Medford Irrigation District
Joint System Canal Modernization Project

Complete Watershed Plan-Environmental Impact Statement

Jackson County, Oregon

Little Butte Creek Watershed

October 2026



United States Department of Agriculture, Natural Resources Conservation Service—Lead Federal Agency in cooperation with the Medford Irrigation District and Rogue River Valley Irrigation District

Prepared by the Natural Resources Conservation Service

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Natural Resources Conservation Service

Complete Watershed Plan-Environmental Impact Statement for the Medford Irrigation District Joint System Canal Modernization Project: Jackson County, Oregon

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

Sponsoring Local Organization (SLO): Medford Irrigation District (MID) (sponsor) and Rogue River Valley Irrigation District (RRVID) (co-sponsor).

Authority: This study and the Watershed Plan-Environmental Impact Statement (Plan-EIS) have been prepared under the Authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law Number [Pub. L. No.] 83-566) and would be implemented under the Pub. L. No. 83-566 authorized purpose of Agricultural Water Management. The Plan-EIS 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.] 4321 et seq.).

Abstract: The project seeks to improve water conservation, water delivery reliability, and public safety for irrigation infrastructure in Oregon's Rogue Basin. The project would pipe up to 11.5 miles of the Joint System Canal. The Joint System Canal is a locally known common name for an irrigation ditch which is an excavated channel that is used to convey water for agricultural irrigation purposes. Total estimated project costs are $94,209,000, of which $23,808,000 would be paid by the sponsors and other non-federal funding sources. The estimated amount to be paid through NRCS Pub. L. No. 83-566 funds is $70,401,000.

Certifying Statement for EIS Page Limit and Deadline

The Responsible Official certifies that this EIS:

☑ 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.

Non Discrimination Statement: In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the State or local Agency that administers the program or contact USDA through the Telecommunications Relay Service at 711 (voice and TTY). Additionally, program information may be made available in languages other than English.

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

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Watershed Agreement

between the

Medford Irrigation District

(Referred to herein as the lead sponsor)

and the

Rogue River Valley Irrigation District

(Referred to herein as the co-sponsor)

and the

U.S. Department of Agriculture,

Natural Resources Conservation Service

(Referred to herein as NRCS)

Whereas, application has heretofore been made to the Secretary of Agriculture by the sponsors for assistance in preparing a plan for works of improvement for the Medford Irrigation District – Joint System Canal Modernization Project, State of Oregon, under the authority of the Watershed Protection and Flood Prevention Act, as amended (16 U.S.C. Sections 1001 to 1008, 1010, and 1012); and

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

Whereas, there has been developed through the cooperative efforts of the sponsors and NRCS a watershed project plan and environmental impact statement for works of improvement for the Medford Irrigation District – Joint System Canal Modernization Project, State of Oregon, hereinafter referred to as the watershed project plan or plan, which plan is annexed to and made a part of this agreement.

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

1. Term. The term of this agreement is for the installation period and evaluated life of the project (104 years) and does not commit NRCS to assistance of any kind beyond the end of the evaluated life.

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

3. Real Property. The sponsors will acquire such real property as will be needed in connection with the works of improvement. The amounts and percentages of the real property acquisition costs to be borne by the sponsors and NRCS are as shown in the cost-share table in Section 5 hereof.

The sponsors agree that all land acquired for measures, other than land treatment practices, with financial or credit assistance under this agreement will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency that will continue to maintain and operate the development in accordance with the O&M agreement.

4. Uniform Relocation Assistance and Real Property Acquisition Policies Act. The sponsors hereby agree to comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. Section 4601 et seq. as further implemented through regulations in 49 Code of Federal Regulations [CFR] Part 24 and 7 CFR Part 21) when acquiring real property interests for this federally assisted project. If the sponsors are legally unable to comply with the real property acquisition requirements, they agree that, before any federal financial assistance is furnished, they will provide a statement to that effect, supported by an opinion of the chief legal officer of the state containing a full discussion of the facts and law involved. This statement may be accepted as constituting compliance.

5. Cost-share for Watershed Project Plans. The following table will be used to show cost-share percentages and amounts for watershed project plan implementation.

Table 1. Cost-share Table for Watershed Operation or Rehabilitation Projects

Cost-share Table for Watershed Operation or Rehabilitation Projects					
	NRCS		Sponsors		Total
Works of Improvement	Percent	Cost	Percent	Cost	Cost
Cost-Sharable Items[1]					
Construction	75%	$57,581,000	25%	$19,193,000	$76,774,000
Engineering	75%	$1,732,000	25%	$577,000	$2,309,000
Subtotal: Cost-Sharable Costs	**75%**	**$59,313,000**	**25%**	**$19,770,000**	**$79,083,000**
Non-Cost-Sharable Items[2]					
Technical Assistance	100%	$6,949,000	0%	$0	$6,949,000
Real Property Rights	N/A	N/A	N/A	N/A	N/A
Permitting	0%	$0	100%	$2,383,000	$2,383,000
Project Administration[3]	71%	$4,139,000	29%	$1,655,000	$5,794,000
Subtotal: Non-Cost-Share Costs	73%	$11,088,000	27%	$4,038,000	$15,126,000
Total:	**75%**	**$70,401,000**	**25%**	**$23,808,000**	**$94,209,000**
Installation costs explanatory notes:					
1. The cost-share rate is the percentage of the average cost of installing the practice in the selected plan for the evaluation unit. During project implementation, the actual cost-share rate must not exceed the rate of assistance for similar practices and measures under existing national programs.					
2. If actual non-cost-sharable item expenditures vary from these figures, the responsible party will bear the change.					
3. The sponsors and NRCS will each bear the costs of project administration that each incurs. Sponsor costs for project administration include relocation assistance advisory service.					

6. Land Treatment Agreements. The sponsors will obtain agreements from owners of not less than 50 percent of the land above each multiple-purpose and floodwater-retarding structure. These agreements must provide that the owners will carry out farm or ranch conservation plans on their land. The sponsors will ensure that 50 percent of the land upstream of any retention reservoir site is

adequately protected before construction of the dam. The sponsors will provide assistance to landowners and operators to ensure the installation of the land treatment measures shown in the watershed project plan. The sponsors will encourage landowners and operators to continue to operate and maintain the land treatment measures after the long-term contracts expire, for the protection and improvement of the watershed.

7. Floodplain Management. Before construction of any project for flood prevention, the sponsors must agree to participate in and comply with applicable federal floodplain management and flood insurance programs. The sponsors are required to have development controls in place below low and significant hazard dams prior to NRCS or the sponsors entering into a construction contract.

8. Water and Mineral Rights. The sponsors will acquire or provide assurance that landowners or resource users have acquired such water, mineral, or other natural resources rights pursuant to State law as may be needed in the installation and operation of the works of improvement. Any costs incurred must be borne by the sponsors and these costs are not eligible as part of the sponsors' cost-share.

9. Permits. The sponsors will obtain and bear the cost for all necessary federal, state, and local permits required by law, ordinance, or regulation for installation of the works of improvement. These costs are not eligible as part of the sponsors' cost-share.

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

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

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

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

14. Operation and Maintenance (O&M). The sponsors will be responsible for the operation, maintenance, and any needed replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with an O&M agreement. An O&M agreement will be entered into before federal funds are obligated and will continue for the project life (100 years). Although the sponsors' responsibility to the Federal Government for O&M ends when the O&M agreement expires upon completion of the evaluated life of measures covered by the agreement, the

sponsors acknowledge that continued liabilities and responsibilities associated with works of improvement may exist beyond the evaluated life.

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

16. Nondiscrimination Provisions. In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the State or local Agency that administers the program or contact USDA through the Telecommunications Relay Service at 711 (voice and TTY). Additionally, program information may be made available in languages other than English.

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

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

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

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

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

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

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

Certification:

A. The sponsors certify that they will or will continue to provide a drug-free workplace by—

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

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

(a) The danger of drug abuse in the workplace.

(b) The grantee's policy of maintaining a drug-free workplace.

(c) Any available drug counseling, rehabilitation, and employee assistance programs.

(d) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.

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

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

(a) Abide by the terms of the statement; and

(b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than 5 calendar days after such conviction.

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

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

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

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

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

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

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

18. Certification Regarding Lobbying (7 CFR Part 3018)

A. The sponsors certify to the best of their knowledge and belief, that—

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

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

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

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

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

A. The sponsors certify to the best of their knowledge and belief, that they and their principals—

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

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

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

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

B. Where the primary sponsors are unable to certify to any of the statements in this certification, such prospective participants must attach an explanation to this agreement.

20. Clean Air and Water Certification.

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

(1) Any facility to be utilized in the performance of this proposed agreement is (____), is not (_x_) listed on the U.S. Environmental Protection Agency List of Violating Facilities.

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

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

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

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

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

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

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

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

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

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

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

(4) The term "clean water standards" means any enforceable limitation, control, condition, prohibition, standards, or other requirement which is promulgated pursuant to the Water

Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by Section 402 of the Water Act (33 U.S.C. Section 1342), or by a local government to assure compliance with pretreatment regulations as required by Section 307 of the Water Act (33 U.S.C. Section 1317).

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

21. Assurances and Compliance.

As a condition of the grant or cooperative agreement, the sponsors assure and certify that they are in compliance with and will comply in the course of the agreement with all applicable laws, regulations, executive orders, and other generally applicable requirements, including those set out below which are hereby incorporated in this agreement by reference, and such other statutory provisions as are specifically set forth herein.
State, Local, and Indian Tribal Governments: Office of Management and Budget (OMB) Circular Nos. A-87, A-102, A-129, and A-133; and 7 CFR Parts 3015, 3016, 3017, 3018, 3021, and 3052.
Nonprofit Organizations, Hospitals, Institutions of Higher Learning: OMB Circular Nos. A-110, A-122, A-129, and A-133; and 7 CFR Parts 3015, 3017, 3018, 3019, 3021, and 3052.

22. Examination of Records.

The sponsors must give the NRCS or the Comptroller General, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to this agreement, and retain all records related to this agreement for a period of three years after completion of the terms of this agreement in accordance with the applicable OMB Circular.

23. Signatures

MEDFORD IRRIGATION DISTRICT

The signing of this plan was authorized by a resolution by the Medford Irrigation District governing body and adopted at an official meeting held on

_____, in _____, Oregon.

By:

_____ Date: _____

Jack Friend, Manager

Medford Irrigation District

5045 Jacksonville Hwy
Central Point, OR 97502

ROGUE RIVER VALLEY IRRIGATION DISTRICT

The signing of this plan was authorized by a resolution by the Rogue River Valley Irrigation District governing body and adopted at an official meeting held on

_____, in _____, Oregon.

By:

_____ Date: _____

Brian Hampson, Manager

Rogue River Valley Irrigation District

3139 Merriman Rd

Medford, OR 97501

USDA-NATURAL RESOURCES CONSERVATION SERVICE

Approved by:

_____ Date: _____

Greg Becker, State Conservationist

Natural Resources Conservation Service

1201 NE Lloyd Blvd
Suite 900
Portland, OR 97232

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Office of Management and Budget (OMB) Fact Sheet

Summary Watershed Plan-Environmental Impact Statement

for

Medford Irrigation District Joint System Canal Modernization Project

Jackson County, Oregon

Oregon 2nd Congressional District

Authorization

The watershed study was carried out and the plan prepared under the authority of Pub. L. 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. L. No. 83-566 authorized purpose of Agricultural Water Management.

Lead Sponsor

Medford Irrigation District

Proposed Action

The Medford Irrigation District (MID or District) Joint System Canal Modernization Project is an agricultural water conveyance efficiency project. The proposed action would pipe 11.5 miles of the Joint System Canal (JSC), including upgrading three existing siphons, installing three new siphons, and updating 24 patron turnouts along the JSC.

Implementation of the proposed action would meet the Pub. L. No. 83-566 Authorized Project Purpose (v), Agricultural Water Management, and would address the sponsor's goals by improving MID irrigation water reliability and efficiency, alleviating damages to irrigated agriculture.

Federal assistance through Pub. L. No. 83-566 would support MID in addressing reduced water supply and poor water quality in waterbodies within the study area, which are watershed problems and resource concerns.

Implementation of the proposed action would address the sponsor's objectives and goals to increase water supply, improve water delivery reliability, optimize water resources management, minimize risk of crop damages, and improve aquatic habitat.

Purpose and Need for Action

The purpose of the proposed project is to enhance Agricultural Water Management by making the delivery of irrigation water through the JSC more reliable and efficient. Federal assistance is needed to alleviate agricultural damages to irrigated agriculture and agricultural communities served by the JSC due to unreliable access to and inefficient delivery of irrigation water.

Description of the Preferred Alternative

Under the Preferred Alternative, MID would install 11.5 miles of the pipe along the JSC, including upgrading three existing pipeline siphons and installing three new pipeline siphons to straighten out the delivery system; retire 1.6 miles of open canal; and upgrade 24 patron turnouts along the JSC.

Project Measures

Under the Preferred Alternative, project sponsors would pipe 11.5 miles of the existing JSC using gravity-pressurized buried pipe, which includes upgrading the Lake Creek, Wyant, and Osborne Creek siphons and installing three new buried, pipeline siphons along new alignments to straighten out the delivery system; retire 1.6 miles of open canal loops where new siphons straighten the system; and update 24 turnouts along the JSC. Preferred Alternative construction would occur in 5 project groups over 4 years.

Resource Information

Watershed Size

64,063 acres

Climate and Topography

The climate in MID is dry with an annual average precipitation of 19 inches. Historically, mild wet winters and hot dry summers prevail in the Rogue River Basin. The majority of annual water supply is provided by winter snowpack, with only 2.9 in of average rainfall during the growing season. The District sits in the Rogue River Valley (~1,300 ft) and spans hillsides and higher elevations with irrigation water conveyance infrastructure in the surrounding mountains (~5,800 ft).

Land Use (Planning Area)

Use	Acres
Irrigated Land	33,563
Non-irrigated Land	1,759,584

Land Ownership (Planning Area)

Owner	Percentage
Federal	52%
Private	47.7%
State-Local	0.2%
Water	0.1%

Population and Demographics

The proposed action would occur within Jackson County, Oregon.

Population and Demographics	Jackson County	Oregon
Population 2020	223,259	4,237,256

Unemployment Rate 2023	4.5%	6.4%
Median Household Income 2023	$71,666	$80,160

Relevant Resource Concerns

Resource concerns identified through scoping are water conservation, fish and aquatic resources, wildlife resources, and climate variability.

Alternatives

Alternatives Considered

Seven 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 MID would continue to operate and maintain the JSC in its current condition. This alternative assumes that modernization of the JSC would not be reasonably certain to occur, as funding at the scale necessary to modernize the JSC is not anticipated from other sources.

Proposed Action (Future with Federal Investment)

Under the Preferred Alternative, MID would make the following improvements:

- Pipe 11.1 miles of the existing JSC, which includes upgrading the Lake Creek, Wyant, and Osborne Creek siphons
- Install three buried pipeline siphons along new alignments (0.4 mi total)
- Retire 1.6 miles of open canal where new siphons would straighten the system
- Upgrade 24 turnouts along the JSC

Mitigation, Minimization, and Avoidance Measures

Wetland and waters delineation field investigations were completed in 2024. The delineation report was submitted to Oregon Department of State Lands (DSL) on December 12, 2025, and DSL concurred with the delineation, with revisions, on July 15, 2026, for purposes of Oregon's Removal-Fill Law. The delineation report will also be submitted to the U.S. Army Corps of Engineers (USACE) for an approved jurisdictional determination prior to implementation. During project coordination on April 24, 2025, DSL acknowledged that the project would provide benefits to the Little Butte Creek Watershed and its ecosystem, and discussed the potential to evaluate the project as a habitat improvement effort. Although habitat improvement projects are not specifically defined under current state Removal-Fill regulations, the agency indicated that demonstrating a clear net benefit to aquatic and riparian resources during the permitting process may help support the permitting pathway that would not require compensatory mitigation. Under this approach, impacts

will be minimized to the extent practicable, and unavoidable wetlands impacts would be recognized and evaluated within the overall long-term ecosystem modification.

NRCS, as lead federal agency, initiated Section 106 consultation on April 18, 2024 between the District; Bureau of Land Management (BLM); Confederated Tribes of the Grand Ronde; Confederated Tribes of the Siletz Indians; Coquille Indian Tribe; Cow Creek Band of Umpqua Tribe of Indians; and Oregon State Historic Preservation Office (SHPO). Consultation will be completed prior to the Record of Decision (ROD).

Ground disturbance would be limited to areas necessary for construction, and effects on agricultural lands would be avoided or minimized by using the existing right-of-way where practicable. Stormwater BMPs would be implemented during and after construction, and construction timing would minimize disturbance to wildlife and the public. Disturbed areas would be restored to pre-construction contours and revegetated with grasses and forbs to reduce erosion and the spread of noxious weeds.

Project Implementation Costs

Project costs	Pub. L. No. 83-566 funds ($)	Pub. L. No. 83-566 funds (%)	Other funds ($)	Other funds (%)	Total ($)	Total (%)
Construction	$57,581,000	75%	$19,193,000	25%	$76,774,000	100%
Engineering	$1,732,000	75%	$577,000	25%	$2,309,000	100%
SUBTOTAL COSTS	**$59,313,000**	**75%**	**$19,770,000**	**25%**	$79,083,000	**100%**
Technical Assistance	$6,949,000	100%	$0	0%	$6,949,000	100%
Relocation	N/A	N/A	N/A	N/A	N/A	N/A
Real Property Rights	N/A	N/A	N/A	N/A	N/A	N/A
Permitting	$0	0%	$2,383,000	100%	$2,383,000	100%
Project Administration	$4,139,000	71%	$1,655,000	29%	$5,794,000	100%
TOTAL COSTS	**$70,401,000**	**75%**	**$23,808,000**	**25%**	**$94,209,000**	**100%**

Project Benefits

Implementation of the Preferred Alternative would modernize critical agricultural water infrastructure and provide long-term benefits to agriculture, natural resources, and rural communities in the Rogue Basin. The project would conserve approximately 5,057 AF of water annually, improve water delivery reliability and drought resilience for MID patrons, increase

agricultural production, and reduce District O&M costs. It would also increase late-season streamflow and improve aquatic habitat for ESA-listed SONCC coho salmon and other aquatic species. By improving the resilience of irrigated agriculture, the project would help sustain the Rogue Basin's rural agricultural economy, agricultural way of life, and historic agricultural land uses.

Number of Direct Beneficiaries

2,163 patrons in MID and RRVID would directly benefit from the proposed project.

Other Beneficial Effects-Physical Terms

Implementation of the Preferred Alternative would conserve approximately 5,057 AF of water annually, including 1,264 AF per year retained instream in South Fork Little Butte Creek. Increased late-season streamflow would improve aquatic habitat, while the remaining conserved water would improve the reliability and drought resilience of irrigation water deliveries.

Damage Reduction Benefits	Proposed Project
Other – Agricultural Production Value	$1,579,000
Other- Instream Flow Value	$102,000
Total Quantified Benefits	$1,681,000
Discount Rate	3.25%
Benefit to Cost Ratio	0.6
Ecosystem Services Multi-Criteria Decision Analysis	59%

The Ecosystem Services Multi-Criteria Decision Analysis shows that the Preferred Alternative has substantive benefits (see Appendix D.4).

Period of Analysis

Installation Period

4 years

Project Life

100 years

Funding Schedule

Year	Pub. L. No. 83-566	Other Funds	Total
1	$9,361,000	$3,150,600	$12,511,600
2	$19,328,000	$6,531,400	$25,859,400
3	$17,366,000	$5,879,000	$23,245,000

4	$24,346,000	$8,247,000	$32,593,000

Environmental Effects

The Preferred Alternative would be planned, designed, and installed to provide long-term benefits to agricultural production, water quality, surface water hydrology, aquatic habitat, and ecosystem services.

Implementation of the Preferred Alternative would result in minor, short-term adverse effects on resources such as vegetation, soils, and wildlife during construction. MID would work closely with partners, contractors, and affected landowners to avoid and minimize these effects. See Section 8.3 for BMPs and other measures that would be implemented.

The Preferred Alternative would also result in minor long-term effects on vegetation, wetlands and riparian areas, groundwater recharge, and wildlife habitat associated primarily with piping the open canal and reducing seepage. Disturbed areas would be restored and revegetated following construction, and BMPs and minimization measures would reduce adverse effects. Visual effects would be negligible to minor and long-term as the open canal is replaced with buried pipe and disturbed areas are revegetated. Overall, these adverse effects would be minor when considered with the project's long-term benefits to water conservation, agricultural water reliability, water quality, and aquatic habitat.

Major Conclusions

Implementation of the Preferred Alternative would conserve water, improve the efficiency and reliability of irrigation water deliveries, increase drought resilience and agricultural production, improve streamflow and aquatic habitat for ESA-listed species, and reduce MID O&M costs. Overall, the project would provide long-term benefits to agriculture, natural resources, and rural communities in the Rogue Basin.

Piping the JSC would result in an adverse effect on historic properties under Section 106 of the National Historic Preservation Act (NHPA), because the canal would no longer convey its significance as a contributing resource to the National Register of Historic Places-eligible Rogue River Basin Project Linear District. SHPO concurred with this finding on August 15, 2025, and the adverse effect would be resolved through a Memorandum of Agreement between NRCS and SHPO, with mitigation stipulations finalized before the ROD. This Section 106 adverse effect would not constitute a significant effect on cultural resources under the National Environmental Policy Act (see Section 6.1.2).

Areas of Controversy

No areas of controversy have been identified.

Issues to be Resolved

NRCS and MID are working with SHPO to identify cultural resources mitigation actions.

Evidence of Unusual Congressional or Local Interest

Comments during the scoping period were received from several federal government agencies including the National Park Service, U.S. Army Corps of Engineers (USACE), and U.S. Environmental Protection Agency (EPA), as well as local nongovernmental organizations.

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

Across the Western United States, aging infrastructure, growing populations, shifting rural economies, and fluctuating climate conditions have contributed to increased pressure on water resources. In Southern Oregon's Rogue River Basin, multiyear droughts have limited irrigation water availability and resulted in agricultural damages. These challenges are compounded by aging and inefficient irrigation infrastructure that loses water during conveyance and is increasingly vulnerable to failure. Medford Irrigation District (MID or District) seeks to modernize its Joint System Canal (JSC) to conserve limited water supplies, improve the reliability and resilience of agricultural water deliveries, and provide benefits to natural resources. MID seeks federal funding for the project through the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Watershed Protection and Flood Prevention Program, authorized by Pub. L. No. 83-566. Throughout this Plan-EIS, the terms "canal" and "laterals" are used. Canals and laterals are irrigation ditches that were manmade to convey water.

Agriculture plays a critical role in the Rogue Basin and contributes to the region's economy, history, and culture. MID receives only approximately 19 inches of rainfall a year, with only 3.5 inches falling during the irrigation season. In general, crops grown in the region require at least 29 inches of water in an average year. Given the low level of rainfall during the growing season, irrigation plays a critical role in agricultural production in the area. Irrigated agriculture in the area accounts for over $72 million in economic value annually (U.S. Bureau of Reclamation 2012) and is a cornerstone of the regional economy, supporting jobs, tourism, and local culture. Reliable irrigation water is therefore important not only to individual producers, but also to the long-term resilience of the region's rural communities and agricultural economy.

The limited water availability and deteriorating state of the JSC have caused the District to shorten its irrigation season and curtail water deliveries to patrons. Over the last decade, MID has regularly been unable to make water deliveries for the full length of the irrigation season. During 2020-2022, the District did not begin water deliveries until June or July, rather than April 15, and the irrigation season ended in August rather than October 1. During these years, the irrigation season was just 6 weeks, or a quarter of a full 24-week season. MID irrigators do not have other options for water supply; there are no other available surface water supplies and local groundwater tends to be marginal in quantity, so drilling of wells to supplement supplies is not a viable option (CH2M and Medford Water Commission 2017). In addition, drought severity in Jackson County has increased in the past three decades compared to historical conditions, and drought is expected to further increase in frequency, severity, and duration in the future.

As a result of these challenges, irrigators are not always able to receive their full water right when they require it, causing agricultural damages. Patrons within the District grow high-value pears, wine grapes, and other fruit, as well as hay and other crops. Some growers in the District have had to cut down trees in their orchards due to lack of water supplies to conserve water for the remaining trees. Other orchards have had enough water to keep trees alive but not enough water to produce a marketable crop.

The District's aging infrastructure is also at risk of catastrophic failures that, if they occur, would cause additional agricultural damages due to interruptions in water deliveries. A large JSC failure would require permitting, contracting, and materials procurement, which could interrupt District water deliveries for a month or more. Together, water shortages, conveyance losses, and aging infrastructure threaten the reliability of agricultural water deliveries and the long-term viability of

irrigated agriculture and rural communities in the Rogue Basin. Modernizing the JSC provides an opportunity to address these challenges by conserving water that is currently lost during conveyance and improving the reliability and resilience of the system.

Low streamflow in the Little Butte Creek watershed results in poor water quality (particularly high temperature) and poor aquatic habitat conditions. This watershed is one of the Rogue Basin's most important habitats and spawning tributaries for the ESA-listed Southern Oregon/Northern California Coast (SONCC) coho salmon, and low instream flows and resultant high temperatures are primary limiting factors imperiling this species (Oregon Department of Fish and Wildlife [ODFW] 2021). The District's North Fork and South Fork Little Butte Creek diversions have fish screens to keep fish out of the District's system; however, the inefficient JSC system (which loses water to seepage, evaporation, and operational losses) results in more water being diverted from Little Butte Creek to meet a given level of irrigation demand, diminishing aquatic habitat conditions. Improving conveyance efficiency therefore provides an opportunity to benefit both agricultural water users and aquatic resources.

The proposed infrastructure modernization project directly supports USDA's mission to conserve natural resources and invest in rural communities and addresses NRCS resource concerns related to inefficient use of irrigation water, water depletion, water quality, and inadequate fish and wildlife habitat. The project also aligns with Oregon priorities to improve water availability and water quality. By modernizing aging agricultural infrastructure, conserving limited water supplies, supporting irrigated agriculture and rural communities, and improving aquatic habitat, the project advances complementary federal, state, and local water resource priorities.

1.1 Planning Area

MID is located in Jackson County, Oregon, within the Rogue River Basin, near the town of Medford. The District is 23,985 acres, of which 11,902 acres are irrigated land used by 1,099 patrons. For purposes of this Watershed Plan-EIS, the planning area[1] is the same as the watershed area (as defined in the National Watershed Program Manual 506.50 TTT (NWPM; NRCS 2015)). See Figure 1-1 for a map of the planning area. The planning area is based on the irrigation problem area, and it includes the lands within MID and RRVID, and the project area along the JSC (see Section 1.2 for a description of the project area).

1.2 Project Area

The project area is the portion of the planning area where the MID JSC Modernization Project would occur (Figure 1-1). The project area, making up only a small portion of the District's total system, consists of the District infrastructure to be modernized, areas where new infrastructure would be built, and associated easements where construction would take place.

[1] The term "planning area" is used in this Plan-EIS in an effort to reduce confusion between the "watershed" definition in NRCS, 2015a and the United State Geological Survey's watersheds as defined by hydrologic unit codes.

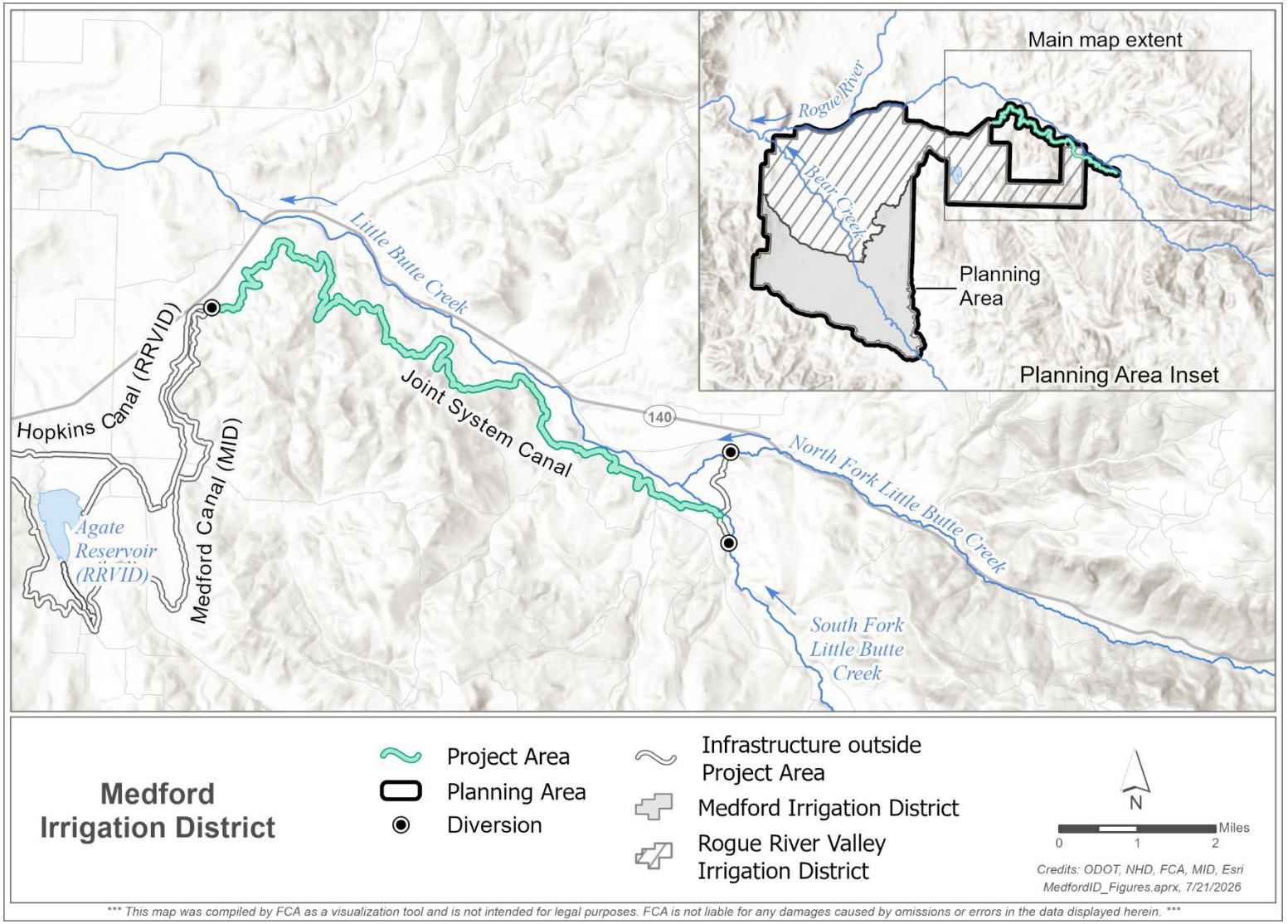


Figure 1-1. Planning area and project area for the Medford Irrigation District Joint System Canal Modernization Project.

1.3 Current Infrastructure

MID operates 136 miles of canals and laterals to serve 1,099 patrons irrigating approximately 11,902 acres. MID relies on live streamflow, storage water, and return flows for its water supply. Streamflow is obtained from the North Fork and South Fork Little Butte Creek and Bear Creek, and supplemental storage is obtained from Fourmile Lake, Fish Lake, Emigrant Lake, Howard Prairie Lake, and Hyatt Lake reservoirs (Figure 1-2). During most years, irrigation water from storage and live flow is insufficient for MID to fully supply its patrons. Return flows from Talent Irrigation District (located upgradient from MID; Figure 1-3) are also captured by MID and incorporated into its water supply to serve its patrons.

The U.S. Bureau of Reclamation's (Reclamation) Talent Division of the Rogue River Basin Project was established in 1953 to expand water supply for irrigation, provide flood control along Bear Creek, and generate hydroelectricity. To this end, many of the water storage areas, canals, and infrastructure were rehabilitated or enlarged in Talent Irrigation District, MID, and RRVID. However, the proposed action in this Plan-EIS does not include any Reclamation-owned infrastructure.

The 13-mile-long earthen Joint System Canal (JSC) was built in 1902 and conveys MID and Rogue River Valley Irrigation District (RRVID) primary water rights from the North Fork and South Fork of Little Butte Creek, as well as stored water in Fourmile Lake and Fish Lake reservoirs. Limited improvements were made to the JSC in the 1950s by Reclamation, including installation of three siphons. The majority of the JSC is now over 120 years old, and the canal loses a significant amount of water to seepage and evaporation (see Section 2.1.2), which requires the District to divert more water than patrons need to ensure water reaches farms. In addition, the canal has had regular failures due to rodent holes, trees, and overtopping from moss issues. The JSC is critical infrastructure for both MID and RRVID since it serves a majority of their irrigated lands and conveys their primary water rights. Together, MID and RRVID deliver water through the JSC to 2,163 agricultural growers who irrigate 21,500 acres (Figure 1-3).

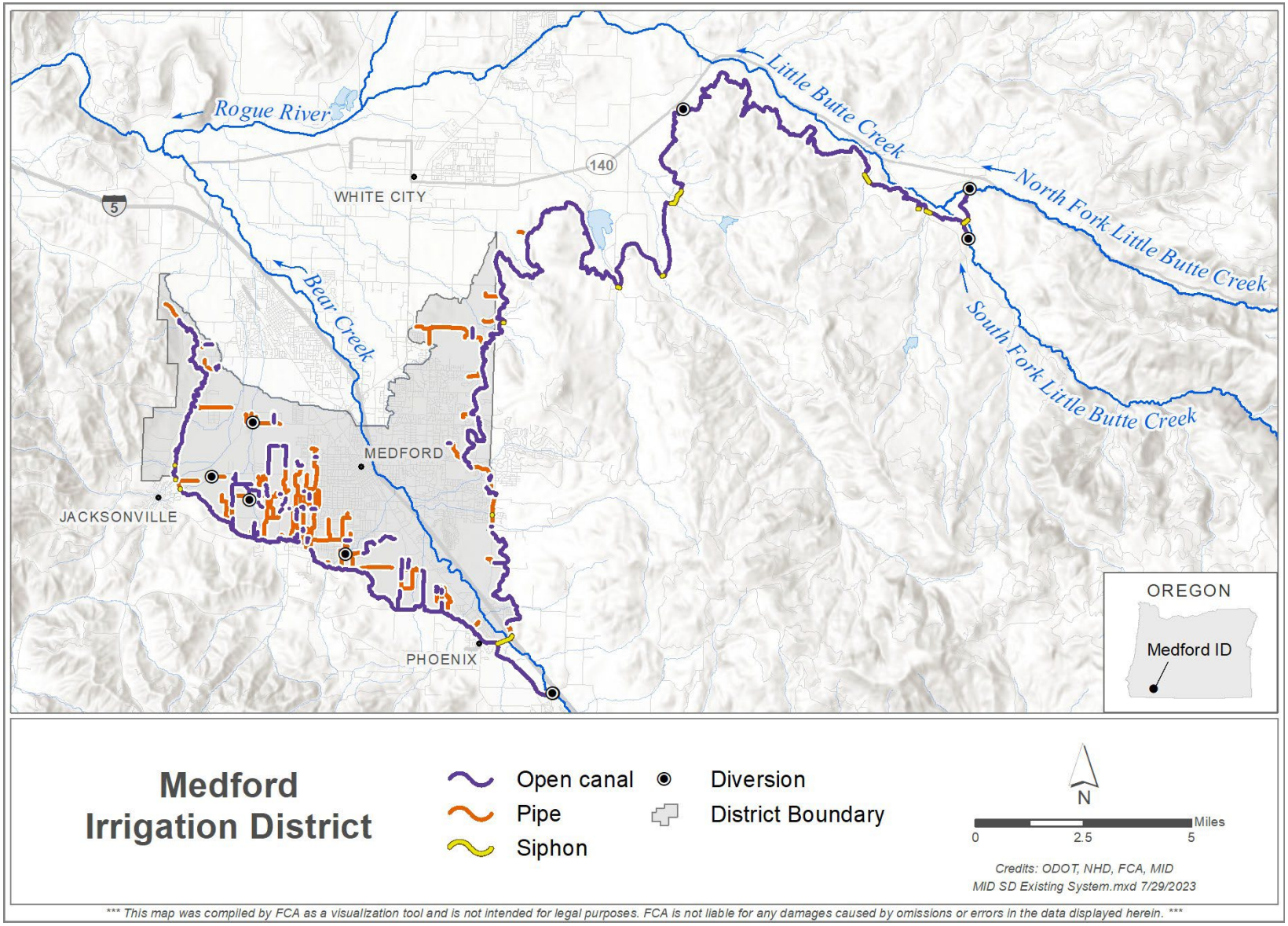


Figure 1-2. Medford Irrigation District existing infrastructure and water sources.

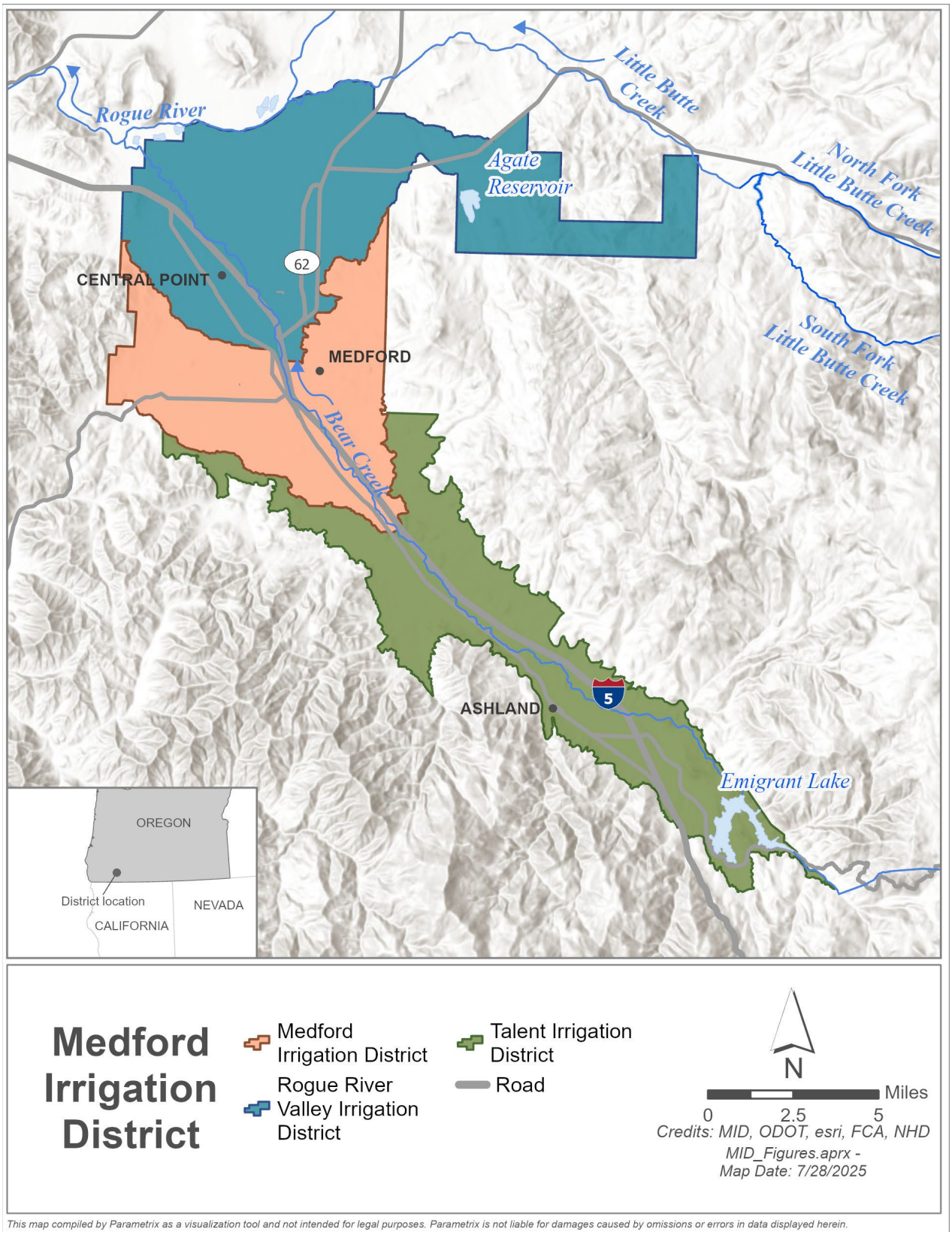


Figure 1-3. Medford, Rogue River Valley, and Talent irrigation districts in Oregon's Rogue River Basin.

1.4 Study Authority and Process

1.4.1 Authority

The NRCS prepared the Watershed Plan-Environmental Impact Statement (Plan-EIS) for the Medford Irrigation District Joint System Canal 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-EIS was prepared in accordance with applicable USDA regulations for implementing NEPA (7 CFR 1b), the NRCS General Manual Part 410 – Compliance with NEPA, and the NRCS National Environmental Compliance Handbook (Title 190 Part 610). This Plan-EIS also meets the NRCS 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-EIS serves to fulfill the NEPA and NRCS environmental review requirements for the proposed action. Note: This environmental document was initiated under the 40 CFR 1500–1508 regulations and the 7 CFR 650 regulations. These regulations have since been rescinded and replaced with USDA's NEPA regulations at 7 CFR 1b. In a good-faith effort to meet NEPA requirements—including Congressional timelines and fiscal constraints—the agency has elected to transition to the 7 CFR 1b regulations as published in the Final Rule. This transition is permissible under the USDA policy guidance provided in the Final Rule, "Transition Period for USDA NEPA Regulations," 91 FR 17091 (April 3, 2026), which allows the use of 7 CFR 1b for preparation of an EIS when a Notice of Intent (NOI) was issued more than 90 days prior to publication of the Final Rule.

1.4.2 Process

For the Medford Irrigation District Joint System Canal Modernization Project Plan-EIS, 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 incorporate 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 follow 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 APEs, 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-EIS 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 1b. 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 2017), Departmental Regulation (DR) 9500-13 (USDA 2017a), 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 this watershed plan is to make the conveyance of irrigation water through the Joint System Canal more efficient and reliable. The project is needed to alleviate agricultural damages to irrigated agriculture and agricultural communities served by the Joint System Canal due to unreliable access to and inefficient delivery of irrigation water. The proposed purpose of this project falls under Pub. L. No. 83-566 Authorized Project Purpose (v), Agricultural Water Management.

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.

Project objectives include improving reliability, efficiency, and long-term resilience of agricultural water deliveries; increasing drought resilience; and improving irrigation water management for irrigators served by Medford Irrigation District (MID) and Rogue River Valley Irrigation District (RRVID). Project constraints include using existing water rights and taking actions allowable under the District's rules.

2.1 Project Need

2.1.1 Water Shortages

In recent years, MID patrons have experienced severe droughts, which have negatively impacted agricultural producers and crop yields. Due to persistent drought, MID did not have a full reservoir storage allotment from 2014-2024 and in some years was unable to deliver irrigation water for the full length of the irrigation season (April 15 – October 1). During 2020-2022, the District did not begin water deliveries until June or July, and the irrigation season ended in August. During these years, irrigators had water for only a quarter of their normal 24-week irrigation season. Crop yields in the District have been negatively impacted by the unreliable and limited water related to drought conditions. For example, some orchards have cut down trees to conserve water for the remaining trees. Other orchards have had enough water to keep trees alive, but not enough to produce a marketable crop.

Additionally, due to rising temperatures and decreasing snowpacks, water supply shortages are expected to worsen in the coming decades. Drought severity in the Jackson County area has increased in the past three decades as compared to previous decades, and drought is expected to increase in frequency, severity, and duration in the future (OWEB 2023). With these projected changes, it is essential that MID deliver water efficiently to conserve water supply and alleviate agricultural damages for irrigators. Irrigation water shortages are also exacerbated due to the aging and inefficient condition of the JSC.

