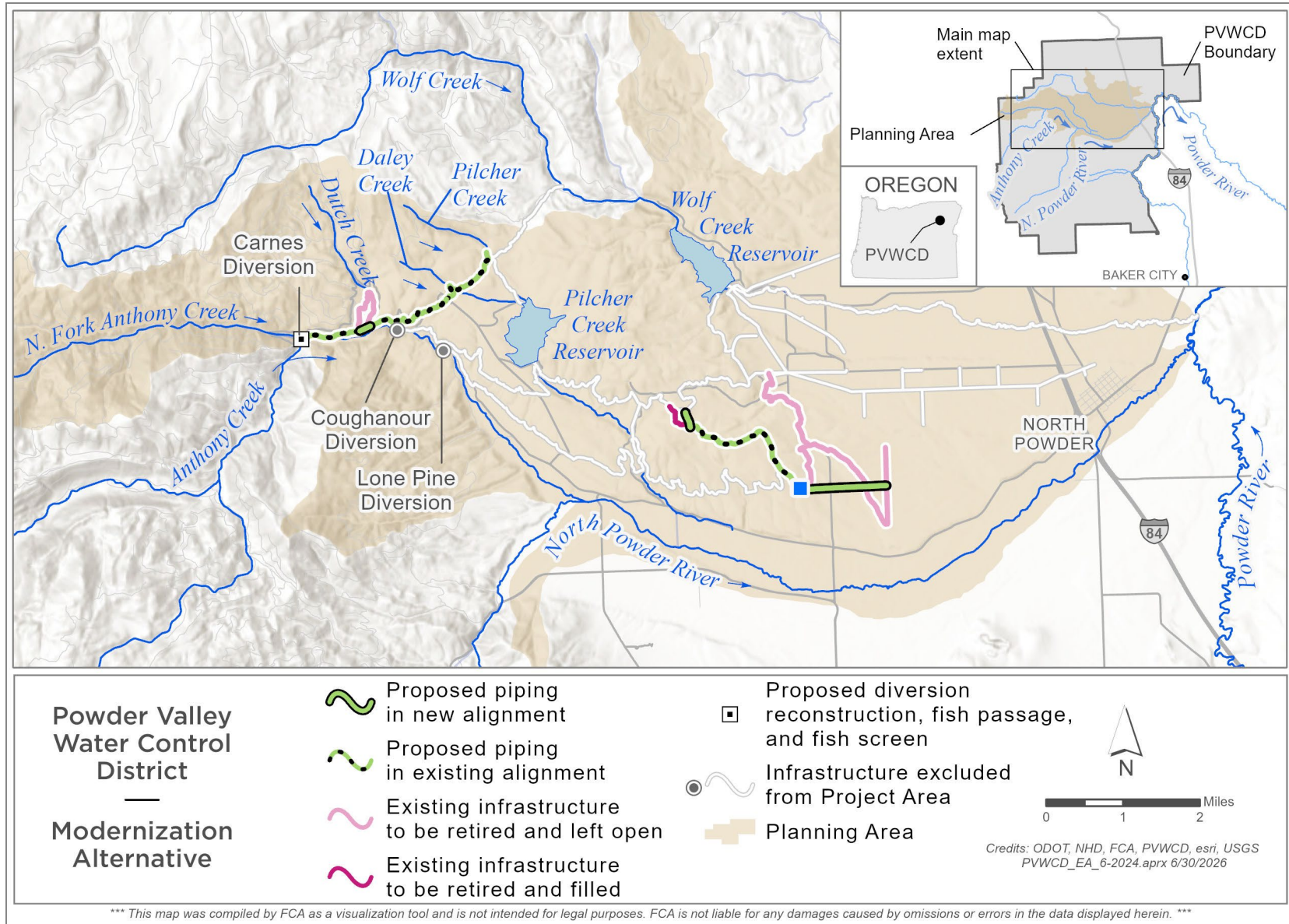


Figure 8-1. Overview of the Preferred Alternative.

#### **8.3.4 Erosion Control**

Silt fencing, straw wattles, geotextile filters, straw bales, or other erosion control measures would be used to minimize soil erosion and prevent soil erosion from entering waterbodies during construction. Erosion control measures would be free of weeds and weed seeds.