MID's long-term water supply may also be reduced in the future if other, more senior water right users exercise their water rights and reduce supplies available to MID. MID has stored water rights in Fourmile Lake (a primary source of stored water for MID and RRVID), which are junior to the water rights of the Klamath Tribes. In 2023, when the Klamath Tribes exercised their senior water right in Fourmile Lake and instituted a call, releases from Fourmile Lake for MID and RRVID were delayed by a month. While this did not result in a significant disruption to MID and RRVID operations, future calls on Fourmile Lake by the Klamath Tribes may decrease the amount of stored

water available to MID and RRVID. The situation has the potential to further decrease MID's future water supplies.

2.1.2 Inefficient Water Delivery

JSC inefficiencies limit the amount of water that reaches irrigators and require MID to divert more water than is needed for irrigation. MID conveys water through the JSC to serve approximately 2,200 farms that irrigate approximately 21,000 acres in MID and RRVID. The JSC is an open canal that was built in 1902 with limited improvements made in the 1950s.

The aging JSC is primarily earthen and unlined and loses approximately 5,504 acre-feet per year, or 25 percent, of the water it conveys to seepage and evaporation. Conveyance efficiency in the JSC is further decreased by aquatic moss, which grows rapidly in the open canal, particularly in late summer, and reduces the volume of water that can be conveyed in the canal.

The JSC is also susceptible to failure due to failure of a siphon (an underground piped section), rodents, falling trees, and impacts from livestock crossing the canal. A canal failure requires water deliveries to be stopped while the canal is fixed, which can leave irrigators without their primary water source for days to weeks depending on the size of the failure. If a large failure occurred during the peak irrigation months of June-August, it could have major detrimental effects on crop yield, crop quality, farm income, and the regional economy.

To meet irrigation needs further down the system, the JSC inefficiencies require MID to divert more water than what reaches farms. Diverting more water from the Little Butte Creek watershed negatively impacts streamflow. The Little Butte Creek watershed is one of the Rogue Basin's most important habitats and spawning tributaries for the ESA-listed Southern Oregon/Northern California Coast (SONCC) Coho Salmon.

2.2 Problems and Opportunities

2.2.1 Problems

The following resource problems are represented through the project needs:

- Insufficient agricultural water supply during drought conditions reduces agricultural production.
- Greater reductions in future agricultural water supply are anticipated due to forecasted changes in regional snowpack and rainfall.
- Potential for an additional reduction in future agricultural water supply because of potential future calls for water from Fourmile Lake reservoir by the Klamath Tribes.
- The JSC loses water through seepage, evaporation, and operational spills, which exacerbates water shortages.
- The JSC intercepts and captures flow from 13 small streams, disrupting natural flow patterns.
- Rogue River tributaries within the study area have poor water quality due to low streamflow, which adversely impacts aquatic habitat, including for the ESA-listed Southern Oregon/Northern California Coast (SONCC) Coho Salmon.
- The project area is located within a high wildfire hazard area, but emergency responders have limited access to reliable water supplies for firefighting along much of the JSC corridor.

2.2.2 Watershed and Resource Opportunities

The following resource opportunities would be met through implementation of the project:

- Improve irrigation water management by reducing JSC delivery system losses.
- Improve water delivery reliability to MID and RRVID irrigators.
- Increase water supply and drought resilience for MID and RRVID irrigators.
- Minimize the risk of crop damages due to insufficient water delivery.
- Improve streamflow and aquatic habitat within the study area.
- Reconnect upstream and downstream reaches of 13 small streams, restoring natural flow patterns.
- Improve public awareness of MID's work with local farmers, environmental resources, and the economy.
- Educate the public about water conservation.
- Provide reliable access to water for firefighting, improving wildfire response capabilities and reducing risks to nearby communities, agricultural lands, infrastructure, and natural resources.

3 Scope of the Plan-EIS

3.1 Agency, Tribal, and Public Outreach

Federal, state, and local agencies and representatives, as well as nongovernmental organizations, received an invitation to participate in scoping for the project. Advertisements announcing the scoping period and the associated scoping meeting were placed in a local newspaper in addition to multiple online locations including the NRCS website and the project website (see Section 7 for more details). Additionally, the District notified patrons of the scoping meeting and invited comments on the scope of the Preliminary Draft Plan-EIS.

Consultation and coordination between NRCS, the District, BLM, NMFS, SHPO, USACE, USFWS, DSL, and ODFW have been initiated, are ongoing, and will be completed prior to implementation.

Tribal consultation was conducted in accordance with the NHPA and EO 13175, *Consultation and Coordination with Indian Tribal Governments*, to maintain NRCS government-to-government relationships. NRCS sent letters on August 8, 2023, to the Cow Creek Band of Umpqua Tribe of Indians, Coquille Indian Tribe, Confederated Tribes of the Grand Ronde, and Confederated Tribes of the Siletz Indians notifying them of the scoping process.

In accordance with the National Historic Preservation Act (NHPA) of 1966 as amended, and its subparts, NRCS initiated consultation and coordination on April 18, 2024, with the Oregon SHPO, Cow Creek Band of Umpqua Tribe of Indians, Coquille Indian Tribe, Confederated Tribes of the Grand Ronde, Confederated Tribes of the Siletz Indians, and other consulting parties on the Area of Potential Effects (APE). No sacred sites were identified within the APE in consultation with the Tribes.

The completed cultural resources survey report was reviewed by BLM in October 2024. NRCS sent BLM a letter on June 26, 2025, formally requesting NRCS as the lead federal agency for Section 106. NRCS sent the final cultural resources survey report to Oregon SHPO and Tribal Governments with ancestral lands within the county of the APE on November 25, 2024. The Confederated Tribes of the Grand Ronde asked for further information about the cultural resource identification surveys in the initial report. A final edited report was sent back to the Grand Ronde on February 28, 2025, for additional review. A Determination of Eligibility and Findings of Effect letter was submitted to SHPO on July 15, 2025. Additional Section 106 consultation is ongoing with the goal of mitigating adverse effects to the MID JSC, and will be completed prior to the ROD.

3.2 Scoping Meeting

An in-person scoping meeting and a virtual scoping meeting were held in August 2023. The in-person meeting was held at the Medford Library on August 17, 2023, and the virtual meeting was held online on August 22, 2023. Presenters at the meeting included Jane Dalgliesh, NRCS, and Kate Hart, Farmers Conservation Alliance (FCA), and Jack Friend, MID. The presentation covered the financial assistance available through Pub. L. No. 83-566, the project purpose and need, the Plan-EIS process, and ways in which the public could get involved. After the presentation, attendees asked questions and provided comments for the public record. A total of 31 people attended the meeting, excluding staff from MID, NRCS, and FCA.

3.3 Scoping Comments

Scoping comments were accepted from July 19 to September 2, 2023. Comments were submitted at the public meeting and via email, phone, mail, or website.

Comments generally expressed support and requested additional analyses during the planning phase. Table 3-1 presents comment topics received and where they are addressed in this Plan-EIS.

Table 3-1. Public Scoping Comment Summary

Comment Topic	Section Where Topic is Discussed
Support for modernizing the District's infrastructure in a manner that balances the needs of agriculture and ecological health	Section 2, Section 8.1
Support for legally protecting water instream to benefit fish habitat in Little Butte Creek	Section 6.12
Request for including other purposes in the project purpose and need	Section 2
Concern for how fish passage will be considered in the project	Section 4.13.1, Section 6.13.2
Request for a cost-benefit feasibility analysis that investigates alternatives	Appendix D.1
Support for continuing community engagement throughout the planning process	Section 7
Recommendation to conduct wildlife surveys in project area	Section 4.15, Section 6.15
Recommendation to consider climate variability and resilience in the project design	Section 4.16, Section 6.17
Request to keep the public informed on project timeline	Section 7

3.4 Identification of Resource Concerns

Table 3-2 provides 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.

Table 3-2. Summary of Resource Concerns for the Joint System Canal Modernization Project.

Resource	Relevant to the proposed action (Yes/No)	Justification
Air Quality	Yes	Possible temporary increase in emissions from equipment associated with construction activities.
Coastal Zones	No	None present.
Coral Reefs	No	None present.
Cultural and Historic Resources	Yes	Consultation with the SHPO, THPO, and other consulting parties including affiliated tribes is required for compliance with Section 106 of the NHPA. Cultural and historic resources are present in the project area (see Section 6.1).
Ecologically Critical Areas	No	There are no ecologically critical areas that intersect with the project area.
Endangered and Threatened Species: Animals	Yes	ESA-listed threatened and endangered animal species may occur in the project area or its vicinity (USFWS 2026).
Endangered and Threatened Species: Plants	Yes	The habitat within the project study area has been found to be suitable for supporting populations of the federally listed endangered plant Gentner's fritillary (USFWS 2026, Oregon Biodiversity Information Center data report (2023), and Oregon Department of Agriculture website (2024)).
Essential Fish Habitat (EFH)	Yes	EFH occurs in the project area or its vicinity (National Oceanic and Atmospheric Administration [NOAA] 2024).
Fish and Fish Habitat	Yes	The proposed action could affect fish habitat within waterbodies associated with District operations (ODFW 2024a and ORBIC 2023).
Floodplain Management	No	Works of improvement would not occur within nor affect the regulatory floodplains.
Forest Resources	No	The proposed action would not affect forest resources.

Resource	Relevant to the proposed action (Yes/No)	Justification
General Wildlife and Wildlife Habitat	Yes	Construction and operation of project components could affect wildlife near District operations (Oregon State University Libraries & Press and Institute for Natural Resources 2024).
Invasive Species/Noxious Weeds	Yes	Invasive species/noxious weeds occur within the project area (JSWCD 2016, JSWCD 2019, ODA 2024).
Land Use	Yes	Construction and operation of the project could affect land use.
Migratory Birds and Eagles	Yes	Migratory birds and eagles may occur within the project area (ORBIC 2023).
Natural Areas	No	The project area does not cross natural areas.
National Parks, Monuments, and Parklands	Yes	The study area contains parks.
Noise	Yes	Construction of the project could affect noise levels.
Prime Farmlands	Yes	Prime farmlands occur in the project area and could be affected by the project (NRCS 2024).
Public Safety	Yes	Drowning risk in the open canal and flooding could be beneficially affected.
Recreation	Yes	The proposed action could beneficially affect recreation.
Regional Water Resources Plans	No	The project would not affect any regional water resource plans.
Riparian Areas and Wetlands	Yes	Wetlands and riparian areas could be affected by project construction activities or changes in water levels.
Scientific Resources	No	The proposed action is located in a heavily disturbed area. No significant scientific resources are known to occur within the area vicinity.
Soils	Yes	Construction of the project could affect soils.

Resource	Relevant to the proposed action (Yes/No)	Justification
Socioeconomics	Yes	The proposed action could affect the local and regional economy.
Visual Resources	Yes	Visual resources in the project area could be affected where the open canal would be altered.
Water: Groundwater Quantity, Aquifer Recharge	Yes	Construction and operation of the project could affect aquifer recharge in the planning area.
Water: Surface Water Quality	Yes	Operation of the project could improve surface water quality of waterbodies in the planning area.
Water: Surface Water Quantity	Yes	Operation of the project could improve surface water quantity in waterbodies in the planning area.
Waters of the United States, including special aquatic sites	Yes	Construction and operation of the project could affect Waters of the United States.
Wild and Scenic River	Yes	The Rogue River is a Wild and Scenic River within the planning area.
National Economic Development	Yes	An economic analysis has been completed as required by PR&G Interagency Guidelines and is included in Appendix D.1.

BMP = Best Management Practice; EFH = Essential Fish Habitat; ESA = Endangered Species Act; NHPA = National Historic Preservation Act; DEQ = Oregon Department of Environmental Quality; PR&G = Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies; SHPO = State Historic Preservation Office; THPO = Tribal Historic Preservation Officer

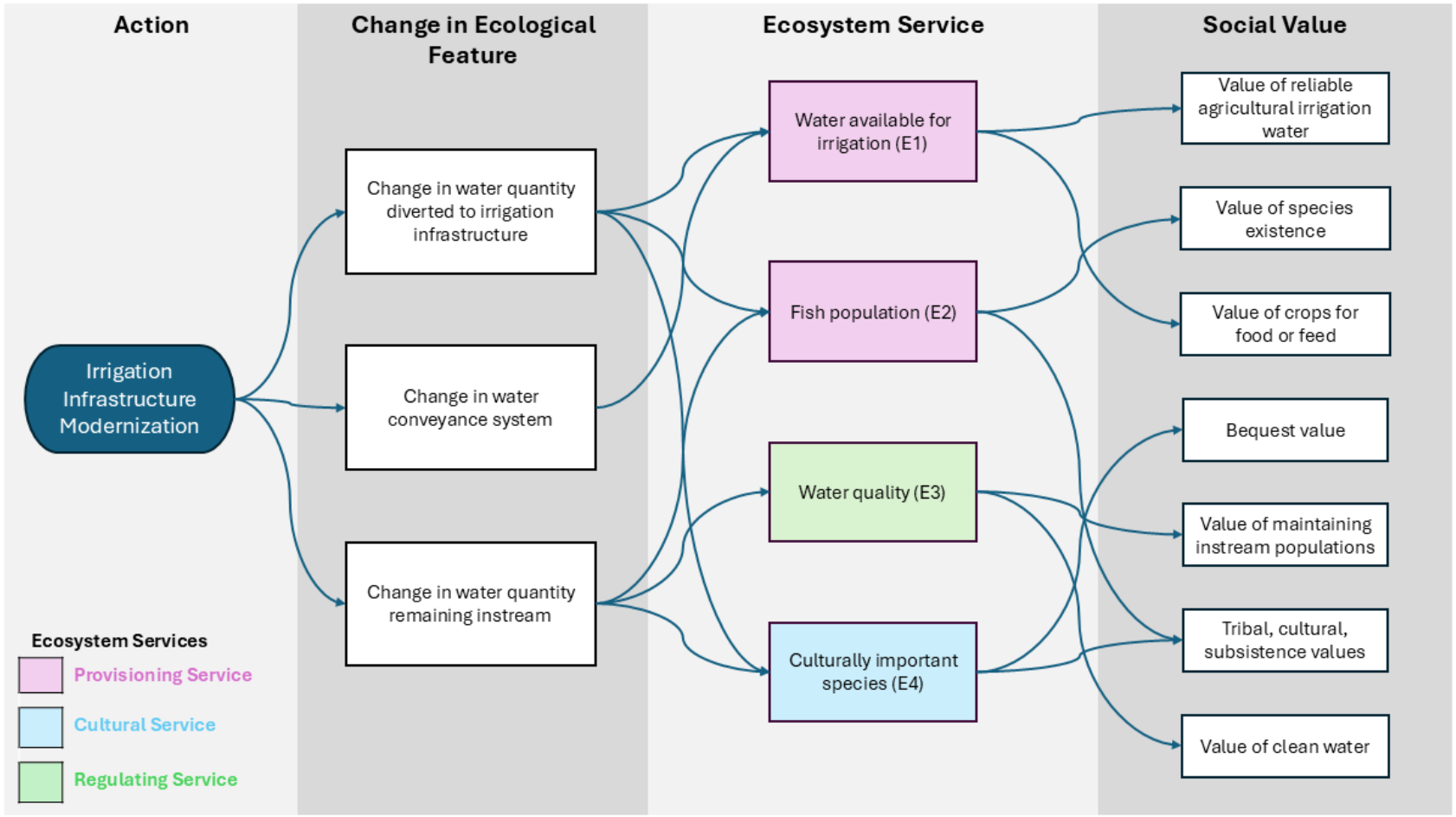
4 Affected Environment

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 MID system. The project area is defined in Section 1.2. Per requirements of the PR&Gs, where applicable, this Plan-EIS describes the ecosystem services associated with each resource. Ecosystem services refer to the benefits that people and their communities derive from their natural environment in which they live. Availability of water for consumption, buffering against crop failure through pollination, 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 requires an ecosystem services assessment to illuminate how management decisions will 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 2022).

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

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.

Figure 4-1 shows 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-EIS because they give rise to and support the final ecosystem services (Provisioning, Regulating, and Cultural) (EEA 2019; USDA 2017).



Note: Ecosystem services concept diagram developed by Farmers Conservation Alliance

Figure 4-1. Ecosystem services concept diagram for the Medford Irrigation District Joint System Canal Modernization Project.

4.1 Cultural Resources

NEPA requires federal agencies to consider the effects of federally funded projects on cultural resources. 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 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.

Section 106 of the National Historic Preservation Act (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties per the regulations at 36 CFR §800.

Initiating the Section 106 process and sharing the Area of Potential Effect (APE), NRCS sent letters to the Oregon SHPO office and to the Coquille Indian Tribe, Cow Creek Tribe, Confederated Tribes of Siletz Indians, and Confederated Tribes of the Grand Ronde, sharing information about the proposed undertakings and requesting consultation (April 18, 2024).

The APE for the project area crossed a portion of federal land, under the Bureau of Land Management. NRCS sent BLM a letter on June 26, 2025, formally offering that NRCS would act as the lead federal agency for the Section 106 process.

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).

For direct effects, the Project's APE was delineated primarily to account for physical and visual effects. Direct effects from construction, such as vibration, noise, and fugitive dust, are expected but are anticipated to be minor and temporary. As such, the APE was defined to include the vertical and horizontal footprint of the areas and/or structures where proposed project activities would occur. This would include activities at, within, and/or adjacent to the MID Joint System Canal junction of the North Fork Canal, South Fork Canal, and Bradshaw Drop, as well as adjacent staging and lay down areas, accessed via existing access roads within the Klamath Drainage District. The APE also includes a 100-foot radial buffer around the project's horizontal footprint to account for effects on the viewsheds of historic properties resulting from alterations to the MID Joint System Canal. For indirect effects, any reasonably foreseeable activities are not anticipated to occur outside of this same area. See APE maps in Appendix C. See Appendix E.2 for detailed information about the ethnographic and historic context of the District, along with information about cultural resources investigations that have been conducted in and near the study area.

The study area includes portions of the traditional territory of the Latakwa (also referred to as the Latagwa) peoples, who traditionally occupied areas of the upper Rogue River drainage, including east of Table Rock to the Cascade Mountains, as well as along Bear Creek and in the vicinity of present-

day Jacksonville (Kendall 1991:589; Ruby et al. 2010:160). Today, descendants of the Latakwa are members of the Confederated Tribes of the Grand Ronde and Confederated Tribes of Siletz Indians and live in communities throughout the region (Kendall 1991:592; Confederated Tribes of the Grand Ronde 2024; Confederated Tribes of Siletz Indians 2024).

Archaeologists at Parametrix reviewed data from the Oregon Archaeological Records Remote Access database to identify previously conducted cultural resource surveys and records of cultural resource records in and near the study area. Fifteen previously conducted cultural resource surveys have been performed in or within 0.5 miles of the APE. Of these fifteen surveys, two partially overlap with this project APE, while the remaining thirteen surveys are located within 0.5 miles of the APE. One historic property was identified in the study area, the MID Main Canal/Joint System Canal (JSC) (Oregon Heritage Office 2015). Additionally, seventeen cultural resources (nine archaeological resources and eight historic built environment resources) were identified within 0.5 mile (Appendix E.2).

The MID Irrigation System and its components were previously evaluated for listing in the NRHP as part of the Rogue River Basin Project (Hovanes et al. 2024). This documentation and evaluation were completed as mitigation stipulated in the 2015 Memorandum of Agreement signed by Reclamation, TID, RRVID, MID, and Oregon SHPO for a Reclamation-funded riparian habitat improvement project involving the TID Main Canal. The MID JSC was determined not eligible for individual listing in the NRHP but eligible for listing in the NRHP as a contributing resource to the Rogue River Basin Project Linear District.

Between April 23 and April 26, 2024, Parametrix archaeologists and an architectural historian performed cultural resources surveys of the APE. Subsequently, between June 17 and 20, 2024, Parametrix archaeologists conducted a pedestrian survey on BLM–owned land and facilities within the APE under Permit # OR-51125. Excerpted sections from the survey report are available in Appendix E.2.

A total of 15 shovel probes were excavated within the APE where both subsurface ground disturbance outside of the existing irrigation canals and laterals is proposed and there is Holocene surface geology present. The surveys identified one surface-exposed archaeological site (temporary designation MID 1) and one surface archaeological isolate (temporary designation ISO-01).

The mitigation measures will be determined through additional Section 106 consultation. The draft cultural resources report was reviewed by NRCS and BLM and was submitted to SHPO and federally recognized tribes on November 25, 2024. SHPO did not provide a response during the 30-day review period. Coquille Indian Tribe responded that they would defer to neighboring Tribes. The Confederated Tribes of the Grand Ronde had comments (see Appendix E.2) and their feedback was incorporated and minor edits were made to the report. NRCS sent the final report, a determination of eligibility, and a finding of adverse effect to SHPO on July 14, 2025. SHPO responded with a letter on August 15, 2025, concurring that the JSC is not individually eligible for listing in the NRHP and that the project will have an adverse effect on historic properties. NRCS will organize consultation meetings with SHPO, Tribes, and interested parties to draft the Memorandum of Agreement (MOA) with mitigation stipulations included within. The MOA will be finalized before the ROD. Table 7.1 in Section 7 and correspondence in Appendix E.2 illustrate consultation efforts to date.

4.2 Land Use

The study area for this land use analysis includes the project area and all parcels within a half-mile buffer to either side of the existing JSC (see the Land Use Technical Report Figure 4-1 [Appendix E.4]). This half-mile distance encompasses all parcels where MID patrons served by irrigation turnouts along the project area are currently using their water. It also encompasses all parcels adjacent to Highway 140 where existing uses could potentially experience temporary effects from construction vehicle traffic during project construction.

The project area is described in Section 1.2 and includes the area where the MID Modernization Project would occur. The project area consists of parcels that are crossed by or adjacent to the existing JSC as well as the potential new siphon alignments that are proposed under the Modernization Alternative. The project area encompasses the footprint of all modernization improvements proposed under the alternatives, including areas needed for construction of permanent infrastructure, staging and storage areas, and temporary construction access.

4.2.1 Land Ownership

The majority of the land in the study area is privately owned. Approximately 1,560 acres within the study area, distributed over 6 parcels, are owned by the Bureau of Land Management (BLM) Medford District. These lands are designated by the BLM's current Southwest Oregon Resource Management Plan (RMP) as District-Designated Reserve – Timber Production Capability Classification and Riparian Reserve – Dry. The District-Designated Reserve – Timber Production Capability Classification applies to forest lands that are identified as unsuitable for sustained-yield timber production. Lands designated as Riparian Reserve – Dry are managed for conservation and recovery of ESA-listed fish species and their habitats and to maintain water quality, streamflows, and aquatic biodiversity, among other objectives (BLM 2016). See the Land Use Technical Report (Appendix E.4) for additional detail on BLM management prescriptions. BLM also holds permanent access easements across several privately owned parcels adjoining BLM-owned forest lands within the study area, to facilitate forest management activities. In addition, the Southern Oregon Land Conservancy owns six conservation easements totaling approximately 2,208 acres on private farm and forest lands in the Little Butte Creek Watershed. Portions of one of these easements are located within the study area slightly less than 0.5 mile east of the eastern terminus of the pipe, but they do not adjoin or intersect the project area (SOLC 2022).

4.2.2 Zoning

4.2.2.1 Exclusive Farm Use (EFU)

The majority of the study area (5,053 acres) is zoned Exclusive Farm Use (EFU). The EFU zones are established and regulated by state law and intended to preserve the maximum amount of agricultural land for the continued practice of commercial farming. The EFU zoning district functions to conserve agricultural lands in Jackson County for farm use, and implements the Oregon Agricultural Land Use Policy, ORS 215.243, Oregon Administrative Rules, and Statewide Planning Goal 3 (Agricultural Lands), and OAR 660-033. See the Land Use Technical Report Figure 4-2 (Appendix E.4).

4.2.2.2 Aggregate Removal (AR)

Approximately 903 acres of land in the northwestern portion of the study area are designated as Aggregate Removal (AR). The purpose of the AR zoning district is to allow the development and use of significant mineral and aggregate resources subject to uniform operating standards; to balance

and resolve conflicts between surface mining activities and activities on surrounding land; and to ensure the protection of natural resources and the reclamation of mined land. The AR zone is intended to protect the resource from incompatible uses, particularly residential uses, which may inhibit the extraction, crushing, and transportation of the resource.

4.2.2.3 Woodland Resource (WR) and Open Space Reserve (OSR)

The Jackson County Comprehensive Plan identifies areas of the county as forest land, the purpose of which is to conserve forest lands for forest uses and ensure a continued yield of forest products. Forest lands are designated in the Comprehensive Plan and on comprehensive plan map(s) as Forest Open Space (FOS). The adopted Jackson County zoning map(s) divides FOS-designated lands into three zoning districts: Woodland Resource (WR), Open Space Reserve (OSR), and Forest Resource (FR).

Approximately 117 acres of the study area are located in the WR zoning district and another roughly 389 acres are located in the OSR zoning district. The WR and OSR districts implement Statewide Planning Goal 4 (Forest Lands) and OAR 660.006, which governs the conservation of forest lands as defined by Goal 4 and defines standards for compliance with implementing statutes.

4.2.2.4 Rural Residential Zone (RR-5) and Rural Service Commercial (RS)

The remainder of the study area (approximately 34 acres) is located within the RR-5 and RS zones. These zones are described further in the Land Use Technical Report (Appendix E.4). Zoning in the study area and the project area, along with the number of parcels and approximate acreage located within each zoning district, is identified in Table 4-1.

In the EFU zone, “irrigation canals, delivery lines, and accessory structures and facilities associated with a district” are permitted via a Type 2 review, per Jackson County LDO Section 4.2.2. Type 2 uses are subject to 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.

In the AR zoning district, “agriculture (farm use)" and accessory uses and structures are allowed by right (LDO Section 4.4.3). In forest resource zoning districts, including the OSR and WR zones, “water intake facilities, canals, and distribution lines for farm irrigation and ponds” are allowed by right (LDO Section 4.3.3). Uses allowed by right in each zoning district may be permitted via a Type 1 review process, which is the least complex type of land use permit review. Type 1 uses require only non-discretionary staff review to demonstrate compliance with the standards of the LDO and thus do not require public notification or an opportunity for a hearing.

4.2.2.5 Overlays

The purpose of overlays is to protect site-specific environmental and cultural resources through the application of additional development regulations and requirements. Uses within the overlays are governed by the underlying zoning regulations as well as the special regulations set forth in Chapter 7 of the LDO. Overlays identified within the Study Area include the Aggregate Conflicting Use Impact Area and the Floodplain Overlay.

Table 4-1 Study Area Parcels and Zoning

Zoning District	Parcels (Study Area)	Acres (Study Area)	Parcels (Project Area)	Acres (Project Area)
Exclusive Farm Use Zone (EFU)	149	5,053	29	4,353.1
Aggregate Removal (AR)	11	903	5	394.1
Open Space Reserve (OSR)	11	389	2	240.2
Woodland Resource Zone (WR)	1	117	1	117.0
Rural Residential (RR-5)	11	31	0	0
Rural Service Commercial (RS)	3	3	0	0

4.2.2.5.1 Aggregate Conflicting Use Impact Area

The Aggregate Conflicting Use Impact Area overlay consists of the area surrounding properties zoned Aggregate Removal (AR), where the potential may exist for new uses or development to adversely affect or interfere with mining and processing operations. This overlay generally extends 1,500 feet from the boundaries of a mining area, but may extend a greater distance where significant potential conflicts have been identified. Portions of the project area located adjacent to AR-zoned lands are assumed to lie within the Aggregate Conflicting Use Impact Area. The extent of this overlay, if greater than 1,500 feet from the boundaries of AR-zoned lands, would be confirmed during a pre-application conference with the Jackson County Planning Department prior to submittal of a land use permit application.

4.2.2.5.2 Floodplain Overlay

The Floodplain Overlay applies to all areas within the 100-year floodplain within the jurisdiction of Jackson County, as shown on Flood Boundary and Floodway Maps or FEMA Flood Insurance Rate Maps (FIRM). The purpose of this district is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas. The Floodplain Overlay overlaps with approximately 0.14 acre (6,191 square feet) of the project area near the junction of the North Fork Canal and South Fork Canal.

4.2.3 Land Use

Existing land use throughout the study area is primarily characterized by agriculture (approximately 5,000 acres), with aggregate removal and forestry making up the majority of the remainder. Approximately 903 acres in the northwestern portion of the study area are in aggregate extraction use and occupied in part by the Panther Quarry and Panther Crushing Company, a rock crushing business. Forestry and open space uses are also sporadically present throughout the study area.

Intermittent rural residential development is located along the Highway 140 corridor and primarily concentrated in the unincorporated community of Brownsboro. Many of the residences are associated with adjacent farming and ranching operations. One vacant commercial-zoned property is located at the intersection of Highway 140 and Brownsboro-Eagle Point Highway in the northwesternmost portion of the study area.

Crops grown within the District are generally reflective of crop types grown in Jackson County as a whole, consisting of hay and forage as well as pears, wine grapes, and other fruit, hemp, and vegetables. Table 4-2 summarizes the most recent available crop data for the District and Jackson County (MID 2017; USDA-NASS 2022).

Table 4-2. Top Crops Grown in the District and Jackson County (Acres).

Crop type	MID (2016)[1] (acres)	Jackson County (2022)[2] (acres)
Cereals	612	986
Forage (Hay/Haylage, Alfalfa, and Other Pasture Crops)	6,154[3]	17,772
Orchard crops (Pears, Apples, Peaches)	3,288	4,190
Grapes and Berries	490	3,314
Vegetables	586	291
Hemp (Cannabis)	N/A	369
Other (yard, garden, etc.)	1,070	N/A
TOTAL	**12,200**	**26,922**

[1] 2016 data from MID 2017.

[2] Source: USDA-NASS 2022 Agricultural Survey for Jackson County, OR

[3] This 6,514 acres may include land that is used for schools, cemeteries, and golf courses (MID 2017)

4.2.4 Ecosystem Services

Provisioning service: Water available for irrigation (Figure 4-1 [E1]): Water is diverted from North and South Fork Little Butte Creek and is delivered to patrons within the District service area. This water allows for cultivation of crops, including hay and forage to support livestock production as well as pears, grapes, other fruit and vegetables, and hemp products for human consumption.

4.3 Public Safety

The study area for the public safety analysis is the same as the Project Area, as described in Section 1.2, which includes the existing JSC alignment, as well as potential staging areas and piping siphon options.

The existing open canal poses a risk to public safety when it carries water during the irrigation season. During the summer months when irrigation water is flowing at peak volume in the canal, water depths can reach 1 to 2 feet with water moving through the canal at up to 50 cubic feet per second. These conditions result in areas of deep, swift water that can make it difficult for a child or adult to get to safety and can result in injury or death.

The public can currently access the canal at very few points along the system. Only one public road crosses the existing alignment – South Fork Little Butte Creek Road. The majority of the other access points are from private access roads serving the private lands and rock quarries in the Project Area.

Wildfire in Southern Oregon and in the wildland-urban interface and rural areas where the Project Area is located has become an increasing concern to the public in recent years. Data from the U.S. Forest Service (USFS) Oregon Wildfire Risk Explorer shows that almost all of the land in the project area is considered to have a high wildfire risk (USFS and ODF 2024). In 2020, the Almeda and South Obenchain fires burned through the Rogue Valley, destroying thousands of homes in one of the most destructive fires in Oregon's recorded history (Chavez 2023). In June 2025, the Upper Applegate Fire prompted evacuation notices for more than 1,000 people in Jackson County southwest of Medford (OPB 2025).

4.4 Air Quality

4.4.1 Regulatory Background

General conformity ensures that the actions taken by federal agencies do not interfere with a state's plans to attain and maintain national standards for air quality. General conformity applies to all Federal actions (e.g., funding, licensing, permitting, or approving) that do not include federal transportation projects and that take place in nonattainment or maintenance areas for all criteria pollutants: ozone (O3), particulate matter (PM10, PM2.5), nitrogen dioxide (NO2), carbon monoxide (CO), lead, and sulfur dioxide (SO2).

Under the Clean Air Act, EPA sets air quality standards and periodically updates the standards to ensure that they are continuously protective of public health. Based on new health information, the EPA has proposed to tighten the fine particulate matter standard and is beginning review of the ozone standard. State and local agencies are required to monitor air quality within their jurisdictions and to use their monitoring data as the basis to classify areas as "attainment" (meeting the standards), "nonattainment" (not meeting the standards), or "unclassifiable" (not enough information to classify). Oregon DEQ operates a statewide monitoring network to address this requirement. The Rogue Valley Council of Governments, which acts as the Metropolitan Planning Organization for Jackson and Josephine counties, and Oregon DEQ have classified the project area as a "maintenance" area. Two pollutants are a concern in the Rogue Valley: carbon monoxide (CO) in Medford, and particulate matter less than 10 microns in diameter (PM10) in the Bear Creek Basin.

The State Implementation Plan (SIP) is an air quality plan that shows how an area will meet National Air Quality Standards. SIPs are required for nonattainment or maintenance areas, prepared by the state, and approved by EPA. SIPs provide for the implementation and enforcement of emission control measures from all source categories.

The CO and PM10 Air Quality Maintenance Areas (AQMA) are two distinct maintenance areas with different boundaries. The CO AQMA encompasses the City of Medford's Urban Growth Boundary (UGB). The Medford-Ashland PM10 AQMA covers about 228 square miles and approximates the Bear Creek Basin.

Medford-Ashland PM10 SIP

The Medford-Ashland AQMA is the designated PM10 nonattainment boundary for the greater Medford area. The AQMA encompasses much of the Rogue Valley of Southwest Oregon and includes the communities of Ashland, Talent, Phoenix, Medford, Central Point, Jacksonville, White City, Eagle Point, and the intervening lands of Jackson County.

Medford UGB Carbon Monoxide SIP

Air quality monitoring results demonstrate that the Medford UGB area meets the National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO). In accordance with the 1990 Federal Clean Air Act Amendments (CAA), the Department of Environmental Quality (DEQ) is requesting the Environmental Protection Agency (EPA) to redesignate the Medford area to "attainment" status for carbon monoxide. Accompanying this request is a CO maintenance plan required by the CAA that demonstrates how the area will continue to maintain acceptable levels of carbon monoxide at least ten years after EPA's approval.

The project area for the Joint System Canal piping project is outside of both the Medford-Ashland PM10 AQMA boundary and the Medford UGB CO AQMA boundary. As a result, there is no requirement for a general conformity analysis for the Federal action (funding) being considered for the Joint System Canal piping project.

Existing Conditions

The Joint System Canal is an irrigation water canal that is not a source of air quality criteria pollutants.

4.5 Socioeconomic Resources

The project area lies within Jackson County, Oregon. The study area for the analysis of potential impacts to socioeconomic resources consists of demographic data from block groups adjacent to the project area – Block Groups 1 and 2, Census Tract 25; and Block Group 2, Census Tract 26. Economic conditions were analyzed at the county level. The socioeconomic resources are illustrated in Figure 4-2 below.

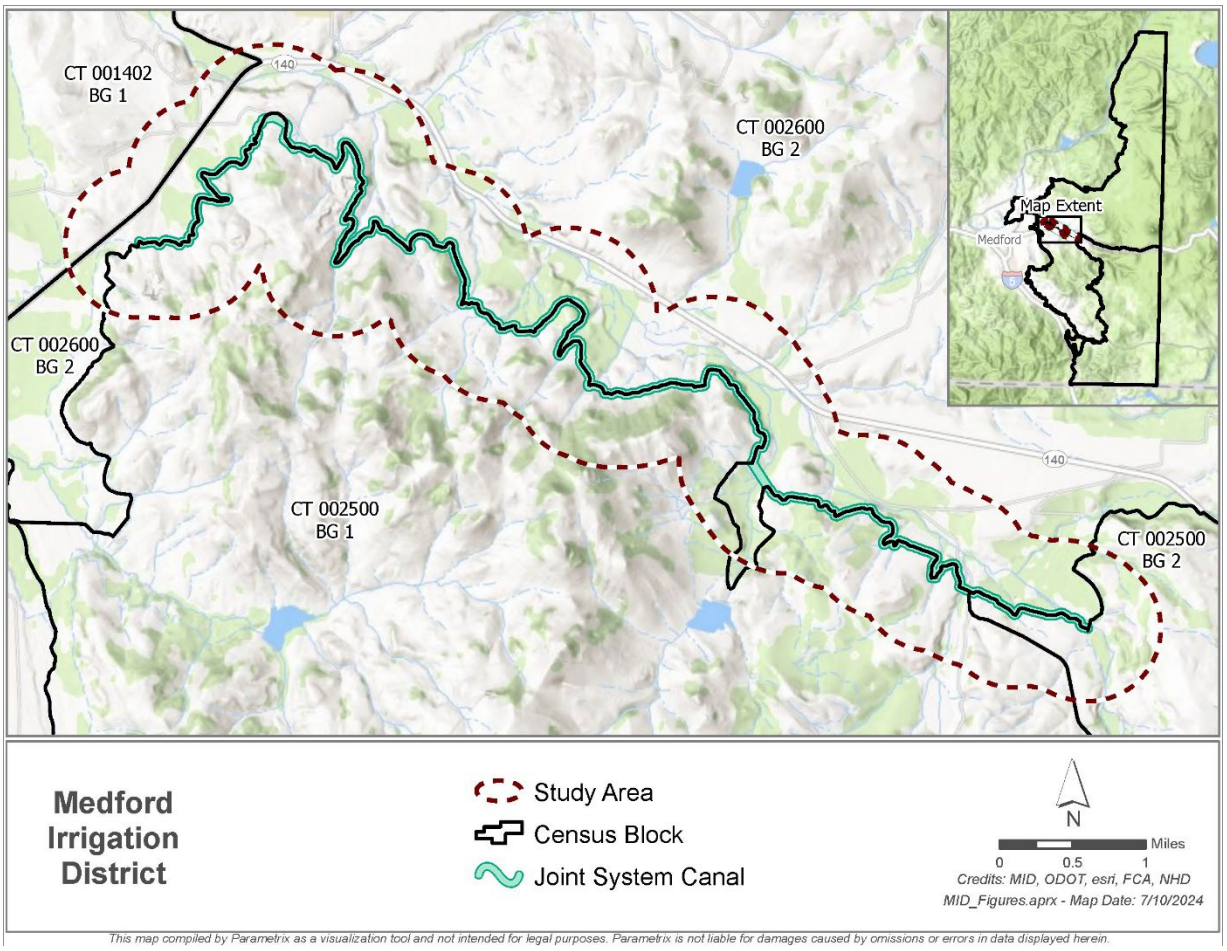


Figure 4-2. Overview of the Study Area for analysis of Socioeconomic Resources.

4.5.1 Population

Table 4-3 shows the population characteristics for the study area. Between 2016 and 2021, the population of the study area increased by approximately 20 percent.

Table 4-3. Population Characteristics

Area	2016 Population	2021 Population	Percent Change, 2017 to 2022
Jackson County	3,104	3,726	+20%

Source: U.S. Census Bureau 2016, 2021.

Race and ethnicity in the study area and the state of Oregon are summarized in Table 4-4. Approximately 25 percent of the population of Jackson County identifies as a minority, similar to the statewide proportion in Oregon (approximately 28 percent).

Table 4-4. Race and Ethnicity

Indicator	Study Area	Oregon
Total Population in 2021	3,726	4,207,117
Two or More Races	4.4%	7.7%
One Race	-	-
White alone	88.5%	80.7%
Black or African American alone	3.1%	1.9%
American Indian or Alaska Native alone	0.1%	1%
Asian alone	0.4%	4.4%
Native Hawaiian and Other Pacific Islander alone	0.4%	0.4%
Some other race	0%	3.8%
Hispanic or Latino (of any race)	3%	13.6%
Not Hispanic or Latino	97%	86.4%

Source: US Census Bureau 2021.

4.5.2 Area Employment and Income

The study area has lower labor force participation rates and employment rates than Oregon as a whole (Table 4-5). The study area unemployment rate is higher than that of the state.

Table 4-5. Labor Force Characteristics

Indicator	Study Area	Oregon
Labor Force Participation Rate	53.4%	62.6%
Employed	49.4%	59.0%
Unemployment Rate	4%	3.5%

Source: U.S. Census Bureau 2021.

4.5.3 School Demographics

The Lake Creek Learning Center elementary school is located approximately 0.5 miles from the project area. The school had 39 students in the 2022-2023 school year. Of these students, 95 percent

identify as white and 5 percent identify as multiracial. More than 95 percent of students are eligible for free or reduced-price lunch.

4.6 Neighborhoods

The study area for neighborhoods analysis includes a 0.5-mile buffer around the project area. This analysis includes neighborhoods and communities, schools, social service providers, and other community facilities. Parks are analyzed in Section 4.7.

Within the study area, the JSC alignment primarily passes through agricultural and forest land. The alignment is near the unincorporated communities of Lake Creek and Brownsboro, Oregon, both of which fall at least partially within the study area. The communities are rural in nature and have few community services or social service providers located within the study area. There are existing residences and commercial uses within the study area. For more information on land uses within the study area, see the Land Use Technical Report (Appendix E.4) and Section 4.2.3.

In Lake Creek, both the Lake Creek Grange and Lake Creek Pioneer Hall are located within the study area. Both facilities are community gathering places where local events are hosted. The Lake Creek Pioneer Hall features historical exhibits hosted by the Lake Creek Historical Society and a privately owned park space adjacent to South Fork Little Butte Creek.

The Lake Creek Learning Center is the only school located within the study area. It is within the Eagle Point School District and had an enrollment of 39 students in the 2022-2023 school year. More information on schools and student demographics is provided in Section 4.5.3.

Social services in the area are provided by Jackson County Health and Human Services. Services provided include addiction treatment and prevention, animal services, developmental disability services, environmental public health services, mental health services, public health services, and veterans' services. There are no service providers physically located within the study area.

4.7 Parks and Recreation

The study area for parks and recreation analysis includes a 0.5-mile buffer around the project area. This analysis includes public and private park and recreation facilities within the study area.

There are few formal parks or recreation facilities within the study area. The school grounds at Lake Creek Learning Center include a grassy field as well as a playground area. There is a privately owned park adjacent to the Lake Creek Pioneer Hall. This park is located adjacent to South Fork Little Butte Creek and features a grassy field and bandstand and is used for events such as company picnics and weddings.

Section 6(f) of the Land and Water Conservation Fund (LWCF) Act prohibits the conversion of park and recreational areas developed with LWCF funding to a non-recreation use without the approval of the National Park Service and provision of replacement property. A review of the Oregon Parks Land Ownership/LWCF Map Application indicates that there are no LWCF-assisted properties within the study area (OPRD 2024). Section 6(f) regulations do not apply to the proposed project.

4.8 Soils

The study area for soils is the same as the project area, which includes areas where construction would occur and spans 50 feet from the canal centerline on both sides for a total width of 100 feet.

Soils in MID are generally gravelly clay loams with volcanic ash properties due to the geological influence of the eruption of Mt. Mazama (Crater Lake).

McMullin gravelly loam makes up 25 percent of the project area. The Tulebasin series consists of shallow, well and somewhat excessively drained soils that formed in material weathered from shale, sandstone, basic igneous and metamorphic rocks. These soils are on ridges and south-facing slopes and have slopes of 1 to 75 percent. Principal plants are Idaho fescue, Lemmon needlegrass, associated shrubs, hardwoods, forbs, and scattered pine. Some areas are dominated by wedgeleaf ceanothus and manzanita.

The McMullin – Rock outcrop complex with slopes of 3 to 35 percent makes up another 22 percent of the project area. This is the same soil series as above, with rock outcrops defining much of the area.

Carney clay makes up 10 percent of the project area. The Carney series consists of moderately deep, moderately well drained soils formed in alluvium and colluvium weathered from tuffs and breccias. The Carney series consists of moderately deep, moderately well drained soils on fans and hillslopes. Slopes are 1 to 35 percent.

Medco cobbly clay loam makes up 10 percent of the project area. The Medco series consists of moderately deep, moderately well drained soils that formed in alluvium and colluvium from tuffs, breccias, and andesite. Medco soils are on hillslopes and have slopes of 1 to 50 percent. Native vegetation is Oregon white oak, ponderosa pine, shrubs, and grasses in dry areas; and Douglas fir, ponderosa pine, shrubs, and grasses in moist areas.