If it is determined that a spill is beyond the scope of on-site equipment and personnel, an Environmental Emergency Response Contractor would be contacted immediately to contain or clean up the spill. Any spill into a waterbody or along the adjacent streambed would be reported immediately to Oregon Emergency Response Service at 1-800-452-0311 and the National Response Center at 1-800-424-8802. The Spill Coordinator would complete a Spill Report Form for each release of a regulated substance, regardless of volume.

#### **8.3.5 In Water Work**

All in water work would occur during the permitted In Water Work Window for Upper Powder and Elkhorn Tributaries (July 1–August 31). All federal, state, and local permits would be secured prior to any work instream. Water quality protection measures would be implemented including erosion control, sediment control, and pollution control for all In Water Work and all dewatering efforts.

During in water work, best management practices outlined in SLOPES would be used to minimize impacts, including work area isolation, temporary water management, fish exclusion and salvage, downstream fish passage during construction, and rectification of temporary impacts, including restoring riparian vegetation and reestablishing preexisting contours of the site.

#### **8.3.6 Invasive Species Control**

The following measures would be taken to avoid the introduction of invasive plants and noxious weeds into project areas.

- Inspect gear and equipment to be used in or near water for aquatic invasive species.
- Limit ground disturbance to those areas necessary to safely implement the Preferred Alternative.
- Begin activities in areas uninfested with invasive plants or noxious weeds before operating in infested areas.
- Use uninfested areas for staging, parking, and cleaning equipment. Avoid or minimize all types of travel through infested areas, restrict to those periods when spread of seed, or plant reproductive parts are least likely.
- When it is necessary to conduct soil work in infested roadsides or ditches, schedule activity when seeds or propagules are least likely to be viable to be spread.
- Monitor disturbed areas for at least three growing seasons following completion of activities. Provide for follow-up treatments based on inspection results.
- Inspect material sources at their site of origin to ensure that they are free of invasive plant material before use and transport to the extent practicable. If possible, treat contaminated material before any use.

#### **8.3.7 Revegetation**

During excavation, topsoil would be saved and replaced as the top layer after trenches are filled.

Areas disturbed for access purposes or during construction would be regraded to their original contours. When necessary, compacted areas such as access roads, staging, and stockpile areas would be loosened to facilitate revegetation and improved infiltration. Disturbed areas would be planted with a native seed mix appropriate to the habitat. Revegetation practices would follow the NRCS *Oregon and Washington Guide for Conservation Seedings and Plantings* (NRCS 2000). Costs of revegetation are included in project installation cost estimates.

### **8.3.8 Wildlife**

Construction would occur outside of the primary nesting period for migratory birds of concern (April 15 through July 15) and raptors (April through July). For rare occasions where construction would occur during the primary nesting period, construction would occur outside the USFWS-approved buffer distance of known nests. Should an active nest be found, construction would be paused and consultation with a local USFWS biologist would occur.

### **8.3.9 Cultural Resources**

If archaeological resources were inadvertently discovered during construction, an Inadvertent Discovery Plan would be followed (see Appendix E.2). Construction would stop in the vicinity of the discovery, the area would be secured and protected, a professional archaeologist would assess the discovery, consultation with SHPO and NRCS cultural resources staff would occur as appropriate, and the appropriate tribes would be notified. Continuation of construction would occur in accordance with applicable guidance and law.

## **8.4 Land Rights and Easements**

Prior to construction and where needed, the District would coordinate with landowners and obtain all necessary easements or agreements. The District would also coordinate with USFS, BLM, and ODFW to secure the necessary permits and agreements to construct the preferred alternative across state- and federally-owned public land.

## **8.5 Permits and Compliance**

See Appendix E.10 for a list of potentially required permits and a detailed discussion of Local and County, State, and Federal compliance requirements for planning and implementing the Modernization Alternative.

## **8.6 Costs**

The total project cost for the Preferred Alternative is \$30,361,000. Pub. Law No. 83-566 funds would support \$22,798,000 of the total project cost and \$7,563,000 would be contributed by other, non-federal funds. Appendix D.6 itemizes the costs for each project feature.

Construction costs account for all material, labor, and equipment necessary for installation of the Preferred Alternative. These costs were estimated based on costs for similar installations at other irrigation districts in Oregon. The planning construction costs are estimated using the best available information about the project without having detailed design information.

Table 8-1 details the location, construction timeline, and design cost for the Preferred Alternative. Engineering costs were estimated as a percentage of the cost of construction. The costs presented are planning-level estimates and do not reflect final costs. Detailed designs and construction cost estimates would be completed prior to initiating the project. Final construction costs would only reflect the time and materials to perform the work.

**Table 8-1 Location, Construction, Timeline, and Design Cost for the Preferred Alternative**

Project Group	Latitude <sup>1</sup>	Longitude <sup>1</sup>	Construction Start Year	Construction End Year	Estimated Design Cost (Technical Assistance) <sup>2</sup>
PG 1 C-1 Project	45.020263	-118.000382	2027	2028	\$949,000
PG 2 Carnes Pipeline	45.049911	-118.106936	2030	2032	\$1,386,000
PG 3 Carnes Fish Screen & Passage	45.044824	-118.132526	2030	2031	\$327,000

<sup>1</sup> Latitude and longitude represent the central point of the project group.

Prepared: June 2025

<sup>2</sup> Estimated design costs are preliminary and were calculated by taking a percentage of the estimated construction cost. Design costs are funded 100% by NRCS Pub. Law No. 83-566.

## 8.7 Installation and Financing

### 8.7.1 Framework for Carrying out the Plan

The Preferred Alternative would be implemented in a planned sequence as discussed in Section 8.7.2. The project responsibilities of NRCS and the sponsor are outlined in Section 8.7.3. No cost-shared on-farm measures are involved with this project; therefore, the responsibilities of individual participants do not need to be discussed. No preconditions are anticipated for installing the project.

### 8.7.2 Planned Sequence of Installation

The District would obtain all approvals and permits for the project prior to the start of construction. The entire project would be completed over a 5-year period. The District developed an appropriate construction phasing schedule that addresses District priorities while working within engineering and funding constraints to meet District, patron, and community development needs.

### 8.7.3 Responsibilities

NRCS is responsible for leading the planning efforts, providing engineering design and construction oversight assistance, and certifying completion of the project. The District would be responsible for engineering design, project administration, environmental permitting, contracting, and construction implementation. The District has the needed authorities as an irrigation district organized under ORS 545, and it has agreed to exercise those authorities to implement the actions described in this Plan-EA.

### 8.7.4 Contracting

Irrigation modernization projects would be completed using NRCS funding mechanisms. The District would be primarily responsible for overseeing and administering the construction of the project in coordination with NRCS.

### 8.7.5 Real Property and Relocations

Any real property acquisition needed (as described in Section 6.2.2) would be completed in conjunction with private landowners, USFS, BLM, and ODFW prior to construction. PVWCD would fully cover any property acquisition and easement costs.

### **8.7.6 Financing**

NRCS would provide up to approximately 75 percent of the total project cost which would include technical and financial assistance for the Preferred Alternative through Pub. Law No. 83-566. The District would be responsible for securing funding for the remaining 25 percent of the costs including funds that are not eligible under the National Watershed Program (i.e., project administration and technical assistance). Table 8-2 and Table 8-3 present installation costs of the project and the proportion of funding through Pub. Law No. 83-566 funding and other funding sources.

The majority of the required match funding would be expected to be provided through grants. If necessary, a portion of the project cost would be financed through loans. O&M costs after project completion would be provided through PVWCD revenues. O&M costs would not increase due to the proposed project and may decrease with the retirement of multiple ditches and would be budgeted on an annual basis.

### **8.7.7 Conditions for Providing Assistance**

Conditions for the District to receive program funds for the proposed project include completion of a Final Plan-EA, NRCS issuing a Finding of No Significant Impact, and authorization of funding by the chief of NRCS. The chief of NRCS would act on behalf of the secretary of the interior to ensure that the proposed project meets 16 U.S.C. 1005.