The potential for water-based erosion on most of these soil types is moderate because they each occur on slopes of 0 to 75 percent. Soil loss in the area is due to both water-based erosion and wind-based erosion. As described above for the McMullin – Rock outcrop complex, approximately 22 percent of the project area runs through rock formations/outcroppings located in the northern portion of the alignment.

4.8.1 Farmland Classification

NRCS has developed technical soil groups that are associated with a particular soil type and a soil's rating for agricultural commodity production (NRCS 2024). NRCS soil groupings within the project area are 14 percent farmland of statewide importance and 86 percent not prime farmland.

4.9 Vegetation

The study area for vegetation analysis is limited to the project area where construction would occur and an additional 200-foot buffer on either side to account for potential indirect long-term impacts. Additionally, the study area for vegetation analysis includes areas within 200 feet adjacent to Fourmile Lake, Fish Lake, and North Fork Little Butte Creek, all of which may be influenced by the project.

4.9.1 General Vegetation

Vegetation provides ecological functions to a variety of environments. Vegetation provides habitat and food sources for wildlife, improves air quality, provides in-stream shade, filters stormwater, and contributes to flood control. Vegetation also provides societal benefits by connecting people with nature and reducing stress (Oregon Watershed Plans 2020). Even though the portions of the study area are used for agricultural operations, residential development, rock mines, roads, and irrigation

infrastructure, the existing vegetation provides important ecological functions to the immediate surroundings, supporting biological resources.

The study area landscape supports a variety of vegetation communities including oak woodland, mixed conifer forest, riparian areas, madrone stands, poison oak thicket, and native grassland (Oregon State University Libraries & Press and Institute for Natural Resources 2018). The most common trees are Oregon white oak (*Quercus garryana*), California black oak (*Q. kelloggii*), bigleaf maple (*Acer macrophyllum*), and Douglas fir (*Pseudotsuga menziesii*) (CPNH 2024; Oregon Flora 2024). Table 4-6 provides a list of common tree species in the area (Consortium of Pacific Northwest Herbaria 2024). A comprehensive list of plant species observed during the field survey can be found in the Terrestrial Ecology and Wetlands and Riparian Areas Technical Report (Appendix E.5), which accompanies this Plan-EIS.

Table 4-6. Common Tree Species in the Study Area

Vegetation Species	Scientific Name
Black cottonwood	*Populus trichocarpa*
Bigleaf maple	*Acer macrophyllum*
California black oak	*Quercus kelloggii*
Douglas fir	*Pseudotsuga menziesii*
Field horsetail	*Equisetum arvense*
Oregon ash	*Fraxinus latifolia*
Oregon white oak	*Quercus garryana*
Red alder	*Alnus rubra*
White alder	*Alnus rhombifolia*

Fringes of hydrophytic plants occur along the margins of the top of the canal bank in some areas and are formed mainly by reed canary grass (*Phalaris arundinacea*), sedges (*Carex* sp.), rushes (*Juncus* sp.), and willow (*Salix* sp.). Where present, this fringe ranges from narrow stretches to 5 feet wide or wider. During the warmer months of July and August, submerged aquatic plants (species of aquatic moss and algae) thrive in shallow waters of the slower-flowing segments of the JSC and are mechanically removed by MID (2024).

MID manages vegetation along the JSC using various methods to ensure efficient water flow, prevent erosion, and maintain the structural integrity of the canal. Mechanical clearing is performed annually to remove aquatic moss and algae, as the use of aquatic herbicides in open canals is not currently permitted. Regular mowing of grasses and weeds is conducted along the canal banks to prevent overgrowth and reduce the presence of invasive species. In the off-season, MID reshapes the canal to remove silt, which helps reduce the growth of aquatic moss. This process often involves

excavation or regrading, which can impact nearby vegetation by disrupting their root systems, altering soil conditions, and/or exposing them to erosion or sedimentation.

4.9.2 Federally Listed Plant Species

A list of federally and state-listed plant species that may occur within the study area was compiled using the USFWS Official Species List for the project (USFWS 2026), Oregon Biodiversity Information Center data report (2023), and Oregon Department of Agriculture website (2024), and was confirmed through coordination with USFWS (see Section 7.1). While a formal rare plant survey was not conducted in the study area, Parametrix determined potential for occurrence based on species habitat requirements, known habitat presence, and field observations. The full list and details of review and determination are provided in the Terrestrial Ecology and Wetlands and Riparian Areas Technical Report (Appendix E.5).

The habitat within the project study area was determined to have the potential to be suitable for supporting populations of the endangered Gentner's fritillary (*Fritillaria gentneri*). This rare plant occurs in various environments but is most commonly found in the transitional zones between meadows and oak woodlands, which are abundant in the study area. Parametrix and USFWS botanist Sam Friedman surveyed a portion of the Project Area on April 24, 2024 to determine habitat suitability for the species within areas where ground disturbance would occur. No individuals were observed, and the majority of the area was not suitable habitat for the species. However, a 0.6 acre area located within 0.5 miles from the eastern most extent of the Project Area contained checker lily (*Fritillaria affinis*) and had similar habitat requirements as Genter's fritillary. During the survey, Geneter's fritillary was not observed and was determined to be absent from this location. Overall, it was determined the species is absent where ground disturbance would occur. State-Listed Plant Species.

The habitat within the project study area has been found to be suitable for supporting populations of the following state-listed plant species:

- Gentner's fritillary (*Fritillaria gentneri*), endangered;
- Wayside aster (*Eucephalus vialis*), threatened;
- White fairy poppy (*Meconella oregana*), threatened;
- Southern Oregon buttercup (*Ranunculus austro-oreganus*), candidate.

Potential occurrence of endangered state-listed Gentner's fritillary is discussed above.
Wayside aster, white fairy poppy, and southern Oregon buttercup all may occur in a variety of habitats including open oak savannahs, mixed forests, grasslands, and along roadsides, in association with Douglas fir (*Pseudotsuga menziesii*), Oregon white oak (*Quercus garryana*), California black oak (*Quercus kelloggii*), and poison oak (*Toxicodendron diversilobum*), all of which occur throughout the study area (NatureServe Explorer 2024). While native species typically associated with wayside aster, white fairy poppy, and southern Oregon buttercup were observed in the project area, no state-listed plants were identified during the survey.

4.9.3 Common and Noxious Weeds

The Jackson Soil and Water Conservation District determines a weed to be noxious if it is "harmful to animals, water, or humans." Plants that spread aggressively outside of their range, outcompeting native plants, are called invasive (JSWCD 2016). Furthermore, it is recognized that certain noxious weeds are so pervasive that they have been classified by ORS 569.350 to be a menace to public

welfare. The Oregon Noxious Weed Policy and Classification System (ODA 2024) categorizes weeds into three main classes: A, B, and T. A-listed weeds are those of known economic importance that are either not yet present in Oregon or are present in small enough infestations that eradication or containment is possible. B-listed weeds are economically significant and regionally abundant, but may have limited distribution in some counties, requiring intensive control measures. T-designated weeds are a subset of B-listed weeds that are prioritized for prevention and control efforts by the Noxious Weed Control Program. This classification helps prioritize and implement effective weed management strategies across the state. A variety of noxious weeds are found within the study area (JSWCD 2016; JSWCD 2019). Table 4-7 lists the noxious and common weeds found in the study area.

Table 4-7. Noxious Weeds Present or Potentially Occurring in Study Area

Vegetation Species	Scientific Name	Oregon Department of Agriculture Noxious Weed Rating
Canada thistle	*Cirsium arvense*	B
English ivy	*Hedera helix*	B
Garlic mustard	*Alliaria petiolata*	B (T)
Himalayan blackberry	*Rubus armeniacus*	B
Japanese knotweed	*Polygonum cuspidatum*	B
Puncturevine	*Tribulus terrestris*	B
Purple loosestrife	*Lythrum salicaria*	B
Scotch broom	*Cytisus scoparius*	B
Spotted knapweed	*Centaurea maculosa*	B
poison-hemlock	*Conium maculatum*	B
Yellow flag iris	*Iris pseudacorus*	B
Yellow star-thistle	*Centaurea solstitialis*	B
Herb Robert	*Geranium robertianum*	B
Medusahead rye	*Taeniatherum caput-medusae*	B
St. Johnswort	*Hypericum perforatum*	B
Ventenata grass	*Ventenata dubia*	B

Sources: JSWCD 2016; JSWCD 2019; ODA 2024.

Jackson County's vegetation management includes control of invasive plant species of concern such as puncturevine (*Tribulus terrestris*), Scotch broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus armeniacus)*, and Russian thistle (*Salsola tragus*) (BLM 2017). Aquatic treatments have targeted yellow flag iris (*Iris pseudacorus*), purple loosestrife (*Lythrum salicaria*), and cattails (*Typha* spp.), and biocontrol releases have been coordinated to treat puncturevine (BLM 2017).

As detailed above in Section 4.9.1, MID utilizes a variety of methods to combat the spread of invasive species within and along the Joint System Canal. A mechanical clearing method is utilized to address moss growth in the open canals. Notably, herbicides cannot be applied to combat aquatic or wetland weeds such as reed canarygrass or yellow iris due to the water's use for crop irrigation and livestock (MID 2024). Consequently, the open canal becomes susceptible to the spread of noxious weeds.

4.10 Hazardous Materials

The study area for hazardous materials includes a 0.5-mile radius around the project area. A review of federal, state, and local regulatory database records was conducted to identify sites within the study area that use, store, or transport hazardous or regulated materials, or sites that have had releases of hazardous or regulated materials to the ground or subsurface (EDR 2024). These sites are considered sources of potential hazardous material contamination. The EDR report is a summary of DEQ and EPA database searches for sites of possible environmental concern.

4.10.1 US MINES Database

According to the data in the EDR report, six facilities listed on the US MINES (United States Mining Sites) database as active or abandoned mines (rock quarries) are located within the western portion of the study area. Only one of these appears to be adjacent to the project area (L&S Rock Products, Stanley Pit, located at 6540 Hwy 140). One active rock quarry, Panther Pit (7776 Hwy 140), is operating in the project area.

4.10.2 UST/LUST Databases

Additionally, two facilities are listed on both the Underground Storage Tank (UST) and Leaking Underground Storage Tank (LUST) databases. The Lake Creek Store facility (1562 S Fork Little Butte Creek Road) is located approximately 850 feet to the north of the project area, and according to the listing, cleanup of the LUST was completed in 1988 and the tanks have been decommissioned. The Brownsboro Tavern facility (5322 Brownsboro Hwy) is located approximately 1,450 feet to the north-northwest of the project area, and according to the listing, cleanup of the LUST was completed in 1993 and the tanks have been decommissioned.

4.11 Visual Resources

4.11.1 Open Canal Project Area and Adjacent Lands

The Jackson County Land Development Ordinance (Jackson County 2005) Chapter 7 includes Overlay Districts and Areas of Special Concern (ASC). ASC 90-9 Scenic Resources Overlay District applies to lands identified by the Jackson County Planning Commission and Board of Commissioners as important scenic resources that significantly contribute to the landscape character of the County. They include distinctive scenic areas, views, sites, streams, and roadway corridors.

The nearest Scenic Resources Overlay District to the project area is in the Cascade-Siskiyou National Monument, approximately 10 miles east of Lake Creek, Oregon. As noted in Section 4.3, Public Safety, there are very few public roads within the project area and due to the hilly terrain and

oak savannah tree canopy, the JSC is not readily visible from most viewpoints along Oregon State Route 140. The canal is only readily visible to a limited number of private landowners that are adjacent to the canal.

4.12 Water Resources

The study area for water rights and surface water resources includes the project area and all waterbodies affected by District operations and that may be impacted by the Modernization Alternatives. These waterbodies include North Fork Little Butte Creek, South Fork Little Butte Creek, Lake Creek, Osborne Creek, Wyant, Grasshopper, Owens, and Eagle Gulch drainages, Unnamed Drainages 1-10, Little Butte Creek, Rogue River, Fish Lake, and Fourmile Lake (see Table 4-8 and Figure 4-1).

The groundwater study area includes all areas within the Little Butte Creek Watershed that are influenced by seepage from the JSC into the groundwater resources. It is assumed this area is restricted to 1 mile downgradient from the JSC. It is assumed groundwater resources further than 1 mile downgradient from the JSC are not discernably affected by canal seepage.

Table 4-8. Waterbodies Associated with District Operations in the Project Area

Name	Associated River Miles	Size	Tributary To	Project Nexus
North Fork Little Butte Creek	Confluence with Little Butte Creek to outlet of Fish Lake (RM 16)	N/A	Little Butte Creek	Flow timing and quantity in North Fork Little Butte Creek is largely controlled by discharge from Fish Lake. Water is diverted from North Fork Little Butte Creek at RM 0.9 into the JSC for use by MID and RRVID. Water diversion cannot exceed 125 cfs.
South Fork Little Butte Creek	Confluence with Little Butte Creek to JSC canal diversion point (RM 1.1)		Little Butte Creek	Water is diverted from South Fork Little Butte Creek at RM 1.1 into the JSC for use by MID and RRVID. Water diversion cannot exceed 100 cfs.
Lake Creek	Mouth of creek to siphon (RM 0.25)	N/A	Little Butte Creek	The JSC traverses underneath Lake Creek via an existing concrete siphon.
Osborne Creek	Mouth of creek to siphon (RM 0.7)	N/A	Little Butte Creek	The JSC traverses underneath Osborne Creek via an existing concrete siphon.
Wyant, Grasshopper, Owens, and Eagle Gulch drainages in addition to Unnamed Drainages 1-10	150+ ft	N/A	Little Butte Creek	These streams flow into the JSC and provide supplemental water.

Name	Associated River Miles	Size	Tributary To	Project Nexus
Little Butte Creek	Confluence with the Rogue River to confluence of North Fork and South Fork Little Butte Creek (RM 17.2)	N/A	Rogue River	Water diverted from North and South Fork Little Butte Creek is diverted into the JSC which alters flow volume in Little Butte Creek.
Rogue River	Former Gold Ray Dam (RM 126) to confluence with Little Butte Creek (RM 132)	N/A	Pacific Ocean	Water diverted from North and South Fork Little Butte Creek is diverted into the JSC which alters flow volume in Rogue River.
Fish Lake	N/A	7,900 AF	Outlets into North Fork Little Butte Creek	MID and RRVID hold a water right of 7,900 AF of primary storage in Fish Lake. Water levels are controlled by MID.
Fourmile Lake	NA	15,600 AF	Outlets into Fish Lake	MID and RRVID hold a water right of 15,600 AF of primary storage in Fourmile Lake. Water levels are controlled by MID.

RM = River Mile, JSC = Joint System Canal, MID = Medford Irrigation District, RRVID = Rogue River Valley Irrigation District

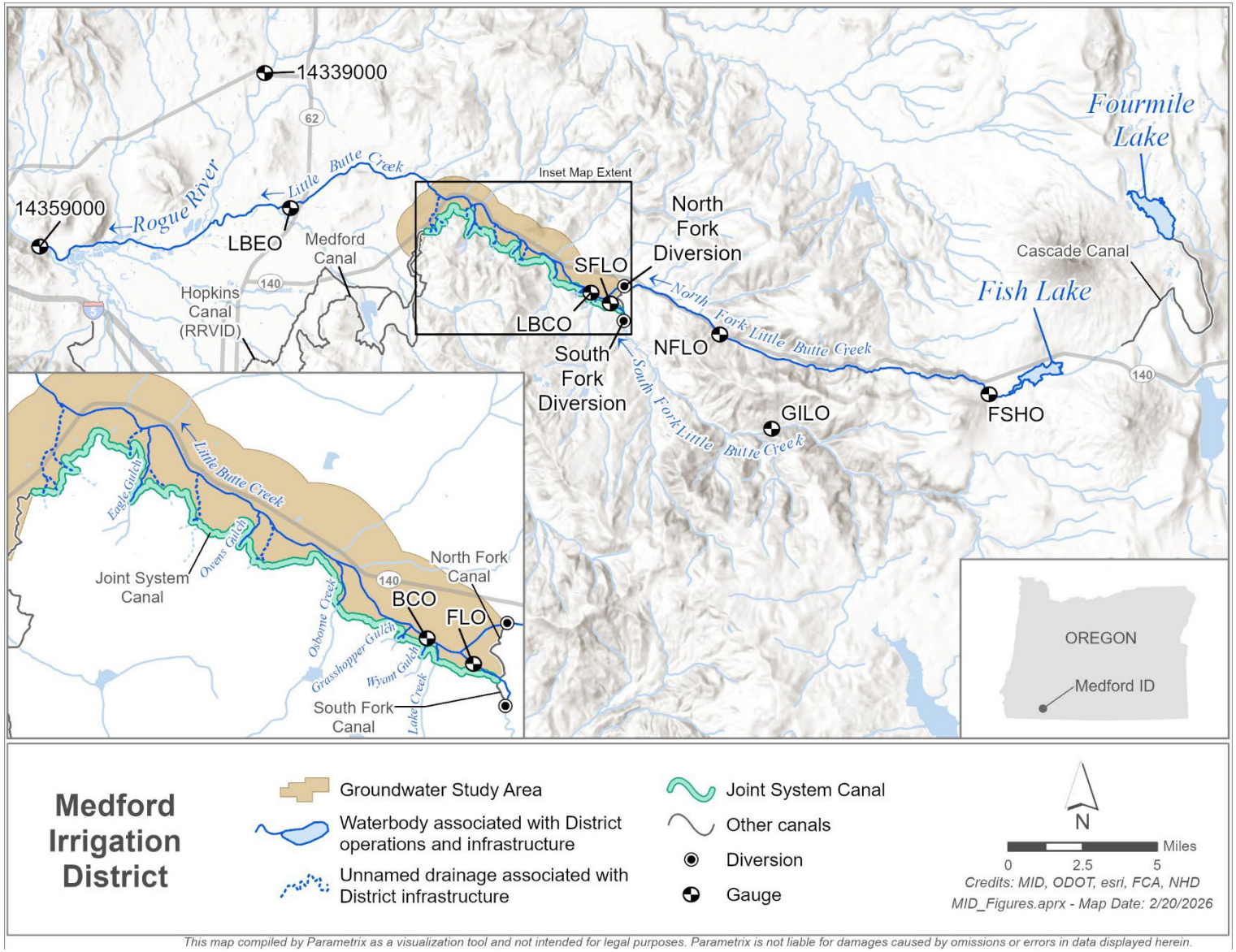


Figure 4-3. Waterbodies associated with District Operations in the project area.

4.12.1 Water Rights and Operations

Water Rights

The JSC directly conveys water to 783 acres of irrigated land and transports water to the Medford Canal, which supplies water to up to 8,303 acres of irrigated land within MID. The JSC also provides water to over 9,500 acres of irrigated land in RRVID. The JSC terminates at Bradshaw Drop, where the conveyed water is split between the two irrigation districts. According to the district's water rights and existing agreement, 2/3rd of the water goes to MID and 1/3rd goes to RRVID.

MID and RRVID divert live flow from South Fork Little Butte Creek and North Fork Little Butte Creek under Certificates 97557 and 97558, which carry 1909 and 1910 priority dates, respectively. Total diversion from North and South Forks of Little Butte Creek shall not exceed 140 cubic feet per second (cfs), of which 90 cfs is for MID and 50 cfs is for RRVID. Total diversion from North Fork Little Butte Creek and South Fork Little Butte Creek will not exceed 125 cfs and 100 cfs at any point, respectively. The districts also have water rights to drainages that flow into the JSC that contribute to irrigation water under Certificate S-4951. Thirteen intermittent drainages, including Grasshopper, Owens, and Eagle Gulch in addition to Unnamed Drainages 1-10, flow into the JSC and provide supplemental water (see Figure C-5 in Appendix C). Multiple years of drought have prevented the districts from providing full water delivery for the last 4 years (2020-2023). Existing water loss data of the JSC indicate that up to approximately 5,057 AF per year is lost from the JSC via canal seepage and evaporation (FCA 2024). A 2017 Water Management and Conservation Plan (WMCP) estimated MID's total diversion needs to be 43,243 acre-feet per year (AFY) based on the District crop mix.

MID and RRVID hold primary storage water rights in Fourmile Lake and Fish Lake under Certificate 79911, which has a 1910 priority date. MID has 15,600 acre-feet (AF) of primary water storage in Fourmile Creek which is held in Fourmile Lake. In addition, MID holds 7,900 AF of primary water storage in North Fork Little Butte Creek which is held in Fish Lake. Fourmile Lake is in the Klamath River Basin but is connected to the Little Butte Creek Watershed via the Cascade Canal, which transports water from the lake into the Little Butte Creek Watershed near Fish Lake. Cascade Canal does not reach Fish Lake but terminates approximately 2.1 miles upgradient of the lake. The transferred water from Cascade Canal infiltrates into the highly permeable volcanic material in the area where it is believed to contribute to groundwater that discharges into Fish Lake (DEQ 2008).

District Operations

Diversions occur at river mile (RM) 0.9 on North Fork Little Butte Creek and at RM 1.1 on South Fork Little Butte Creek, where water is transported into the North Fork Canal and South Fork Canal, respectively. At the convergence of the North and South Fork Canals, a concrete junction diverts water into the JSC. At the junction, a headgate releases 7 cfs back into South Fork Little Butte Creek at RM 0.6 during dry years as part of the RRVID Bradshaw Drop Piping project and to meet instream flow requirements in Little Butte Creek associated with the biological opinion for the Rogue River Basin Project.

Five headgates are located along the JSC that release water to downslope streams including Grasshopper and Eagle Gulch. These headgates do not divert water to District patrons but are used to regulate flows within the JSC to ensure flow capacity in the canal is not exceeded above design capacity and to prevent water accumulation during the non-irrigation season by acting as a drain.

Headgates are 5- to 6-foot-wide structures that use headboards to regulate flow. Headboards are removed during the non-irrigation season to prevent pooling of water within the JSC.

The irrigation season for MID and RRVID occurs from April 15 to October 1, and diversion rates are highest from mid-May to the beginning of August. Diversions generally end by mid-October. Diversions occur during the non-irrigation season to fill RRVID's Agate Reservoir and to serve frost protection water rights. The JSC is dry when diversions are not occurring except during high precipitation events that result in water incidentally being retained. Headgates along the JSC drain the canal during these precipitation events.

Water diversions from South Fork Little Butte Creek constitute most of the flow within the JSC until they peak in mid-May. Thereafter, water diversions from North Fork Little Butte Creek are the dominant source of water for the JSC. The ramping up of diversions from North Fork Little Butte Creek corresponds with the increased release of water from Fish Lake and Fourmile Lake. During the non-irrigation season, Fish Lake releases 10-18 cfs of water into Little Butte Creek. Releases from Fish Lake increase with the onset of the irrigation season and peak in early August. Fourmile Lake releases water into Cascade Canal from early-May to early-October with peak releases occurring in mid-June. On average 6,200 AF of water is transported from Fourmile Lake into Fish Lake; however, an estimated 30 percent is assumed to be lost to seepage and evaporation and remains in the Klamath River Basin (RRVID 2023).

The filling of Fourmile Lake and Fish Lake is restricted by flood control "space" reservations as these waterbodies are also used for flood control. Storage space within these lakes is reserved during the winter to retain runoff from storm events to prevent downstream flooding. Reservoir filling is restricted in Fourmile Lake from November 1 through March 31 and in Fish Lake from November 1 through February 28.

Surface Water Hydrology

Within the Rogue River Basin, streamflow generally follows seasonal precipitation patterns. Generally, in unregulated systems, low flow normally occurs from July through September or October. Higher flows occur throughout the remainder of the year with peak flow timing fluctuating widely with storm events and snowmelt. Storm events are generally 3 to 5 days in duration. Precipitation is generally quickly routed to streams resulting in peak flows within hours of a storm event occurring. Rapid runoff results in higher magnitude of flooding conditions but for a shorter duration (OWRD 1985). However, extensive pumice deposits and fractured lava flows in the eastern portion of the watershed result in longer flow paths for rain and melting snow that help to maintain flows during the summer months (OWRD 1985).

Hydrologic conditions within Rogue River Basin have changed significantly since 1900 with the construction and operations of reservoirs, dams, and diversions. Reservoirs and dams retain runoff and reduce peak flow events within regulated streams, which limits geomorphic processes that support and create instream and riparian habitats. Release of retained water from reservoirs during the drier months artificially increases flow within portions of downstream waterbodies. From 1941 to 2010, winter streamflow decreased and summer streamflow increased within regulated waterbodies, reflecting the management of reservoirs and dams (Dalton et al. 2015). Retention of water during high precipitation months and release during drier months can create an inverted hydrograph where high flow within these regulated systems occurs during summer with low flows occurring during winter. Diversions during the irrigation season cause high flow conditions to begin declining as early as mid-April and cause base flow conditions to have reduced flow.

4.12.1.1 Mandated Instream Flows

The National Marine Fisheries Service (NMFS) in 2012 issued a biological opinion for Southern Oregon and Northern California coho salmon (Oncorhynchus kisutch) on the Bureau of Reclamation's (Reclamation) Rogue River Basin Project which included the operations of MID, RRVID, and Talent Irrigation District (TID). In the opinion, NMFS provided an incidental take statement which states conservation measures necessary to minimize the impact of the take which altered hydrology within South Fork Little Butte Creek and Little Butte Creek. These conservation measures included minimization of ramping, reduction in TID's diversions within the headwaters of South Fork Little Butte Creek, and minimum flows within Little Butte Creek and South Fork Little Butte Creek. Minimum flows are set according to dry and wet seasons.

The following sections summarize surface water hydrology in each waterbody affected by District operations. Information on flow volumes within Study Area waterbodies was collected from Reclamation Pacific Northwest Region Bear Creek and Little Butte Creek Basins Hydromet stations (Reclamation 2024) and U.S. Geologic Service (USGS) National Water Information System (USGS 2024).

4.12.1.2 Anticipated Changes to Baseline Hydrologic Conditions

Climatological variations have and will continue to alter hydrologic conditions within the Rogue River Basin. Precipitation has increased throughout much of the basin, but with warming temperatures more of this precipitation has come in the form of rain resulting in reduced snowpack (Dalton et al. 2015). Climatic projections anticipate the basin will continue to warm and result in warmer, wetter winters with reduced snowpacks and drier summers. Extreme precipitation events are also anticipated to become more common and result in higher peak flow events. Alterations in precipitation patterns will have commensurate impacts on streamflow regime. Streamflows in winter are anticipated to increase whereas summer streamflows are projected to decrease (Dalton et al. 2015). Projections of warmer, drier summers with reduced snowpack will likely contribute to increased potential for drought conditions. Drought declarations have occurred for the last four years in Jackson County (OWRD 2023).

4.12.1.3 North Fork Little Butte Creek

North Fork Little Butte Creek begins at the outfall of Fish Lake and flows 16 miles to its confluence with South Fork Little Butte Creek and the beginning of Little Butte Creek. Flows within North Fork Little Butte Creek are largely controlled by dam releases from Fish Lake. Flow timing is inverted with low flow periods occurring during winter, high flow periods occurring between early-June and mid-September, and peak flows occurring in early-August. In addition to releases from Fish Lake, North Fork Little Butte Creek receives inflow from tributaries and groundwater. Water is diverted from North Fork Little Butte Creek into the JSC at RM 0.9. Smaller private diversions occur along the lower portions of North Fork Little Butte Creek.

4.12.1.4 South Fork Little Butte Creek

South Fork Little Butte Creek begins in the headwaters of the watershed and ends at its confluence with North Fork Little Butte Creek and the beginning of Little Butte Creek. Peak flows occur during periodic storm events during winter and in spring during snowmelt. Inflow into South Fork Little Butte Creek includes tributaries and groundwater discharge. There are no reservoirs present within South Fork Little Butte Creek. Following spring-melt and commencement of irrigation season (April 15), flows in South Fork Little Butte Creek steadily decline until they reach base flow in early-June. Diversions within South Fork Little Butte Creek reduce peak flows, shorten high flow periods, and

lessen base flow. Major diversions (>40 cfs) occur up in the headwaters associated with TID and at RM 1.1 associated with MID and RRVID into the JSC. Smaller private diversions occur along the lower portion of South Fork Little Butte Creek.

TID's average annual diversion from headwater tributaries of South Fork Little Butte Creek into Klamath River Basin's Howard Prairie Reservoir is 14,800 AF (NMFS 2012). Minimum flows in South Fork Little Butte Creek as part of the NMFS 2012 biological opinion are set for the GILO Hydromet station which occurs 7.5 miles upstream of TID's diversion point. Median minimum flows vary from 18 to 40 cfs in June through December and 41 to 145 cfs in January through May (NMFS 2012).

4.12.1.5 Lake Creek

The JSC traverses underneath Lake Creek at RM 0.25. Lake Creek flows into Little Butte Creek at RM 16.9. No hydrologic data is available for Lake Creek. Lake Creek's hydrology is likely similar to South Fork Little Butte Creek and is driven by rain and snowmelt. High flow likely occurs from mid-December to mid-April with baseflow conditions occurring in early-June through December. Reservoirs in the headwaters of Lake Creek and its tributaries retain and divert water likely resulting in dampened peak flows and a lower base flow. The creek receives inflow from tributaries and groundwater which is supplemented by tailwater from flood irrigation.

4.12.1.6 Little Butte Creek

Little Butte Creek begins at the confluence of the South Fork and North Fork Little Butte Creek and flows 17.2 miles until its confluence with Rogue River. Diversion points along tributaries on North and South Fork Little Butte Creek influence flow within the stream. Little Butte Creek is a rain-snowmelt driven system with highest flows occurring from mid-December to mid-April. Peak flows occur during periodic storm events during winter and in spring during snowmelt. Following spring-melt and commencement of irrigation season (April 15), flows in Little Butte Creek steadily decline until they reach base flow in early-June.

Minimum flows in Little Butte Creek as part of the NMFS 2012 biological opinion are set for Little Butte Creek below Eagle Point (LBEO) and Little Butte Creek at Lakecreek (LBCO) Hydromet stations which occur at RM 3.5 and 17, respectively. Median minimum flows at LBCO vary from 29 to 73 cfs in June through November and 122 to 295 cfs in December through May. Median minimum flows at LBEO vary from 36 to 162 cfs in June through November and 231 to 408 cfs in December through May.

4.12.1.7 Rogue River

From the confluence of Little Butte Creek and Rogue River, Rogue River flows 132 miles to the Pacific Ocean. Rogue River flows are orders of magnitude larger than Little Butte Creek and thus Little Butte Creek's effect on flows and water quality within Rogue River are limited to a few river miles (RM 132 to 126). Rogue River is a rain-snowmelt driven system with highest flows occurring from mid-December to mid-April. Lost Creek Lake, a reservoir with 465,000 AF of storage on RM 157 of the Rogue River, dampens peaks flows on the river and increases flows during late spring and summer from dam releases. Base flow in Rogue River is not reached until mid-September. Flows in Rogue River begin to rise again in November with increased precipitation and reach high flows by mid-December. The river receives inflow from tributaries such as Little Butte Creek in addition to groundwater discharge.

4.12.1.8 Fish Lake

Fish Lake is a 483-acre lake with a maximum depth of 31 feet and an average depth of 18 feet. The lake was enlarged in 1908 with the construction of a non-fish passable dam. Fish Lake relies on snowmelt, precipitation, tributary inflows, groundwater input, and the Cascade Canal for inflow. Fish Lake and its dam are operated in coordination with Fourmile Lake for water demands in MID and RRVID. Fish Lake Dam is owned by MID and RRVID and operated by MID. Storage and releases are directed by OWRD and are executed by MID. Average water storage varies from 6,000 AF in mid-June to 2,770 AF in late-September. Oscillations in storage capacity result in lake levels varying on average 9.7 feet in surface elevation (Reclamation 2024).

Water releases from the dam are to maintain water levels in North Fork Little Butte and to transport water to downstream water users. During the non-irrigation season, 7 to 18 cfs are released, whereas releases during the irrigation season peak on average of 86 cfs is released.

4.12.1.9 Fourmile Lake

Fourmile Lake is a 740-acre reservoir constructed in 1922 (NMFS 2012) with a maximum depth of 170 feet. Fourmile Lake relies on tributary input, precipitation, and snowmelt for inflow. Fish Lake and its dam are operated in coordination with Fourmile Lake for water demands in MID and RRVID. Fourmile Lake dam is owned by MID and RRVID and operated by MID. Storage and releases are directed by OWRD and are executed by MID personnel. Average water storage varies from 7,800 AF in late-May to 1,400 AF in early-September. Oscillations in storage capacity result in lake levels varying on average 9.3 feet in surface elevation.

Dam releases from Fourmile Lake begin in late-April and end in late-September, with peak release of 40 cfs occurring from mid to late-June.

4.12.1.10 Other Waterbodies

Other waterbodies that may be affected by the Modernization Alternative include Osborne Creek, and Wyant, Grasshopper, Owens, and Eagle gulches, in addition to 10 unnamed drainages (see Figure C-5 in Appendix C). These systems are predominately intermittent systems and are highly modified by private and District water diversion infrastructure. At Osborne Creek and Wyant Gulch, buried siphons convey irrigation water under these streams. At the other gulches and unnamed drainages, the waterbodies flow into the JSC and contribute water to the water conveyance system. Headgates incidentally allow some mixture of irrigation flows and creek water to continue flowing into the stream channel downslope of the ditch for Grasshopper Gulch, Eagle Gulch, and Unnamed Drainages 7 and 10 during the irrigation season. During the non-irrigation season, headboards from the headgates are removed to drain the JSC, which allows some upslope flows to continue downslope in these streams. The remainder of the streams that flow into the JSC lack headgates and as a result, the up- and downslope portions of these waterways are hydrologically disconnected. Waterbodies without headgates form a channel downslope due to groundwater discharge which is augmented by canal seepage.

Further information on waterbodies within the study area can be found in the Water Resource Technical Report (Appendix E.6), which accompanies this Plan-EIS.

4.12.2 Surface Water Quality

DEQ maintains a list of all surface waters in the state that are identified as impaired because they do not meet water quality standards under Section 303(d) of the CWA (33 United States Code [USC] 1251 et seq.). All waterbodies associated with District operations are included on Oregon's Section

303(d) impaired list, per DEQ's 2022 integrated report on surface water quality and list of water quality–limited waters (DEQ 2022). Table 4-9 lists the water quality impairment parameters that each waterbody exceeds.

Table 4-9. Impaired Waterbodies Associated with District Operations

Name	Listed Reach (River Miles)	Parameters Included on Oregon's 303(d) List
North Fork Little Butte Creek	Mouth of creek to RM 5.5	Temperature
South Fork Little Butte Creek	Mouth of creek to JSC diversion point (RM 1.1)	Flow Modification Habitat Modification Temperature
Lake Creek	Mouth of creek to JSC siphon (RM 0.25)	E. coli Habitat Modification Temperature Sedimentation
Little Butte Creek	Confluence with the Rogue River to creek beginning at confluence of North Fork and South Fork Little Butte Creek (RM 17.2)	Sedimentation E. coli Phosphorus Temperature Dissolved Oxygen
Rogue River	Former Gold Ray Dam (RM 126) and confluence with Little Butte Creek (RM 132)	Temperature Biological criteria Methylmercury
Fish Lake	N/A	Chlorophyll-a pH Harmful Algal Blooms

Source: DEQ 2022
N/A = Not Applicable; RM= River Mile

General Contributing Factors to Water Quality Impairment

Water management in the study area has altered seasonal streamflow patterns, largely reducing streamflow from historical levels. Low streamflow affects water quality by exacerbating temperature and dissolved oxygen problems. Agricultural land use has also contributed to poor water quality owing to reduced riparian areas and tailwater discharge from flood irrigation. Most agricultural lands surrounding waterbodies within the study area are irrigated using flood irrigation.

Flood irrigation is inefficient and results in tailwater exiting the irrigated land and potentially entering waterbodies. Studies within the Little Butte Creek Watershed have shown tailwater has elevated temperature, turbidity, and concentrations of *Escherichia coli* (*E. coli*) (JSWCD 2017). Tailwater has also been shown to have elevated concentrations of nitrogen and phosphorus (McHugh et al. 2008). Thus, tailwater interception with waterbodies can further degrade water quality. Water from the JSC is delivered through turnouts to irrigators adjacent to the JSC who predominantly use flood irrigation on livestock pastures. Tailwater runoff can carry pollutants from these fields and from the canal into Little Butte Creek. Jackson Soil and Water Conservation District received grant funding from the Oregon Department of Agriculture to monitor water quality parameters of *E. coli*, phosphorus, turbidity, temperature, and nitrate within the JSC. These contaminants enter the JSC via tailwater and stormwater runoff from upslope land practices. Irrigation canals generally have elevated temperatures due to thermal loading from lack of riparian cover. Monitoring is ongoing but preliminary data has shown elevated *E. coli* concentrations within the JSC.

The JSC likely acts as a point and nonpoint source of pollution to nearby waterbodies. Preliminary water quality data collected by Jackson Soil and Water Conservation District show that *E. coli* concentrations in the JSC are elevated and that turbidity levels increase within the JSC, which is likely due to canal erosion and runoff from upslope areas. Furthermore, irrigation canals generally have elevated temperatures due to thermal loading from a lack of riparian cover. Impaired water within the JSC is able to enter nearby waterbodies through canal seepage and incidental headgate release, degrading water quality in the receiving streams. Incidental headgate release into tributaries of Little Butte Creek (Grasshopper Gulch, Eagle Gulch, Unnamed Drainages 7 and 10) during the irrigation season likely elevates temperatures and turbidity levels within these waterbodies which may have an associated effect on downstream waterbodies. Similarly, canal seepage may also be influencing water quality to streams whose groundwater discharge is augmented by this artificial source. Canal seepage water may also be further impaired along its groundwater flow path to receiving streams. Canal seepage downslope of the JSC was observed in several locations to result in a slow-moving sheet flow that may result in further impairment of water quality by elevating temperature, *E. coli* concentrations, and turbidity levels as is observed for flood irrigation tailwater in the area. Thus, it is likely that canal seepage may act as a nonpoint pollution source to tributaries of Little Butte Creek that are adjacent to the JSC such as Lake Creek, Wyant Gulch, Grasshopper Gulch, Owens Gulch, Eagle Gulch, and Unnamed Drainages 1 to 10 (see Figure C-5 in Appendix C).

Municipal Drinking Water and Water Quality Management

The Medford Water Commission (MWC) provides drinking water to 140,000 customers from numerous municipalities within the region including Medford, Eagle Point, White City, Central Point, Ashland, Jacksonville, Phoenix, and Talent. The MWC sources drinking water from the Big Butte Springs Watershed in addition to the Rogue River. During the months of peak season (May – September), the MWC diverts water from the Rogue River at RM 131 wherein it is treated at MWC Duff Treatment Plant. Currently, water rights at this diversion point are approximately 70 cfs (GSI 2020). However, to account for projected demands in water consumption, MWC and its partner cities have a strategic plan to increase diversions and expand the capacity of the Duff Treatment Plant (GSI 2020).

Water quality impairments to waterbodies within the study area such as turbidity and *E. coli* have a direct effect on municipal drinking water by increasing the treatment requirements of water diverted from the Rogue River. To ensure the protection of water quality for these municipalities, the Rogue Valley Council of Governments, in partnership with the Rogue River Watershed Council and the

JSWCD, prepared the Rogue National Water Quality Initiative Plan (Stabach and Siedlecki 2024). The plan outlines contaminants of concern and their sources, current treatments occurring, and plans for future treatments. Within the Little Butte Creek Watershed, JSWCD has already coordinated with landowners to improve and modernize irrigation systems to prevent tailwater runoff, developed management plans for cattle grazing to improve pastureland health, and restored riparian areas by removing noxious weeds, planting native vegetation, and installing fencing (Stabach and Siedlecki 2024). Future plans for water quality improvements are outlined in the Little Butte Creek Watershed Plan, which calls for funding of projects to restore riparian areas, install fencing to prevent or limit cattle access into streams, and promote the conversion of flood irrigation to sprinkler systems (Rogue River Watershed Council [RRWC] 2018).

Anticipated Changes to Water Quality Parameters

Climate variability is anticipated to put further stress on water quality within the study area. Projected increases in air temperature may result in higher water temperatures and declines in dissolved oxygen (Dalton et al. 2015). Increased temperatures and drought conditions may result in increased wildland fire activity, which can increase loading of sediment and nutrients into waterbodies (Dalton et al. 2015).

DEQ is required to develop total maximum daily loads for rivers and streams in the Upper Rogue River Basin (these impairments may extend upstream or downstream of the reaches identified in Table 4-9). Further information on Section 303(d)–listed impairments in the waterbodies associated with District operations can be found in the Water Resource Technical Report (Appendix E.6).

4.12.3 Groundwater

Hydrogeology

The groundwater study area is in the Western Cascades physiographic subprovince, which is composed of old and softened volcanic materials (BLM and USFS 1997). The groundwater study area is composed of three geomorphic landforms: valley floor, alluvial bottom, and stream terrace. Alluvial bottom includes current floodplains associated with Little Butte Creek in addition to South and North Fork Little Butte Creek whereas stream terraces are relict floodplains. The valley floor composes the remainder of the groundwater study area.

Alluvial bottom and stream terraces have shallow surficial deposits of quaternary alluvium that are underlain by tertiary volcanic rocks such as tuff and ballistic, ballistic andesite, and andesite that formed from lava flows and eruptions from nearby volcanic cones and vents (BLM and USFS 1997, Hull 1999, DEQ 2008). Quaternary alluvium varies from 8 to 35 feet deep and consists of gravels, silt, clay, and boulders (OWRD 2024a). Soils within the alluvial bottom are generally well drained whereas stream terraces have an associated hardpan layer resulting in somewhat poor drainage (BLM and USFS 1997). The valley bottom generally lacks surficial deposits and is entirely composed of tertiary volcanic rocks. During field investigations for water and wetland delineation (April and June 2024), shallow soils and shallow bedrock were observed within the valley bottom.

An unconfined aquifer is present within the quaternary alluvium. This alluvial aquifer is likely linked to Little Butte Creek and its associated tributaries. Water level fluctuations in the alluvial aquifer likely vary with flow patterns in the river systems. The alluvial aquifer is further supported by irrigation and canal seepage during the irrigation season. This alluvial aquifer is likely small and is not recorded to be used solely by wells within the study area (OWRD 2024a). The one well that accesses this alluvial aquifer receives most of its water from deeper aquifers but indicates the depth of the alluvial aquifer to occur at 5 to 12 feet below the land surface (OWRD 2024a). Water within the

alluvial aquifer likely moves northwest along with the configuration of the stream system. Underlying the alluvial aquifer is likely an impermeable layer of andesite, basalt, or tuff that perches this aquifer.

Within the tertiary volcanic rocks, there are numerous confined aquifers that domestic water users rely on. These confined bedrock aquifers likely formed from fractured or fissured lava flows and are likely supported by rain and snowmelt on the hillslopes that are transported to these aquifers via long groundwater pathways (DEQ 2013). These bedrock aquifers used for domestic consumption generally occur between 40 and 245 feet below ground surface and are generally narrow with a thickness of 1 to 5 feet. These water resources likely are not influenced by flow patterns within the stream system or canal seepage as aquitards prevent the infiltration of water from these waterbodies into them. Movement of water within these bedrock aquifers is dictated by the shape of the fracture or fissure within the rock layer. It is assumed that water within these confined aquifers moves to the northwest.

The District does not rely upon groundwater wells for irrigation. Registered wells in the study area are used for domestic consumption and rely upon confined bedrock aquifers that are not influenced by stream infiltration and canal seepage.

Groundwater Level

Groundwater level and fluctuations within the alluvial aquifer are unknown. The one well that accesses this alluvial aquifer indicates the depth of the alluvial aquifer to occur at 5 to 12 feet below the land surface (OWRD 2024a). The water level within the alluvial aquifer likely fluctuates rapidly with storm events and spring melt. The well drained soils within the alluvial bottom allow for quick recharge from precipitation and stream infiltration. However, the well-drained character of the material also allows for rapid groundwater movement and stream discharge. Thus, the alluvial aquifer water levels quickly rise and fall with precipitation events. The water levels within the system likely mimic Little Butte Creek's hydrograph, with high water levels during late fall through early spring followed by low levels throughout the remainder of the year. A monitoring well located 10 miles west of the groundwater study area indicates that water levels in another alluvial aquifer fluctuated seasonally by up to 20 feet, with high water occurring in the winter and early spring and low water occurring during summer and early fall (OWRD 2024b). During the summer, the alluvial aquifer is also supported by irrigation water infiltration and canal seepage.

Water-bearing zones within the groundwater study area in bedrock aquifers vary from 38 to 675 feet below the ground surface. Monitoring wells outside of the groundwater study area indicate that water pressure within other bedrock aquifers varies throughout the season and from year to year without a discernible trend (OWRD 2024b).

Within the Upper Rogue River Basin, aquifer depths are presumed to be declining (Stabach and Siedlecki 2024) which is likely attributable to increased aquifer consumption and more frequent drought conditions.

Canal Seepage

Groundwater recharge from leaking irrigation canals likely minorly elevates groundwater levels in the alluvial aquifer. However, the influence of groundwater on flows within Little Butte Creek is unknown. Stream discharge increases as Little Butte Creek flows down gradient, but this could reflect tributary inputs and/or groundwater recharge. Increases in groundwater storage within the alluvial aquifer because of canal seepage could result in increased groundwater discharge to Little Butte Creek. Canal leakage rates have been found to vary within the Upper Rogue Watershed (FCA

2020) likely depending on the geology of the canal bottom, the degree to which cracks and voids have been filled by sediment, and the wetted perimeter of the canal. Groundwater monitoring data within the groundwater study area is nonexistent and it is not possible to determine the effect canal seepage has had on groundwater levels. Up to approximately 5,057 AF per year may be lost from the JSC via canal leakage which could be contributing groundwater (FCA 2024).

4.12.4 Ecosystem Services

Provisioning service, Water available for irrigation (Figure 4-1 [E1]): As described in Section 4.12.1, water delivered to patrons within the study area is diverted from the North Fork and South Fork Little Butte Creek. Water for irrigation is stored within Fish Lake and Fourmile Lake wherein it is conveyed to North Fork Little Butte Creek where it is diverted into the JSC. This water allows for the cultivation of crops for human consumption and forage that supports livestock production. In recent years, the region has faced numerous droughts. As a result, MID has faced a high degree of uncertainty in the quantity and timing of water allocations from year to year and was unable to provide full water delivery to its patrons from 2020 to 2023.

Provisioning service, Fish populations (Figure 4-1 [E2]): Waterbodies associated with District operations support populations of Southern Oregon and Northern California Coast coho salmon which is federally and state-listed as threatened. Other species potentially present in waterbodies associated with District operations include Chinook salmon, steelhead, Pacific lamprey, rainbow trout, coastal cutthroat, Klamath smallscale sucker, redside shiner, Umpqua pikeminnow, and introduced species including brook trout, lake trout, and tiger trout. A number of these fish populations provide fishing opportunities for both recreation and consumption.

Regulating service, Water quality (Figure 4-1 [E3]): Surface water loss in the system can affect water quality parameters including turbidity, sediment, temperature, and dissolved oxygen. In general, lower water levels can contribute to higher temperatures, which in turn can contribute to lower concentrations of dissolved oxygen. Separately, runoff from irrigated lands can mobilize fertilizers, pesticides/herbicides, and other contaminants back into open canals and tributaries and return them to waterbodies. Maximizing water level consistency in lakes and reservoirs and consistent live flow levels in streams throughout the season may help to moderate temperatures and pollutant levels. Minimizing the further introduction of pollutants into streams through end spills may help to reduce pollutant loads. Section 4.12.2 describes surface water quality in the waterbodies associated with District operations.

4.13 Fish and Aquatic Resources

The study area for fish and aquatic species analysis considers species found within waterbodies affected by District operations and that may be impacted by the Modernization Alternative. These waterbodies include North Fork Little Butte Creek, South Fork Little Butte Creek, Lake Creek, Osborne Creek, Wyant, Grasshopper, Owens, and Eagle Gulches, 10 unnamed drainages, Little Butte Creek, Rogue River, Fish Lake, and Fourmile Lake (see Table 4-11 and Appendix E.5 Fish and Aquatic Species Technical Report Figure 51 and Figure 52 [Appendix E.7]).

4.13.1 General Fish and Aquatic Species

Waterbodies within the study area provide habitat to 15 documented species of fish and aquatic species (Table 4-10). Native migratory fish species present include coho salmon (*Oncorhynchus kisutch*), spring and fall Chinook salmon (*O. tshawytscha*), summer and winter steelhead (*O. mykiss*), coastal cutthroat (*O. clarkii*), rainbow trout (*O. mykiss),* and Pacific lamprey (*Entosphenus tridentata).* Non-native fish species are not abundant within the study area and are primarily restricted to Fish

and Fourmile Lakes, which include brook trout (*Salvelinus fontinalis)* and lake trout (*Salvelinus namaycush)*. Northwestern pond turtle is known to occur in the Upper Rogue River Basin and is recorded using habitats in and adjacent to Little Butte Creek (USFWS 2023, ORBIC 2023).

Rogue River, Little Butte Creek, North Fork Little Butte Creek, South Fork Little Butte Creek, and Lake Creek are listed as Essential Salmonid Habitat (DSL 2023) and as Essential Fish Habitat for Chinook and coho salmon (NOAA 2024).

Table 4-10. Fish and Aquatic Species Found in the Upper Rogue River and Little Butte Creek Watershed

Common Name	Scientific Name	Upper Rogue River[1]	Little Butte Creek Watershed[2]	Native	Threatened/ Endangered Status
Brook trout	*Salvelinus fontinalis*	No	Yes	No	-
Chinook salmon (spring and fall)	*Oncorhynchus tshawytscha*	Yes	Yes[3]	Yes	State sensitive, petitioned to Federally listed under review
Coastal cutthroat	*O. clarkii*	Yes	Yes	Yes	-
Coho salmon	*O. kisutch*	Yes	Yes	Yes	Threatened
Klamath smallscale sucker	*Catostomus rimiculus*	Yes	Yes	Yes	-
Lake trout	*Salvelinus namaycush*	No	Yes	No	-
Mountain whitefish[3]	*Prosopium williamsoni*	Yes	Yes	Yes	-
Pacific lamprey	*Entosphenus tridentata*	Yes	Yes	Yes	State sensitive, Federal species of concern
Rainbow trout	*Oncorhynchus mykiss*	Yes	Yes	Yes	-
Redside Shiner	*Richardsonius balteatus*	Yes	Yes	Yes	-
Rogue smallscale sucker	*Catostomus rimiculus*	Yes	No	Yes	-

Common Name	Scientific Name	Upper Rogue River[1]	Little Butte Creek Watershed[2]	Native	Threatened/ Endangered Status
Steelhead (summer and winter)	*Oncorhynchus mykiss*	Yes	Yes	Yes	State sensitive
Tiger trout	*Salmo trutta* × *Salvelinus fontinalis*	No	Yes	No	-
Tui chub	*Siphateles bicolor*	No	Yes	Yes	-
Umpqua pikeminnow	*Ptychocheilus umpquae*	Yes	No	Yes	-
Northwestern Pond Turtle	*Actinemys marmorata*	Yes	Yes	Yes	State sensitive, proposed to be listed as threatened Federally

Adapted from ODFW 2024a and ORBIC 2023.

[1] Rogue River from RM 126 to confluence with Little Butte Creek (RM 132)

[2] Little Butte Creek, North Fork Little Butte Creek, South Fork Little Butte Creek from mouth to diversion (RM 1.1), Lake Creek from mouth to siphon (RM 0.25), Fish Lake, and Fourmile Lake

[3] Likely present based upon known presence in the basin and habitat characteristics

Streams within the study area support habitats required for the life stages of anadromous and resident fish and aquatic species. However, habitat quality within these systems is limited by a multitude of land use impacts such as agriculture, grazing, irrigation diversion and impoundments, forestry, and road and residential development (NMFS 2012). Agricultural encroachment of the floodplain has resulted in a narrowed riparian area with few side channels. A narrow riparian area has likely resulted in reduced recruitment of large wood in these systems and has overall caused a decline in structural complexity. Loss of riparian vegetation has also resulted in an over 50 percent reduction in shading of rivers in the Upper Rogue Watershed, which has elevated stream temperatures (DEQ 2008). Numerous diversion dams within the Little Butte watershed have altered channel geomorphology and substrate composition and pose partial barriers to fish movement within the system. Numerous stream crossings along these river systems further limit stream geomorphology and riparian areas.

Migratory fish passage has recently improved within the Rogue River watershed. Savage Rapids Dam, Gold Hill Diversion Dam, and Gold Ray Dam were all removed along the Rogue River from 2008 to 2010, greatly improving passage conditions for migratory anadromous and resident fish. Savage Rapids Dam was particularly harmful to migration of SONCC coho salmon, wherein an estimated 22 percent of migrating coho were killed each year by the dam (USFWS 1981).

Water quality and quantity are impacted by water diversion and flood irrigation. Water diversions limit habitat availability within streams and result in elevated temperature and lower dissolved oxygen. Flood irrigation can result in tailwater runoff into waterbodies, which harms water quality

parameters such as turbidity, temperature, and nitrogen and phosphorus concentrations. As a result of water management and flood irrigation, in addition to land use impacts in the watershed, all waterbodies within the study area are included on Oregon's Section 303(d) impaired list for water quality parameters such as temperature, dissolved oxygen, sedimentation, and phosphorus (Oregon DEQ 2022). Water quality impairments and habitat loss due to reduced water quantity further limit habitat quality for anadromous and resident fish and aquatic species. More information on current water quality within the study area can be found in the Water Resources Technical Report Section 5.3.3 (Appendix E.6). The JSC may serve as habitat for other aquatic reptiles or amphibians.

The District's canals within the study area do not support game fish, salmonids, or threatened and endangered aquatic species. Vertical plate fish screens compliant with ODFW standards were installed on the North Fork and South Fork Diversions in the early 2000s to prevent entrainment of fish and aquatic species. The diversion structures on each creek are partial barriers to fish passage and are listed on the ODFW Fish Passage Priority List (ODFW 2024a). These partial barriers are impediments to fish movement within the Little Butte Creek Watershed.

Table 4-11 summarizes fish and aquatic species in each waterbody within the study area within the Little Butte Creek Watershed. Other waterbodies within the study area not listed in Table 4-11 do not have records of historic or current fish presence. A native migratory fish habitat determination conducted by ODFW during the winter of 2025 determined that within the vicinity of the JSC, Wyant, Owens, Eagle, and Grasshopper gulches in addition to Unnamed Drainages 1-10 lacked suitable habitat for native fish. Further information of aquatic habitat and potential species within each waterbody can be found within the Fish and Aquatic Species Technical Report (Appendix E.7).

Table 4-11. Fish and Aquatic Species found in Study Area Streams and Lakes within the Little Butte Creek Watershed

Common Name	North Fork Little Butte Creek	South Fork Little Butte Creek[1]	Lake Creek[2]	Little Butte Creek	Fish Lake	Fourmile Lake
Brook trout	Yes	No	No	No	Yes	Yes
Chinook salmon (spring)	No	Yes	No	Yes	No	No
Chinook salmon (fall)	Yes	Yes	No	Yes	No	No
Coastal cutthroat	Yes	Yes	Yes	Yes	Yes	No
Coho salmon	Yes	Yes	Yes	Yes	No	No
Klamath smallscale sucker[3]	Yes	Yes	Yes	Yes	No	No
Lake trout	No	No	No	No	No	Yes

Common Name	North Fork Little Butte Creek	South Fork Little Butte Creek[1]	Lake Creek[2]	Little Butte Creek	Fish Lake	Fourmile Lake
Mountain whitefish[3]	Yes	Yes	Yes	Yes	No	No
Pacific lamprey	Yes	Yes	No	Yes	No	No
Rainbow trout	Yes	Yes	Yes	Yes	Yes	Yes
Redside shiner	No	Yes	Yes	Yes	No	No
Steelhead (summer and winter)	Yes	Yes	Yes	Yes	No	No
Tiger trout	No	No	No	No	Yes	No
Tui chub	No	No	No	No	Yes	No
Northwestern pond turtle	Yes[3]	Yes[3]	Yes[3]	Yes	Yes[3]	Yes[3]

Adapted from ODFW 2024a and ORBIC 2023.

[1] South Fork Little Butte Creek from mouth to diversion (RM 1.1)

[2] Lake Creek from mouth to siphon crossing (RM 0.25)

[3] Likely present based upon known presence in the basin and habitat characteristics

4.13.2 Federally Listed Fish and Aquatic Species

Only one ESA-listed aquatic species has been documented in the study area: the Southern Oregon and Northern California Coast (SONCC) coho salmon Evolutionarily Significant Unit (ESU). SONCC coho was listed as threatened under the ESA in 1997. Activities cited as responsible for the decline of this species' ESU include logging, road building, grazing, mining, stream channelization, dams, wetland loss, artificial propagation, over-fishing, water withdrawals, and unscreened diversions for irrigation (62 FR 24588).

Within the study area, coho salmon spawn, rear, and migrate. The Rogue River within the study area is primarily used for rearing and migration, whereas the Little Butte Creek watershed is primarily used for spawning and rearing (ODFW 2024a). Little Butte Creek watershed is highly productive and is estimated to spawn and rear approximately 10 percent of the Rogue River Basin coho population (BLM and USFS 1997). Among watersheds sampled by ODFW, Little Butte Creek consistently produces the largest amount of smolts within the Rogue River Basin with an approximate average of 28,559 smolts produced annually between 1998 and 2004 (ODFW 2004).

Coho salmon within the study area spawn between November 1st and January 31st. Eggs are generally incubating from November 1st through May 31st. Eggs will thereafter hatch, and juveniles rear within their natal systems until they transition to smolts and emigrate out to the ocean between February 15th and June 30th. Returning spawning adults will migrate back between October 1st and January 31st. All waterbodies containing coho salmon within the study area, such as Rogue River,

Little Butte Creek, North Fork Little Butte Creek, South Fork Little Butte Creek, and Lake Creek, are considered critical habitat for the species (64 FR 24049).

Waterbodies within the study area are impacted by Bureau of Reclamation's (Reclamation) operations and maintenance of the Rogue River Basin Project. Reclamation's Rogue River Basin Project includes water collection facilities in the headwater of South Fork Little Butte Creek. These water collection facilities, operated and maintained under contract by Talent Irrigation District, divert water from six headwater streams within the South Fork Little Butte Creek watershed and transport the collected water via the South Fork Collection Canal and Dead Indian Creek Canal into the Klamath River Basin and into Howard Prairie Reservoir. Diversions occur mainly during winter and spring and average 14,800 AF annually (NMFS 2012). Diversion from these headwater streams results in a reduction in streamflows and available habitat for fish and aquatic species within South Fork Little Butte Creek and Little Butte Creek. The National Marine Fisheries Service (NMFS) in 2012 issued a biological opinion on the Rogue River Basin stating the Rogue River Basin Project is unlikely to jeopardize the SONCC coho salmon or result in the adverse modification of the species' critical habitat. In the biological opinion, NMFS provided an incidental take statement which states conservation measures necessary to minimize the impact of the take which include reduction in TID's diversions within the headwaters of South Fork Little Butte Creek, minimum flows in Little Butte Creek and South Fork Little Butte Creek (see Water Resources Technical Report Section 5.3.2 [Appendix E.6]), minimization of TID's diversion ramping, and placement of large woody debris within Little Butte Creek and South Fork Little Butte Creek.

No other federally listed aquatic species occur in the study area. The USFWS proposed to list the northwestern pond turtle (NWPT) as threatened under the ESA on October 3, 2023 (88 FR 68370). In Oregon, northwestern pond turtle abundance is highest in the Willamette, Umpqua, Klamath, and Rogue River drainages (Rosenberg 2013). Holland (1994) reported low densities of NWPT in the Rogue River basin with some moderate-sized populations of 30 or more individuals. Manzo et al. (2021) recorded a population of up to 50 individuals within the Upper Rogue River Basin. Within the study area, NWPT is known to occur in Little Butte Creek and may occur within Rogue River and Little Butte Creek tributaries (USGS GAP 2018, ORBIC 2023, USFWS 2023). In addition, NWPT were observed basking along the banks of the JSC during field work for the project's Wetland and Waters of the U.S. and State Delineation Report in April and June 2024. See Fish and Aquatic Species Technical Report (Appendix E.7) for more information on the NWPT.

4.13.3 State-Listed Fish and Aquatic Species

ODFW maintains a list of native wildlife species in Oregon that have been determined to be either threatened or endangered according to criteria set forth by OAR 635-100-0105. SONCC coho salmon is state-listed as threatened by ODFW and is discussed above. No other species that are state-listed threatened, endangered, or candidate fish or aquatic species are known to occur within the study area.

NWPT is listed as sensitive by ODFW (ODFW 2021) and is discussed above. Chinook salmon, steelhead, and Pacific lamprey are also listed as sensitive by ODFW. Rogue spring Chinook Species Management Unit (SMU) was determined to be potentially at risk whereas the Rogue fall Chinook SMU was determined to be not at risk in regard to their near-term sustainability (ODFW 2005). Summer and winter steelhead SMUs in the Rogue River Basin were determined to not be at risk in regard to their near-term sustainability (ODFW 2005). Pacific lamprey's SMU within the Study Area includes the Rogue River Basin in addition to other coastal watersheds (excluding the Columbia River) and their near-term sustainability was determined to be at risk (ODFW 2005).

4.13.4 Ecosystem Services

Provisioning service, Fish populations (Figure 4-1 [E2]): Waterbodies associated with District operations support populations of SONCC coho salmon, which is federally and state-listed as threatened. Other species potentially present in waterbodies associated with District operations include Chinook salmon, steelhead, Pacific lamprey, rainbow trout, coastal cutthroat, Klamath smallscale sucker, redside shiner, Umpqua pikeminnow, and introduced species including brook trout, lake trout, and tiger trout.

Cultural Service: Culturally important species (Figure 4-1 [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 Latgawa and Takelma peoples whose descendants are members of the Confederated Tribes of the Grand Ronde and Confederated Tribes of Siletz Indians. These include SONCC coho salmon, Chinook salmon, steelhead, and Pacific lamprey, which were traditionally used by these peoples as a food source.

4.14 Wetland and Riparian Areas

Wetlands are defined under Clean Water Act Section 404 (33 CFR 328.3) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

Wetlands perform several valuable functions and services 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 provide specialized habitat for a wide variety of aquatic and terrestrial species. Wetlands 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: the CWA and Oregon Removal-Fill Law.

Riparian areas are transition zones between waterbodies and adjacent upland areas that are dependent upon the hydrology of the waterbody. Riparian areas are defined as "vegetated ecosystems 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." They will sometimes, but not in all cases, have all the characteristics necessary for them to be also classified as wetlands (EPA 2005).

The study area for wetlands and riparian areas analysis includes the project area where construction would occur and an additional 200-foot buffer on either side to account for potential indirect long-term impacts. The study area for wetlands and riparian areas analysis includes areas within 200 feet adjacent to Fourmile Lake, Fish Lake, and North Fork Little Butte Creek, all of which may be influenced by the project. Throughout the Plan-EIS, the terms "canal" and "laterals" are used. Canals and laterals are irrigation ditches that were manmade to convey water.

4.14.1 Wetlands

According to the National Wetland Inventory (NWI) geographic information systems (GIS) data, current and historical aerial imagery, and LiDAR Remote Sensing Data, freshwater forested

wetlands, scrub-shrub wetlands, herbaceous wetlands, as well as riparian areas occur throughout the study area. These hydrological and ecological features are located mostly within or adjacent to the JSC and along the natural streams upslope and downslope from the JSC. According to NWI, freshwater emergent seasonally flooded (PEMC) wetlands are the most common type in the study area. The freshwater scrub-shrub seasonally flooded (PSSC) wetlands and very limited areas of freshwater forested seasonally flooded (PFOC) wetlands are also mapped.

The pedestrian site survey was limited to the project area only, specifically to the area where proposed construction would occur. Presence or absence and extent of wetlands were evaluated. Identified wetlands were delineated, characterized, and described based on Cowardin classification (Cowardin et al. 1979) and on source of water. Table 4-12 provides a preliminary summary of wetlands in the project area. Additional details are provided in the Project's Terrestrial Ecology and Wetlands and Riparian Areas Technical Report (Appendix E.5), which accompanies this Plan-EIS, and the Wetland and Waters of the United States and State Delineation Report. The delineation report was submitted to DSL on December 12, 2025. DSL reviewed the report and concurred with the delineation, with revisions, on July 15, 2026, for purposes of Oregon's Removal-Fill Law. Federal jurisdiction under the Clean Water Act remains subject to review and determination by USACE.

Table 4-12. Summary of Wetlands within the Project Area

Wetland Type	Cowardin Class [a]	Hydrogeomorphic Class	Number of Wetlands [1]	Total Size (acres) [2]
Emergent	PEMC	Slope, Riverine	56	4.0
Scrub-Shrub	PSSC	Slope, Riverine	7	0.6
Forested	PFOC	Slope, Riverine	12	2.2
-	-	**Total**	**75**	**6.8**

PEMC = palustrine emergent seasonally flooded, PSSC = palustrine scrub-shrub seasonally flooded, PFOC = palustrine forested seasonally flooded.

[1] Cowardin et al., 1979, Classification of Wetlands and Deepwater Habitats of the United States.

[2] Federal wetland jurisdiction remains subject to review and determination by USACE.

4.14.1.1 Emergent Wetlands (PEMC)

Emergent wetlands (PEMC) are the most common and diverse type in the project area and beyond, dominated by herbaceous hydrophytic vegetation. These wetlands vary greatly in species composition, location and size, land use, and hydrologic regime, and can be categorized into fringe wetlands, pasture wetlands, vegetated ditches, and wetland benches.
Fringe wetlands, primarily composed of reed canary grass and broad-leaf cattail (*Typha latifolia)*, were observed throughout the project area along the JSC, especially where canal water overflowed or decelerated. These wetlands rely on canal water during the irrigation season and residual water during the non-irrigation season, developing on accumulated silt, loam, and decomposing organic material.

Pasture wetlands were identified on the downslope side of the JSC throughout the project area, formed on historically upland soils due to water seeping through the deteriorated canal berm. These

wetlands would revert to dry land if the irrigation water supply were ceased. Vegetation includes tall false rye grass, field meadow foxtail, reed canary grass, red-tinge bulrush (*Scirpus microcarpus)*, and common rush, with soils predominantly silt loam, silt clay, or silty clay loam.

Vegetated ditches, narrow linear excavated wetland features running parallel to and downslope of the canal, were observed mostly in the eastern half of the project area. These 3- to 5-foot-wide human-made ditches convey water from diversion points into pastures or capture seepage water. Wetland ditches exhibit wetland characteristics such as hydrophytic vegetation, hydric soils, and wetland hydrology. Vegetation includes broad-leaf cattail, reed canary grass, true forget-me-not, American-brooklime, and common duckweed, growing on sandy loam or silt loam soils.

Wetland benches, small, isolated wetlands, were identified and delineated upslope of the JSC near Lake Creek. These wetlands, bordered by rock outcrops and situated on shallow bedrock, are sustained by surface runoff from adjacent uphill pastures, where water concentrates due to impervious shallow bedrock. The vegetation includes a mix of native and introduced grasses and forbs such as Kentucky bluegrass (*Poa pratensis*), creeping buttercup (*Ranunculus repens*), and curly dock.

4.14.1.2 Scrub-Shrub Wetlands (PSSC)

Scrub-shrub wetlands (PSSC) are uncommon in the project area, small in size and are limited to edges of fields, roadsides, and stream banks. Scrub-shrub wetlands were supported by canal water, incidental seepage, and natural streamflow. These wetlands are formed by shrubby vegetation like Sitka willow, Himalayan blackberry, Nootka rose, and swamp red currant, with an understory of common rush (*Juncus effusus*), reed canary grass, curly dock (*Rumex crispus*), and Fuller's teasel (*Dipsacus fullonum*). Soils are typically silty loam or silty clay loam.

4.14.1.3 Forested Wetlands (PFOC)

Forested wetlands (PFOC) are located at the base of gulches along streams and are primarily sustained by natural hydrology, such as streamflow and elevated groundwater levels, with accidental JSC seepage as a secondary source. These wetlands are formed by a variety of trees and shrubs, including Oregon ash, black cottonwood, red alder, Sitka willow (*Salix sitchensis*), Himalayan blackberry, swamp red currant (*Ribes triste*), and Nootka rose (*Rosa nutkana*). The soil is typically sandy clay loam or clay loam over a gravel or cobble layer. Forested wetlands are found in locations such as Wyant Gulch, Osborne Creek, Owens Gulch, Eagle Gulch, and several unnamed streams.

4.14.2 Riparian Areas

Aerial photographs indicate that most streams in the study area have narrow and discontinuous woody riparian areas. However, Lake Creek and Osborne Creek have well-developed, wide uninterrupted riparian corridors.

In the field, riparian areas were observed along South Fork Little Butte Creek, Lake Creek, and the creek that runs at the base of Grasshopper Gulch. Mature woody vegetation was formed by bigleaf maple, Oregon ash, Oregon white oak, white alder, black cottonwood, choke cherry (*Prunus virginiana*), service-berry (*Amelanchier alnifolia*), Nootka rose, and Himalayan blackberry. This upland vegetation was formed on a well-drained loam or silt loam over river gravel or cobble.

In the gulches where siphons are proposed, riparian corridors are in good condition, ranging in width from 100 to 300 feet. In contrast, smaller streams bordered by pastures have riparian corridors less than 100 feet wide, sometimes as narrow as 40 feet. Mature trees and shrubs provide shade for stream thermoregulation. Upland riparian areas intermixed with wetlands enhance biodiversity.

Riparian areas with livestock access exhibited signs of degradation, including bank erosion, soil compaction, bare soil patches, and increased water turbidity.

4.15 Wildlife Resources

The study area for wildlife analysis is limited to the project area, which encompasses the existing JSC, the potential new siphon alignments, and the footprint of all modernization improvements proposed under the alternatives including areas needed for construction, staging and storage areas, and temporary construction access and an additional 200-foot buffer on either side to account for potential indirect long-term impacts. Additionally, the study area for wildlife analysis includes areas within 200 feet adjacent to Fourmile Lake, Fish Lake, and North Fork Little Butte Creek, all of which may be influenced by the project.

Impacts to bald and golden eagles were analyzed in areas according to the National Bald Eagle Management Guidelines (USFWS 2007):

- **Visual impacts**: Area of potential visual impacts to bald and golden eagles included a project area and the area that extends 660 feet from the outermost limits of the project area.
- **Blasting impacts:** Area of potential impacts to nesting bald and golden eagles from blasting and other loud noises included the project area and the area that extends 0.5 mile from the outermost boundaries of the project area. Fourmile Lake and Fish Lake are excluded from this study area, because no blasting or any construction is planned near these waterbodies.

4.15.1 General Wildlife

There are six general habitat types within the study area: riparian, aquatic, chaparral, rural, and agricultural. Generally, wildlife present within the study area consists of habitat generalists or edge species with the ability to adapt to or exploit the agricultural environment. These species are tolerant to disturbance and include black-tailed deer (*Odocoileus hemionus*), coyote (*Canis latrans*), western gray squirrel (*Sciurus griseus*), raccoon (*Procyon lotor*), and turkey vulture (*Cathartes aura*) (Oregon Explorer n.d.).

Wildlife within the study area may use the canal as a water source and dispersal corridor. Where not cleared, vegetation along the canal can provide food, cover, and breeding sites for many wildlife species throughout the year. In portions of the study area located within a more developed setting, habitat connectivity has been modified by agricultural, farming, residential, and mining operations. Development reduces vegetation and food sources, thereby decreasing wildlife occurrence. However, more common species still use farmland and grazing pastures. Table 4-13 lists wildlife species that are likely to occur in the study area (Oregon State University Libraries & Press and Institute for Natural Resources 2024).

Table 4-13. Common Wildlife Species Potentially Occurring within the Study Area

Wildlife Species Common Name	Scientific Name
Black-tailed deer	*Odocoileus hemionus*
Black-tailed jackrabbit	*Lepus californicus*
Coyote	*Canis latrans*
Elk / Wapiti	*Cervus canadensis*
Mule deer	*Odocoileus hemionus*
Osprey	*Pandion haliaetus*
Raccoon	*Procyon lotor*
Turkey vulture	*Cathartes aura*
Western fence lizard	*Sceloporus occidentalis*
Western gray squirrel	*Sciurus griseus*
Wild turkey	*Meleagris gallopavo*

Source: (Oregon State University Libraries & Press and Institute for Natural Resources 2024).
Notes: This is not a comprehensive list of wildlife species that potentially occur within the study area.

4.15.2 Federally Listed Species

An official species list was requested from the USFWS IPaC website (USFWS 2026). There is a total of eleven threatened, endangered, or proposed species on this species list. While a formal wildlife species survey was not conducted in the study area, Parametrix determined the potential for occurrence based on species' habitat requirements, known habitat presence, and field observations. The full list and details of review and determination are provided in the Terrestrial Ecology and Wetlands and Riparian Areas Technical Report (Appendix E.5). Table 4-14 lists species with potential presence in the study area. This section of the document focuses on terrestrial wildlife and bird species only. Aquatic listed species are addressed in Section 4.13, Fish and Aquatic Resources.

Gray wolf (*Canis lupus*) is documented by USFWS (2024b) to potentially occur within the study area. In Oregon, gray wolf is federally listed as endangered west of Oregon Highways 95, 78, and 395. Gray wolf was removed from the Oregon state Endangered Species List in 2015. However, it is still managed under the ODFW Oregon Wolf Conservation and Management Plan, which aims to ensure the population remains stable and continues to grow (ODFW 2019). The project area is on the periphery of the range of the Rogue wolf pack (ODFW 2023). The Rogue pack consists of seven individuals and contains a breeding pair. While the JSC is not mapped within an area of depredating wolf activity (ODFW 2023), the Rogue territory overlaps approximately 1.30 miles of canal at the eastern end of the study area. During site reconnaissance, MID personnel and adjacent farm

landowners confirmed sightings of gray wolf in or near the study area. There is no available information on potential den locations in the study area. Critical habitat for gray wolves is not designated in Oregon.

Table 4-14. Federally Listed Species with a Potential Range in the Study Area

Common Name (Scientific Name)	Federal Listing	Critical Habitat Designated	Occurrence Potential[1]
Gray wolf (*Canis lupus*)	Endangered	Yes	Present
Northern spotted owl (*Strix occidentalis caurina*)	Threatened	Yes	May Occur
Franklin's bumble bee (*Bombus franklini*)	Endangered	-	Not Likely to Occur
Monarch Butterfly (*Danaus plexippus*)	Proposed Threatened	Proposed	May Occur

Source: Adapted from USFWS 2026; Oregon Explorer. n.d.; ORBIC 2023

[1]Present = Known recent records. Species observed during recent survey. May Occur = Species is expected to occur and habitat meets special requirements. Not Likely to Occur = Habitat is only marginally suitable or is suitable but not within species geographic range. Absent = Habitat does not meet species requirements as currently understood in the scientific community.

Northern spotted owl (*Strix occidentalis caurina*) uses forests that are at least 150 to 200 years old (Oregon Forest Resources Institute 2024) and include moderate to high canopy closure from a multilayered, multispecies canopy dominated by large old trees with numerous large cavities, broken tops, and snags. Considerable open space is also needed. There is no suitable old-growth forest within or adjacent to where ground disturbing activities would occur; however, old-growth forests and designated critical habitat for the species exists adjacent to the upstream portion of North Fork Little Butte Creek, Fish Lake, Fourmile Lake, and Cascade Canal within the study area (USFWS 2024). Northern spotted owl may occur in the upstream portion of the study area.

Franklin's bumble bee's (*Bombus franklini*) historical distribution range includes the study area. However, the most recent species surveys have not detected the presence of this species in the project area. It is important to note that agricultural development and other habitat degradation reduced the suitability of this area for Franklin's bumble bee, and therefore it is not likely to occur in the project and study areas.

The monarch butterfly (*Danaus plexippus*) is found throughout the continental United States, including the study area. Monarchs migrate long distances and overwinter in forested areas outside Oregon. It lays eggs on milkweed (*Asclepias* spp.), the sole food for its larvae. No milkweed was observed during the site visit and the area is likely unsuitable for larval feeding. However, blooming forbs or shrubs may provide nectar for adult monarchs passing through. Thus, the species may occur in the study area. In addition to listed threatened or endangered species, the USFWS list includes three species of concern. Based on the historical records and habitat suitability, these species may occur in the study area: Tricolored blackbird (*Agelaius tricolor*); California mountain kingsnake (*Lampropeltis zonata*); and Siskiyou short-horned grasshopper (*Chloealtis aspasma*).

4.15.3 State-Listed Species

ODFW maintains a list of native wildlife species in Oregon determined to be either threatened or endangered according to criteria set forth by OAR 635-100-0105, and a sensitive species list (ODFW 2024b; ODFW 2021). According to ORBIC data, state-listed threatened, sensitive, or sensitive-critical-listed species have a potential range in the study area. This section of the report focuses on terrestrial wildlife and bird species only. Based on available records of occurrence, species' habitat requirements, and availability of suitable habitat within the study area, it was determined that three state-listed species may occur:

- Northern Spotted Owl (*Strix occidentalis caurina*), threatened;
- California mountain kingsnake (*Lampropeltis zonata*), sensitive;
- Townsend's big-eared bat (*Corynorhinus townsendii*), sensitive critical.

Habitat and potential for the occurrence of state-listed threatened northern spotted owl is described in Section 4.15.2.

California mountain kingsnake has a single historical record from 1936, located near Lake Creek within the study area. This species is found in pine forests, oak woodlands, and in chaparral of southwestern Oregon valleys. It is usually found in, under, or near rotting logs in open wooded areas near streams (ODFW 2024c). California mountain kingsnake preys upon snakes, lizards, birds and their eggs, and some small mammals. The study area encompasses suitable habitat and an abundance of appropriate prey species and therefore, California mountain kingsnake may occur in the study area.

Townsend's big-eared bat (*Corynorhinus townsendii*) inhabits coniferous and mixed moist forests, deserts, native prairies, riparian areas, and agricultural lands. It uses caves, mines, isolated buildings, hollow trees, and bridges for roosting, maternity sites, and hibernation (NPS 2020; ODFW 2024c). Several bat species (including Townsend's big-eared bat) are known to occur in the upstream portion of the study area, particularly around Fish Lake (OSU-Cascades 2024). The project area and study area may provide roosting and foraging habitat for this species.

4.15.4 MBTA/BGEPA Species

Migratory birds including those protected under the MBTA and bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) protected under the BGEPA inhabit the study area. Migratory birds are known to feed, nest, and travel through the study area and its surroundings, using a variety of habitats including those within the project area that are periodically disturbed by farming and regular MID maintenance activities.

Bald eagles are known to nest in two locations within proximity to the JSC. According to ORBIC (2023), an active bald eagle nest is located approximately 600 feet (0.1 miles) south of the JSC alignment and 2 miles northwest of Lake Creek. This nest is located within a dense stand of tall conifer trees, hidden from view. A second bald eagle nest was detected on a large cottonwood tree near South Fork Little Butte Creek at the eastern end of the JSC, approximately 300 feet from the JSC alignment. This nest is located within a direct line of sight from the JSC. Bald and golden eagles normally breed in this area from March 1 to August 31.

Other birds protected under the MBTA with their breeding periods are listed in the Terrestrial Ecology, Wetlands and Riparian Areas Technical Report (Appendix E.5).

4.15.5 Areas of Special Concern

In Jackson County, areas of special concern include lands with protected wildlife, vegetation, or historic resources. Much of the study area falls within the protected Deer and Elk Winter Range of Lake Creek Unit, classified as a Very Sensitive habitat (Jackson County 2024). These areas provide essential functions like security from predation and disturbance. The county's nongame species inventory identifies significant nesting areas for birds like bald and golden eagles, osprey, great blue heron, pileated woodpecker, pine marten, or other nongame species of concern, though none are indicated as nesting in the study area.

No vernal pools are mapped within the study area; none were observed during site visits.

4.16 Climate Variability, Resiliency, and Adaptation

Currently, the JSC is an open canal for approximately 12.9 miles from its junction of the North Fork and South Fork Diversion canals to the Bradshaw Drop. The JSC loses up to approximately 5,057 AF per year of the water diverted from the Little Butte Creek watershed and associated storage reservoirs through canal seepage, evaporation due to the arid climate, and other operational losses from system inefficiencies. This means that to meet patrons' irrigation needs, MID and RRVID must divert excess water from the creeks to account for water loss. With a fluctuating climate, increasingly reduced snowpack, earlier snowmelt, and a longer dry season, lower streamflows are expected.

Models suggest that increased rain and a decrease in snowpack combined with an accelerated rate of spring snowmelt will have a progressively greater influence on the future water supply in the area (The Resource Innovation Group 2008); these changes will make managing the water supply more difficult. This trend has potential for a decrease in annual mean streamflow and decreases in groundwater discharge to spring-fed streams.

Adaptive management is an iterative approach to resource management that involves measuring and monitoring management outcomes and making decisions and adjustments in response to new information. Adaptive management allows for feedback between observation and corrective action to ensure that the decision-making framework includes monitoring of metrics for the proposed action. This facilitates the tracking and evaluation of progress toward environmental, social, and economic benefits expected from the Project. It also assists District Managers in accounting for unanticipated changes, inaccurate predictions, or emerging information. Monitoring and adaptive management frameworks allow for increased or modified efforts when issues are identified or when metrics are not met, and decreased efforts when metrics are on track or achieved. Long-term monitoring must be flexible and adapt to the issues and opportunities that arise.

4.17 Wild and Scenic Rivers

The 84-mile, congressionally designated "National Wild and Scenic" portion of the Rogue River begins 7 miles west of Grants Pass, Oregon, and ends 11 miles east of Gold Beach, Oregon. This is outside of the study area.

In October 1990, the US Department of the Interior, Bureau of Land Management's (BLM) western Oregon Districts (Coos Bay, Eugene, Medford, Roseburg, and Salem) and the Klamath Falls Field Office of the Lakeview District completed the eligibility phase of a Wild and Scenic River (WSR) evaluation as part of the resource management plan (RMP) revision process (BLM 1995). The result of this planning effort was the identification of fifty-one eligible river segments across western Oregon.

This study process assessed the suitability of these fifty-one river segments that have been previously identified as eligible components of the National Wild and Scenic Rivers System. The study includes all river segments within the BLM's western Oregon district boundaries that have been determined to meet the eligibility criteria for Wild and Scenic Rivers. This includes the South Fork Little Butte Creek.

Based on the information contained in this study, the BLM Medford District found the South Fork Little Butte Creek to be non-suitable for inclusion into the National Wild and Scenic Rivers System. The makeup of this segment hinders the BLM's ability to manage it effectively as a WSR. First, the BLM-managed portions of the segment are fragmented. The BLM manages 1.3 of the total 24.5 miles of stream in this segment. The BLM does not control uses or activities on private lands, making effective management of this segment difficult. In addition, it has been determined that one or more non-compatible land uses exist within the river corridor. Therefore, it was determined that wild and scenic river designation would not be the best method for protection of the South Fork Little Butte Creek free-flowing condition, water quality, and outstandingly remarkable values.

5 Alternatives

5.1 Formulation Process

During the formulation stage, multiple alternatives were considered including: a new alignment for the JSC, piping the JSC with a reduced pipe size, only installing SCADA, piping only a few sections of the JSC, piping the entire JSC, and adding new siphons. When formulating an alternative, it was first determined whether the alternative met the project purpose. The alternative was then further analyzed for four criteria: completeness, effectiveness, efficiency, and acceptability (USDA 2017a; Appendix D.2). Some of the initial alternatives considered did not meet the formulation criteria and were eliminated from further analysis (Appendix D.2).

Two action alternatives and one No Action Alternative were initially considered during the scoping process. The formulation of alternatives followed 7 CFR Part 1b for implementing NEPA and numerous NRCS watershed planning policies. Scoping comments were also incorporated into the formulation process of alternatives. The two action alternatives are Canal Lining and the Modernization Alternative.

5.2 Alternatives Eliminated from Detailed Study

Canal lining was evaluated based on the formulation criteria, but after further consideration it was not analyzed in detail as a viable alternative. Based on program guidelines, an alternative may be removed from consideration if it does not address the purpose and need for action, does not achieve the Federal Objective (Section 2) and Guiding Principles, or becomes unreasonable because of cost, logistics, existing technology, or environmental reasons (NWPM 501.37; USDA 2017a). After additional consideration, 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 Canal Lining

Canal lining would involve covering the bottom and sides of the currently open MID Joint System Canal with a geotextile liner and shotcrete to prevent water from seeping into the underlying soils and rock. Canal lining would require subgrade preparation and installation of either geosynthetic cementitious composite mats (GCCM), such as Concrete Canvas, or high-density polyethylene (HDPE) liner with a geomembrane liner and shotcrete to protect the HDPE liner across the approximately 12.8 miles of open canal.

Lining would increase the water velocity in the canal because the shotcrete cover is a smoother surface than the existing underlying soils and rock. The smoother surface would make the sides of the canal slippery and thus more difficult for people, livestock, and wildlife that might accidentally fall into the water to climb out. This alternative does not meet the public safety component of the Federal Objective and Guiding Principles.

Canal 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 50 years for Concrete Canvas and 25 to 50 years for HDPE liner before needing to be replaced (SHN 2023). Before replacement, as the system aged, it would likely require maintenance with progressively increasing frequency. Maintenance 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 still require energy use and other pumping costs for farmers like their current operations.

Several recently completed Watershed Plan-Environmental Assessments within Oregon[2] have evaluated the cost efficiency of canal lining against the costs of piping. For canal lining, capital costs included increased operation and maintenance (O&M) costs—owing to the relatively fragile nature of a lined canal compared to an unlined canal—and one to two additional full replacements of the lining over the 100-year analysis period. Several of the lining cost evaluations relied upon the material unit costs experienced by the Three Sisters Irrigation District. In all cases, it was determined that the combined capital and O&M costs for canal lining exceeded the cost of piping by factors as low as 2 to as high as 5. In all cases, cost was used to justify eliminating the canal lining alternative from further study. The initial capital costs of canal lining for this project were estimated based on the size of the existing open canal, earthwork to reshape the canal, materials, and installation of the liner and shotcrete. The estimated canal lining costs for the 100-year analysis period, including replacement costs, are estimated at $119,449,000.

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

5.3 Alternatives Description

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 within the project area 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. The No Action Alternative would be a continuation of the District's current operations and maintenance.

The uphill land uses in the project area—flood irrigation, livestock and wildlife access, and upland drainages—result in sediment, nutrients, and bacteria entering the Joint System Canal. This, in turn, exacerbates aquatic vegetation growth in the canal which raises the water level in the canal, reduces flow delivery volumes due to increased resistance and decreased canal capacity, and can increase losses due to overtopping and seepage.

The No Action Alternative would not meet the project's purpose and need. Water would continue to be lost to seepage and evaporation in District infrastructure. Water delivery reliability for farmers, streamflow and habitat conditions for fish and aquatic species, public safety, and sediment levels and other pollutants in irrigation water would not improve. Because no water would be conserved or allocated instream, the No Action Alternative would not achieve the Federal Objective to protect

[2] Swalley Irrigation District Irrigation Modernization Project, Final Watershed Plan-Environmental Assessment, United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), December 2018; Central Oregon Irrigation District, Smith Rock-King Way Infrastructure Modernization Project Final Watershed Plan-Environmental Assessment, United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), July 2020; North Unit Irrigation District Infrastructure Modernization Project Final Watershed Plan-Environmental Assessment, United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), January 2023.