## **8.8 Operations and Maintenance**

The District would be responsible for project O&M for the 100 years of its design life. Prior to construction, a separate O&M agreement, based on the NRCS National Operation and Maintenance Manual, would be made between NRCS and the District. The agreement would continue through the design life of the project and could be modified with NRCS approval.

The District would conduct annual inspections of project measures to ensure the quality of ongoing O&M. The District would be in charge of scheduling O&M inspections and be responsible for necessary work. District O&M would consist of an inspection program that would systematically inspect all modernization actions of the project over a period of several years.

The proposed system would continue its current operation schedule and work would be performed on an as-needed basis. During the winter months, outside of the irrigation season, the District would perform system component maintenance including maintaining pumps, pipelines, and other components of the water delivery system. The District would expand its current vegetation and weed management to include the areas on top of the new pipelines. All procedures would be followed as specified in the O&M agreement between the District and NRCS.

## 8.9 Economic Tables

A summary of the economic analysis of the Preferred Alternative (NED Alternative) and Future Without Federal Investment is provided in Section 5.4 and in the economic tables below. The full NED Analysis can be found in Appendix D. The Preferred Alternative does not have any structural data to show in a table.

**Table 8-2. Economic Table 1 - Estimated Installation Cost of the Preferred Alternative, Water Resource Project Measures, Powder Valley Watershed, Oregon, 2024\$.<sup>1,2</sup>**

Works of Improvement	Unit	Federal Land – Number	Non-Federal Land – Number	Total - Number	Pub. Law No. 83-566 Federal land NRCS	Pub. Law No. 83-566 Non-Federal land NRCS <sup>3</sup>	Pub. Law No. 83-566 Total	Other Funds Federal Land	Other Funds Non-Federal Land	Other Funds Total	Total
PG 1 C-1 project	Miles	0.00	8.86	8.86	\$0	\$8,127,000	\$8,127,000	\$0	\$2,681,000	\$2,681,000	\$10,808,000
PG 2 Carnes Pipeline	Miles	2.62	1.90	4.52	\$6,881,000	\$4,990,000	\$11,871,000	\$2,299,000	\$1,667,000	\$3,966,000	\$15,837,000
PG 3 Fish Screen & Passage	Acres	0.18	0	0.18	\$2,800,000	\$0	\$2,800,000	\$916,000	\$0	\$916,000	\$3,716,000
<b>Total</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>\$9,681,000</b>	<b>\$13,117,000</b>	<b>\$22,798,000</b>	<b>\$3,215,000</b>	<b>\$4,348,000</b>	<b>\$7,563,000</b>	<b>\$30,361,000</b>

Notes: Totals may not sum due to rounding

Prepared: June 2026

<sup>1/</sup> Price base: 2024 dollars

<sup>2/</sup> Project cost as identified in Crew (2017), updated to 2024 dollars with additional engineering considerations, project administration, and technical assistance costs based on NRCS-OR guidance.

<sup>3/</sup> Federal agency responsible for assisting in installation of works of improvement.

**Table 8-3. Economic Table 2 - Estimated Preferred Alternative Cost Distribution, Water Resource Project Measures, Powder Valley Watershed, Oregon, 2024\$.<sup>1</sup>**

Works of Improvement	Pub. Law No. 83-566 Construction	Pub. Law No. 83-566 Engineering	Pub. Law No. 83-566 Project Admin <sup>2</sup>	Pub. Law No. 83-566 Total	Other Funds Construction	Other Funds Engineering	Other Funds Real Property Rights	Other Funds Project Admin	Other Funds Permitting	Other Funds Total	Total
PG 1 C-1 project	\$6,493,000	\$195,000	\$1,439,000	\$8,127,000	\$2,165,000	\$65,000	\$20,000	\$163,000	\$268,000	\$2,681,000	\$10,808,000
PG 2 Carnes Pipeline	\$9,484,000	\$285,000	\$2,102,000	\$11,871,000	\$3,161,000	\$95,000	\$80,000	\$239,000	\$391,000	\$3,966,000	\$15,837,000
PG 3 Fish Screen & Passage	\$2,237,000	\$67,000	\$496,000	\$2,800,000	\$746,000	\$22,000	\$0	\$56,000	\$92,000	\$916,000	\$3,716,000
<b>Total Costs</b>	<b>\$18,214,000</b>	<b>\$547,000</b>	<b>\$4,037,000</b>	<b>\$22,798,000</b>	<b>\$6,072,000</b>	<b>\$182,000</b>	<b>\$100,000</b>	<b>\$458,000</b>	<b>\$751,000</b>	<b>\$7,563,000</b>	<b>\$30,361,000</b>

Notes: Totals may not sum due to rounding.