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)

Under the Modernization Alternative, federal funding through Pub. L. No. 83-566 would be available. The District would modernize up to 11.5 miles of its system from the junction of the North Fork and South Fork diversion canals to where the canal bifurcates with RRVID at the Bradshaw Drop (see Figure 5-1). As part of modernization, up to 11.5 miles of the JSC would be piped, existing siphons would be upgraded, some segments of the system could be shortened, and turnouts would be upgraded.

The Modernization Alternative would help turn the JSC into a pressurized pipeline, eliminate canal leakage, improve water conservation, maximize the use of existing storage reservoirs, pressurize water for irrigators, reduce canal maintenance, potentially reduce the total canal length, measure irrigator water use, replace aging infrastructure, and improve water quality. MID and RRVID store water in Fourmile Lake reservoir, which is then conveyed to Fish Lake using the Cascade Canal. Flow in the North Fork Little Butte Creek is controlled by releases from Fish Lake. The Modernization Alternative would improve water management in these two storage reservoirs by decreasing water loss in the JSC and allowing the reservoirs to retain more stored water.

Construction of the Modernization Alternative would occur in five project groups over the course of 4 years. Construction would primarily occur during the non-irrigation season (October to April), with Project Group 1 construction beginning as early as the 2027–2028 non-irrigation season. The following subsections describe actions that are part of the Modernization Alternative.

5.3.2.1 Piping

In general, the majority of piping would occur within the existing JSC canal alignment. For the purposes of this Plan-EIS, including construction cost estimates, the new pipeline is assumed to have a 72-inch inner-diameter. Pipe size was determined based on the results of a previous hydraulic modeling study (FCA 2022). The new pipe may be smaller in diameter after more detailed engineering is completed.

Construction of the proposed pipeline would include mobilization and staging of construction equipment; delivery of pipe to construction areas; excavation of trenches; pipeline fusion and installation; backfilling and compaction; and restoration and reseeding of disturbed areas. Appropriately sized construction equipment would be used to minimize disturbance within the construction area.

Canal segments identified for piping would be accessed from existing MID maintenance roads whenever possible. Existing maintenance roads and overland access routes commonly used for operation and maintenance (O&M) may require minor improvements to support construction activities.[3] In some cases, temporary overland travel routes within existing MID easements may be necessary to access canal segments that do not have established maintenance roads. To facilitate restoration, temporary travel routes would be left in their natural condition, with only minimal alterations necessary to accommodate construction traffic. The most direct route practicable would be used to access construction areas, and any work needed to establish equipment access would occur prior to or concurrently with pipeline installation.

[3] Any road modifications would be paid for entirely by MID.

Pipe installation would require staging and storage areas for pipe, construction materials, and construction equipment. Source areas for borrow or fill material may also be required. These areas have not yet been identified and would be selected prior to construction. Previously disturbed areas that are accessible via existing access routes would be prioritized for staging, storage, and borrow/fill activities, as applicable.

The existing canal would be excavated for subgrade preparation prior to pipe installation using excavators, with excavated material side-cast adjacent to the canal. A geotextile liner would be installed in the trench, followed by placement of pipe bedding and the pipeline. The side-cast excavated material would then be returned to the trench as pipe cover. Trench design would conform to the NRCS Conservation Practice Standard for Irrigation Pipeline (Code 430-CPS-1). Excess material that could not be reused as backfill would be disposed of at an approved upland location. Specific details regarding the final pipeline alignment, construction materials, and construction means and methods would be determined during final design.

The pipeline alignment may be adjusted slightly within the project area to avoid rock outcroppings observed along the existing canal. If relocation to an alternate route is not feasible, jackhammering, blasting, or other rock removal methods may be required to facilitate pipeline installation.

Additionally, along the JSC there are 10 unnamed drainages that flow into the JSC. In some locations, headgates allow a mixture of irrigation water and drainage water to continue flowing into the drainage downslope of the JSC (see Figure C-5 in Appendix C). Where headgates are not present, a channel forms downslope of the JSC due to groundwater discharge, which is augmented by canal seepage. At these unnamed drainages, the canal would be piped below the drainage as described in Section 5.3.2.4. The drainage would be recontoured and replanted with riparian vegetation after pipeline construction to allow the drainage to reconnect up- and downslope portions of the drainage, maintain its hydraulic connection to Little Butte Creek and to prevent scouring over the underlying pipeline. The drainage channel can be composed of natural streambed materials underlain by erosion resistant material to ensure integrity of the pipeline. ODFW determined that the 10 unnamed drainages do not have suitable habitat for native migratory fish and, therefore, no fish passage would be required in these locations.

Vegetation clearing prior to construction, vegetation and weed management during construction, and reseeding following construction would be completed in accordance with MID's current vegetation management practices and the *NRCS Oregon and Washington Guide for Conservation Seedings and Plantings* (NRCS 2000). Vegetation clearing would be minimized to the extent practicable during construction, and locations for vehicle and equipment access, staging, and storage would be selected to avoid trees and other slow-growing vegetation whenever possible. Trees would only be removed if no reasonable alternative existed to access the construction site or if they posed a safety hazard to construction crews.

Under the Modernization Alternative, O&M activities would continue to be performed on an as-needed basis during the irrigation season (April through October). Outside the irrigation season, MID would perform maintenance and repairs on system components, including District meters, turnout valves, and air and vacuum release valve infrastructure.

5.3.2.2 Existing Siphon Updates

Existing siphons include Lake Creek siphon (563 feet in length; 54-inch diameter), Wyant Gulch siphon (145 feet; 60-inch diameter), and Osborne Creek siphon (1,094 feet; 60-inch diameter). Siphons are used to cross a barrier, such as a stream or drainage feature, by burying the irrigation

pipeline underground such that the stream's functionality as a watercourse is maintained. This is an alternative to using elevated channels, such as a viaduct or flume, to pass irrigation water over a natural drainage feature. Under the Modernization Alternative, the three existing siphons would be upgraded.

Existing siphons would be upgraded by one of these methods: sliplining the existing siphon with a new siphon inserted into the current one; replacing the existing siphon with a new siphon along the same alignment; or decommissioning the existing siphon and constructing a new siphon adjacent to the existing siphon. Decommissioning could include either leaving the siphon in place as is or filling it with controlled low-strength material (CLSM) to prevent future collapse. If required, construction of a new siphon may occur using a variety of methods including a cut-and-cover trench method, horizontal directional jack-and-boring method, or a combination of the two.

If trenching were selected, trenching approximately 10 to 14 feet below the bottom of the active streambed would be used to place the new siphon. Trenching would occur within the ODFW-preferred work period for Rogue River tributaries above Marial, Oregon (June 15 to September 15). The work area would be isolated by cofferdams and temporary water management would maintain flows downstream and out of the work area.

If jack and bore is selected, two pits would be established, one on either side of the waterbody that would be crossed. The two pits would be used to install the siphon approximately 4 to 8 feet below the bottom of the streambed.

The appropriate siphon construction method would be determined for each siphon prior to construction after further engineering studies, and may include a condition assessment of the existing siphons. When a siphon pipeline goes underneath a natural wetland, such as Osborne Creek, anti-seep collars or equivalent technology would be used to prevent draining of wetlands. Disturbed areas would be restored to pre-construction conditions.

The options for each existing siphon are listed below and include installation cost and length. Costs assume the most expensive construction method (see above for a discussion of the different methods).

- Osborne Creek Siphon Option 1 (Existing Alignment) – The existing 1,094-foot-long siphon would be upgraded in its current alignment; $2,076,700
- Osborne Creek Siphon Option 2 (Adjacent Alignment) – A new 1,094-foot siphon would be built adjacent to the existing siphon with the existing siphon retired in place; $2,517,500
- Lake Creek Siphon Option 1 (Existing Alignment) – The existing 398-foot siphon would be upgraded in its current alignment; $904,800
- Lake Creek Siphon Option 2 (Adjacent Alignment) – A new 398-foot siphon would be built adjacent to the existing siphon with the existing siphon retired in place; $1,232,400
- Wyant Gulch Siphon Option 1 (Existing Alignment) – The existing 145-foot-long siphon would be upgraded in its current alignment and 1,544 feet of canal loop would be piped; $1,212,800
- Wyant Gulch Siphon Option 2 (New Alignment) – install siphon (512 feet) in a new siphon alignment downslope of the existing siphon under Wyant Gulch and retire the canal loop; $1,150,000

5.3.2.3 Canal Loop Improvements

In addition to existing siphons, under the Modernization Alternative there are three segments of the JSC where the existing open canal loops around natural drainage areas. These three segments are being evaluated to determine whether the pipeline would follow the existing canal alignment or whether a siphon could be installed beneath a natural drainage feature, which would shorten the length of the JSC pipeline.

When considering the installation of a siphon, the lowest point of all siphons that cross a stream or drainage feature is assumed to be 4 to 8 feet below the centerline drainage feature ground surface. If the cut-and-cover trench method is employed, siphons under perennial streams would be installed during the in-water work window defined for the Rogue River and its tributaries as described in the Fish and Aquatic Species Technical Report (Appendix E.7). Jack and bore method could be used outside of the in-water work window as this work would be performed approximately 4 to 8 feet below the bottom of the active streambed and the stream would not be disturbed. In some locations, specifically at new siphons, construction access would need to be created before delivering pipe or equipment to construction areas and could include vegetation removal within the construction area.

With installation of a siphon, the unnecessary canal loop would be retired and left open. In places where retired sections of canal intersect a drainage, the drainage would be recontoured and the drainage portions upstream and downstream of the canal would be reconnected. ODFW determined that these drainages do not have suitable habitat for native migratory fish and, therefore, no fish passage would be required at these locations.

Piping in the existing alignment of these three segments of canal would include all of the actions described above in the Piping subsection.

The options for the three segments of the JSC that could remain in their existing alignment or have a siphon installed are listed below:

- Grasshopper Segment Option 1 (Existing Alignment) – pipe canal loop along its existing alignment; 1,521 feet, $1,296,500
- Grasshopper Segment Option 2 (Siphon) – install siphon in a new alignment (438 feet) and retire canal loop; $1,305,800
- Owens Segment Option 1 (Existing Alignment) – pipe canal loop along its existing alignment; 2,267 feet, $2,921,800
- Owens Segment Option 2 (Siphon) – install siphon in a new alignment (574 feet) and retire canal loop; $1,448,700
- Eagle Gulch Segment Option 1 (Existing Alignment) – pipe canal loop along its existing alignment; 4,796 feet, $6,123,500
- Eagle Gulch Segment Option 2 (Siphon) – install siphon in a new alignment (1,004 feet) and retire canal loop; $2,702,400

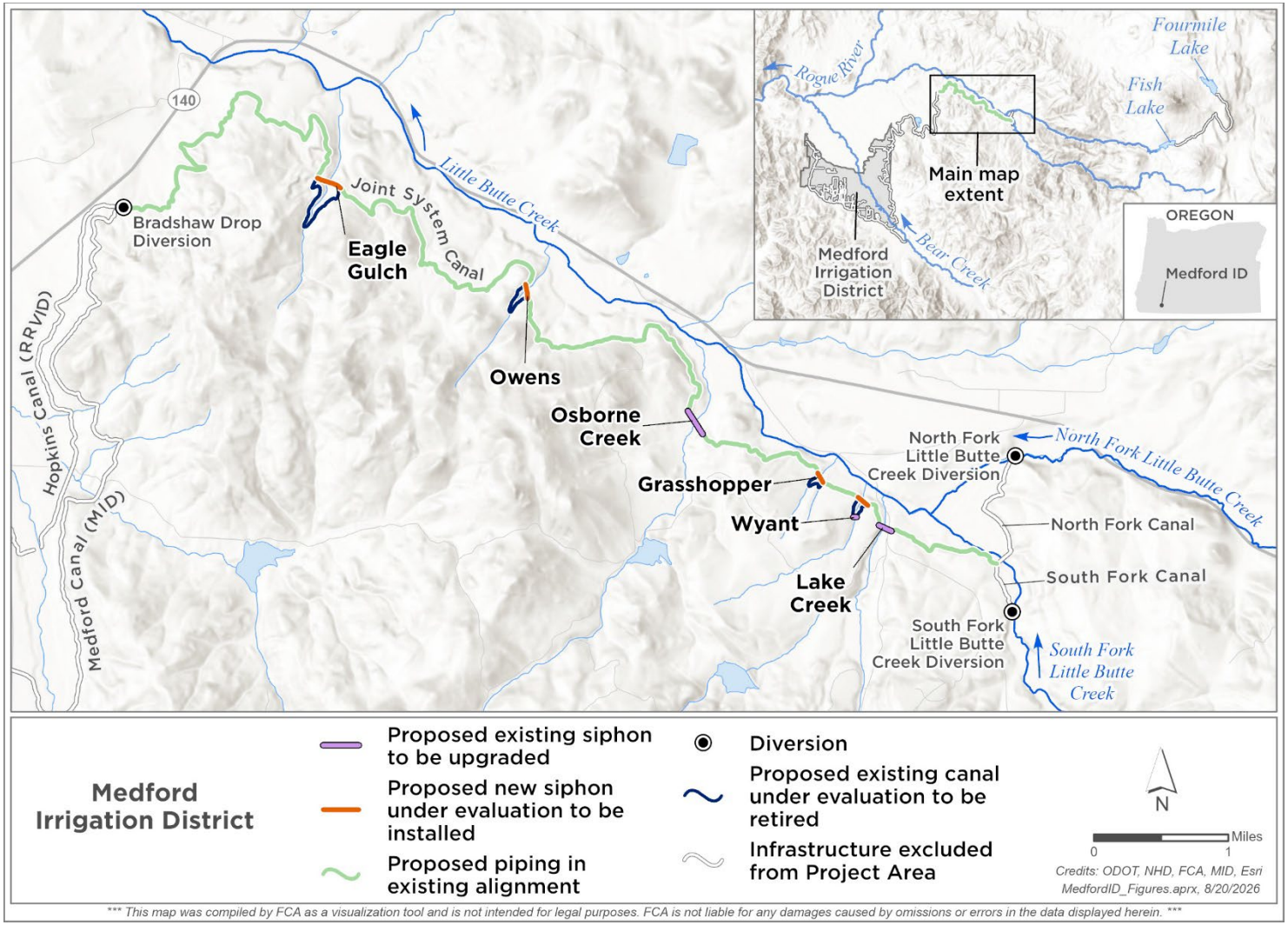


Figure 5-1. Modernization Alternative for the Medford Irrigation District Joint System Canal Modernization Project.

5.3.2.4 Irrigation Turnout Installation

There are 24 turnouts on the JSC. The turnouts are gravity fed and would be converted to pressurized delivery systems through the Modernization Alternative. Each converted turnout would be 10 inches in diameter with a valve, locking valve box, flow meter, and pipe stub out. Currently, there are no flow meters on the existing turnouts. Some of these turnouts could also be designed to accommodate fire hydrant fittings such that they could be used as a water supply for wildland firefighting. Turnout costs are included in the total project cost.

5.3.2.5 Project Cost

The estimated capital costs for the Modernization Alternative, excluding NRCS technical assistance, program administration, and permitting costs, would range from $82.8 million to $90.6 million (2026 dollars) depending on the siphon options selected. Detailed information regarding the capital costs of the siphon options and Modernization Alternative can be found in Section 5.3.2.2 and Appendix D.3, respectively. Section 8.9 includes the total Preferred Alternative costs, including NRCS technical assistance, program administration, and permitting costs.

5.4 Summary and Comparison of Alternatives

Table 5-1 compares the No Action/Future without Federal Investment (No Build Alternative) and the Full Modernization Alternative. The table summarizes measures addressed as well as environmental, social, cultural, and economic effects.

Table 5-1. Summary and Comparison of Alternative Plans

Alternative Plans Item or Concern	**No Action Alternative** **(Future without Federal Investment)**	**Modernization Alternative[1]** **(Future with Federal Investment)**
Locally Preferred	No	Yes
National Economic Efficiency	No	Yes
Socially Preferred	No	Yes
Environmentally Preferred	No	Yes
Guiding Principles Item or Concern	**No Action Alternative** **(Future without Federal Investment)**	**Modernization Alternative** **(Future with Federal Investment)**
Healthy and Resilient Ecosystems	No	Yes
Sustainable Economic Development	No	Yes

Floodplains	Not Applicable	Not Applicable
Public Safety	No	Yes
Watershed Approach	No	Yes
Provisioning Services – Trade-Offs	**No Action Alternative (Future without Federal Investment)**	**Modernization Alternative (Future with Federal Investment)**
Irrigation water	No	Yes
Instream fish species	No	Yes
Regulating Services – Trade-Offs	**No Action Alternative (Future without Federal Investment)**	**Modernization Alternative (Future with Federal Investment)**
Water quality	No	Yes
Cultural Services – Trade-Offs	**No Action Alternative (Future without Federal Investment)**	**Modernization Alternative (Future with Federal Investment)**
Culturally important species	No	Yes
Installation Costs	**No Action Alternative (Future without Federal Investment)**	**Modernization Alternative (Future with Federal Investment)**
Federal Pub. L. No. 83-566	$0	$70,401,000
Local only or Matching Pub. L. No. 83-566	$0	$23,808,000
Total	$0	$94,209,000

Average Annual Cost		
Installation	$0	$3,014,000
OM&R[2]	$0	$37,000
Total	$0	$3,051,000
Annual Benefits[3]	$0	$1,681,000
Annual Costs	$0	$3,051,000
Annual Net Benefits[4]	$0	-$1,370,000
Regional Economic Impacts	**No Action Alternative (Future without Federal Investment)**	**Modernization Alternative (Future with Federal Investment)**
Annual Jobs from Recreation	0	0
Local jobs during 4-year construction (including direct/indirect/induced)[5]	0	320
Change in Annual Jobs from agriculture (including direct/indirect/induced)	0	150
Beneficial Effects Annualized (2024$)	**No Action Alternative (Future without Federal Investment)**	**Modernization Alternative (Future with Federal Investment)**
Region	$0	$3,300,000
Rest of Nation	$0	Some ripple effects on jobs and income, not quantified.
Adverse Effects Annualized (2024$)	**No Action Alternative (Future without Federal Investment)**	**Modernization Alternative (Future with Federal Investment)**
Region	$0	$40,000
Rest of Nation	$0	$3,000,000

[1] Within this table, the Modernization Alternative is inclusive of all siphon alignment options. The benefits are the same for all siphon alignment options.
[2] Operation, maintenance, and replacement (OM&R) for the Modernization Alternative includes operation and maintenance costs for the new pipeline and replacement costs for siphons. A decrease in OM&R costs with piping for the Modernization Alternative was included in the benefits, rather than the costs.
[3] Quantified benefits include agricultural production value and instream flow benefits.
[4] Annual net benefits shown for the Modernization Alternative are the additional net benefits compared to the No Action Alternative.
[5]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. It may overstate impacts as it assumes that the project administration and technical assistance provided by NRCS is generally provided by local staff and not state office staff located outside the region.

6 Environmental Consequences

This section evaluates the environmental consequences of the No Action Alternative and Modernization Alternative. The beneficial and adverse effects of the alternatives on each resource described in Section 4 were evaluated. The intensity of an adverse effect was classified as negligible, minor, moderate, or major. The duration of an effect was classified as temporary, short-term, or long-term. Appendix E.1 presents the intensity threshold matrix that categorizes and defines the range of expected effects.

6.1 Cultural Resources

6.1.1 No Action (Future without Federal Investment)

The No Action Alternative would maintain existing conditions and activities in the study area as defined in Section 4.1. As such, the potential for impacts to cultural resources from the No Action Alternative would be limited. However, impacts to unknown cultural resources remain possible through the inadvertent disturbance of these resources by current irrigation and agricultural activities in the study area.

6.1.2 Modernization Alternative

The archaeological survey identified one precontact archaeological site that is potentially eligible and recommended for avoidance and one historic-period archaeological isolate that is recommended not eligible. The built environment survey identified one historic property in the APE, the MID JSC, which is a contributing resource in the NRHP-eligible Rogue River Basin Project Linear District.

Archaeological site MID-1 consists of a precontact lithic quarry with unknown subsurface extent. As such, the project team recommended the site as potentially eligible. The site occurs within the APE, but no project activities are mapped within the site boundary. The project team recommends that the site boundary be flagged and that all construction activities be limited to the north side of the JSC during construction. Archaeological isolate ISO-01 is recommended not eligible. As such, the project would result in no effects on archaeological resources.

The JSC is recommended as a contributor to the NRHP-eligible Rogue River Basin Project Linear District. Project activities associated with the Modernization Alternative would affect the integrity of the JSC such that it can no longer convey its significance as a contributor to the historic property and would no longer be considered eligible as a contributing resource to the Rogue River Basin Project Linear District in the NRHP. As such, NRCS recommends a finding of Adverse Effect to historic built environment resources in the APE.

The mitigation measures for the adverse effect on the JSC are being determined through additional Section 106 consultation which will result in an MOA between NRCS and SHPO and will be addressed during the Record of Decision (ROD) process. Potential mitigation may include articles with historic and current images or a drone video posted online at Oregon Encyclopedia and MID's website. The draft cultural resources report was reviewed by NRCS and BLM and was submitted to SHPO and federally recognized tribes on November 25, 2024. SHPO did not provide a response during the 30-day review period. Coquille Indian Tribe responded that they would defer to neighboring Tribes. The Confederated Tribes of the Grand Ronde had comments (see Appendix E.2) and their feedback was incorporated and minor edits were made to the report. NRCS sent the final report, a determination of eligibility and a finding of adverse effect to SHPO on July 14, 2025. SHPO responded with a letter on August 15, 2025, concurring that the JSC is not individually

eligible for listing in the NRHP and that the project will have an adverse effect on historic properties. NRCS will organize consultation meetings with interested parties to draft the MOA with mitigation stipulations included within. The MOA would be finalized before the ROD. The Inadvertent Discovery Plan is included in Appendix E.2.

6.2 Land Use

6.2.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the JSC would remain as an open canal. The alignment would remain in its current location and siphons would not be constructed. There would be no interruptions to existing land uses along the canal alignment or on adjacent parcels. There would be no acquisitions or permanent changes to planned land uses or zoning. The No Action Alternative is not expected to have any effects on land use.

6.2.1.1 Ecosystem Services

Provisioning service, Water available for irrigation (Figure 4-1 [E1]): Under the No Action Alternative, the amount of irrigation water diverted by the District from the North Fork and South Fork Little Butte Creek would largely remain the same. Existing District infrastructure would continue to be 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

Overall, the Modernization Alternative, including all siphons and canal loop segment options, would have a minor temporary effect on land use during construction and no long-term effects. If construction methods include blasting, temporary effects would be moderate.

6.2.2.1 Piping

In the short term, construction activities for piping would include vegetation clearing, trenching, equipment mobilization and staging, and backfilling of trenches after pipe installation. All of these activities could potentially result in temporary visual, noise, dust, and vibration impacts to existing land uses adjacent to the JSC alignment. No impacts to structures are anticipated. There would be no acquisitions or permanent changes to existing land uses or ownership outside of the existing canal alignment.

Due to the protections that the land uses in the project area are afforded through the statewide planning goals, land uses in the project area are not expected to change. Overall, the project area would continue to be characterized by agricultural, forest, and aggregate extraction uses.

The Project is consistent with Oregon's Statewide Land Use Planning Goal 3, Agricultural Lands, and Goal 4, Forest Lands. Piping of the JSC and improved reliability of water delivery to MID and RRVID patrons would support agricultural land uses in Jackson County and on lands served by the JSC. Piping of the JSC would not affect forest lands on BLM-owned parcels that are zoned Open Space Reserve and Woodland Resource, and would be consistent with the existing RMP designations of District-Designated Reserve – Timber Production Capability Classification and Riparian Reserve – Dry. Tree growth along the pipeline alignment would be prohibited to protect the pipe from potential damage by tree roots. However, tree growth is only currently occurring at the edges of the JSC and the prevention of additional tree growth along the alignment would not have overall effects on surrounding forest uses.

6.2.2.2 Existing Siphon Updates

Under the Modernization Alternative, three existing siphons were evaluated. During construction, temporary visual, noise, dust, and vibration impacts to adjacent existing land uses could occur. No impacts to structures are anticipated.

After construction, all of the siphons would be underground and there would be no anticipated permanent impact created by changes to visual or aesthetic features on land uses in these areas. Permanent use restrictions such as prohibitions on tree growth and limits on heavy equipment and vehicle use would be in place within easements surrounding the siphons.

Option 1: Existing Alignment (Osborne Creek, Lake Creek, and Wyant Gulch)

There would be no change to the current EFU zoning or existing land use on either side of the canal or at either end of the siphon alignment.

Option 2: Adjacent Alignment (Osborne Creek and Lake Creek) and New Alignment (Wyant Gulch)

There would be no change to the current EFU zoning or existing land use on either side of the canal or at either end of siphon alignments. However, permanent use restrictions would be in place within easements along new siphon alignments.

6.2.2.3 Canal Loop Improvements

Under the Modernization Alternative, three segments of the JSC where there are canal loops were evaluated. During construction, temporary visual, noise, dust, and vibration impacts to adjacent existing land uses could occur. No impacts to structures are anticipated.

Option 1: Existing Alignment (Grasshopper, Owens, Eagle Gulch)

There would be no impacts to the existing EFU zoning or existing land uses for all three of these segments. For the Eagle Gulch segment, the new pipeline would be consistent with, and would have no impact on, the Aggregate Conflicting Use Impact Area overlay and on the existing zoning in this portion of the project area, which is split between Aggregate Removal on the upslope side of the canal and EFU on the downslope side.

Option 2: New Siphon (Grasshopper, Owens, Eagle Gulch)

The new siphons would be installed in EFU zoning, which is the same zoning as the existing canal loop alignments. Permanent use restrictions would be in place within easements along the new siphon alignments. The segments of canal bypassed by the new siphons would be retired and left open. In the long term, it is expected that the retired sections of canal would become revegetated with upland vegetation.

6.2.2.4 Permitting

The majority (29 of 37) of the parcels crossed by the existing canal and proposed siphon route options are zoned EFU. According to the Jackson County Land Development Ordinance, Chapter 4 (Resource Districts), irrigation canals, delivery lines, and accessory structures and facilities associated with a district are an allowed use within EFU-zoned lands through a Type 2 land development permitting process. Type 2 uses are subject to administrative review. These decisions are discretionary and therefore require a notice of decision and opportunity for a public hearing.

Open Space Reserve and Woodland Resource zoned parcels are both included in the Forest Resource District in Chapter 4 of the Land Development Ordinance. Only 3 of 37 total parcels in

the project area are within these zoning designations. Water intake facilities, canals and distribution lines for farm irrigation and ponds are permitted in these zones through a Type 1 land development permitting process. Type 1 uses are authorized by right, requiring only non-discretionary staff review to demonstrate compliance with the standards of the Land Development Ordinance.

Development within the Aggregate Removal zoning for the 5 remaining parcels does not identify irrigation use or structures in the Land Development Ordinance as either an allowed or prohibited use. The closest use to irrigation facilities that is an allowed use is utility facilities, which is also a Type 2 use.

It is likely that the entire Modernization Alternative would be processed by Jackson County as a Type 2 use. The Type 2 development review would include an assessment of the Project's compatibility with the Aggregate Conflicting Use Impact Area overlay and the Floodplain Overlay, where applicable. Further coordination with Jackson County for land use permitting would occur during a pre-application conference, which would take place after Plan-EIS authorization.

6.2.2.5 Ecosystem Services

Provisioning service: Water available for irrigation (Figure 4-1 [E1]): Under all options for the Modernization Alternative, ecosystem services of water for irrigation would be supported through the improvement of water delivery through infrastructure improvements. Please see the NED in Appendix D.1 for further information.

6.3 Public Safety

6.3.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the JSC would remain open and there would be no effect on public safety; the drowning and accident risk would remain. Wildfire risk would remain the same.

6.3.2 Modernization Alternative

During construction associated with the Modernization Alternative, including all siphon and canal loop options, public safety could be affected by vehicle and heavy equipment traffic entering and leaving the project area. Construction traffic could interact with motor vehicles, pedestrians, and bicyclists traveling through rural areas along county and private access roads that intersect the project area. Blasting activities pose a risk to public safety, as there is the potential for flying debris to cause injury and/or damage structures or utilities.

Most of the construction would take place during the non-irrigation season when wildfire risk is low. Additionally, burn bans or other restrictions based on wildfire hazard potential would be followed as appropriate.

Standard safety protocols and BMPs would be followed during construction to minimize risk to public safety; therefore, a minor short-term effect on public safety is anticipated during construction because effects on public safety would be minimized by BMPs and would be limited to within the project area.

Once fully completed, the Modernization Alternative, including all siphon and canal loop options, would eliminate the drowning risk in portions of the project area where the existing open JSC would be converted to buried pipe. The Modernization Alternative would, therefore, result in long-term beneficial effects on public safety because drowning and other open canal-related accidents would no longer be possible in the project area.

The Modernization Alternative, including all siphon and canal loop options, could provide benefits by increasing access to water used for firefighting. The project would include standpipes on approximately each mile of the JSC that is piped, which would allow firefighters to access JSC water in times of emergency. Standpipe locations would be determined with further engineering. Access to JSC water could help to prevent fire damage to residences, commercial property, agricultural operations, and natural areas. By preventing the spread of wildfire, the Project could also improve water quality if it allowed firefighters to prevent hillsides from burning, which increases runoff into adjacent streams.

6.4 Air Quality

6.4.1 No Action (Future without Federal Investment)

Under the No Action Alternative, air quality would remain unchanged. The project area is outside of the CO and PM10 Air Quality Maintenance Areas (AQMA) for the Medford Urban Growth Boundary and the Medford-Ashland urban areas of the Bear Creek Basin. The JSC is an irrigation water canal that is not a source of air quality criteria pollutants.

6.4.2 Modernization Alternative

Direct impacts of construction activities would result in the temporary emission of several air pollutants. PM10 emissions are associated with dust created from land clearing, excavation, cut-and-fill operations, and blasting. All other pollutants (including PM2.5, CO, SO2, and NO2) are generated from heavy-duty diesel engines used in construction equipment and vehicles.

Construction of the project would occur in phases, and it would be spread out through the study area over a 4-year period. Construction emissions in the study area would vary from day to day, depending on work being done, equipment used, and weather conditions. Soil moisture, silt content of soil, wind speed, and amount of equipment operating in an area can impact the amount of dust (i.e., PM10) generated from the site. The amount of PM10 and exhaust emissions from construction activities emitted from the site would be minimized by using BMPs.

Under the Modernization Alternative, including all siphon and canal loop options, air quality would remain unchanged in the long-term. The canal would be piped, buried underground, and operationally isolated from ambient atmospheric conditions. No long-term air quality impacts are anticipated as a result of the Modernization Alternative, including all siphon and canal loop options. Therefore, no mitigation would be required.

BMP Measures

Fugitive dust generated during construction would be minimized by taking reasonable precautions, as required by the construction specifications. Control measures typically would include BMPs for dust suppression and construction equipment emission, such as the following:

- Using water or dust suppressants on unpaved roads.
- Covering trucks that are likely to give rise to airborne dust.
- Minimizing disturbed areas.
- Using street sweepers to remove entrained dust from paved roads.
- Using soil stabilization BMPs such as tackifier, mulch, and temporary seeding, as required by permit.

- Locating truck staging areas for diesel-powered vehicles where truck emissions have a minimum impact on sensitive populations such as residences and schools.
- Instituting contractor incentives to shorten construction durations and encourage the use of lower-emitting construction equipment including retrofitting diesel engines with verified control technologies, replacing older equipment with newer, and using cleaner fuels (e.g., 20 percent biodiesel fuel).

6.5 Socioeconomic Resources

6.5.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the JSC would remain as an open canal, and the alignment would remain in its current location. There is no construction expenditure associated with the No Action Alternative, and therefore no construction economic development benefits.

6.5.2 Modernization Alternative

The Modernization Alternative, including all siphon and canal loop options, would require excavating materials, mobilizing and staging construction equipment, removing vegetation before construction, fusing and placement of pipe, backfilling, and restoring and reseeding disturbed areas. Blasting may be required in some areas. Trees would only be removed if there were no other way to access the construction site, or if there would be a safety threat to construction crews. Construction would occur in phases primarily during the non-irrigation season and is expected to last a total of 4 years.

Adjacent residents would experience minor temporary impacts from construction activities. The impacts could be visual, noise, vibration, and dust. Construction of the Lake Creek Siphon under both Options 1 and 2 may temporarily impact access to and from the town of Lake Creek to the south along South Fork Little Butte Creek Road.

Under the Modernization Alternative, including all siphon and canal loop options, the JSC would be piped and buried underground. There would be no long-term effect on socioeconomic resources in the study area.

6.5.2.1 Regional Economic Development

The Modernization Alternative construction expenditures of $94.2 million would support construction sector jobs and income, as well as economic ripple effects increasing jobs and income in other economic sectors in Jackson 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 would 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 $94.2 million in construction expenditure is spread over four years. During this four-year period, construction is expected to support approximately 320 jobs and $12.4 million in average

income over the 4-year construction period (annualized over 104 years[4] this equates to approximately $1.5 million in annualized average income benefits). [5] Of these impacts, approximately 150 jobs and $0.9 million in annual income are in the construction sector (direct impacts) while the remaining 70 jobs and $0.6 million income are in other sectors. Note that some of these impacts may accrue outside the region if the project costs for NRCS technical assistance and project administration support are provided by personnel outside the region.

The Modernization Alternative would also result in agricultural damage reduction benefits. This includes total net income benefits of $1.8 million that accrue to local agricultural producers as quantified in the NED. Additionally, regional economic development benefits associated with increased agricultural production compared to the No Action Alternative condition are estimated to increase economic activity that would support 150 jobs and an additional $1.8 million in annual average income in other sectors. [6] These benefits combined with the annualized average regional income supported by construction results in a total regional income benefit of $3.3 million.

6.6 Neighborhoods

6.6.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the JSC would remain as an open canal, and the alignment would remain in its current location. There would be no effect on neighborhoods or community facilities. There would be no change of community facilities to another use, and there would be no changes in access to neighborhoods or community facilities.

6.6.2 Modernization Alternative

The Modernization Alternative, including all siphon and canal loop options, would require excavating materials, mobilizing and staging construction equipment, removing vegetation before construction, fusing and placement of pipe, backfilling, and restoring and reseeding disturbed areas. Blasting may be required in some areas. Trees would only be removed if there were no other way to access the construction site, or if there would be a safety threat to construction crews. Construction would occur in phases primarily during the non-irrigation season and is expected to last a total of 4 years.

[4] Note that each project has a 100-year life, but since construction takes 4 years, the analysis period across all project groups is 104 years.

[5] This estimate includes the economic ripple impacts that would result from the increased construction sector economic activity which spurs the construction sector to spend more on its inputs (referred to in economics as backward linkages), including labor, materials, and services from such businesses as hardware stores and construction equipment suppliers. 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).

[6] The regional economic income analysis shows the "positive effects of a plan on a region's income", and as defined in the 1983 Principles and Guidelines (page 11), are" equal to the sum of the NED [National Economic Development] benefits that accrue to that region, plus transfers of income to the region from outside the region" (page 11). The net income benefits of $1.78 million are national net benefits (NED effects) that accrue to agricultural producers in the local region and are thus a component of the total increased income in the local region. As such, the total RED income benefit includes the NED net income benefit of $1.78 million plus other income in backward-linked indirect and induced impacted sectors and is equal to the $1.78 million in net income to agricultural producers plus the $1.7 million in income due to indirect and induced effects.

Adjacent neighborhoods and community facilities would experience minor temporary impacts from construction activities. The impacts could be visual, noise, vibration, and dust. Construction of the Lake Creek Siphon under both Options 1 and 2 may temporarily impact access to and from the town of Lake Creek to the south along South Fork Little Butte Creek Road.

After completion of the Modernization Alternative, including all siphon and canal loop options, the JSC would be piped and buried underground. There would be no long-term effect on neighborhoods or community facilities. There would be no change of community facilities to another use, and there would be no changes in access to neighborhoods or community facilities.

6.7 Parks and Recreation

6.7.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the JSC would remain as an open canal, and the alignment would remain in its current location. There would be no effect on parks or recreation facilities. There would be no change of parks or recreation facilities to another use, and there would be no changes in access to parks or recreation facilities.

6.7.2 Modernization Alternative

The Modernization Alternative, including all siphon and canal loop options, would require excavating materials, mobilizing and staging construction equipment, removing vegetation before construction, fusing and placement of pipe, backfilling, and restoring and reseeding disturbed areas. Blasting may be required in some areas. Trees would only be removed if there were no other way to access the construction site, or if there would be a safety threat to construction crews. Construction would occur in phases primarily during the non-irrigation season and is expected to last a total of 4 years.

Parks and recreation facilities within the study area would experience minor temporary impacts from construction activities. The impacts could include visual, noise, vibration, and dust. Construction of the Lake Creek Siphon under both Options 1 and 2 may temporarily impact access to and from the park adjacent to Lake Creek Pioneer Hall to the south along South Fork Little Butte Creek Road.

Temporary construction impacts would be mitigated through noise-reduction measures, limiting construction activities to certain hours, providing notification of construction to nearby property owners and residents, and providing detour routes for any access impacts. If blasting is required, a blasting plan would be prepared with recommendations and methods to mitigate impacts from noise, vibration, and debris.

After completion of the Modernization Alternative, including all canal loop and existing siphon options, the JSC would be piped and buried underground. There would be no long-term effect on parks or recreation facilities. There would be no change of parks or recreation facilities to another use, and there would be no changes in access to parks or recreation facilities.

6.8 Soils

6.8.1 No Action (Future without Federal Investment)

Under the No Action Alternative, long-term effects on soils would be minor. Erosion would continue to occur within open ditches and sedimentation would continue to result. Continued operation of the District's system would not be expected to measurably affect prime farmlands.

6.8.2 Modernization Alternative

Actions proposed under the Modernization Alternative, including all siphon and canal loop options, would result in disturbance to soils, including soils classified as Farmland of Statewide Importance. Overall, the Modernization Alternative, including all siphon and canal loop options, would have minor, short-term effects on soil resources because most effects would occur within limited portions of the project area and only during the construction period. Construction in the northern portion of the alignment through rock outcroppings would involve blasting, resulting in localized disturbance to rock formations along the alignment. Prior to construction, pre-engineering feasibility studies would be conducted to determine if blasting poses any unique construction considerations.

All existing siphon options would be constructed within the same soil types found along the entire JSC alignment and would avoid soils classified as Farmland of Statewide Importance. For the canal loops, both Options 1 and 2 for the Owens and Grasshopper segments would occur within the same soil type. The Eagle Gulch Option 1 (existing alignment) would occur within the same soil type found along the entire JSC. Eagle Gulch Option 2 (siphon), would occur in a different soil type than those found along the existing JSC canal loop and would be installed almost entirely in the Medco-McMullin complex, a bedrock complex.

During construction for all options under the Modernization Alternative, construction erosion and sedimentation control BMPs would be implemented to minimize effects on soils. Following construction, revegetation of disturbed areas with NRCS-approved grasses and vegetation would continue to minimize erosion and sedimentation. Long-term effects on soils would include reduction in erosion and sedimentation where buried pipelines would replace open canal. Additionally, water saved through reduced evaporation and seepage would support irrigated agriculture on soils classified as Farmland of Statewide Importance.

6.9 Vegetation

6.9.1 No Action (Future without Federal Investment)

Under the No Action Alternative, there would be minimal to no impacts to general vegetation or to federally and state-listed species beyond those resulting from the ongoing regular water management under current conditions. However, long-term consequences include continued deterioration of canal infrastructure and increased risk of breaching of the canal. This could result in an impact to downstream vegetation communities and listed plant species due to flooding and sedimentation.

6.9.2 Modernization Alternative

The Modernization Alternative, including all siphon and canal loop options, would result in short- and long-term effects on general vegetation ranging in intensity from no effect to moderate, depending on the construction method chosen. Under all options, there would be no effect to federally-listed plant species.

6.9.2.1 General Vegetation

6.9.2.1.1 Piping

Short-term direct impacts to vegetation would occur from vegetation clearing, tree removal, access road construction, equipment mobilization and staging, excavation, existing concrete structures' removal, blasting, and backfilling the pipe. After construction, the area above the pipe would be backfilled, recontoured with topsoil, and planted with NRCS-approved grasses and forbs, leading to a net increase in herbaceous vegetation along the JSC. Minor, short-term impacts to vegetation in

the project area are anticipated. These short-term impacts would be minimized or avoided through implementation of BMPs during construction.

Over the long-term, piping the JSC would eliminate a water source for existing general vegetation. Upland vegetation that is supported by incidental canal seepage would transition to drought tolerant plant communities. After buried pipe installation, the area would be graded and planted with native upland species, further increasing upland vegetation. Tree removal would be avoided as much as possible and would only occur in instances when there would be no other way to access the construction site, or if the tree would pose a safety threat to construction crews. Tree removal, where unavoidable, would be mitigated through on-site and in-kind replacement to the greatest extent feasible. Overall, the project would have a minor long-term effect on vegetation.

6.9.2.1.2 Existing Siphon Updates

All options under existing siphon updates would require maintaining shallow-rooted vegetation (low shrubs and herbaceous) over the buried pipes to protect pipe integrity. Intersections with natural streams would be revegetated by planting and seeding. Riparian shrubs and herbaceous plants are expected to establish healthy vegetation over time.

Option 1: Existing Alignment (Osborne Creek, Lake Creek, and Wyant Gulch)
Under this option there would be no long-term effect. Vegetation would continue to be maintained over the existing siphon. In the short-term there would be minimal disturbance to vegetation during construction.

Option 2: Adjacent Alignment (Osborne Creek and Lake Creek) and New Alignment (Wyant Gulch)

In the long-term, minor impacts may result from maintenance activities, including maintaining shallow-rooted vegetation and discouraging tree establishment. Additionally, the narrow siphon crossing corridor could be converted from a forested to a shrub vegetation community. In the short-term, effects would depend on the construction method chosen, discussed below.

Trenching

Trenching would involve vegetation removal within the construction corridor and, potentially, tree removal for equipment access. Exposed soil could increase sediment runoff into adjacent vegetation communities. Implementation of BMPs such as silt fencing would be used to minimize effects. If trenching is selected, there would be a moderate, direct short-term impact to vegetation.

Boring

Vegetation removal would be limited to small areas required for launching and receiving pits. Vegetation would be reestablished at the completion of siphon construction. The impact on upland vegetation would be negligible to minor.

6.9.2.1.3 Canal Loop Improvements

Option 1: Existing Alignment (Grasshopper, Owens, Eagle Gulch)
Under this option, effects on vegetation would be similar to those described under piping in Section 6.9.2.1.1.

Option 2: New Siphon (Grasshopper, Owens, Eagle Gulch)
In the long-term, under this option the new siphons would require maintaining shallow-rooted vegetation (low shrubs and herbaceous) over the buried pipes to protect pipe integrity. Unnecessary canal loops would be retired and left open. Intersections with natural streams would be revegetated by planting and seeding. Riparian shrubs and herbaceous plants are expected to form healthy vegetation over time. Vegetation along retired canal banks and immediately adjacent to the retired canal loops would be directly affected by no water flowing through the canal after project completion, leading to stress and a potential die-off of species that are sensitive to a shortage of water. Consequently, the overall effect on vegetation would be minor to moderate and localized. Short-term effects due to construction are dependent on the construction method and described above under Option 2 in Section 6.9.2.1.2.

6.9.2.2 Federally and State-Listed Plant Species

6.9.2.2.1 Piping

The Project would have no effect on federally-listed plant species. In coordination with USFWS, it was determined that Gentner's fritillary is absent from areas of ground disturbance. Ground disturbance within the one area having suitable habitat would be limited to current maintenance roads and no vegetation clearing grubbing would occur within this area.

The construction area for piping includes habitats suitable for state-listed plant species such as wayside aster, white fairy poppy, and southern Oregon buttercup. Although these species were not observed during field investigations, no species-specific surveys were conducted and some individuals may be present within the project area. However, the Project would have no discernible effect on the population or habitat availability of these species. Access roads and staging areas would be confined to previously disturbed sites such as unpaved roads, aggregate removal areas, and farmlands. BMPs would be used to mitigate impacts on undisturbed surrounding areas. With BMPs, the Project would result in minor short-term impacts to state listed plant species.

In the long term, the piping under the Modernization Alternative would alter the surface and subsurface hydrologic regime in the suitable habitats downslope from the JSC, where populations of the federally listed Gentner's fritillary, and state listed southern Oregon buttercup, wayside aster, and white fairy poppy may occur, though the effect on populations of listed species would be below detection.

Separate from the NEPA impact characterizations described above, NRCS made the following effect determinations pursuant to Section 7 of the ESA. NRCS coordinated with USFWS regarding potential effects to federally listed plants and determined that the project would have no effect on Gentner's fritillary. USFWS subsequently reviewed the Draft Biological Assessment, which documented this determination, and had no comments. See Appendix E.8 for the Biological Assessment.

6.9.2.2.2 Existing Siphon Updates

Option 1: Existing Alignment (Osborne Creek, Lake Creek, and Wyant Gulch)
Under this option there would be no effect to federally-listed plant species. Vegetation would continue to be maintained over the existing siphon.

Option 2: Adjacent Alignment (Osborne Creek and Lake Creek) and New Alignment (Wyant Gulch)

This option would have no effect to federally-listed plant species. In the short-term, there might be a minor effect to state-listed plant species if they occur in siphon crossing corridors. However, no listed plant species were observed to occur in the location of siphon corridors and construction of the siphons is anticipated to have no effect on listed species. In the long-term, the Project would have no effect on listed plant species as disturbed areas along the siphon crossing would be restored to pre-construction conditions.

6.9.2.2.3 Canal Loop Improvements

Option 1: Existing Alignment (Grasshopper, Owens, Eagle Gulch)

This option would have no effect to federally-listed plant species. Effects on state-listed plant species would be similar to those described under piping in Section 6.9.2.2.1. With implementation of BMPs, there would be minor short-term effects on listed plant species and negligible long-term effects on stated-listed plant species and their habitats.

Option 2: New Siphon (Grasshopper, Owens, Eagle Gulch)

This option would have no effect to federally-listed plant species. In the short term, there could be a minor effect on state-listed plant species if they occur within the new siphon crossing corridors. However, no listed plant species were observed within the proposed siphon corridors, and construction of the siphons is anticipated to have no effect on state-listed plant species. In the long term, the Project would have no effect on state-listed plant species because disturbed areas along the siphon crossings would be restored following construction.

6.9.2.3 Noxious Weeds

6.9.2.3.1 Piping

Construction activities create several ways of spreading weeds. Construction vehicles could transport noxious weeds to new locations; weed seeds can travel on crew boots and clothes, in contaminated topsoil, mulch, or erosion control materials. To reduce the spread of noxious weeds, BMPs would be implemented, such as regularly checking and cleaning equipment, and using weed-free erosion control measures. Ground disturbance would be minimized, and all exposed soil would be seeded with a mix of native plants, pasture grasses, and sterile wheat. With these BMPs, the Modernization Alternative would have a minor, short-term effect on spreading noxious weeds.

Over the long term, piping the JSC would remove habitat for aquatic noxious species and reduce the spread of weeds through the canal. Since noxious weeds are present in the study area and the Modernization Alternative does not propose changes in land use, intensity of activities, and human presence, the Project overall would have a negligible long-term impact on the presence, extent, and composition of noxious weeds in the study area.

6.9.2.3.2 Existing Siphon Updates

Option 1: Existing Alignment (Osborne Creek, Lake Creek, and Wyant Gulch)
Under this option, construction would occur within previously disturbed and maintained siphon corridors. Construction activities could temporarily increase the potential for the spread of noxious weeds through ground disturbance and the movement of vehicles, equipment, and materials. BMPs described under piping in Section 6.9.2.3.1 would be implemented to minimize the introduction and spread of noxious weeds. With implementation of BMPs, there would be a minor short-term effect

on the spread of noxious weeds. In the long term, there would be no effect on the presence or spread of noxious weeds.

Option 2: Adjacent Alignment (Osborne Creek and Lake Creek) and New Alignment (Wyant Gulch)

Under this option, construction would disturb vegetation and soils along new siphon corridors, with the amount of disturbance dependent on the construction method. Trenching would result in greater ground disturbance and potential for the spread of noxious weeds than boring. BMPs described under piping in Section 6.9.2.3.1 would be implemented to minimize the introduction and spread of noxious weeds. With implementation of BMPs, there would be a minor short-term effect on the spread of noxious weeds. In the long term, there would be no effect on the presence or spread of noxious weeds.

6.9.2.3.3 Canal Loop Improvements

Option 1: Existing Alignment (Grasshopper, Owens, Eagle Gulch)

Under this option, effects on noxious weeds would be similar to those described under piping in Section 6.9.2.3.1.

Option 2: New Siphon (Grasshopper, Owens, Eagle Gulch)

Construction of the new siphons could temporarily increase the potential for the spread of noxious weeds through ground disturbance and the movement of vehicles, equipment, and materials. The potential for weed spread would depend on the construction method, with trenching resulting in greater ground disturbance than boring. BMPs described under piping in Section 6.9.2.3.1 would be implemented to minimize the introduction and spread of noxious weeds. With implementation of BMPs, there would be a minor short-term effect on the spread of noxious weeds.

In the long term, the new siphon corridors would be revegetated and maintained with shallow-rooted vegetation. Retired canal loops would no longer convey water, which would reduce the potential for aquatic noxious weeds and weed seeds to spread through these canal segments. Overall, there would be a negligible long-term effect on the presence, extent, and composition of noxious weeds.

6.10 Hazardous Materials

6.10.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the JSC would remain as an open canal, and the alignment would remain in its current location. There would be no effect to hazardous materials sites.

6.10.2 Modernization Alternative

6.10.2.1 US MINES Database

Based on distances or lack of reported hazardous materials releases, none of the quarry or mine listings in the EDR report, including the currently operating Panther Mine, appear to represent a risk for the project.

6.10.2.2 UST/LUST Databases

The Lake Creek Store facility (1562 S Fork Little Butte Creek Road) is located approximately 850 feet to the north of the project area, and according to the listing, cleanup of the LUST was completed in 1988 and the tanks have been decommissioned. Based on the distance from the

alignment and the completed cleanup of the release, the facility does not appear to pose a risk for the project.

The Brownsboro Tavern facility (5322 Brownsboro Hwy) is located approximately 1,450 feet to the north-northwest of the project area, and according to the listing, cleanup of the LUST was completed in 1993 and the tanks have been decommissioned. Based on the distance from the project area and the completed cleanup of the release, the facility does not appear to pose a risk for the project.

6.11 Visual Resources

6.11.1 No Action (Future without Federal Investment)

Under the No Action Alternative, piping of the JSC would not occur, and there would be no changes in the visual appearance of the project area.

6.11.2 Modernization Alternative

Piping of the JSC would remove the open canal as a visual resource along its alignment in the project area. After construction, the pipe and siphons would be buried, and they would not be visible. Overall, effects on visual resources would be minor. Areas adjacent to the canal would be restored to near-prior contours, and the area over the pipe would be graded to blend with the surrounding landscape. Disturbed areas, including those areas above the newly buried pipes, would be planted with a seed mix of native grasses and forbs in consultation with NRCS. The view of the project area would change from an open canal (with or without water depending on the season) to a corridor of native upland vegetation in areas where construction would take place.

The visual change would most affect properties adjacent to the project area with direct or indirect views of the JSC.

Under the Modernization Alternative, including all siphon and canal loop options, construction activities would primarily take place during the non-irrigation season. The project would be constructed in phases; therefore, visual disruptions associated with construction would be limited to the phase or part of the phase under construction. Construction activities would include vegetation clearing, trenching, equipment mobilizing and staging, and backfill of trenches after pipe installation. Vegetation clearing would be minimized to the extent practicable, and reseeding would be completed after construction.

Tree removal would be avoided as much as possible, only occurring in instances when there would be no other way to access the construction site, or if the tree would pose a safety threat to construction crews. Tree removal, where unavoidable, would be mitigated through on-site and in-kind replacement to the greatest extent feasible.

6.12 Water Resources

6.12.1 No Action (Future without Federal Investment)

6.12.1.1 Water Rights

Under the No Action Alternative, MID would maintain its existing water rights. Improvement to water management would not occur, and there would be no changes in available water for agricultural production. Water would continue to seep through canals before reaching irrigation users. District patrons may continue to receive less than their full allocation during dry years. There would be no effect on District water rights.

6.12.1.2 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 4-8). Water would continue to be diverted at rates and in volumes that account for water loss from seepage and evaporation in the open canals.

6.12.1.3 Surface Water Quality

The No Action Alternative would have no change in adverse effect on surface water quality or Oregon's Section 303(d) listings in the waterbodies associated with District operations (see Table 4-9). Canal seepage and incidental headgate release from the JSC would continue to occur at current rates, likely contributing continued point and nonpoint sources of pollutants into Little Butte Creek and the creek's tributaries.

6.12.1.4 Groundwater

The No Action Alternative would have no effect on groundwater within the District and within the Little Butte Creek Watershed. Water would continue to infiltrate from the JSC into the watershed's alluvial aquifer.

6.12.1.5 Ecosystem Services

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

6.12.2 Modernization Alternative

6.12.2.1 Surface Water Hydrology and Quality

Long-term and short-term effects of the Modernization Alternative, including all siphon and canal loop options, on waterbodies associated with District operations and infrastructure are identified below. More information about effects to waterbodies as a result of the Modernization Alternative can be found in the Water Resources Technical Report (Appendix E.6).

6.12.2.1.1 Piping

Piping the JSC would have minor short-term effects on the surface water hydrology of Grasshopper, Owens, and Eagle gulches, and Unnamed Drainages 1 to 10 (see Figure C-5 in Appendix C). These 13 streams intermittently flow into the JSC, with greater flow during the non-irrigation season when most construction would occur. At the locations of these drainages and the JSC, the work area would be isolated with sandbag cofferdams and temporary water management would maintain flows downstream and out of the work area.

There would also be minor short-term effects on the surface water quality of South Fork Little Butte Creek, Grasshopper Gulch, Owens Gulch, Eagle Gulch, and Unnamed Drainages 1 to 10 due to construction activities that occur within or adjacent to these waterbodies. Construction activities can potentially affect surface water quality by facilitating increased erosion and mobilization of sediment in stormwater. These short-term impacts would be minimized or avoided through implementation of BMPs during construction to control erosion and pollution.

After completion of the Modernization Alternative, under all siphon and canal loop alternatives, piping of the JSC would result in a water savings of approximately 5,057 AF per year. MID and RRVID would retain 3,793 AF per year (75 percent) to fulfill existing water rights of MID and RRVID patrons, and 1,264 AF per year (25 percent) would be restored in South Fork Little Butte Creek during August and September. During these months, MID would commit 1,264 AF per year

instream in South Fork Little Butte Creek, which is equivalent to 10.45 cfs, improving habitat for fish and aquatic species (see Section 6.13.2). The 10.45 cfs instream water would consist of existing voluntary bypasses (4.36 cfs on average) plus an additional 6.09 cfs (on average) bypass. These instream flows would be additive to the existing senior instream water right (1.67 cfs) to ensure flows in South Fork Little Butte Creek below RM 1.1 do not go below 12.12 cfs. This would increase flows in South Fork Little Butte Creek below RM 1.1 in addition to portions of Little Butte Creek (RM 10.2 to 17.2). Flow gains are not expected to be realized in the lower portions of Little Butte Creek (RM 0 to 10.2) and Upper Rogue River due to the Project's elimination of canal seepage and incidental headgate release of canal water, which in part support flow in these waterbodies.

The 3,793 AF per year (75 percent) of saved water retained by the District would augment water management within Fish Lake, Fourmile Lake, and North Fork Little Butte Creek from the outlet of Fish Lake (RM 16) to the MID North Fork Little Butte Creek diversion point (RM 0.9). The saved water would be retained within Fish Lake and Fourmile Lake for use during dry years. This would increase water volumes in these lakes and would generally result in decreased flows during the irrigation season in North Fork Little Butte Creek from RM 0.9 to 16. During dry years, the saved stored water resulting from the Project would be released from the lakes to extend the irrigation season, resulting in increased flows in September in North Fork Little Butte Creek from RM 0.9 to 16. Increased water volumes in Fish Lake may result in increased reservoir releases in North Fork Little Butte Creek during the non-irrigation season when reservoir water storage capacity has the potential to be exceeded. However, the likelihood of increased releases during this time period is low given Fish Lake storage is typically below levels that would require releases. Thus, the Project would overall have an indiscernible long-term effect on flows in North Fork Little Butte Creek during the non-irrigation season as potential increases in Fish Lake releases in response to increased water storage are anticipated to be rare and isolated.

Piping the JSC and eliminating canal seepage and incidental headgate release would allow MID to divert less water and still meet patron demands. As a result, in spring when MID relies on natural flow only and no stored water (May and June), streamflow would increase in North Fork Little Butte Creek below the diversion point (RM 0.9) and the upper portions of Little Butte Creek (RM 10.2 to 17.2).

Piping and burying the JSC would prevent the canal from intercepting and capturing flow from 13 streams (Grasshopper, Owens, and Eagle gulches, and Unnamed Drainages 1 to 10). These streams would be reconnected to their downslope stream channel by a bioengineered stream channel. Reconnecting these streams would better facilitate runoff during precipitation events and would likely result in higher flows in these streams and Little Butte Creek during the non-irrigation season.

Piping the JSC would eliminate canal seepage. Canal seepage augments groundwater discharge into waterbodies adjacent to the JSC, and the loss of this water source could result in decreases in artificial hydrology to Osborne Creek, Wyant Gulch, Grasshopper Gulch, Owens Gulch, Eagle Gulch, and Unnamed Drainages 1 to 10. Furthermore, piping the JSC would eliminate incidental headgate release which augments flow in Grasshopper Gulch, Eagle Gulch, and Unnamed Drainages 7 and 10. This loss of artificial hydrology from canal seepage and incidental headgate release could reduce flows in these systems during the irrigation season and could influence flows in Little Butte Creek. However, eliminating canal seepage and incidental headgate releases would remove these point and nonpoint sources of thermal, sediment, and *E. coli* pollution which could result in improved water quality to waterbodies that currently receive these artificial sources of hydrology.

Table 6-1 provides a summary of hydrologic and water quality impacts of piping the JSC. Anticipated quantitative streamflow trends as a result of the Modernization Alternative were determined by a hydrologic model of the Little Butte Creek Watershed developed by GSI Water Solutions. Averages are used to describe the general trends in hydrology in these waterbodies. Further detail on hydrologic and water quality impacts of piping the JSC can be found in the Water Resources Technical Report (Appendix E.6).

6.12.2.1.2 Existing Siphon Updates

All of the existing siphon update options would have no long-term impact on water resources. Any adjacent or new siphon routes would be constructed beneath waterbodies, disturbed areas restored to initial conditions, and there would be no long-term impact to surface water hydrology or quality. Temporary effects vary by siphon option and are described below.

Option 1: Existing Alignment (Osborne Creek, Lake Creek, and Wyant Gulch)

Under this option for the Lake Creek, Osborne Creek, and Wyant siphons, the existing siphons would be upgraded by sliplining the current siphon. Sliplining the existing siphons would result in minimal ground disturbance, would not involve in-water work, and would have no effect on surface water quality or hydrology. If required, decommissioning the existing siphon would not involve in-water work, and it would not involve ground disturbance adjacent to waterbodies; thus, it would have no effect on surface water hydrology or quality.

During construction, erosion, sediment and pollution control, and spill prevention BMPs would be employed to minimize stormwater runoff to waterbodies.

Option 2: Adjacent Alignment (Osborne Creek and Lake Creek) and New Alignment (Wyant Gulch)

Construction of new siphons at Osborne and Lake Creek would be adjacent to the existing siphons and under waterbodies. Construction of a new siphon at Wyant Gulch would be downstream of the existing siphon and under waterbodies. For all operations, construction could occur using a variety of methods including cut and cover trench or jack and bore. A discussion of the potential construction methods and their effects on surface water hydrology and water quality is provided below.

Trenching

During construction, trenching across the streambed would occur. The work area would be isolated by cofferdams and temporary water management would maintain flows downstream and out of the work area. There would be minor short-term impacts to water quality and hydrology as a result of the placement and removal of cofferdams and temporary water management. In addition, temporary removal and reestablishment of riparian vegetation would result in minor short-term impacts to water quality due to reduced shading and increased water temperature.

Boring

If jack and bore is selected, two pits would be established, one on either side of the waterbody. The two pits would be used to install the siphon approximately 4 to 8 feet below the bottom of the active streambed, and the stream would not be disturbed. Construction within 50 feet of waterbodies could result in a short-term increase in the potential for sediment loading into waterways; this could have a minor short-term effect on water quality. These short-term impacts would be minimized or avoided through implementation of BMPs during construction to control erosion and pollution.

Table 6-1. Summary of Hydrologic and Water Quality Impacts of Piping the JSC

Waterbody Name	Hydrology - Irrigation Season	Water Quality – Irrigation Season	Hydrology – Non-Irrigation Season	Water Quality – Non-Irrigation Season
South Fork Little Butte Creek (RM 0-1.1)	Moderate beneficial effect due to increased streamflow of approximately 6.37 cfs (106 percent) in August and September. Minimum flows in August and September would be 12.12 cfs.	Moderate beneficial effect due to increased flows in August and September that would reduce stream temperature and increase dissolved oxygen concentration.	No effect as the Project would not alter water management during this time period.	No effect as the Project would not alter water management during this time period.
North Fork Little Butte Creek (RM 0–0.9)	Minor beneficial effect due to increased streamflow of approximately 4.6 cfs (13 percent) during May and June.	Minor beneficial effect due to increased flows in May and June that would reduce stream temperatures and increase dissolved oxygen concentrations.	Insignificant beneficial effect as the Project would not significantly increase flows during this time period.	Insignificant beneficial effect as the Project would not significantly increase flows during this time period.
North Fork Little Butte Creek (RM 0.9–16)	Minor adverse effect during the majority of irrigation seasons as flow would decrease by approximately 1.4 cfs (-2 percent). During dry years, streamflow would increase by approximately 26.5 cfs (79 percent) during the month of September which would be a major benefit to hydrology.	Minor adverse effect during the majority of irrigation seasons due to decreased flows increasing stream temperatures and decreasing dissolved oxygen concentrations. Major beneficial effect during September of dry years due to increased flows reducing stream temperatures and increasing dissolved oxygen concentrations.	Insignificant beneficial effect as the Project would not significantly increase flows during this time period.	Insignificant beneficial effect as the Project would not significantly increase flows during this time period.
Lake Creek	No effect as piping would not affect streamflow and would have no detectable effect on groundwater discharge to this waterbody.	No effect as piping of the JSC would not have a detectable effect on pollution inputs in this waterbody.	No effect as District operations and infrastructure do not impact this waterbody during this time period.	No effect as District operations and infrastructure do not impact this waterbody during this time period.

Waterbody Name	Hydrology - Irrigation Season	Water Quality – Irrigation Season	Hydrology – Non-Irrigation Season	Water Quality – Non-Irrigation Season
Osborne Creek and Wyant Gulch	Minor adverse effect due to decrease in flows from reduced groundwater discharge from loss of canal seepage.	Minor beneficial effect due to elimination of nonpoint source pollution from piping the JSC and preventing canal seepage.	No effect as District operations and infrastructure do not impact this waterbody during this time period.	No effect as District operations and infrastructure do not impact this waterbody during this time period.
Grasshopper Gulch, Eagle Gulch, Unnamed Drainages 7 and 10	Moderate adverse effect due to decrease in flows from loss of incidental headgate release and reduced groundwater discharge from loss of canal seepage. Project would restore natural hydrologic patterns in these waterbodies.	Moderate beneficial effect due to elimination of point and nonpoint source pollution from piping the JSC and preventing incidental headgate release and canal seepage.	Minor beneficial effect due to an increase in flows from reconnecting the up- and downslope portions of these waterbodies.	Minor beneficial effect due to increased flows reducing stream temperatures and increasing dissolved oxygen concentrations.
Owens Gulch and Unnamed Drainages 1–6, 8, and 9	Minor adverse effect due to decrease in flows from reduced groundwater discharge from loss of canal seepage.	Minor beneficial effect due to elimination of nonpoint source pollution from piping the JSC.	Minor beneficial effect due to an increase in flows from reconnecting the up- and downslope portions of these waterbodies.	Minor beneficial effect due to increased flows reducing stream temperatures and increasing dissolved oxygen concentrations.
Little Butte Creek	Minor beneficial effect due to increase in flows in Little Butte Creek from RM 10.2 to 17.2 by approximately 3.5 cfs (4%) during the irrigation season.	Minor beneficial effect due to increased flows and elimination of point and nonpoint source pollution from piping the JSC.	Minor beneficial effect due to increased tributary inputs.	Minor beneficial effect due to increased tributary inputs reducing stream temperatures and increasing dissolved oxygen concentrations.
Rogue River (RM 126 to 132)	No effect as input from Little Butte Creek during this time	No effect as water quality improvements in Little Butte are	No effect as increased input from Little Butte Creek is not anticipated	No effect as water quality improvements in Little Butte are not anticipated to have a

Waterbody Name	Hydrology - Irrigation Season	Water Quality – Irrigation Season	Hydrology – Non-Irrigation Season	Water Quality – Non-Irrigation Season
	period is not anticipated to change.	not anticipated to have a detectable effect on Rogue River.	to have a detectable effect on hydrology.	detectable effect on Rogue River.
Fish Lake and Fourmile Lake	Significant beneficial effect as reduced drawdown would increase water stored in the lakes by 16 percent on average during the irrigation season.	Minor beneficial effect as increased water volume in these lakes would decrease water temperature and increase dissolved oxygen concentration.	Significant beneficial effect as reduced drawdown would increase water stored in the lakes by 20 percent on average during the non-irrigation season.	Minor beneficial effect as increased water volume in these lakes would decrease water temperature and increase dissolved oxygen concentration.

6.12.2.1.3 Canal Loop Improvements

All of the canal loop improvement options would have no long-term impact on water resources. If siphon options were selected, they would be constructed beneath waterbodies, and disturbed areas would be restored to initial conditions. Temporary effects vary by option and are described below.

Grasshopper, Owens, Eagle Gulch Options 1 (Existing Alignment)

Under this route option for Grasshopper, Owens, and Eagle Gulches, the existing canal loop would be piped and siphons would not be constructed. Impacts to water resources under this option are the same as described above under piping.

Grasshopper, Owens, Eagle Gulch Options 2 (New Alignment)

Under this option, the existing canal loops would be retired and new siphons would be constructed downstream. The potential construction methods and effects on water resources are discussed above in Section 6.12.2.1.2 under adjacent alignment.

6.12.2.2 Water Rights

In August and September in all water years, under all options, the District would reduce diversions at its South Fork Little Butte Creek Diversion. The District would work with OWRD and others to determine the best mechanism for leaving water savings instream below the South Fork Little Butte Creek Diversion.

6.12.2.3 Groundwater

Currently, the 5,057 AF per year of water lost from the JSC (FCA 2024) contributes a relatively small amount of recharge to the alluvial aquifer within the Little Butte Creek valley bottom. The 1,264 AF per year of water saved as a result of piping the JSC would remain in South Fork Little Butte Creek where it could enter the alluvial aquifer via infiltration. The remaining 3,793 AF per year of saved water would be retained by the District for meeting patron demands, which are predominately outside of the Little Butte Creek Watershed. Thus, piping the JSC would result in the alluvial aquifer within the groundwater study area losing approximately 3,793 AF per year of water input.

Major contributors to alluvial aquifer recharge include surface water from rivers, reservoirs, lakes, irrigation, and canal seepage (DEQ 2013). Given other sources of alluvial aquifer recharge, the 3,793 AF per year of water input from the JSC into the alluvial aquifer is a relatively minor contribution to the groundwater system and is not anticipated to have a significant effect on groundwater levels. The majority of domestic water users within the groundwater study area source water from confined aquifers that are not supported by the alluvial aquifer or from JSC water losses and thus would not be affected by the Project. Overall, the reduction of approximately 3,793 AF per year of water input into the alluvial aquifer would have a minor long-term effect on groundwater.

6.12.2.4 Ecosystem Services

The Modernization Alternative, and all existing siphon updates and canal loop improvement options, would affect the ecosystem services provided by water resources in the following ways:

*Provisioning service, Water available for irrigation (*Figure 4-1 *[E1]):* Piping the JSC would improve the efficiency of the District's water conveyance system 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 4-1 *[E2]):* Alterations to water quantity and quality within waterbodies associated with District operations and infrastructure would overall improve habitat availability and habitat quality for resident fish species.

*Regulating service, Water Quality (*Figure 4-1 *[E3]):* The Project would result in improved water quality within the Little Butte Creek Watershed by increased flow volumes and elimination of pollution from the JSC.

6.13 Fish and Aquatic Resources

6.13.1 No Action (Future without Federal Investment)

6.13.1.1 General Fish and Aquatic Species

The No Action Alternative would have no effect on fish and aquatic species within waterbodies associated with District operations and infrastructure because water quantity and quality in streams and lakes would not change. Water diverted from North Fork Little Butte Creek and South Fork Little Butte Creek would continue to be conveyed through the JSC, and a portion would be lost to seepage, incidental headgate release, and evaporation. Canal seepage and incidental headgate release would continue to be sources of pollution for waterbodies. District operations of Fourmile Lake and Fish Lake would continue to release water to their receiving waterbodies at the current rate. Habitat availability for fish and aquatic species would not change from current conditions (Section 4.8).

6.13.1.2 Federally Listed Fish and Aquatic Species

The No Action Alternative would have no direct or indirect effects on ESA- listed SONCC coho salmon, the proposed northwestern pond turtle, or their natural habitats in North Fork Little Butte Creek, South Fork Little Butte Creek, Lake Creek, Little Butte Creek, and the Rogue River. The JSC would still continue to provide habitat to northwestern pond turtle. No changes to streamflow would occur, and habitat would not likely change from current conditions.

6.13.1.3 Ecosystem Services

The No Action Alternative would not affect ecosystem services associated with fish and aquatic resources.

6.13.2 Modernization Alternative

Long-term and short-term effects of the Modernization Alternative, including all siphon and canal loop options, on fish and aquatic resources are identified below. More information about effects on fish and aquatic species can be found in the Fish and Aquatic Resources Technical Report (Appendix E.7).

6.13.2.1 General Fish and Aquatic Species

6.13.2.1.1 Piping

Piping the JSC would have minor short-term effects on the habitat availability in Grasshopper, Owens, and Eagle gulches, and Unnamed Drainages 1 to 10 (see Figure C-5 in Appendix C). Temporary water management where these 13 streams flow into the JSC may impact flows within these systems.

Piping of the JSC may have minor short-term effects on the habitat quality of South Fork Little Butte Creek, Grasshopper Gulch, Owens Gulch, Eagle Gulch, and Unnamed Drainages 1 to 10 due

to temporary impact to water quality from construction activities that occur within or adjacent to these waterbodies.

In the long term, the availability of and quality of habitats within waterbodies affected by District operations and infrastructure would be impacted and have associated effects on fish and aquatic species. In general, the project would have seasonal alterations to flow volumes in waterbodies. Increased water volumes in waterbodies increase the available habitat for fish and aquatic species to use, whereas decreased water volumes constrict habitat usage. Increased water volumes also generally result in colder water temperatures as the increased body of water moderates temperature fluctuations and requires a longer period of time for it to warm up. Reduced temperature can alleviate stress on species within the study area that prefer colder temperatures, such as salmonids which include rainbow trout, coastal cutthroat, Chinook salmon, SONCC coho salmon, and steelhead. Reduced temperatures can also result in higher dissolved oxygen concentrations, which improve habitat quality by improving growth rates of fish and aquatic species. Conversely, higher temperatures can increase stress on species that prefer colder water and reduce dissolved oxygen concentration that may reduce growth rates of fish and aquatic species. Extremely low flows within South Fork Little Butte Creek below the diversion in late summer can prevent migration of aquatic species through this reach owing to insufficient habitat availability or poor water quality. Increased instream flows in South Fork Little Butte Creek during August and September as a result of the project would help to ensure sufficient flows for aquatic species to migrate through this reach.

Reconnection of 13 streams (Grasshopper, Owens, and Eagle gulches; Unnamed Drainages 1 to 10) with their up- and downslope counterparts would increase discharge during high flow events. Restoration of these higher flow events would allow downslope portions of these waterbodies to have normal flooding frequency and intensity that had been previously disrupted by the stream's interception with the JSC. Common flood events (10-year flood or less) have been shown to reset riparian-stream zone morphology (Dean and Schmidt 2013), benefit aquatic and riparian ecology (Townsend et al. 1997; Talbot et al. 2018), and improve the quality of salmonid spawning habitat (Wheaton et al. 2010).

The Project would also eliminate canal seepage and incidental headgate releases from the JSC, which are sources of thermal and turbidity pollution for waterbodies that receive these artificial sources of hydrology. Elevated turbidity from incidental headgate releases of irrigation water may cause gill tissue damage, physiological stress, and behavioral changes to fish (NMFS 2002).

The JSC is used as aquatic habitat by reptiles and amphibians and construction would permanently remove this artificial habitat. Thus, piping the JSC would have moderate -short-term impacts to aquatic species within this artificial habitat.

The effects on fish and aquatic species habitat in waterbodies associated with District operation and infrastructure as a result of changes to hydrology and water quality are summarized below in Table 6-2.

Table 6-2. Long-term Impacts of the Modernization Alternative on Fish and Aquatic Species Habitat within Waterbodies Associated with District Operations and Infrastructure

Waterbody Name	Impact to Fish and Aquatic Species Habitat - Irrigation Season	Impact to Fish and Aquatic Species Habitat – Non-Irrigation Season
South Fork Little Butte Creek (RM 0-1.1)	Moderate beneficial effect due to increased habitat availability and quality in addition to improved fish passage conditions from increased flows in this waterbody during August and September.	No effect as the Project would not alter water management during this time period.
North Fork Little Butte Creek (RM 0–0.9)	Minor beneficial effect due to increased habitat availability and quality from increased flows in this waterbody during May and June.	Insignificant benefit as the Project would not significantly increase flows during this time period.
North Fork Little Butte Creek (RM 0.9–16)	Minor adverse effect during the majority of irrigation seasons due to decreased habitat availability and quality from decreased flow. Major beneficial effect during Septembers of dry years due to increased habitat availability and quality from increased flow.	Insignificant benefit as the Project would not significantly increase flows during this time period.
Lake Creek	No effect as the Project would not have detectable effects on habitat availability or quality in Lake Creek.	No effect as District operations and infrastructure do not impact this waterbody during this time period.
Osborne Creek and Wyant Gulch	Minor beneficial effect on habitat quality from elimination of pollution from the JSC. Minor adverse effect on habitat availability due to elimination of artificial sources of hydrology from the JSC.	No effect as District operations and infrastructure do not impact this waterbody during this time period.
Grasshopper Gulch, Eagle Gulch, Unnamed Drainages 7 and 10	Minor beneficial effect on habitat quality from elimination of pollution from the JSC. Minor adverse effect on habitat availability due to elimination of artificial sources of hydrology from the JSC.	Minor beneficial effect due to increased habitat availability and quality from increased flows in these waterbodies.
Owens Gulch and Unnamed Drainages 1–6, 8, and 9	Minor beneficial effect on habitat quality from elimination of pollution from the JSC. Minor adverse effect on habitat availability due to elimination of artificial sources of hydrology from the JSC.	Minor beneficial effect due to increased habitat availability and quality from increased flows in these waterbodies.
Little Butte Creek	Minor beneficial effect due to increased habitat availability and quality in Little Butte Creek from RM 10.2 to 17.2 from increased flows in this portion of the waterbody.	Minor beneficial effect due to increased habitat availability and quality from increased flows in these waterbodies.

Waterbody Name	Impact to Fish and Aquatic Species Habitat - Irrigation Season	Impact to Fish and Aquatic Species Habitat – Non-Irrigation Season
Rogue River	No effect as the Project would not have detectable effects on habitat availability or quality in the Rogue River.	No effect as the Project would not have detectable effects on habitat availability or quality in the Rogue River.
Fish Lake and Fourmile Lake	Minor beneficial effect due to increased habitat availability and quality from increased water volumes in these waterbodies.	Minor beneficial effect due to increased habitat availability and quality from increased water volumes in these waterbodies.

6.13.2.1.2 Existing Siphon Updates

All options for updating existing siphons would have no long-term impact on fish and aquatic resources. All siphon routes would be constructed beneath waterbodies and disturbed areas restored to initial conditions.

Option 1: Existing Alignment (Osborne Creek, Lake Creek, and Wyant Gulch)
Under this route option for the Lake Creek, Osborne Creek, and Wyant siphons, the existing siphons would be upgraded by sliplining or replacing the current siphon.

Sliplining the existing siphons would result in minimal ground disturbance, would not involve in-water work, and would have no short-term effect on fish and aquatic resources.

If the existing siphon needs to be replaced rather than sliplined, during construction, there would be minor short-term impacts to fish and aquatic species as a result of placing and removing cofferdams and temporary water management, which would limit habitat availability, momentarily reduce water quality from sediment mobilization, and result in the harm of fish and aquatic species that are salvaged within the isolated work area. In addition, temporary removal and reestablishment of riparian vegetation would result in minor short-term impacts to water quality due to reduced shading and increased water temperature.

Option 2: Adjacent Alignment (Osborne Creek and Lake Creek) and New Alignment (Wyant Gulch)

For the project areas outside of waterbodies, placing a new siphon in an adjacent or new alignment would involve vegetation clearing, trenching, equipment mobilization and staging, and backfilling of trenches after pipe installation.

Construction-phase erosion, sediment and pollution control and spill prevention BMPs would be employed to minimize stormwater runoff to waterbodies. Construction of the siphon across the waterbody could occur using a variety of methods including a cut-and-cover trench or jack and bore. Below is a discussion of the potential construction methods and their effects on fish and aquatic resources.

Trenching

Trenching across the waterbody would occur within the ODFW-preferred work period for Rogue River tributaries above Marial, Oregon (June 15 to September 15). The work area would be isolated by cofferdams. The isolated area would be dewatered with an appropriately sized fish screen until a shallow area of water is present. Fish salvage would remove all individuals present within the isolated area and relocate them downslope of the isolated work area. Temporary water management would maintain flows downstream and provide for downstream fish passage.

During construction, there would be minor short-term impacts to fish and aquatic species as a result of placing and removing cofferdams and temporary water management, which would limit habitat availability, momentarily reduce water quality from sediment mobilization, and result in the harm of fish and aquatic species that are salvaged within the isolated work area. In addition, temporary removal and reestablishment of riparian vegetation would result in minor short-term impacts to water quality due to reduced shading and increased water temperature.

Boring

Construction within 50 feet of waterbodies may result in a short-term increase in the potential for sediment loading into waterways and increasing turbidity, which may have a minor short-term effect on habitat quality for fish and aquatic species. These short-term impacts would be minimized or avoided through implementation of BMPs during construction to control erosion and pollution.

6.13.2.1.3 Canal Loop Improvements

All options for canal loop improvements would have no long-term impact on fish and aquatic resources. Any siphon routes would be constructed beneath waterbodies, and disturbed areas would be restored to initial conditions.

Option 1: Existing Alignment (Grasshopper, Owens, Eagle Gulch)
Piping the existing canal loops would have short-term impacts to fish and aquatic species during construction. See the construction effects described above for piping in Section 6.13.2.1.1 for further information.

Option 2: New Siphon (Grasshopper, Owens, Eagle Gulch)
Short-term effects for the construction of new siphons would be minor and depend on the construction method. See Existing Siphon Updates Option 2 in Section 6.13.2.1.2 for more information on effects specific to trench or jack-and-bore methods.

6.13.2.2 Federally Listed Fish and Aquatic Species

Separate from the NEPA impact characterizations described above, NRCS addressed effects to federally listed and proposed aquatic species through ESA Section 7 consultation and coordination. In coordination with NOAA, NRCS determined that the Modernization Alternative's effects on SONCC coho salmon fit under the Oregon and Washington NRCS Aquatic Habitat Conservation Programmatic Biological Opinion (ORWAC; NMFS 2018). Applicable conservation measures would be incorporated into project design and construction to meet NRCS's ESA Section 7 obligations for SONCC coho salmon. NRCS also coordinated with USFWS regarding effects on the proposed Northwestern Pond Turtle; NRCS and USFWS determined that conferencing for the Northwestern Pond Turtle was not necessary.

6.13.2.2.1 Piping

During construction, piping the JSC adjacent to South Fork Little Butte Creek could result in sediment loading into the waterbody during the non-irrigation season which could impact SONCC coho salmon spawning adults or incubating eggs. However, sediment and erosion control BMPs would be in place and ground disturbance would occur more than 30 feet away from South Fork Little Butte Creek. Thus, piping the JSC would have negligible effects on SONCC coho salmon as the potential for sediment mobilization into South Fork Little Butte Creek would be minimized by sediment and erosion control BMPs and vegetated riparian cover.

Construction of the JSC is not anticipated to have an impact on NWPT as the species is not likely to be present where ground disturbance would occur during the non-irrigation season. Construction would occur during the non-irrigation season (late fall/winter) when NWPT is either overwintering or in its natal nests (delayed emergence). Piping the JSC would result in ground disturbance within the canal and the adjacent access road. Adult NWPT is unlikely to overwinter in the canal where ground disturbance would occur; individuals that overwinter in the project area would do so in forested areas where leaf litter is present as water is not consistently present within the JSC from October to February. Nesting is also unlikely to occur on the access road where ground disturbance would occur as the access road consists of either dense riparian vegetation or compacted gravels that are frequently disturbed by District employees using the road and are thus unsuitable for NWPT nesting.

In the long term, piping of the JSC would overall have benefits to SONCC coho salmon. Increased flow volumes in North Fork Little Butte Creek and South Fork Little Butte Creek below the District diversion points and Little Butte Creek (RM 10.2 to 17.2) would increase habitat availability for rearing juveniles and improve passage conditions for outmigrating smolts. Elimination of pollution from the JSC into Little Butte Creek would further improve habitat quality for species within the waterbody. Alterations in flow patterns in North Fork Little Butte Creek above MID's diversion (RM 0.9 to 16) would minorly decrease habitat availability and quality for rearing juveniles and outmigrating smolts in most years during the irrigation season. During dry years in September, increased flow would majorly increase habitat availability and quality for rearing juveniles.

NWPT would be impacted by the Project from piping and burial of the JSC and alterations to water volumes and flow within waterbodies associated with District operations and infrastructure. Piping and burial of the JSC would permanently remove habitat used by NWPT. The JSC provides relatively deep and slow-moving water that the species uses for foraging and hiding. Individuals that currently use the JSC would be able to migrate to nearby reservoirs, stock ponds, and natural waterbodies. However, piping and burial of the JSC would have moderate long-term impacts on NWPT as it would reduce habitat availability for the species within the Little Butte Creek Watershed. Reduction in habitat availability from the loss of the JSC would be ameliorated, in part, by increases in habitat availability in natural waterbodies. Increased water volumes and flows in Fish Lake, Fourmile Lake, Little Butte Creek, North Fork Little Butte Creek, and South Fork Little Butte Creek would have a minor, long-term benefit to NWPT by increasing habitat availability for NWPT occurring in these waterbodies.

6.13.2.2.2 Existing Siphon Updates

All options for updating existing siphons would have no long-term impact on federally listed fish and aquatic resources. Short-term impacts vary depending on the option.

Option 1: Existing Alignment (Osborne Creek, Lake Creek, and Wyant Gulch)
If the siphon is replaced using sliplining, there would be minimal ground disturbance and no in-water work; therefore, there would be no short-term effects on federally listed fish or habitat.

If the siphon needs to be removed and replaced, there would be short-term minor impacts to SONCC coho salmon in Lake Creek and NWPT. See Option 2 below, for more information regarding effects resulting from in-water work.

Option 2: Adjacent Alignment (Osborne Creek and Lake Creek) and New Alignment (Wyant Gulch)

In the long term, there would be no effect on federally listed fish. Temporary effects would depend on the construction method chosen.

Trenching

Trenching would have minor short-term impacts on SONCC coho salmon. Juvenile SONCC coho salmon may be present within the project area in Lake Creek and may be harmed by temporary water quality impairments and from fish salvage.

Trenching is not anticipated to impact NWPT as stream habitats that may be disturbed during trenching consist of shallow riffles and are not suitable habitat for the species. Trenching would also occur during the active season for NWPT, and ground disturbance would not impact nesting or overwintering individuals of the species. Individuals that may be present within the area would be expected to vacate the area and not be harmed by trenching.

Boring

Boring would have similar effects on SONCC coho salmon as the effects discussed in Section 6.13.2.2.1. Overall, boring would have a negligible effect on these species as sediment mobilization would be minimized by sediment and erosion control BMPs and vegetated riparian cover.

Boring would have no effect on NWPT as the species would not be impacted by a short-term increase in turbidity. Boring could occur outside of the in-water work window which could correspond to NWPT overwintering and nesting time periods. If ground disturbance associated with boring occurs during the non-irrigation season, this action would have minor short-term impacts on NWPT as suitable habitat for overwintering and nesting is present adjacent to waterbodies and individuals may be harmed.

6.13.2.2.3 Canal Loop Improvements

All options for canal loop improvements would have no long-term impact on fish and aquatic resources. Any siphon routes would be constructed beneath waterbodies, and disturbed areas would be restored to initial conditions.

Option 1: Existing Alignment (Grasshopper, Owens, Eagle Gulch)
Short-term impacts to federally listed fish and aquatic resources under this route option are similar to those described under piping in Section 6.13.2.1.1.

Option 2: New Siphon (Grasshopper, Owens, Eagle Gulch)
Short-term impacts to federally listed fish and aquatic resources would depend on the construction method and range from negligible to minor. The potential effects of these construction methods on federally listed fish and aquatic resources are discussed above in Section 6.13.2.2.2 under Option 2 for updating existing siphons.

6.13.2.3 State-Listed Fish and Aquatic Species

6.13.2.3.1 Piping

Impacts to state-listed threatened species are similar to those described under piping in Section 6.13.2.1.1.

In the short-term, the construction required for piping would have similar effects on state-listed sensitive species such as Rogue SMU winter-run steelhead, Rogue SMU Chinook salmon, and Pacific lamprey as discussed above for SONCC coho.

In the long-term, piping the JSC would have beneficial effects on state-listed sensitive species such as Rogue SMU winter-run steelhead, Rogue SMU Chinook salmon, and Pacific lamprey due to improvements to habitat availability and habitat quality in South Fork Little Butte Creek, North Fork Little Butte Creek, and Little Butte Creek.

6.13.2.3.2 Existing Siphon Updates

All options for updating existing siphons would have no long-term impacts on state-listed fish and aquatic resources.

Option 1: Existing Alignment (Osborne Creek, Lake Creek, and Wyant Gulch)

If the siphon is replaced using sliplining, there would be minimal ground disturbance and no in-water work; therefore, there would be no short-term effects on state-listed fish or habitat.

If the siphon needs to be removed and replaced, there could be short-term minor impacts to state-listed species such as Rogue SMU winter-run steelhead, Rogue SMU Chinook salmon, and Pacific lamprey. Those impacts are similar to those discussed above for SONCC coho salmon in Section 6.13.2.2.2 under Option 1.

Option 2: Adjacent Alignment (Osborne Creek and Lake Creek) and New Alignment (Wyant Gulch)

Short-term impacts to state-listed fish and aquatic resources would depend on the construction method and range from negligible to minor. The potential effects of these construction methods are discussed above in Section 6.13.2.2.2 under Option 2.

6.13.2.3.3 Canal Loop Improvements

All options for canal loop improvements would have no long-term impact on state-listed fish and aquatic resources. Any siphon routes would be constructed beneath waterbodies, and disturbed areas would be restored to initial conditions.

Option 1: Existing Alignment (Grasshopper, Owens, Eagle Gulch)
Short-term impacts to state-listed fish and aquatic resources are similar to those described under piping in Section 6.13.2.1.1.