Prepared: June 2026

<sup>1</sup> Price base: 2024 dollars.

<sup>2</sup> This includes project administration and technical assistance.

<sup>3</sup> Any improvements to roads or access routes would be paid entirely by PVWCD.

<sup>4</sup> This includes funding for easement acquisition, which would be paid entirely by PVWCD

**Table 8-4 - Economic Table 4 - Estimated Average Annual National Economic Development Costs, Powder River Watershed, Oregon, 2024\$.<sup>1</sup>**

<b>Works of Improvement</b>	<b>Project Outlays (Amortization of Installation Cost)</b>	<b>Operation, Maintenance, and Repair Costs of the Modernization Alternative over the No Action Alternative</b>	<b>Total Average Annual Costs</b>
PG 1 C-1 project	\$355,000	\$2,000	\$357,000
PG 2 Carnes Pipeline	\$465,000	\$0	\$465,000
PG 3 Fish Screen & Passage	\$111,000	\$0	\$111,000
<b>Total Costs</b>	<b>\$931,000</b>	<b>\$2,000</b>	<b>\$933,000</b>

Note: Totals may not sum due to rounding.

Prepared June 2026

<sup>1</sup>/ Price Base: 2024 dollars amortized over 100 years at a discount rate of 3.25 percent.

**Table 8-5. Economic Table 5a - Estimated Average Annual Watershed Protection Damage-Reduction Benefits, Powder Valley Water Control District Watershed Plan, Powder River Basin Watershed.**

<b>Project Group 1 (C-1 Project) On-Site Damage Reduction Benefits</b>	<b>Agricultural- Related</b>	<b>Non-Agricultural Related</b>
Agricultural Yield Enhancement	\$13,000	\$0
Other – Reduced Patron O&M	\$37,000	\$0
Other – Reduced District OMR	\$52,000	\$0
<b>On-site Subtotal</b>	<b>\$102,000</b>	<b>\$0</b>
<b>Project Group 1 (C-1 Project) Off-Site Damage Reduction Benefits</b>	<b>Agricultural- Related</b>	<b>Non-Agricultural Related</b>
Instream Flow Value	\$0	\$46,000
<b>Off-site Quantified Subtotal</b>	<b>\$0</b>	<b>\$46,000</b>
<b>Total Quantified Benefits</b>	<b>\$102,000</b>	<b>\$46,000</b>
<b>Project Group 2 (Carnes Pipeline) On-Site Damage Reduction Benefits</b>	<b>Agricultural- Related</b>	<b>Non-Agricultural Related</b>
Agricultural Yield Enhancement	\$79,000	\$0

Other – Reduced Patron O&M	\$0	\$0
Other – Reduced District OMR	\$20,000	\$0
<b>On-site Subtotal</b>	<b>\$99,000</b>	<b>\$0</b>
<b>Project Group 2 (Carnes Pipeline) Off-Site Damage Reduction Benefits</b>	<b>Agricultural- Related</b>	<b>Non-Agricultural Related</b>
Instream Flow Value	\$0	\$78,000
<b>Off-site Quantified Subtotal</b>	<b>\$0</b>	<b>\$78,000</b>
<b>Total Quantified Benefits</b>	<b>\$99,000</b>	<b>\$78,000</b>
<b>Project Group 3 (Carnes Fish Screen and Passage) On-Site Damage Reduction Benefits</b>	<b>Agricultural- Related</b>	<b>Non-Agricultural Related</b>
Agricultural Yield Enhancement	\$0	\$0
Other – Reduced Patron O&M	\$0	\$0
Other – Reduced District OMR	\$0	\$0
<b>On-site Subtotal</b>	<b>\$0</b>	<b>\$0</b>
<b>Project Group 3 (Fish Screen and Passage) Off-Site Damage Reduction Benefits</b>	<b>Agricultural- Related</b>	<b>Non-Agricultural Related</b>
Instream Flow Value	\$0	\$0
<b>Off-site Quantified Subtotal</b>	<b>\$0</b>	<b>\$0</b>
<b>Total Quantified Benefits</b>	<b>\$0</b>	<b>\$0</b>

Note: Totals may not sum due to rounding.