Option 2: New Siphon (Grasshopper, Owens, Eagle Gulch)
Short-term impacts to state-listed fish and aquatic resources would depend on the construction method and range from negligible to minor. The potential effects are discussed above in Section 6.13.2.2.2 under Option 2 for updating existing siphons.

6.13.2.4 Ecosystem Services

*Provisioning service: Fish populations (*Figure 4-1*, [E2]):* Alterations to habitat availability and quality within waterbodies associated with District operations and infrastructure would overall improve habitat availability and habitat quality for resident fish species.

*Cultural service: Culturally important species (*Figure 4-1*, [E4]):* Some fish species have cultural significance to the Latgawa and Takelma peoples. These include the threatened coho salmon, Chinook salmon, steelhead, and Pacific lamprey, which were traditionally used by these peoples as a food source. These species would benefit from the Modernization Alternative due to increases in habitat availability and water quality improvements.

6.14 Wetland and Riparian Areas

6.14.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the JSC would not be piped. As a result, there would be no overall impacts to wetlands and riparian areas beyond those resulting from the ongoing regular water management under current conditions. However, long-term consequences include continued deterioration of canal infrastructure and increased risk of breaching of the canal. This could result in an impact on downstream wetlands and riparian areas due to flooding and sedimentation.

6.14.2 Modernization Alternative

6.14.2.1 Wetlands

6.14.2.1.1 Piping

Construction activities may result in a short-term impact to adjacent wetlands due to potential for soil erosion and the mobilization of sediments in stormwater. With proper BMPs there would be no or minor short-term impacts to adjacent wetlands.

In the long term, piping the canal would permanently remove wetlands adjacent to the JSC, resulting in the direct loss of approximately 6.8 acres of various wetland types (see Table 4-12).

Additionally, about 30 acres of wetlands outside the project area would be indirectly affected over time by the loss of canal seepage water. Piping the JSC and stopping canal seepage would cut off an artificial water source, eventually converting downslope wetland pastures into upland habitats. As the soil dries, upland pasture grasses and common weeds are expected to dominate.

During project coordination on April 24, 2025, DSL acknowledged that the project would provide benefits to the Little Butte Creek Watershed and its ecosystem, and discussed the potential to evaluate the project as a habitat improvement effort. Although habitat improvement projects are not specifically defined under current state Removal-Fill regulations, the agency indicated that demonstrating a clear net benefit to aquatic and riparian resources during the permitting process may help support the permitting pathway that would not require compensatory mitigation. Under this approach, impacts will be minimized to the extent practicable, and unavoidable wetlands impacts would be recognized and evaluated within the overall long-term ecosystem modification. DSL subsequently concurred with the project's wetland and waters delineation, with revisions, on July 15, 2026, for purposes of Oregon's Removal-Fill Law. Federal jurisdiction under the Clean Water Act remains subject to review and approved jurisdictional determination by USACE.

Piping and burying the JSC would prevent the canal from intercepting flow from 13 natural streams (Grasshopper, Owens, and Eagle Gulches, and Unnamed Streams 1 to 10; see Figure C-5 in

Appendix C). Reconnecting upstream and downstream reaches would benefit wetlands along these streams by restoring natural flow patterns. This would enhance wetland functions and restore seasonal patterns characterized by hot, dry summers and cooler, wetter winters.

Given the substantial distance from the project site, the attenuated impact of the project itself, and the predominant influence of alternative hydrological sources on the wetlands adjacent to Fourmile Lake, Fish Lake, and North Fork Little Butte Creek, the project effects on these wetlands are anticipated to be negligible, if present at all. In the long term, the Modernization Alternative would reduce wetland acreage but would enhance functions of remaining wetlands by restoring natural hydrologic conditions in the watershed. Overall, the Project would have a minor long-term beneficial effect on naturally occurring wetlands in the study area.

6.14.2.1.2 Existing Siphon Updates

During construction, the effects within the siphon corridors would depend on the construction method employed (see Section 5.3.2.2 for a description of the different construction methods). If sliplining, there would be no effect on wetlands. If boring is selected, the impact on wetlands is expected to be negligible and short-term since the pits would be in uplands.

If a trenching method is selected, there would be a moderate direct short-term impact to natural and artificial wetlands located at the bases and sides of gulches. Impacts would include removal of wetland vegetation and excavating hydric soils. Exposed soil could increase sediment runoff into adjacent vegetation communities, wetlands, and riparian areas. Implementation of BMPs such as silt fencing would be used to minimize these effects. Additionally, to minimize impacts from construction, excavated material would be sidecast with topsoil stored separately. During the backfill, topsoil would be used as topsoil material for replanting.

For all existing siphon options, the long-term impact of siphon construction activities on wetlands would be minimal to negligible. All siphons would be constructed beneath waterbodies and any natural wetlands adjacent to the streams at the base of the gulches would return to their pre-construction functionality. The District would discourage tree growth and would maintain shallow-rooted vegetation (low shrubs and herbaceous plants) over the buried pipeline to protect its integrity. However, the corridor affected by construction is narrow, and a small change in wetland vegetation would not impair the functions of wetlands.

6.14.2.1.3 Canal Loop Improvements

There are no wetlands mapped along the canal loop sections; therefore, there would be no effect on wetlands in these locations. In areas with new siphon options, decommissioning the unnecessary canal loop would involve abandoning the existing canal in its current condition, reconnecting streams that intersect the canal, restoring the natural hydrologic regime, and planting streamside woody vegetation. In the long term, these activities would have minor beneficial effect on wetlands by supporting a natural seasonal hydrologic regime in the study area, which is important for maintaining habitat quality downstream of the JSC.

6.14.2.2 Riparian Areas

6.14.2.2.1 Piping

Riparian areas along streams intersecting the JSC would potentially be impacted by clearing for construction access, excavating and filling, recontouring, and constructing the bed and banks of the canal. Riparian vegetation would be planted along the newly constructed stream channels.

Following construction, the new pipelines would be buried. All disturbed areas would be recontoured and planted with a seed mix of native grasses and forbs in consultation with NRCS, thus mitigating the potential for soil erosion and the mobilization of sediments in stormwater. Herbaceous riparian vegetation would be established along the banks of reconnected channels that convey streams across the piped JSC.

Overall, the Project would have moderate short-term effects on riparian areas due to vegetation clearing and excavation of these habitats during construction, as well as from subsequent vegetation reestablishment.

After completion, the piped JSC would restore natural hydrologic patterns, benefiting riparian areas. It would improve streamflow, habitat connectivity, and wildlife travel corridors. Reconnecting Owens Gulch and Unnamed Streams 1 to 6, 8, and 9 (see Figure C-5 in Appendix C) would create over 150 linear feet of riparian corridor at each stream-canal crossing. Increased flow in Little Butte Creek, South Fork Little Butte Creek, and North Fork Little Butte Creek, and increased water volume in Fish Lake and Fourmile Lake would enhance the hydrologic regime, providing minor long-term benefits to riparian areas. The Project would restore natural seasonal patterns, resulting in minor long-term benefits to riparian areas and species inhabiting them within the study area.

6.14.2.2.2 Existing Siphon Updates

In locations where sliplining would occur, there would be no effect on riparian areas. If boring were selected, disturbance would occur outside of riparian areas; therefore, boring would have no effects on riparian areas.

In locations where trenching would occur, the removal of riparian trees and shrubs would result in temporary loss of riparian functions, such as providing wildlife shelter and travel corridors, and water thermoregulation. These temporary impacts would be partially mitigated by promptly replanting disturbed areas with shrubs and herbaceous species. Exposed soil poses increased potential for sediment runoff into adjacent streams, wetlands, and riparian areas. Implementation of BMPs such as silt fencing would be used to minimize these effects. During construction there would be a moderate direct short-term impact on riparian areas.

Post restoration, the long-term impacts would include loss of mature trees and their associated habitat functions, and maintenance activities aimed at preventing tree and shrub growth over the siphon pipe. Given the narrow siphon corridor and the presence of mature trees outside this corridor, the long-term impacts on riparian areas would be minor.

6.14.2.2.3 Canal Loop Improvements

The impact of reconnecting the streams in the no-longer-needed canal loops would be minor, as it would occur at only four locations within the project area. Native trees and shrubs would be planted on newly constructed stream banks to replicate riparian corridor up- and downslope of the crossing. Consequently, the overall effect on riparian areas would be beneficial, direct, and localized.

6.15 Wildlife Resources

6.15.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the JSC would not be piped. As a result, there would be no impacts to wildlife or their habitat beyond those resulting from the ongoing regular water management under current conditions. In the long term, canal berms may deteriorate, increasing the risk of breaches. This could lead to flooding and sedimentation, impacting downstream habitats.

6.15.2 Modernization Alternative

6.15.2.1 General Wildlife

6.15.2.1.1 Piping

Removing an open water source by piping the canal could alter wildlife distribution as they would congregate at other water sources. Wildlife species should have enough time and mobility to find nearby water alternatives, since there are many streams, canals, ponds, and irrigation ditches in the area.

The existing open canal is a barrier to terrestrial wildlife movement, but piping the JSC would allow safer crossings over piped and backfilled areas, reducing the risk of injury or drowning (Beier et al. 2008). Additionally, seeding with native vegetation would provide more foraging habitat. Overall, the Modernization Alternative would offer minor long-term benefits for terrestrial wildlife.

Construction impacts on wildlife would include short-term habitat loss from vegetation clearing, ground disturbance, and noise from construction activities, equipment, and human presence. However, since the access roads and staging areas would be limited to previously disturbed locations like unpaved roads, aggregate removal sites, and pastures, impacts on sensitive birds and wildlife species would be minor.

Blasting is particularly disruptive to wildlife, causing them to leave the area temporarily. Once construction is complete, wildlife is likely to return and use the newly created habitats. Blasting, if necessary, would be limited to short sections with rocky soil, mainly in the western project area where birds and animals are already accustomed to such disturbances. These negative impacts are anticipated to be minimal and short-term.

Overall, construction activities would cause minor short-term effects on wildlife due to temporary loss of habitat availability and suitability during construction and as revegetation activities progress.

6.15.2.1.2 Existing Siphon Updates

All options for updating existing siphons would have negligible long-term impact on wildlife resources. Any siphon routes would be constructed beneath waterbodies and disturbed areas restored to initial conditions.

Option 1: Existing Alignment (Osborne Creek, Lake Creek, and Wyant Gulch)
Under this route option for the Lake Creek, Osborne Creek, and Wyant siphons, the existing siphons would be upgraded by sliplining or replacing the current siphon.

Sliplining the existing siphons would result in minimal ground disturbance. Construction noise would have a negligible short-term effect on wildlife resources.

If the existing siphon needs to be replaced rather than sliplined, there would be minor short-term impacts to wildlife during construction. Effects would occur as a result of placing and removing cofferdams and temporary water management, which would limit habitat availability, momentarily reduce water quality from sediment mobilization, and result in the harm of fish and aquatic species that are salvaged within the isolated work area. In addition, temporary removal and reestablishment of riparian vegetation would result in minor short-term impacts to water quality due to reduced shading and increased water temperature.

Option 2: Adjacent Alignment (Osborne Creek and Lake Creek) and New Alignment (Wyant Gulch)

Placing a new siphon in an adjacent alignment would involve vegetation clearing, trenching, equipment mobilization and staging, and backfilling of trenches after pipe installation for the project areas outside of waterbodies. Short term effects would depend on the construction method. The potential construction methods and their effects on wildlife resources are discussed below.

Trenching

Vegetation removal would lead to temporary loss of habitats for various species of birds and wildlife. Following the construction, replanting and seeding would restore lost habitats. Additionally, indirect minor short-term effects on wildlife species would be expected from human presence and noise from operating equipment. Generally, the short-term effects would be similar to those caused by piping the canal, which are described above.

Boring

Vegetation removal would be limited to small areas required for launching and receiving pits. Vegetation would be reestablished at the completion of siphon construction. The impact on upland vegetation would be negligible to minor and short-term.

6.15.2.1.3 Canal Loop Improvements

Grasshopper, Owens, Eagle Gulch Options 1 (Existing Alignment)

Under this route option for Grasshopper, Owens, and Eagle Gulches, short-term impacts to wildlife would be minor, due to construction activities necessary for placing pipe in the existing canal alignment. In the long-term, effects would be overall beneficial. See the description of effects under piping in Section 6.15.2.1.1 for more details.

Grasshopper, Owens, Eagle Gulch Options 2 (New Alignment)

Under this route option, impacts during construction would be minor and short term. During construction of siphons, wildlife would be able to migrate out of the construction zone and use adjacent undisturbed habitat.

In the long-term, decommissioned and left-open canals would have a negligible impact on terrestrial wildlife migration. In appropriate locations, and under consultation with ODFW, MID would consider constructing a gentle sloping dirt ramp to prevent wildlife from becoming trapped in the empty canal loops. In addition, vegetation growth within these decommissioned canals would, in the long term, provide additional foraging habitat for wildlife species.

6.15.2.2 Federally and State-Listed Wildlife Species

6.15.2.2.1 Piping

The Project would have no effect on federally or state listed wildlife species. Effects to federally listed fish and aquatic species are discussed in Section 6.13.2.2. The Project has the potential to have minor effects to monarch (proposed to be listed as threatened under the ESA), tricolored blackbird (federal species of concern), and Townsend's big-eared bat (state sensitive critical).

Mobile species such as gray wolf, California mountain kingsnake, Franklin's bumble bee, Siskiyou short-horned grasshopper, and monarch do not rely directly on surface water in the JSC for breeding and feeding. These species would have no discernible effects to their habitat availability resulting from the long-term changes to upland vegetation, potential wetland area reduction, and

altered surface water regimes. Other mobile species would be expected to vacate the area at the commencement of construction and have no direct effect.

Northern spotted owl, which may occur in higher elevations of the study area—particularly around waterbodies associated with District operations—is expected to experience no long-term or short-term effects. This is because potential changes would be limited to water level alteration with no anticipated changes to the old-growth forest habitat or food sources for this species. And no construction activities are proposed within the portion of the study area where this species may occur.

Tricolored blackbird might experience nonquantifiable effects due to the elimination of small artificial wetlands associated with the JSC seepage, particularly those formed by hardstem persistent rushes and cattails, which are primary nesting habitats for this species. However, the area of hardstem wetlands in the study area is small, and similar or higher quality habitats are available in the project vicinity. With scheduling the initial stages of construction outside the nesting period and implementation of BMPs, construction impacts to tricolored blackbirds would be below the level of biological detection.

The Modernization Alternative would eliminate the open water canal, a potential foraging site for Townsend's big-eared bat. Any Townsend's big-eared bat populations in the study area would relocate to alternative foraging sites, as the project vicinity offers ample opportunities with open ponds, streams, and irrigation ditches. Townsend's big-eared bat could experience short-term impacts due to potential removal of a roosting and/or feeding site. However, with scheduling construction activities outside of critical periods such as breeding, roosting, and hibernation seasons, and implementation of BMPs, the short-term construction impacts on Townsend's big-eared bat would be below the level of biological detection .

Given the large home range of wolf packs, gray wolves could potentially occur within the area. However, because the project area is not near potential den locations, construction would occur primarily outside of the denning season (April 1-July 15) in a developed area, and construction would be confined to associated right of ways and easements where a moderate level of disturbance already is present, the Modernization Alternative would have no effect on gray wolves.

Separate from the NEPA impact characterizations described above, NRCS made the following effect determinations pursuant to Section 7 of the ESA. NRCS drafted a Biological Assessment (see Appendix E.8) and determined that the project would have no effect on ESA-listed or proposed wildlife species, including gray wolf, North American wolverine, California condor, northern spotted owl, Franklin's bumble bee, and Suckley's cuckoo bumble bee, or their designated critical habitat. For monarch butterfly, in the event that the species is listed prior to completion of the Project, NRCS made a provisional effect determination of "may affect, but is not likely to adversely affect." USFWS reviewed the Biological Assessment and had no comments. On August 27, 2026, USFWS indicated that it was prepared to complete a conference report for the monarch butterfly that would transition to informal consultation if the species were listed during project implementation. NRCS subsequently submitted a letter to USFWS requesting voluntary conferencing under Section 7 of the Endangered Species Act for the monarch butterfly (see Appendix A.2).

6.15.2.2.2 Existing Siphon Updates

Option 1: Existing Alignment (Osborne Creek, Lake Creek, and Wyant Gulch)
Sliplining the existing siphons would result in minimal ground disturbance. Construction noise would have no effect on federal or state listed wildlife species.

If the existing siphon needs to be replaced rather than sliplined, during construction, there would also be no effect on federal or state listed wildlife species. Potential impacts to monarch and tricolored blackbird would be similar as those described above.

Replacing siphons in the existing alignment would have long-term impacts on listed species, as it would not alter the general nature or quality of the habitat in the proposed siphon areas.

Option 2: Adjacent Alignment (Osborne Creek and Lake Creek) and New Alignment (Wyant Gulch)

The construction of siphons in adjacent alignments would not have any short or long-term effects on federal or state listed wildlife species, since the activity would cause impacts similar to those caused by piping the canal, which is described above. Construction of siphons has the potential to impact monarchs as described above. There are not expected to be any long-term impacts to listed species.

6.15.2.2.3 Canal Loop Improvements

Grasshopper, Owens, Eagle Gulch Options 1 (Existing Alignment)

Under this route option for Grasshopper, Owens, and Eagle Gulches, there would be no short or long-term effect to federal or state listed wildlife species. Potential impacts to monarch, tricolored blackbird, and Townsend bat would be similar as those described under piping in Section 6.15.2.1.1.

Grasshopper, Owens, Eagle Gulch Options 2 (New Alignment)

The construction of siphons in adjacent alignments is not anticipated to have a short- or long-term effect on federal or state wildlife listed species. Potential impacts to monarch, tricolored blackbird, and Townsend bat would be similar as those described under piping in Section 6.15.2.1.1.

6.15.2.3 MBTA/BGEPA Species

6.15.2.3.1 Piping

There would be no long-term effect on bald and golden eagle nesting or foraging sites. The primary nesting and foraging site in the area, the Little Butte Creek and its riparian corridor with large cottonwood trees, would remain unchanged at the completion of the Project.

To ensure minimal disturbance to known bald eagles nesting near the project area, construction activities would adhere to USFWS National Bald Eagle Management Guidelines (2007). Prior to construction, nest occupancy surveys would be conducted. If nests are found to be occupied, vegetation clearing and other activities that could visually disturb birds within 660 feet of the nests would be scheduled outside the critical nesting period (January 1 through August 31).

It is well documented that construction disturbance, particularly blasting, during the eagle nesting season can result in adverse effects on eagles and other raptors. Shockwaves and vibrations from blasting activities could cause physical damage to nearby nests, potentially dislodging them from trees or structures. Additionally, the disturbance caused by blasting could lead to abandonment of nests, leaving eggs or chicks vulnerable to predation or exposure. To avoid and minimize impacts to nesting eagles, blasting and other activities that produce extremely loud noises within 0.5 mile of active nests would be avoided as recommended by USFWS (2007). If an active nest is found at 0.5 mile or closer to the construction area, necessary blasting would be scheduled outside the critical nesting period (January 1 through August 31).

Additionally, project activities would not affect bald eagle feeding opportunities, as the Project would not directly impact the nearest fish-bearing waterbody, Little Butte Creek. With these measures in place, impacts to eagle species are anticipated to be negligible to minor.

Migratory bird species, including bird species of conservation concern, could experience a negligible to minor long-term effect due to the elimination of nesting habitat (trees, shrubs, bridges, wetlands, open water). Additionally, those species feeding on insects over open water (such as swifts) could be affected due to loss of open canal. Migratory birds in the study area would relocate to find alternative nesting and foraging sites, as the project vicinity offers a variety of habitats with woody vegetation and open water sources.

There would be no effect on breeding migratory songbirds or waterbirds, as construction activities would be scheduled outside of the nesting season. If construction, including clearing and grubbing of vegetation, begins during the nesting season, clearance surveys would be completed prior to vegetation clearing and grubbing for construction to ensure that construction of the Project would not disturb the nests of native avian species. Short-term impacts to migratory birds would be below the level of biological detection.

6.15.2.3.2 Existing Siphon Updates

For both Option 1 and Option 2 there would be no long-term effect on bald and golden eagle nesting or foraging sites, since the proposed siphon corridors do not currently provide nesting or feeding ground to eagles. The construction of the siphons is not expected to have long-term impacts on other migratory bird species, as it would not alter the general nature or quality of the habitat in the proposed siphon areas.

Short-term impacts to migratory birds and bald and golden eagles would be minor, since the activity would cause impacts similar to those caused by piping the canal, which is described above.

6.15.2.3.3 Canal Loop Improvements

For both Option 1 and Option 2 there would be no long-term effect on bald and golden eagle nesting or foraging sites, since the proposed corridors do not currently provide nesting or feeding ground to eagles. The construction of the siphons under Option 2 is not expected to have long-term impacts on other migratory bird species, as it would not alter the general nature or quality of the habitat in the proposed siphon areas.

Short-term impacts to migratory birds and bald and golden eagles would be minor, since the activity would cause impacts similar to those caused by piping the canal, which is described above.

6.15.2.4 Areas of Special Concern

6.15.2.4.1 Piping

The Project is not expected to have long-term negative effects on the Lake Creek Unit deer and elk winter range. Minor benefits are anticipated due to habitat improvements, as the impacted lands would be vegetated and habitat connectivity reestablished.

The Lake Creek Unit deer and elk winter range would be minimally affected by construction disturbance because piping the JSC would occur in stages. This would localize the area of disturbance and leave large portions of the winter range undisturbed throughout the duration of construction. After the piping work is completed, the affected lands would be leveled to match the surrounding terrain, covered with topsoil, and planted with native species. This would result in improved habitat conditions compared to what currently exists.

6.15.2.4.2 Existing Siphon Updates

The construction of the siphons under Option 1 and Option 2 is not expected to have long-term negative effects on the Lake Creek Unit deer and elk winter range, as it would not alter the general habitat in the proposed siphon areas.

The construction of siphons would have no or negligible impact to the Lake Creek Unit deer and elk winter range due to confined disturbances to small areas, leaving most of the winter range undisturbed.

6.15.2.4.3 Canal Loop Improvements

The canal loop improvements under Option 1 and Option 2 are not expected to have long-term effects on the Lake Creek Unit deer and elk winter range, as they would not alter the general habitat in the proposed siphon areas.

Under Option 1 and Option 2 there would be a negligible impact to the Lake Creek Unit deer and elk winter range due to confined disturbances to small areas, leaving most of the winter range undisturbed.

6.16 Wild and Scenic Rivers

6.16.1 No Action (Future without Federal Investment)

Under the No Action Alternative, no modernization improvements would be constructed. Existing water management practices and existing hydrological and hydrographic trends would continue. The No Action Alternative would have no effect on Wild and Scenic Rivers.

6.16.2 Modernization Alternative

Under the Modernization Alternative, including all siphon and canal loop options, all effects would be located outside of the Rogue River Wild and Scenic River and its designated corridors. The Modernization Alternative would have no long-term impacts on Wild and Scenic Rivers.

All construction activities would take place outside of a Wild and Scenic River or designated corridor. Therefore, construction equipment, activities, dust, and other elements that could create temporary adverse impacts to Wild and Scenic River values would not be perceptible from a Wild and Scenic River or designated corridor. The Modernization Alternative, including all siphon and canal loop options, would have no short-term impacts on Wild and Scenic Rivers.

6.17 Climate Variability, Resiliency, and Adaptation

6.17.1 No Action Alternative (Future without Federal Investment)

To meet patrons' irrigation needs, MID and RRVID must divert excess water from the Little Butte Creek basin and associated storage reservoirs to account for water lost due to the porous underlying geology and evaporation due to the arid climate, and other operational losses from system inefficiencies. With a fluctuating climate, increasingly reduced snowpack, earlier snowmelt, and a longer dry season, lower streamflows and lower groundwater recharge would be expected. The availability of water in the Little Butte Creek basin and associated storage reservoirs to satisfy irrigation demands would diminish, and water shortages for MID and RRVID patrons would likely result. Additionally, sufficient streamflow to provide for fish and aquatic species' habitat needs would not be available.

6.17.2 Modernization Alternative

The Modernization Alternative, including all siphon and canal loop options, is expected to help mitigate the impacts of climate variability on MID and RRVID patrons and the JSC by replacing the open canal with a buried pipeline. To protect the pipeline system itself from climate-driven hazards, such as more frequent wildfires, the Modernization Alternative includes either heat-resistant steel or high-density polyethylene piping that would be buried.[7] Thus, the piped system has been designed to take into consideration future climate scenarios.

The Modernization Alternative would contribute to the long-term sustainability of irrigated agriculture by minimizing water loss, ensuring efficient water use, and ensuring more reliable access to irrigation water for MID and RRVID patrons. By improving the overall efficiency of water delivery to agricultural producers, the Project aims to ensure that the infrastructure investments made today support irrigated agriculture and instream habitat as climate conditions evolve.

The purpose of the proposed project is to alleviate damages to irrigated agriculture and agricultural communities served by the Joint System Canal by making the delivery of irrigation water more reliable and efficient. Additional project goals include improving water quality and conserving streamflow for fish, aquatic, and riparian habitat. Short-term goals include limiting and mitigating construction-related disturbance within the project area.

6.18 Cumulative Effects

Cumulative effects result from the total effect of the proposed MID JSC Modernization Project when added to other past, present, and reasonably foreseeable future projects or actions. Cumulative effects may be partly caused by the MID JSC Modernization Project, but they may also be caused by other projects. Cumulative effects are studied so the public, decision-makers, and project proponents take time to consider the big picture effects a project would have on the community and environment.

Past actions over the last 120 years that have affected resources in the Rogue River watershed are generally land development activities that include irrigated agriculture (consisting of canal system construction, previous piping projects, and diversions), urban and suburban development, industrial land and water uses, commercial development, water diversions for non-agricultural uses, and transportation infrastructure.

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 that are highly likely to occur based on available information. Various sources including local, state, and federal agency websites and city and county staff were consulted to obtain information about current and potential future development in the project area. The following sections describe these past, recently completed, current, and reasonably foreseeable future actions. This list is not comprehensive, and other actions may be taking place or may take place in the future.

[7] At the time of project implementation, the specific piping material would be selected based on a number of considerations: the cost of the project would meet NED requirements, meet construction requirements, be appropriate based on local conditions and risk factors, and result in minor or no changes to project effects described in Section 6 of the Plan-EIS, as determined through the tiered decision framework approach outlined in Section 1.4. The NRCS State Conservationist and the Sponsoring Local Organization would possess the final discretion to select the appropriate piping material.

6.18.1 Past Actions

6.18.1.1 U.S. Bureau of Reclamation Rogue River Basin Project (past and ongoing project)

Congress authorized the Talent Division of the Rogue River Basin Project in 1954 for irrigation, flood protection, power generation, fish and wildlife, and recreation facilities. The Talent Division of the Rogue River Basin Project is in the northeastern part of the Rogue River Basin in southwestern Oregon. Work on the division consisted of construction, rehabilitation, and improvement of the irrigation facilities of three irrigation districts in the vicinity of Medford, Oregon, and the provision for full and supplemental water for these lands. The work on the Medford and Rogue River Valley Irrigation Districts included rehabilitation and betterment of Fourmile Lake Dam, Fish Lake Dam, and the numerous structures which are a part of the Main and Medford Canals. Rehabilitation work on the Talent Irrigation District included enlargement and extension of the distribution system. An extensive collection, diversion, storage, and conveyance system was constructed to carry excess waters of the Rogue River and Klamath River Basins to the irrigated lands.

The Talent Irrigation District consists of approximately 15,500 irrigable acres. Medford Irrigation District has a water supply for 11,500 acres, and RRVID has a water supply for 8,300 acres. Additionally, the Talent Division provides electric power from a 16,000-kilowatt hydroelectric Green Springs Powerplant.

Principal features of the Talent Division include Howard Prairie Dam, Howard Prairie Delivery Canal, Keene Creek Dam, Green Springs Powerplant, the enlarged Emigrant Dam and Lake, and Agate Dam and Reservoir.

6.18.1.2 RRVID Bradshaw Drop Pipeline Project (past project)

The Bradshaw Drop Pipeline Project, completed in 2020, converted 3 miles of open Hopkins Canal, 3 concrete flumes, and a siphon with a pressurized pipe within the RRVID. The piping project occurred directly after Bradshaw's Drop. As a result of water conservation from the project, 7 cfs is left instream in Little Butte Creek during specific times of the year to benefit SONCC coho salmon and meet their flow requirements.

6.18.2 Current and Reasonably Foreseeable Future Actions

6.18.2.1 Water Use Development

6.18.2.1.1 EPA Community Grant Joint System Canal Diversions and Junction (current and ongoing)

MID and RRVID secured an EPA Community Grant for Phase 1 of the JSC Pipeline Project for Fiscal Year 2022. This project includes piping the JSC North Fork Diversion Canal and South Fork Diversion Canal with a low-pressure pipe (such as fusion welded HDPE), associated appurtenances including headgates and Junction structure, design and engineering for the project, permitting and environmental compliance, and partner coordination. Construction is anticipated to start in January 2027.

6.18.2.1.2 RRVID Modernization Project (reasonably foreseeable)

RRVID proposes to modernize District irrigation infrastructure to improve the efficiency of its system. Agricultural production in the District depends on RRVID's ability to deliver water effectively and efficiently, particularly during drought years when surface water allocation is scarce.

By converting open-ditch irrigation canals into underground pipe systems or lining the District's open canals, the proposed project could reduce conveyance and operational losses over the irrigation season and improve the District's ability to efficiently provide water to its patrons. The project is sponsored by RRVID, with funding and technical support from NRCS Oregon.

6.18.2.1.3 On-Farm Water Conservation Projects (past and ongoing projects)

On-farm water conservation projects throughout the Rogue River Basin typically consist of smaller efforts implemented on a project-by-project basis that can involve many active collaborators within the Rogue River Basin. These may include the NRCS Oregon Regional Conservation Partnership Program, Jackson Soil and Water Conservation District, and nongovernmental organizations such as the Rogue River Watershed Council. One specific project was the Conservation Implementation Strategy (CIS), completed in 2018. The on-farm projects can range from piping of laterals for individual patrons or groups of patrons to renewable energy projects, on-farm irrigation system efficiency projects, and improved waste management practices to enhance water quality.

6.18.2.2 Biological Resource Perspective:

6.18.2.2.1 2012 Biological Opinion (past and ongoing project)

NMFS prepared a biological opinion (opinion) in April 2012 pursuant to section 7(a)(2) of the ESA on the effects of Reclamation's future operation and maintenance of the Rogue River Basin Project (2012-2022), Rogue River and Klamath River basins, in Oregon and California. In this opinion, NMFS concluded that the proposed action is not likely to jeopardize the continued existence of SONCC coho salmon or result in the destruction or adverse modification of designated critical habitat for SONCC coho salmon.

The following reasonable and prudent measures are required in the opinion. Reclamation shall:

- Minimize incidental take from fish passage construction and large wood additions by using conservation measures to avoid or minimize disturbance to aquatic habitats.
- Minimize incidental take from fish screen and fish passage structures at Oak Street Diversion and Ashland Creek diversion by coordinating with NMFS fish passage engineers.
- Minimize incidental take in the Little Butte Creek reach during median flow conditions in the month of June by providing 90 percent of the flow without the Reclamation weighted useable area.
- Minimize incidental take in Emigrant Creek from loss of flow over redds by implementing a survey and manage process.
- Minimize incidental take in South Fork Little Butte Creek and Antelope Creek by operating the facilities to minimize flow ramping and entrapment and stranding of SONCC coho salmon.
- Ensure completion of a monitoring and reporting program to confirm that the take exemption for the proposed action is not exceeded, and that the terms and conditions in the opinion's incidental take statement are effective in minimizing incidental take.

The opinion includes specific terms and conditions to accomplish the reasonable and prudent measures listed above. The opinion also includes conservation programs for the benefit of the threatened and endangered species. The recommendations are discretionary measures that are

consistent with the obligations under the opinion and therefore should be carried out by Reclamation.

6.18.2.2.2 Rogue River Dam Removal (past and ongoing project)

Migratory fish passage has recently improved within the Rogue River watershed. Savage Rapids Dam, Gold Hill Diversion Dam, and Gold Ray Dam were all removed along the Rogue River from 2008 to 2010, greatly improving passage conditions for migratory fish. Savage Rapids Dam was particularly harmful to migrating SONCC coho, wherein an estimated 22 percent of migrating coho were killed each year by the dam (USFWS 1981).

6.18.2.2.3 Fish Conservation Projects (past and ongoing projects)

Numerous fish conservation projects are occurring within the project vicinity that have impacts on fish and aquatic species assemblages found within the study area. Trout Unlimited in 2023 purchased a water right from Butte Creek Mill in Eagle Point, restoring 6.6 to 8.4 cfs of flow instream for up to 12 miles during summer and fall in addition to improving fish passage at the diversion dam's fish ladder.

The Rogue River Watershed Council has conducted numerous conservation efforts within Little Butte Creek Watershed including the removal of several fish passage barriers and riparian and instream restoration within Salt Creek in addition to floodplain rehabilitation along Little Butte Creek (RRWC 2023).

The Little Butte Creek Watershed Action Plan was prepared for the Little Butte Creek Watershed Council and funded by the Oregon Watershed Enhancement Board in August 2003. The Action Plan is based on information contained in the Little Butte Creek Watershed Assessment and additional source documentation. This information has been used to evaluate site-specific and watershed-wide issues affecting salmon and other essential watershed resources. These issues include protection/conservation, riparian health, sediment sources, fish barriers, fish screens, channel modifications, roads, low streamflows, wetland loss, non-point source nutrient pollution, and additional assessment opportunities. The Action Plan included recommendations for how to protect, restore, and enhance conditions through the implementation of a watershed health strategy.

The RRWC North Fork Little Butte Creek River Mile (RM) 2.9 Ecological Restoration Project will provide the necessary ecological components to improve water quality, stream processes, and aquatic and terrestrial habitats that build a resilient ecosystem and robust native fish and wildlife populations as part of a comprehensive restoration strategy in North Fork Little Butte Creek and the greater Upper Rogue Basin. Placing large wood at 34 locations, rehabilitating 53.5 acres of riparian forest, and constructing 5 miles of riparian fence will achieve the goal.

6.18.3 Cumulative Effects by Resources

6.18.3.1 Cultural Resources

The Modernization Alternative is anticipated to adversely affect sections of the JSC, which is a contributing resource in the NRHP-eligible Rogue River Basin Project Linear District. Project activities associated with the Modernization Alternative would affect the integrity of the JSC such that it would no longer be considered eligible for listing in the NRHP. Across the Rogue River Basin similar modernization actions will also eliminate open canals with historic character. Cumulatively, these actions may remove the majority of these historic resources across the Rogue River Basin, but approved mitigation, such as interpretive signage, materials salvage and display, and detailed historic publications provide interested parties with photo, video, physical, and informational representations

of the impacted resources while allowing beneficial irrigation improvements to continue the essential function of the irrigation canal systems. In addition, there may be open canals retained for the foreseeable future as parts of main canals or laterals throughout the basin.

6.18.3.2 Land Use

There are no ongoing or reasonably foreseeable projects within the study area that could result in potential cumulative effects on land use. Because the Modernization Alternative itself is not expected to result in long-term changes to land use, this alternative would not contribute to cumulative effects. Temporary occupancy of lands within the project area may cause short-term disruption to existing land uses during construction. However, after completion of construction, land use in the study area would approximate pre-construction conditions.

6.18.3.3 Public Safety

The Modernization Alternative, when combined with other current or future projects, is not expected to cause cumulative effects on public safety resources. Piping of the JSC would substantially reduce the risk of flooding that currently exists. Potential safety impacts related to construction are not expected to remain following the completion of construction.

6.18.3.4 Air Quality

The JSC is an irrigation water canal that is not a source of air quality criteria pollutants. The canal would be piped, buried underground, and operationally isolated from ambient atmospheric conditions. No long-term air quality impacts are anticipated as a result of the Modernization Alternative. Therefore, no cumulative effects are anticipated for air quality.

6.18.3.5 Socioeconomic Resources

Since there are no long-term impacts on the neighborhoods or social services identified for the Modernization Alternative, there are no cumulative effects impacts identified for these resources.

6.18.3.6 Soils

Under the No Action Alternative, long-term effects on soils would be minor. Erosion would continue to occur within open canals, ditches, and drainage crossings. Under the Modernization Alternative, impacts to soils through hydraulic erosion would be lessened, especially at drainage crossings. As more irrigation districts implement modernization projects, and on-farm practices are upgraded, changes to soil management would be expected to have a minor beneficial contribution to overall beneficial cumulative effects on soils.

6.18.3.7 Vegetation

Agricultural activities, livestock grazing, vegetation control, and urban development have significantly impacted vegetation in the study area by spreading weeds, degrading native communities, and altering riparian and wetland areas. The amount of vegetation that would be affected by the proposed action is small compared to the area affected by past and ongoing agricultural activities. Therefore, the cumulative effects are anticipated to be minor.

6.18.3.8 Hazardous Materials

Hazardous material contamination in the soil and groundwater in proximity to the project area would not be disturbed, remediated, or mitigated under the No Action Alternative. Therefore, hazardous material contamination would not be different from existing conditions and would not contribute to impacts from past, present, and reasonably foreseeable actions.

Construction of the project, as well as concurrent projects identified in the area, would likely involve some use and handling of hazardous materials and would be required to comply with hazardous material laws and regulations. Therefore, this project and concurrent projects would likely implement programs to manage hazardous material handling, use, and disposal—programs such as spill response plans to address accidental releases. This makes it unlikely that construction of the projects would have a cumulative adverse impact to hazardous material conditions.

6.18.3.9 Visual Resources

No long-term visual impacts are anticipated as a result of implementing the Modernization Alternative. Therefore, no cumulative effects are anticipated for visual resources.

6.18.3.10 Water Resources

Under the No Action Alternative, no federal funding would be forthcoming to support the Project and modernization of MID infrastructure would not take place. No new direct effects on water resources would result from the Project, and existing conditions would remain unchanged. Improvement to water management would not occur and District patrons may continue to receive less than their full allocation during dry years. The No Action Alternative would, therefore, not contribute to cumulative impacts to water resources over current conditions.

Future irrigation canal piping projects may increase streamflow and reduce groundwater infiltration from canal seepage in the alluvial aquifers. MID and RRVID secured an EPA Community Grant for Phase 1 of the Joint System Canal Pipeline Project for Fiscal Year 2022. This project includes piping the JSC North Fork Diversion Canal and South Fork Diversion Canal to eliminate water losses from the current open unlined canal. RRVID also proposes to modernize irrigation infrastructure in RRVID by piping or lining open canals and laterals. The RRVID project would reduce conveyance and operational losses over the irrigation season and improve RRVID's ability to efficiently provide water to its patrons. The project is sponsored by RRVID, with planning funding from NRCS. The Phase 1 piping project and RRVID irrigation modernization project may result in changes to streamflow in North Fork Little Butte Creek and/or South Fork Little Butte Creek or other waterbodies in the study area.

Under the Modernization Alternative and its siphon route options, implementation of the Project could contribute to increased streamflow, improve surface water quality, and reduce groundwater infiltration. Other past, present, and reasonably foreseeable future actions are anticipated to result in overall beneficial effects on water resources, although they would also contribute cumulatively to reductions in groundwater levels. Overall, the Modernization Alternative would be expected to have a minor beneficial contribution to overall beneficial cumulative effects on water.

6.18.3.11 Fish and Aquatic Species

Under the No Action Alternative, no federal funding would be forthcoming to support the Project and modernization of MID would not take place. No new direct effects on fish and aquatic species would result from the Project, and existing conditions would remain unchanged. The No Action Alternative would, therefore, not contribute to cumulative impacts to fish and aquatic species over current conditions.

Past actions over the last 130 years that have affected fish and aquatic species in the Little Butte Creek Watershed include urban and agricultural development, construction and maintenance of the roadway network, logging, water impoundment projects, and other irrigation projects. Since the early 2000s, various water conservation projects conducted by the NRCS Oregon Regional Conservation

Partnership Program, Jackson Soil and Water Conservation District, and nongovernmental organizations such as the RRWC and Trout Unlimited have resulted in improved habitat availability and quality for fish and aquatic species within waterbodies in the Little Butte Creek Watershed as described above.

Guidance documents will further promote activities that will improve water quality and habitat quality for fish and aquatic species within the Little Butte Creek Watershed. The Inland Rogue Agricultural Water Quality Management Area Plan (ODA 2022) addresses water pollution coming from private agricultural land. The plan identifies educational programs, suggested land treatments, management activities, and monitoring to reduce water pollution from agricultural lands. Actions are voluntary, but noncompliance with Agricultural Water Quality Management Area Rules is subject to enforcement by the Oregon Department of Agriculture. Prohibited conditions outlined in the plan will prevent the further degradation of waterbodies by minimizing sediment inputs and riparian vegetation destruction and preventing exceedance of water quality standards from irrigation return flows. The Water Quality Improvement Plan for Little Butte Creek Watershed (RRWC 2018) outlines numerous realistic projects and initiatives to achieve compliance with water quality standards for Section 303(d)-listed streams. These projects focus on attaining more instream water rights, decreasing temperature by increasing shading by riparian vegetation, and reducing bacteria loading into waterbodies within the Little Butte Creek Watershed.

The impact on the Little Butte Creek Watershed of the Klamath Basin Adjudicator granting a large senior priority claim for water (including water stored in Fourmile Lake) by the federal government on behalf of Reclamation, USFWS, and the Klamath Tribes is yet to be determined. When Klamath Tribes asserted its Claim 622 that led to a call on Fourmile Lake by OWRD in 2023, releases from Fourmile Lake were delayed by a month and did not result in a significant disruption to MID and RRVID operations. Recent funding provided by the state of Oregon to RRVID for construction of a headgate below Fourmile Lake would provide a means for water stored in Fourmile Lake to be released to senior water rights holders in the Klamath Basin. Future calls on Fourmile Lake by the Klamath Tribes may decrease the amount of stored water MID releases from Fourmile Lake, which would result in lower storage levels in Fish Lake and lower flows in North Fork Little Butte Creek.

Future irrigation canal piping projects may improve habitat availability and quality by increasing streamflow. MID and RRVID secured an EPA Community Grant for Phase 1 of the Joint System Canal Pipeline Project for Fiscal Year 2022 as described above. The Phase 1 piping project and RRVID irrigation modernization project may result in changes to streamflow in North Fork Little Butte Creek as described for this Modernization Alternative and may involve reduced diversion from diversion points on North Fork Little Butte Creek and South Fork Little Butte Creek.

Under the Modernization Alternative and its siphon alignment options, implementation of the Project could contribute to increased habitat availability and quality for fish and aquatic species. Other past, present, and reasonably foreseeable future actions are anticipated to result in overall beneficial effects on fish and aquatic species, although they would also contribute cumulatively to reductions in artificial canal aquatic habitat used by reptiles and amphibians. The Modernization Alternative would be expected to have a minor beneficial contribution to overall beneficial cumulative effects on fish and aquatic species.

6.18.3.12 Wetland and Riparian Areas

The combined impact of the Modernization Alternative and other past, present, and future projects is expected to moderately reduce the extent of artificial wetlands; however, there would be a minor beneficial cumulative effect on naturally occurring riverine wetlands and riparian areas.

6.18.3.13 Wildlife

Past and ongoing land use activities including agriculture, rural development, and development of irrigation infrastructure have affected wildlife and wildlife habitat in the project area. Effects on wildlife from implementation of both the Modernization Alternative 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 in phases over a period of time during which animals would be able to adapt; therefore, implementation of the Modernization Alternative would have a minor contribution to overall cumulative effects on wildlife in the project area.

6.18.3.14 Climate Variability

Climate variability, by its very definition, is a cumulative impact process. The Modernization Alternative and other irrigation district and agricultural improvements within the Rogue River Basin will assist irrigation districts with managing scarce water resources and provide water to irrigation patrons to support sustainable agriculture, which will lessen the cumulative effect of climate variability.