Prepared June 2026

<sup>1</sup>/ Price base: 2024 dollars amortized over 100 years at a discount rate of 3.25 percent.

**Table 8-6. Economic Table 6 - Comparison of Average Annual National Economic Development Costs and Benefits, Powder Valley Water Control District Watershed Plan, Powder River Basin Watershed, Oregon, 2024\$.**

<b>Works of Improvement</b>	<b>Agriculture-Related Agricultural Benefits</b>	<b>Agriculture-Related Reduced Patron O&amp;M</b>	<b>Agriculture-Related Reduced District OM&amp;R</b>	<b>Non-Agricultural Instream Flow Value</b>	<b>Average Annual Benefits</b>	<b>Average Annual Cost<sup>2</sup></b>	<b>Benefit Cost Ratio</b>
PG 1 C-1 Project	\$13,000	\$37,000	\$52,000	\$46,000	\$148,000	\$357,000	0.41
PG 2 Carnes Pipeline	\$79,000	\$0	\$20,000	\$78,000	\$177,000	\$465,000	0.38
PG 3 Fish Screen and Passage	\$0	\$0	\$0	\$0	\$0	\$111,000	0.00
<b>Total</b>	<b>\$92,000</b>	<b>\$37,000</b>	<b>\$72,000</b>	<b>\$124,000</b>	<b>\$325,000</b>	<b>\$933,000</b>	<b>0.35</b>

Notes:

<sup>1/</sup> Price base: 2024 dollars amortized over 100 years at a discount rate of 3.25 percent.

O&M = operation and maintenance

OM&R = operation, maintenance, and repair

<sup>2/</sup> From Economic Table 4

Prepared: June 2026

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## 10 List of Preparers

Under the direction of NRCS, FCA and its subcontractor Highland Economics primarily developed the Draft Watershed Plan-EA. The staff responsible for preparation of the Draft Watershed Plan-EA are included in Table 10-1.

**Table 10-1. List of Preparers.**

Name	Organization	Title	Education	Professional Experience	Area Responsible For
Gary Diridoni	NRCS - Oregon	Assistant State Conservationist – Watershed Resources	Fisheries Management Graduate Certificate B.S. Wildlife Management B.S. Interdisciplinary Studies, Ecosystem Conservation	21 years	General
Antonio Bentivoglio	NRCS - Oregon	Watershed Planner	M.S. Fish Systematics	25 years	General
Lars Santana	NRCS – Oregon	Watershed Planner	Rangeland Ecology and Forest Management	24 years	General
Jane Dalglish	NRCS - Oregon	Water Resources Planning Specialist / Watershed Planner	B.S. Fisheries and Wildlife Science	21 years	General
Rachel Gebauer	NRCS - Oregon	State Archeologist	M.A. Anthropology	26 years	Section 106 Consultation
Michael Petrozza	NRCS - Oregon	State Archeologist	Ph.D. Anthropology M.A. Anthropology B.A. Cultural Anthropology	8 years	Section 106 Consultation
Kate Hart	FCA	Planning and NEPA Lead	M.S. Earth Science B.S. Earth Science	7 years	General

Grace Brofman	FCA	Program Specialist	M.E.S.M. Environmental Science and Management B.A. Geology	4 years	General
Raija Bushnell	FCA	Watershed Planning Program Manager	M.P.A Natural Resource Policy M.S.E.S Natural Resource Management B.A. Political Science	9 years	General
Matt Adams	FCA	Engineer	B.A. Civil Engineering	5 years	Project Costing; Water Resources
Daniel Kaler	FCA	Engineer	Professional Engineer: State of Oregon B.S. Mechanical Engineering	9 years	Project Costing; Water Resources
Jason Medema	Parametrix (under contract with FCA)	Senior Environmental Planner	M.S. Environmental Studies Real Estate Development Graduate Certificate B.A. International Affairs	20 years	General; Land Use, Recreation, Soils, Alternatives, Preferred Alternative, Cumulative Impacts
Colton Kyro	Parametrix (under contract with FCA)	Scientist II	M.S. Systems Ecology B.S. Ecosystem Science and Restoration	6 years	Vegetation, Wildlife Resources, Water Resources, Fish and Aquatic Resources, Wetlands and Riparian Areas
Taya MacLean	Parametrix (under contract with FCA)	Senior Scientist	M.S. Biology B.S. Forestry and Natural Resources Management	25 years	Water Resources, Fish and Aquatic Resources

Stephanie O'Brien	Parametrix (under contract with FCA)	Senior Cultural Resources Specialist	M.A. Social Sciences B.A. Anthropology	16 years	Section 106
Peter Geiger	Parametrix (under contract with FCA)	Senior Planner	M.Sc. Physics B.S. Physics	38 years	Alternatives, Preferred Alternative, Cumulative Impacts Analysis
Irina Lapina	Parametrix (under contract with FCA)	Scientist III	M.S. Biology	21 years	Vegetation, Wildlife, and Fish and Aquatic Resources
Tait Elder	Parametrix (under contract with FCA)	Senior Consultant	M.A. Anthropology B.A. Anthropology	21 years	Section 106
Barbara Wyse	Highland Economics (under contract with FCA)	Senior Economist	M.S. Environmental and Natural Resource Economics B.A. Environmental Sciences and Policy	15 years	Economic Analysis
Winston Oakley	Highland Economics (under contract with FCA)	Economist	M.S. Applied Economics B.S. Environmental Sciences, Policy, and Management	6 years	Economic Analysis

## 11 Distribution List

- City of North Powder
- Union County
- Union County Soil and Water Conservation District
- Oregon Department of Agriculture
- Oregon Department of Environmental Quality
- Oregon Department of Fish and Wildlife
- Oregon Department of State Lands
- Oregon Department of Transportation
- Oregon Regional Solutions
- Oregon Water Resources Department
- Oregon Watershed Enhancement Board
- Oregon State Historic and Preservation Office
- Oregon Representative Cliff Bentz (2nd District)
- Oregon Senator Ron Wyden
- Oregon Senator Jeff Merkley
- Burns Paiute Tribe
- Tribes of the Colville Reservation
- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes of the Warm Springs Reservation
- Nez Perce Tribe
- U.S. Army Corps of Engineers
- U.S. Bureau of Land Management
- U.S. Fish and Wildlife Service
- U.S. Forest Service

## 12 Acronyms, Abbreviations, and Short-forms

APE	Area of Potential Effects
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code Federal Regulations
cfs	Cubic feet per second
CWA	Clean Water Act
ODEQ	Oregon Department of Environmental Quality
DSL	Department of State Lands
EA	Environmental Assessment
EFU	Exclusive Farm Use
EO	Executive Order
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FCA	Farmers Conservation Alliance
GIS	Geographic Information Systems
IPaC	Information for Planning and Consultation
MBTA	Migratory Bird Treaty Act
NED	National Economic Development
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
OAR	Oregon Administrative Rules
ODFW	Oregon Department of Fish and Wildlife
O&M	Operations and Maintenance
OMB	Office of Management and Budget
ORBIC	Oregon Biodiversity Information Center
OWRD	Oregon Water Resources Department
Pub. L. No.	Public Law
PR&G	Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies
PVWCD	Powder Valley Water Control District
RM	River mile
SHPO	State Historic Preservation Office
TMDL	Total Maximum Daily Loads
U.S.	United States
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

## **13 Index**

Index will be completed prior to finishing the Draft Plan-EA.

## **14 Appendix**

Appendices are provided in a separate document.

Appendix A. Comments and Responses

Appendix B. Project Map

Appendix C. Supporting Maps and Tables

Appendix D. Investigation and Analysis Report

Appendix E. Other Supporting Information