6.18.3.15 Wild and Scenic Rivers

No long-term impacts to Wild and Scenic Rivers are anticipated as a result of implementing the Modernization Alternative. Therefore, no cumulative effects are anticipated for Wild and Scenic River resources.

6.18.3.16 Ecosystem Services

*Provisioning service: Water available for irrigation (*Figure 4-1 *[E1]):* Under the No Action Alternative, the amount of water available for irrigators would remain the same or decrease as canals and laterals continue to degrade over time for all irrigation districts in the Rogue River Valley. Under the Modernization Alternative and other irrigation district and agricultural improvements within the Rogue River Basin, ecosystem services of water for irrigation would be supported through the improvement of water delivery through infrastructure improvements.

*Provisioning service, Fish Populations (*Figure 4-1 *[E2]):* Under the No Action Alternative, habitat for fish populations would be expected to continually slowly degrade. Under the Modernization Alternative and other irrigation district and agricultural improvements within the Rogue River Basin, alterations to water quantity and quality within waterbodies associated with operations and infrastructure would improve overall habitat availability and habitat quality for resident fish species.

*Regulating service, Water Quality (*Figure 4-1 *[E3]):* The Modernization Alternative would result in improved water quality within the Little Butte Creek Watershed and the Rogue River Basin by increased flow volumes and elimination of pollution from the JSC and other upland sources of water quality contamination.

*Cultural service: Culturally important species (*Figure 4-1 *[E4]):* Some fish species have cultural significance to the Latgawa and Takelma peoples. These include the threatened coho salmon, Chinook salmon, steelhead, and Pacific lamprey, which were traditionally used by these peoples as a food source. In the No Action Alternative, these species would continue to struggle for survival. For the Modernization Alternative and other irrigation district and agricultural improvements within the Rogue River Basin, these species would benefit due to increases in habitat availability, potentially increased streamflow, and water quality improvements.

7 Consultation, Coordination, and Public Participation

In the development of the Plan-EIS, 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 public to ensure transparency and cooperation towards a solution that fits within the framework of the purpose and need for action.

Public Announcements

- Notice of Intent in the Federal Register (July 19, 2023)
- NRCS public notice (July 27, 2023)
- The Daily Courier—three public notices (July 27, 2023; August 3, 2023; August 10, 2023)
- District website notice (July 27, 2023)
- Postcard to District patrons (July 26, 2023)

Public Involvement Website

Information about the proposed project was added to the project website (Oregonwatershedplans.org) to inform the public. The website includes the following information:

- Overview of NRCS's Pub. L. No. 83-566 funding program
- Overview of NEPA and EIS public participation process
- Frequently Asked Questions about the EIS process
- Background on the District, the Plan-EIS and appendices, and presentations and handouts from public meetings
- Contact information and how to submit public comments
- Email signup option for more information; subscribers receive updates over the course of project development

Public Scoping Meeting

A public scoping meeting was held on August 17, 2023, at the Medford Public Library, 205 South Central Ave., Medford, Oregon 97501. Participants had an opportunity to learn more about the proposed irrigation improvements and discuss their comments, ideas, and concerns. Public scoping comments were accepted from July 19 through September 2, 2023.

7.1 List of Persons and Agencies Consulted

Table 7-1 describes communications with agency personnel that were consulted during development of this Plan-EIS. 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
August 8, 2023	Kessina Lee, USFWS	NRCS sends letter requesting consultation under the provisions of Section 12 of Pub. L. No. 83-566.
December 4, 2023	Jim Thrailkill, Trinity Harvey, Mike Asch, Sam Friedman, USFWS	Early coordination for MID JSC Modernization Project.
January 11, 2024	Alyssa Garcia and Kate Wells, NOAA	Early coordination for MID JSC Modernization Project.
January 22, 2024	Nicky Smith, BLM	Discuss status of MID easements and right-of-way grants on BLM parcels crossed by the JSC. Request for GIS data regarding natural resources.
April 18, 2024	SHPO, Cow Creek Band of Umpqua Tribe of Indians, Coquille Indian Tribe, Confederated Tribes of the Grand Ronde, Confederated Tribes of the Siletz Indians	NRCS sends letters to initiate consultation and coordination with SHPO, Cow Creek Band of Umpqua Tribe of Indians, Coquille Indian Tribe, Confederated Tribes of the Grand Ronde, Confederated Tribes of the Siletz Indians, and other consulting parties for Section 106 consultation.
June 11, 2024	Jason Robison, Kelly Coates, Ben Steward, Cow Creek Band of Umpqua Tribe of Indians	NRCS sends a letter formally initiating consultation with the Cow Creek Band of Umpqua Tribe of Indians.
June 27, 2024	Justin Cournoyer, Justin Kelly, Todd Bowen, BLM	Early coordination for MID JSC Modernization Project.
October 8, 2024	Brian Gillooly and Matt Unitis, DSL	Early coordination regarding DSL jurisdiction of artificial wetlands.
November 11, 2024	Charles M. Barr, Pete Samarin, Danette Faucera, Janna Guzman, ODFW	Early coordination on Oregon fish passage requirements for the Modernization Alternative.
November 25, 2024	SHPO, Tribes, and consulting parties	NRCS submits the Cultural Resources Report to SHPO, Tribes, and consulting parties. Case No. 24-0805.

Date	Contact, Agency	Communication
November 26, 2024	Cheryl Pouley, Confederated Tribes of the Grand Ronde	NRCS receives comment from The Confederated Tribes of the Grand Ronde requesting additional information in the Cultural Resources Report.
December 10, 2024	Sara Palmer, Coquille Indian Tribe	NRCS receives email from Coquille Indian Tribe, deferring consultation on this project to other, "neighboring Tribes".
December 17, 2024	Kelly Coates, Ben Steward, Cow Creek Band of Umpqua Tribe of Indians	NRCS staff meets with Cow Creek Band of Umpqua Tribe of Indians to discuss the MID Project.
February 7, 2025	Bill Ryan, DSL	Early coordination regarding DSL jurisdiction of wetlands.
February 27, 2025	Mike Asch and Sam Friedman, USFWS Alyssa Garcia and Lance Kruzic, NOAA Pete Samarin, Danette Faucera, Bobby Buckmister, ODFW	Discuss instream priority areas for conserved water in the Rogue Basin.
February 28, 2025	Cheryl Pouley, Confederated Tribes of the Grand Ronde	NRCS sent The Confederated Tribes of the Grand Ronde the revised Cultural Resources Report with more information relating to concerns expressed by the Tribe and Inadvertent Discovery Plan for the project.
March 18, 2025	Bill Ryan, Bryan Gillooly, Charles Redon, Dana Hicks, Matt Unitis, Dan Evans, DSL	Early coordination regarding DSL jurisdiction of wetlands.
April 24, 2025	Brian Gillooly, DSL	Coordination regarding DSL jurisdiction and permitting of wetlands. DSL discussed the potential to evaluate the project as a habitat improvement effort.
June 26, 2025	Elizabeth Burghard, BLM	In accordance with NHPA regulations for Section 106, NRCS sends letter to BLM requesting that they designate NRCS as the Lead Federal Agency.

Date	Contact, Agency	Communication
July 14, 2025	SHPO	NRCS emails the Final Cultural Resources Report and determination of adverse effect letter to SHPO.
August 15, 2025	Aspen Kemmerlin, SHPO	SHPO concurs that the JSC is not individually eligible for listing in the NRHP and that the project will have an adverse effect on historic properties.
January 21, 2026	Lance Kruzic, NOAA NMFS	Coordination for MID JSC Modernization Project.
January 29, 2026	Jim Thrailkill, Trinity Harvey, Sam Friedman, USFWS	Coordination for MID JSC Modernization Project.
March 27, 2026	Todd Bowen, Jen Sigler, BLM SHPO, Cheryl Pouley, Grand Ronde; Ben Steward, Cow Creek	NRCS emails a letter of invitation to discuss mitigation plans for adverse effect on cultural resources. NRCS submits letter requesting consultation with SHPO to develop a mitigation plan and MOA. NRCS sends letters to Tribes inviting discussion of mitigation plans.
July 15, 2026	Heather Howard, DSL	DSL completed its review of the wetland and waters delineation report and concurred with the delineation, with revisions, for purposes of Oregon's Removal-Fill Law.
August 27, 2026	Colleen Holland, USFWS	USFWS sent an email saying they had no comments on the Biological Assessment and that they are prepared to complete a conference report for the monarch that would transition to informal consultation should the species be listed during the project implementation.
September 8, 2026	Brooke Anderson, NMFS	Discussion of the Oregon and Washington NRCS Aquatic Habitat Conservation Programmatic Consultation (ORWAC)
October 6, 2026	Michael Ash, USFWS	NRCS emailed a letter to USFWS requesting to initiate voluntary conferencing for monarch butterfly under Section 7 of the ESA

Date	Contact, Agency	Communication
October 6, 2026	Ben Steward, Cow Creek Todd Bowen and Jen Sigler, BLM Cheryl Pouley, Grand Ronde	NRCS emails letter invitation to consult on mitigation options for adverse effects to cultural resources.
October 7, 2026	SHPO	NRCS emails letter invitation to consult on mitigation options for adverse effects to cultural resources, including a draft copy of the MOA.
October 8, 2026	NOAA	NRCS emails ORWAC Project Notification Form

7.2 Review of Draft Plan-EIS

A Notice of Intent for the project was published in the Federal Register on July 19, 2023. Subsequently, NRCS Oregon published a news release on July 27, 2023, inviting the public to attend two EIS scoping period meetings on August 17 and August 22, 2023. Members of the public were invited to provide input to help guide planning efforts. The August 17, 2023 meeting was held in person and the August 22, 2023 meeting was held virtually.

A Draft Plan-EIS was developed by FCA under the guidance and direction of MID and NRCS to meet Watershed Program planning and NEPA requirements and in cooperation and consultation with agencies, Tribes, and interested parties. The planning process included identifying, developing, and evaluating alternatives to meet the Purpose and Need and the Sponsor's Goals and Objectives. Alternatives were evaluated against project criteria, resulting in several alternatives being carried forward for detailed analysis and further refinement.

As part of the planning and environmental compliance process, NRCS State Office personnel reviewed and provided input on the Draft Plan-EIS throughout its development. After the NRCS State Office reviewed the Draft Plan-EIS and determined that it met planning criteria, it was provided to the NRCS National Water Management Center for a Technical Review. Technical review comments were addressed, and the Draft Plan-EIS was submitted to NRCS National Headquarters for Programmatic Review. After addressing programmatic review comments, NRCS determined, consistent with USDA NEPA regulations (7 CFR 1b), to publish the Complete Watershed Plan-EIS.

8 Preferred Alternative

8.1 Selection and Rationale for the Preferred Alternative

In Section 6, the effects of the Modernization Alternative, including piping and different route options for existing siphons and canal loops, are explored. See Section 5.3.2 for a detailed description of the existing siphon and canal loop improvement options. After comparison of the environmental effects and costs for each of the different route options, the following Modernization Alternative improvements were selected for inclusion in the Preferred Alternative:

1. Pipe the JSC and upgrade irrigation turnouts
2. Update Existing Siphons: Lake Creek Option 2 (Adjacent Alignment), Wyant Gulch Option 1 (Existing Alignment), and Osborne Creek Option 2 (Adjacent Alignment)
3. Install Canal Loop Improvements: Grasshopper Segment Option 2 (Siphon), Owens Segment Option 2 (Siphon), and Eagle Gulch Segment Option 2 (Siphon)

Together, these improvements would pipe up to 11.5 miles of the JSC, upgrade three existing siphons, install three new siphons to straighten out the pipeline, retire 1.6 miles of open canal loop, and upgrade 24 irrigation turnouts along the JSC (Figure 8-1).

NRCS selected the Preferred Alternative because it best meets the project purpose and need, advances the Pub. L. No. 83-566 authorized purpose of Agricultural Water Management, and provides the greatest overall agricultural, environmental, social, and economic benefits. The Preferred Alternative is also the Locally Preferred Alternative and Environmentally Preferable Alternative and best addresses the Federal Objective and Guiding Principles for sustainable economic development, healthy and resilient ecosystems, public safety, and a watershed approach.

The project represents a long-term investment in critical agricultural water infrastructure that would address both immediate water-delivery problems and broader watershed needs. The JSC is critical infrastructure for MID and RRVID and conveys water to 2,163 agricultural patrons irrigating approximately 21,500 acres. Piping the JSC would conserve approximately 5,057 AF of water annually. Of this amount, approximately 3,793 AF per year would improve delivery of existing irrigation water rights. The remaining 1,264 AF per year would be committed instream in South Fork Little Butte Creek during August and September, increasing flows by an average of 6.09 cfs, or 106 percent. These benefits would improve drought resilience, support continued agricultural production, and reduce the vulnerability of irrigators to water shortages and infrastructure failures.

The Preferred Alternative would also provide long-term natural-resource benefits. Increased late-season streamflow, improved water quality, and reconnection of natural drainages would improve aquatic habitat within the Little Butte Creek watershed, including habitat used by ESA-listed SONCC coho salmon and other sensitive fish species. The project would also reduce drowning and flooding risks associated with the open canal and provide firefighters with improved access to irrigation water through standpipes along the piped JSC.

The project would further support the rural economy. Construction expenditures are estimated to support approximately 320 local direct, indirect, and induced jobs over the four-year construction period, while increased agricultural production is estimated to support approximately 150 additional annual jobs. These benefits extend beyond individual irrigators to businesses and rural communities that depend on agricultural production.

The Preferred Alternative would result in some localized, temporary, or minor adverse effects on resources, including vegetation, wetlands and riparian areas, groundwater recharge, wildlife, and nearby land uses. These effects would be reduced through BMPs, avoidance and minimization measures, and regulatory compliance. The Preferred Alternative would also result in an adverse effect on historic properties under Section 106 of the NHPA; this effect would be resolved through mitigation stipulated in an MOA between NRCS and SHPO, which will be finalized before the ROD. When weighed against the long-term benefits to agricultural water reliability, drought resilience, aquatic habitat, public safety, and the rural economy, the Preferred Alternative provides the greatest overall benefit.

The Preferred Alternative therefore strongly aligns with NRCS and USDA priorities. It directly addresses NRCS resource concerns related to inefficient use of irrigation water, water depletion, water quality, and inadequate fish and wildlife habitat. It also advances USDA's broader objectives of conserving natural resources, strengthening agricultural production, and investing in rural communities. Consistent with the PR&G framework, the project would improve multiple ecosystem services: reliable water for irrigation, habitat for fish populations, water quality, and culturally important aquatic species.

The project would modernize critical shared irrigation infrastructure; conserve a substantial volume of water each year; improve the reliability and resilience of agricultural water deliveries; sustain agricultural production and rural communities; increase late-season instream flow; improve water quality and aquatic habitat; reduce public-safety and infrastructure risks; and improve wildfire-response capability. These combined benefits demonstrate that the Preferred Alternative does more than replace aging infrastructure: it provides an integrated agricultural water-management and watershed-resilience project with durable benefits to natural resources and the rural communities of the Rogue Basin.

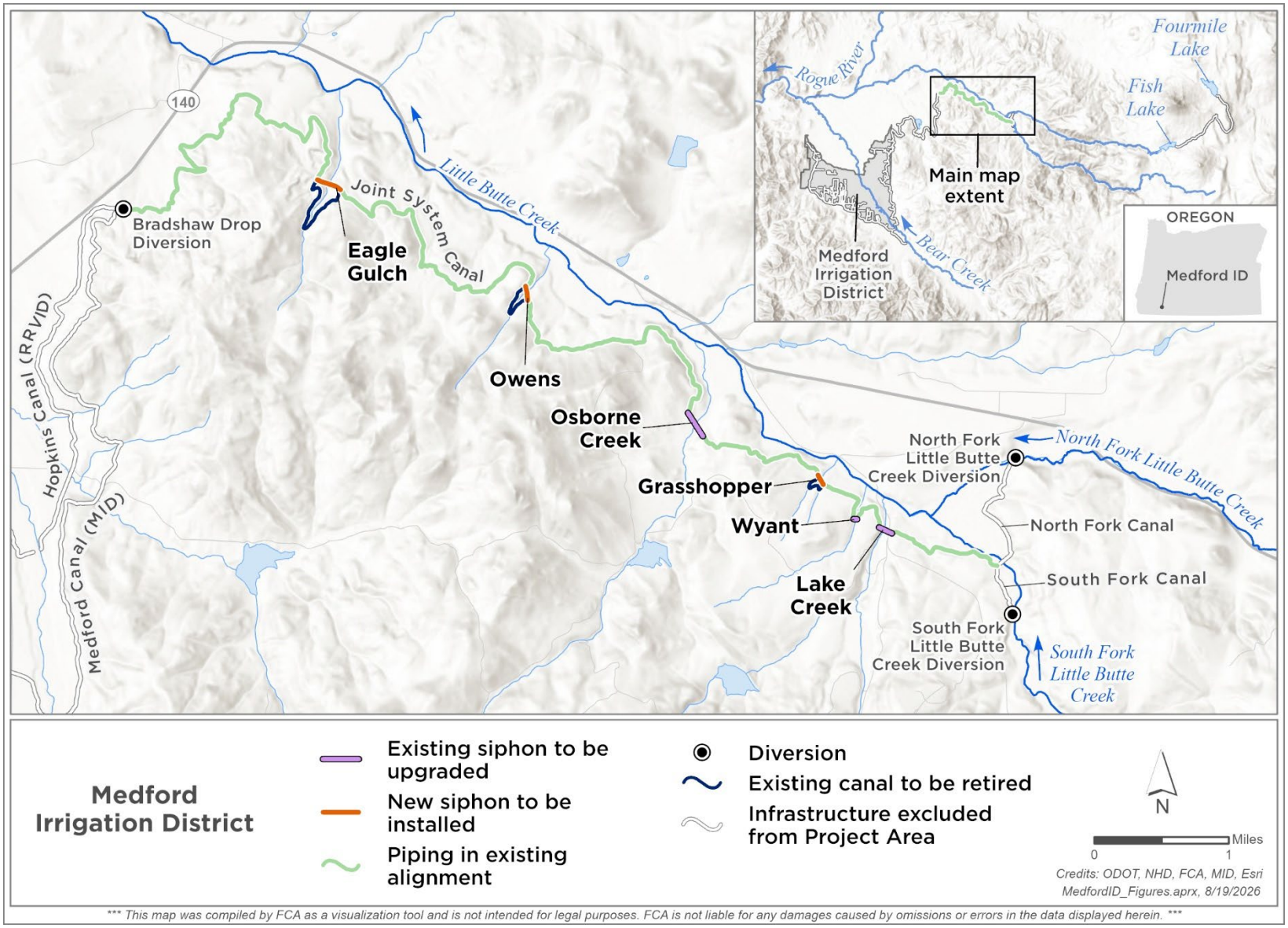


Figure 8-1. Preferred Alternative for the Medford Irrigation District Joint System Canal Modernization Project.

8.2 Measures to be Installed

The Preferred Alternative would be implemented in five project groups with construction occurring over portions of 4 years (four non-irrigation seasons).

- Project Group 1: Pipe approximately 1.8 miles of the JSC, including Grasshopper Segment Option 2
- Project Group 2: Pipe approximately 3.4 miles of the JSC, including Owens Segment Option 2
- Project Group 3: Pipe approximately 2.6 miles of the JSC, including Eagle Gulch Segment Option 2
- Project Group 4: Pipe approximately 3.4 miles of the JSC
- Project Group 5: Install Lake Creek Siphon Option 2, Wyant Gulch Siphon Option 1, and Osborne Creek Siphon Option 2, totaling approximately 0.3 miles of pipe. Siphons would be constructed concurrently with Project Groups 1 to 4.

8.3 Avoidance, Minimization, and Compensatory Mitigation Measures

Project design features and BMPs would be applied during construction of the Preferred Alternative to avoid and minimize effects on environmental and social resources. Potential measures that could be included as construction-phase BMPs are described in Appendix E.4.

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 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 Table 8-1 for a list of potentially required permits and Section 6.2.2.4 for a detailed discussion of Local and County, State, and Federal compliance requirements related to land use.

Table 8-1. Potentially Required Permits

Local and County Regulation or Permit Type	Reviewing Agency	Applicability
Land Use Compatibility Statement (LUCS)	Jackson County Development Services Department	Under OAR Chapter 340, Division 18, a LUCS would be submitted for County approval prior to construction. The LUCS is required supporting documentation for various State permits from DEQ (1200-C permit) and DSL (Removal-Fill permit).
Type 2 Land Use Permit	Jackson County Planning Department	It is likely that the entire Preferred Alternative would be processed by Jackson County as a Type 2 use because it would require a Type 2

		review in the EFU district. Further consultation with Jackson County would occur during a pre-application meeting.
Utility Encroachment Permit	Jackson County Road Department	Required for replacing the existing siphon under South Fork Little Butte Creek Road at Lake Creek.
State of Oregon Regulation or Permit Type	**Reviewing Agency**	**Applicability**
Oregon Removal and Fill Permit	Oregon Department of State Lands	Required for removal or fill within waters of the State, including wetlands, streams, and estuaries.
CWA Section 401 Water Quality Certification	Oregon Department of Environmental Quality	Required for fill within waters of the United States and prior to issuance of Section 404 CWA permit from Corps of Engineers.
Oregon Construction Stormwater Permit - 1200-CA	Oregon Department of Environmental Quality	Required for construction sites disturbing one acre or more.
Oregon State Endangered Species Act	Oregon Department of Fish and Wildlife	Voluntary incentives, encouraging appropriate species management, coordinated planning, habitat protection and restoration, and other means as appropriate, in a manner consistent with the provisions of ORS 496.182(1).
Oregon Fish Passage Requirements	Oregon Department of Fish and Wildlife	Decommissioning of the JSC loops on Grasshopper, Owens, and Eagle Gulch would be considered an abandonment of a structure; this is a trigger for providing fish passage at these locations (OAR 635-412-0005[49]).
Federal Regulation or Permit Type	**Reviewing Agency**	**Applicability**
Clean Water Act (CWA) Section 404 Permit	U.S. Army Corps of Engineers	Required for fill within waters of the United States, including wetlands, streams, and estuaries. If less than ½ acre of impact, project can generally be permitted under various Nationwide Permits (streamlined process), otherwise would require an individual permit.
Endangered Species Act Section 7 Consultation	National Marine Fisheries Service and U.S. Fish and Wildlife Service	Required when a federal action (federal funding or a permit) may affect an ESA-listed species or designated critical habitat. Listed species and habitats would likely include anadromous salmonids and others.

Magnuson-Stevens Fishery Conservation Management Act	National Marine Fisheries Service	Magnuson-Stevens consultation is required when federal actions may adversely affect Essential Fish Habitat, defined as those waters and substrate necessary to specific fish for "spawning, breeding, and feeding, for growth to maturity." Conducted along with ESA consultation.
Bald and Golden Eagle Protection Act	U.S. Fish and Wildlife Service	Required when known active nests of bald or golden eagles are within the vicinity.
Migratory Bird Treaty Act	U.S. Fish and Wildlife Service	Requires that all entities refrain from actions to pursue, hunt, take, kill, sell, purchase, transport, or receive any migratory birds (including parts, nests, eggs, or other products, manufactured or not). This includes destruction of active nests during vegetation clearing or other construction activities. Nests may be present in natural areas or associated with structures or other built features. Vegetation clearing and grubbing outside of the nesting season is allowable (August 1 – January 31).
Section 106 National Historic Preservation Act	Oregon State Historic Preservation Office	Requires federal agencies that fund or provide permit approvals for projects to assess effects on historic properties and includes coordination with tribes that may attach religious or cultural importance to them.
National Environmental Policy Act	Lead Federal Agency; NRCS	Required for federal agency actions to assess potential effects on the built and natural environment. Documentation ranges from a categorical exclusion checklist to a multi-year, multi-partnership environmental impact statement. Federal NEPA lead would be determined based on primary funding source or lead permitting agency. Note: USACE 404/10 permit normally requires internal NEPA review by the USACE. This would not require NEPA documentation on Permittee's behalf.

8.6 Costs

Table 8-2 presents the total project cost of $94,209,000 for the Preferred Alternative. Pub. L. No. 83-566 funds would support $70,401,000 of the total project cost. The $23,808,000 remainder of the cost would be contributed by other, non-federal funds. See further cost details in Section 8.9. Table 8-3 has information on location, construction timing, and estimated design costs (technical assistance).

Table 8-2. Installation Costs by Funding Source for the Piping Alternative, Little Butte Creek Watershed, Oregon, 2026$[1]

Project Group	Pub. L. No. 83-566 Funds	Other, Non-Federal Funds	Total Costs
1 - Piping	$7,955,000	$2,681,000	$10,636,000
2- Piping	$17,219,000	$5,827,000	$23,046,000
3- Piping	$17,366,000	$5,879,000	$23,245,000
4- Piping	$24,346,000	$8,247,000	$32,593,000
5 – Upgrade Existing Siphons	$3,515,000	$1,174,000	$4,689,000
Total Project	**$70,401,000**	**$23,808,000**	**$94,209,000**

[1] Price Base: 2026 dollars

Table 8-3. Location, Construction Timeline, and Design Cost for the Preferred Alternative.

Project Group	Latitude[1]	Longitude[1]	Construction Start Year	Construction End Year	Estimated Design Cost (Technical Assistance)[2]
1	42.417306	-122.620446	2027	2028	$810,000
2	42.433783	-122.650271	2028	2029	$1,687,000
3	42.446371	-122.68977	2029	2030	$1,701,000
4	42.459877	-122.718895	2030	2031	$2,362,000
5	42.442877	-122.674627	2027	2030	$389,000

[1] Latitude and longitude represent the central point of the project group.
[2] 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. L. No. 83-566.

8.7 Installation and Financing

The following subsections present further details regarding installation of and financing for the Preferred Alternative. Included in this section is a framework for implementing the Preferred Alternative; the framework includes the sequence of installation, responsibilities, contracting, real property and relocations, financing, and conditions for providing assistance.

8.7.1 Framework for Carrying out the Plan

The Preferred Alternative would be implemented in a planned sequence as discussed below in Section 8.7.2, Planned Sequence of Installation. The responsibilities of NRCS and the sponsors for the Preferred Alternative are outlined in Section 8.7.3, Responsibilities. No cost-shared on-farm measures are involved with the Preferred Alternative; 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 proposed project prior to the start of construction. The entire project would be completed over portions of a 4-year period expected to commence during the 2027–2028 non-irrigation season and end by 2031. The District has developed a project 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, reviewing engineering designs, providing construction oversight support, and certifying completion of the Project. MID would be responsible for engineering design, project administration, environmental permitting, contracting, construction implementation, and acquisition of easements. MID has the needed authorities as an irrigation district organized under ORS 545 and has agreed to exercise those authorities to implement the actions described in the Plan-EIS.

8.7.4 Contracting

Irrigation modernization projects would be completed using NRCS funding mechanisms. MID 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 would be completed by MID in conjunction with landowners prior to authorization. All construction would be completed under either existing MID-operated and maintained easements or the newly obtained easement agreements as described in Section 6.2.2.

8.7.6 Financing

NRCS would provide 75 percent of the total project allowable cost for the Preferred Alternative through Pub. L. No. 83-566.[8] MID is 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 presents the annual installation costs of the Project and the proportion of funding through Pub. L. No. 83-566 funding and other funding sources.

Most of the required match funding would be provided through non-federal grants. If necessary, a portion of the project cost would be financed through loans. O&M costs after project completion would be provided through MID revenues.

[8] NRCS reserves the authority and right to discontinue or reduce program benefits based on changes in agency priorities, funding availability, or the failure of MID to fulfill the provisions of their agreement.

8.7.7 Conditions for Providing Assistance

Conditions for MID to receive program funds for the proposed project include completion of a Final Plan-EIS and NRCS issuing a ROD, and authorization of funding by the Chief of NRCS. The Chief of NRCS acts on behalf of the Secretary of Agriculture to ensure the 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.

Project sponsors 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 a canal piping inspection program that would systematically cover inspection of the proposed 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 valve battery changes, magnetic meter maintenance, District operational valve maintenance, air and vacuum valve maintenance, pressure reducing station filter maintenance, and valve repairs. The District would expand its current vegetation and weed management to include the areas on top of the newly piped system. All procedures would be followed as specified in the O&M agreement between project sponsors and NRCS.

8.9 Economic Tables

A summary of the economic analysis of the Preferred Alternative and Future Without Federal Investment is provided in Section 5.4, Summary and Comparison of Alternatives. The full economic analysis can be found in Appendix D.1. The costs and benefits associated with the proposed project are detailed in the following tables in this section. Table 8-4 (NWPM 506.11, Economic Table 1) presents the projected installation costs and the percentages of costs to be shared by the sponsors and NRCS for the proposed project.

Table 8-5 (NWPM 506.12, Economic Table 2) presents the proposed project's cost, as well as the proportion of Pub. L. No. 83-566 funding and other funding sources. The average annual NED costs are shown in Table 8-6 (NWPM 506.18, Economic Table 4). The Preferred Alternative does not have any structural data to show in a table.

Table 8-4. Economic Table 1 – Estimated Installation Cost of the Preferred Alternative, Water Resource Project Measures, Little Butte Creek Watershed, Oregon, 2026$[1]

Works of Improvement[2]	Federal land (mi)	Non-Federal land (mi)	Total (mi)	Estimated Cost Federal Funds Federal land NRCS[3]	Estimated Cost Federal Funds Non-Federal land NRCS[3]	Estimated Cost Federal Funds Total	Estimated Cost Other Funds Federal land	Estimated Cost Other Funds Non-Federal land	Estimated Cost Other Funds Total	Estimated Cost Total
PG 1 Piping	0.00	1.84	1.84	$0	$7,955,000	$7,955,000	$0	$2,681,000	$2,681,000	$10,636,000
PG 2 Piping	0.60	2.77	3.37	$2,891,000	$14,328,000	$17,219,000	$978,000	$4,849,000	$5,827,000	$23,046,000
PG 3 Piping	0.00	2.57	2.57	$0	$17,366,000	$17,366,000	$0	$5,879,000	$5,879,000	$23,245,000
PG 4 Piping	0.00	3.41	3.41	$0	$24,346,000	$24,346,000	$0	$8,247,000	$8,247,000	$32,593,000
PG 5 Replace Existing Siphons	0.00	0.34	0.34	$0	$3,515,000	$3,515,000	$0	$1,174,000	$1,174,000	$4,689,000
Total	**0.60**	**10.93**	**11.53**	**$2,891,000**	**$67,510,000**	**$70,401,000**	**$978,000**	**$22,830,000**	**$23,808,000**	**$94,209,000**

Notes: Totals may not sum due to rounding Prepared: August 2026

[1] Price base: 2026 dollars

[2] Costs for each project group include piping, upgrading turnouts, drainage restoration, and other actions. See Appendix D.3 for a more detailed cost table.

[3] Federal agency responsible for assisting in installation of works of improvement

Table 8-5. Economic Table 2 – Estimated Cost Distribution-Water Resource Project Measures, Little Butte Creek Watershed, Oregon, 2026 dollars[1]

Works of Improvement[2]	Installation Cost Federal Funds Construction	Installation Cost Federal Funds Engineering	Installation Cost Federal Funds Project Admin Subtotal[3]	Installation Cost Federal Funds Total	Installation Cost Other Funds Construction	Installation Cost Other Funds Engineering	Installation Cost Other Funds Project Admin	Installation Cost Other Funds Permitting	Installation Cost Other Funds Total	Installation Cost Total
PG 1 Piping	$6,484,000	$195,000	$1,276,000	$7,955,000	$2,161,000	$65,000	$186,000	$269,000	$2,681,000	$10,636,000
PG 2 Piping	$14,095,000	$424,000	$2,700,000	$17,219,000	$4,698,000	$141,000	$405,000	$583,000	$5,827,000	$23,046,000
PG 3 Piping	$14,215,000	$428,000	$2,723,000	$17,366,000	$4,739,000	$143,000	$409,000	$588,000	$5,879,000	$23,245,000
PG 4 Piping	$19,950,000	$600,000	$3,796,000	$24,346,000	$6,650,000	$200,000	$573,000	$824,000	$8,247,000	$32,593,000
PG 5 Replace Existing Siphons	$2,837,000	$85,000	$593,000	$3,515,000	$945,000	$28,000	$82,000	$119,000	$1,174,000	$4,689,000
Total Costs	**$57,581,000**	**$1,732,000**	**$11,088,000**	**$70,401,000**	**$19,193,000**	**$577,000**	**$1,655,000**	**$2,383,000**	**$23,808,000**	**$94,209,000**

[1] Price base: 2026 dollars. Prepared August 2026

[2] Costs for each project group include piping, upgrading turnouts, drainage restoration, and other actions. See Appendix D.3 for a more detailed cost table.

[3] Includes $4,139,000 in project administration costs and $6,949,000 in technical assistance costs.

Table 8-6. Economic Table 4 – Estimated Average Annual Cost of the Preferred Alternative, Rogue River Basin, Oregon, 2026 dollars[1]

Project Group	Implementation Outlays (Amortization of Installation Cost)	Operation, Maintenance, and Repair Costs	Other Direct Costs	Total Annualized Costs
PG 1 Piping	$360,000	$5,000	$0	$365,000
PG 2 Piping	$756,000	$6,000	$0	$762,000
PG 3 Piping	$739,000	$10,000	$0	$749,000
PG 4 Piping	$1,003,000	$0	$0	$1,003,000
PG 5 Replace Existing Siphons	$156,000	$16,000	$0	$172,000
Total Costs	**$3,014,000**	**$37,000**	**$0**	**$3,051,000**

Note: Totals may not sum due to rounding. Prepared: August 2026

[1] Price base: 2026 dollars, amortized over 100 years at a discount rate of 3.25 percent.

The Preferred Alternative damage-reduction benefits would include agricultural yields, power cost savings, reduced O&M costs, and avoided carbon emissions. Table 8-7 (NWPM 506.20, Economic Table 5a) presents the average annual watershed protection damage-reduction benefits. Table 8-8 present a comparison of the average annual NED costs and benefits (NWPM 506.21, Economic Table 6).

Table 8-7. Economic Table 5a – Estimated Average Annual Watershed Protection Damage-Reduction Benefits, Medford Irrigation District Watershed Plan, Rogue River Basin[1]

Project Group	Damage Reduction Benefit Category	Agricultural Related	Non-Agricultural Related	Total
1	**On-Site**	-	-	-
-	Agricultural Production Value	$79,000	$0	$79,000
1	**Off-Site**	-	-	-
-	Instream Flow Value	$0	$18,000	$18,000
-	**Total Quantified Benefits (PG 1)**	**$79,000**	**$18,000**	**$97,000**
2	**On-Site**	-	-	-
-	Agricultural Production Value	$139,000	$0	$139,000
2	**Off-Site**	-	-	-

-	Instream Flow Value	$0	$32,000	$32,000
-	**Total Quantified Benefits (PG 2)**	**$139,000**	**$32,000**	**$171,000**
3	**On-Site**	-	-	-
-	Agricultural Production Value	$111,000	$0	$111,000
3	**Off-Site**	-	-	-
-	Instream Flow Value	$0	$26,000	$26,000
-	**Total Quantified Benefits (PG 3)**	**$111,000**	**$26,000**	**$137,000**
4	**On-Site**	-	-	-
-	Agricultural Production Value	$116,000	$0	$116,000
4	**Off-Site**	-	-	-
-	Instream Flow Value	$0	$26,000	$26,000
-	**Total Quantified Benefits (PG 4)**	**$116,000**	**$26,000**	**$142,000**
5	**On-Site**	-	-	-
-	Agricultural Production Value	$1,134,000	$0	$1,134,000
5	**Off-Site**	-	-	-
-	Instream Flow Value	$0	$0	$0
-	**Total Quantified Benefits (PG 5)**	**$1,134,000**	**$0**	**$1,134,000**

[1] Price base: 2026 dollars amortized over 100 years at a discount rate of 3.25 percent Prepared: August 2026

Table 8-8. Economic Table 6 – Comparison of Average Annual National Economic Development Costs and Benefits, Medford Irrigation District Watershed Plan, Rogue River Basin, Oregon, 2026$[1]

Works of Improvement	Agriculture-Related Agricultural Production Value	Non-Agricultural Instream Flow Value	Average Annual Benefits	Average Annual Cost[2]	Benefit Cost Ratio
PG 1 Piping	$79,000	$18,000	$97,000	$365,000	0.3
PG 2 Piping	$139,000	$32,000	$171,000	$762,000	0.2
PG 3 Piping	$111,000	$26,000	$137,000	$749,000	0.2
PG 4 Piping	$116,000	$26,000	$142,000	$1,003,000	0.1
PG 5 Replace Existing Siphons	$1,134,000	$0	$1,134,000	$172,000	6.6
Total	**$1,579,000**	**$102,000**	**$1,681,000**	**$3,051,000**	**0.6**

[1] Price base: 2026 dollars amortized over 100 years at a discount rate of 3.25 percent. Prepared: August 2026

[2] From Economic Table 4 (Table 8-6 of this Plan-EIS)

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10 List of Preparers

Under the direction of NRCS, FCA and its subcontractors developed the Plan-EIS. The staff responsible for preparation of the Plan-EIS are included in Table 10-1.

Table 10-1. List of Preparers

Name	Organization	Title	Education	Professional Experience	Area Responsible For
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Lars Santana	NRCS-Oregon	Watershed Planner	Rangeland Ecology and Forest Management	24 years	General
Connor Benfield	NRCS-Oregon	Watershed Planner	B.S. Ecosystem Science	11 years	General
Antonio Bentigvolio	NRCS-Oregon	Watershed Planner	M.A. Biology	26 years	General
Rachel Smith Gebauer M.A., RPA	NRCS-Oregon	Acting State Cultural Resource Specialist/Archaeologist	M.A., Anthropology (Archaeology)	26 years	Cultural Resources
Kate Hart	FCA	Planning and NEPA Lead	M.S. Earth Sciences B.S. Earth Sciences	9 years	General

Name	Organization	Title	Education	Professional Experience	Area Responsible For
Mattie Bossler	FCA	Water Resources Engineer	B.S. Environmental Resources Engineering	13 years	Engineering
Raija Bushnell	FCA	Watershed Planning Program Manager	M.P.A. Natural Resource Policy M.S.E.S. Natural Resource Management B.A. Political Science	12 years	General
Barbara Wyse	Highland Economics	Principal and Senior Economist	M.S. Environmental and Natural Resource Economics B.A. Environmental Sciences and Policy	23 years	Economic Analysis
Winston Oakley	Highland Economics	Economist	M.S. Applied Economics B.S. Environmental Sciences, Policy, and Management	11 years	Economic Analysis
Peter Geiger	Parametrix	Senior Planner	M.Sc. Physics B.S. Physics	37 years	Consultant Project Manager; Air Quality; Noise and Vibration; Alternatives Analysis, Sustainability
Taya MacLean, PWS	Parametrix	Senior Scientist	M.S. Biology B.S. Forestry	24 years	Biology and Wetland QA Review

Name	Organization	Title	Education	Professional Experience	Area Responsible For
Colton Kyro	Parametrix	Biologist	M.S. Systems Ecology B.S. Ecosystem Science	5 years	Water Resources; Fish and Aquatic Resources
Tait Elder	Parametrix	Archaeologist	M.S. Anthropology	20 years	Cultural Resources
Stephanie O'Brien	Parametrix	Archaeologist	M.A. Social Sciences	15 years	Cultural Resources
Irina Lapina, PWS	Parametrix	Scientist III	M.S. Biology	20 years	Wetlands; Terrestrial Ecology
Jason Medema	Parametrix	Senior Planner	B.A. International Affairs M.S. Environmental Studies	20 years	Land Use
Cassandra Dobson	Parametrix	Planner IV	MURP, Land Use Specialty B.A. Political Science	6 years	Socioeconomics; Built Environment
Kelly Carini	Parametrix	Scientist II	B.A. Environmental Science	8 years	Soils, Geology, Hazardous Materials
Owen McMurtrey	GSI Water Solutions, Inc.	Managing Water Resource Consultant	M.S. Water Resources Policy and Management B.A. Environmental Studies	11 years	Water Resources
Vokhidjon Kakhramonov	GSI Water Solutions, Inc.	Staff Water Resources Consultant	M.S. Water Cooperation and Diplomacy M.S. International Business B.S. International Economic Relations	2 years	Water Resources

11 Distribution List

- Rogue River Valley Irrigation District
- Talent Irrigation District
- U.S. Army Corps of Engineers
- U.S. Bureau of Land Management
- U.S. Bureau of Reclamation
- U.S. Environmental Protection Agency Region 9
- U.S. Fish and Wildlife Service
- National Oceanic and Atmospheric Administration
- Coquille Indian Tribe
- Cow Creek Band of Umpqua Tribe of Indians
- Confederated Tribes of the Grand Ronde
- Confederated Tribes of the Siletz Indians
- Oregon Governor
- Oregon Representative Cliff Bentz
- Oregon Senator Ron Wyden
- Oregon Senator Jeff Merkley

12 Acronyms, Abbreviations, and Short-forms

AF – Acre-feet

APE – Area of Potential Effects

AQMA – Air Quality Maintenance Area

BGEPA – Bald and Golden Eagle Protection Act

BLM – Bureau of Land Management

BMP – Best Management Practice

CEQ – Council on Environmental Quality

CFR – Code of Federal Regulations

cfs – Cubic Feet/Second

CO – Carbon Monoxide

CWA – Clean Water Act

DEQ – Oregon Department of Environmental Quality

DSL – Oregon Department of State Lands

EIS – Environmental Impact Statement

EFH – Essential Fish Habitat

EFU – Exclusive Farm Use Zone

EPA – Environmental Protection Agency

ESA – Endangered Species Act

FCA – Farmers Conservation Alliance

FEMA – Federal Emergency Management Agency

HDPE – High-Density Polyethylene

JSC – Joint System Canal

JSWCD – Jackson Soil and Water Conservation District

LDO – Land Development Ordinance

LUST – Leaking Underground Storage Tank

MBTA – Migratory Bird Treaty Act

MID – Medford Irrigation District

MOA – Memorandum of Agreement

MWC – Medford Water Commission

NEPA – National Environmental Policy Act

NHPA – National Historic Preservation Act

NRHP – National Register of Historic Places

NMFS – National Marine Fisheries Service

NOAA – National Oceanic and Atmospheric Administration

NRCS – Natural Resources Conservation Service

NWI – National Wetlands Inventory

NWPM – National Watershed Program Manual

NWPT – Northwestern Pond Turtle

O&M – Operations and Maintenance

OAR – Oregon Administrative Rule

ODA – Oregon Department of Agriculture

ODFW – Oregon Department of Fish and Wildlife

OR DSL – Oregon Department of State Lands

ORBIC – Oregon Biodiversity Information Center

ORS – Oregon Revised Statutes

OWRD – Oregon Water Resources Department

Pub. L. No. 83-566 – USDA-NRCS Watershed Protection and Flood Prevention Act, Public Law Number 83-566

Plan-EIS – Watershed Plan-Environmental Impact Statement

PM10 – Particulate Matter Less Than 10 Microns in Diameter

PR&G – Principles, Requirements, and Guidelines

Project – Medford Irrigation District Joint System Canal Modernization Project

Reclamation – United States Bureau of Reclamation

RM – River Mile

ROW – Right-of-Way

RRVID – Rogue River Valley Irrigation District

SHPO – State Historic Preservation Office

SIP – System Improvement Plan

SMU – Species Management Unit

SONCC – Southern Oregon and Northern California Coast

THPO – Tribal Historic Preservation Officer

TID – Talent Irrigation District

UGB – Urban Growth Boundary

USACE – U.S. Army Corps of Engineers

USDA – United States Department of Agriculture

USFS – U.S. Forest Service

USFWS – United States Fish and Wildlife Service

USGS – United States Geological Survey

UST – Underground Storage Tank

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14 Appendix

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Appendix A. Comments and Responses

Appendix B. Project Map

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Appendix E. Other Supporting Information