Ochoco Irrigation District
Infrastructure Modernization Project
Final Watershed Plan- Environmental Assessment

Crook County, Oregon
December 2020

United States Department of Agriculture, Natural Resources Conservation Service – Lead Federal Agency in cooperation with the Deschutes Basin Board of Control, U.S. Bureau of Reclamation, and Ochoco Irrigation District

Prepared by Farmers Conservation Alliance

Final Watershed Plan-Environmental Assessment for the Ochoco Irrigation District Infrastructure Modernization Project

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

Cooperating Agency: Department of Interior, U.S. Bureau of Reclamation (Reclamation)

Sponsoring Local Organization: Deschutes Basin Board of Control (DBBC) (lead sponsor) and Ochoco Irrigation District (OID) (co-sponsor).

Authority: This Watershed Plan-Environmental Assessment (Plan-EA) has been prepared under the Authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law [PL] 83-566). The Plan-EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, PL 91-190, as amended (42 United States Code [U.S.C.] 43221 et seq.).

Abstract: This document is intended to fulfill requirements of the NEPA and to be considered for authorization of PL 83-566 funding of the OID Infrastructure Modernization Project (Project). The Project seeks to improve water conservation and water delivery reliability in Oregon's Deschutes Basin. The Project would include installing 16.8 miles of buried pipeline, installing four new pump stations and associated pipe, and canal improvements along 15.2 miles of canal where needed. Total estimated Project costs are $30,788,000 of which $7,727,000 would be paid by the sponsors and other non-federal funding sources. The estimated amount to be paid through NRCS PL 83-566 funds is $23,061,000.

Comments: NRCS completed this Final Plan-EA in accordance with the NEPA and NRCS guidelines and standards. Comments submitted in response to this Notice of Availability must be received within 30 days of the date of publication. Submit comments and inquiries to: Jason Jeans, Acting State Conservationist, USDA/NRCS, 1201 NE Lloyd Blvd, Suite 900, Portland, OR 97232, (503) 414-3200, or jason.jeans@usda.gov.

Watershed Agreement
between the
Deschutes Basin Board of Control
(Referred to herein as the lead sponsor)
and the
Ochoco 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 Ochoco Irrigation District Infrastructure 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 assessment for works of improvement for the Ochoco Irrigation District Infrastructure 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 (103 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 operation and maintenance (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, it agrees that, before any federal financial assistance is furnished, it will provide a statement to that effect, supported by an opinion of the chief legal officer of the state containing a full discussion of the facts and law involved. This statement may be accepted as constituting compliance.

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

Cost-share Table for Watershed Operation or Rehabilitation Projects					
Works of Improvement	**NRCS**		**Sponsors**		**Total**
	Percent	**Cost**	**Percent**	**Cost**	**Cost**
Cost-Sharable Items[1]					
Agricultural Water Management	75%	$21,342,000	25%	$7,114,000	$28,456,000
Sponsors Engineering Costs	75%	$828,000	25%	$276,000	$1,104,000
Subtotal: Cost-Sharable Costs	75%	$22,170,000	25%	$7,390,000	$29,560,000
Non-Cost-Sharable Items[2]					
NRCS Technical Assistance/Engineering	100%	$300,000	0%	$0	$300,000
Project Administration[3]	67%	$591,000	33%	$296,000	$887,000
Permits	0%	$0	100%	$41,000	$41,000
Subtotal: Non-Cost-Share Costs	73%	$891,000	27%	$337,000	$1,228,000
Total:	75%	$23,061,000	25%	$7,727,000	$30,788,000

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. Sponsors 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.

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.

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 USDA civil rights regulations and policies, the USDA, its agencies, offices, employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

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, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.

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 grantees' payroll, or employees of subrecipients or subcontractors in covered workplaces).

Certification:

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

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

(2) Establishing an ongoing drug-free awareness program to inform employees about—
   (a) The danger of drug abuse in the workplace.
   (b) The grantee's policy of maintaining a drug-free workplace.
   (c) Any available drug counseling, rehabilitation, and employee assistance programs.
   (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 participant must attach an explanation to this agreement.

20. Clean Air and Water Certification.

Applicable if this agreement exceeds $100,000 or a facility to be used has been subject of a conviction under the Clean Air Act (42 U.S.C. Section 7413(c)) or the Federal Water Pollution Control Act (33 U.S.C. Section 1319(c)) and is listed by the U.S. Environmental Protection Agency (USEPA), or is not otherwise exempt.

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 there under before the signing of this agreement by NRCS.

(2) That no portion of the work required by this agreement will be performed in facilities listed on the USEPA List of Violating Facilities on the date when this agreement was signed by NRCS unless and until the USEPA 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 it is in compliance with and will comply in the course of the agreement with all applicable laws, regulations, executive orders, and other generally applicable requirements, including those set out below which are hereby incorporated in this agreement by reference, and such other statutory provisions as a specifically set forth herein.

State, Local, and Indian Tribal Governments: 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 3 years after completion of the terms of this agreement in accordance with the applicable OMB Circular.

23. Signatures

DESCHUTES BASIN BOARD OF CONTROL

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

NOV 23RD, 2020 at [REDMOND], Oregon.

By: _____ Date: 12/10/2020

Craig Horrell, Chairman

Deschutes Basin Board of Control

c/o: DBBC Chair
2024 NW Beech Street
Madras, OR 97741

OCHOCO IRRIGATION DISTRICT

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

November 24, 2020 at [Prineville], Oregon.

By: _____ Date: 12/10/2020

Bruce Scanlon, Acting Board Manager

Ochoco Irrigation District

1001 NW Deer St.
Prineville, OR 97754

USDA-NATURAL RESOURCES CONSERVATION SERVICE

Approved by:

JASON JEANS Digitally signed by JASON JEANS
Date: 2020.12.10 07:36:56 -08'00'

Date: _____

Jason Jeans, Acting 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 Assessment Document For Ochoco Irrigation District Infrastructure Modernization Project Lower Crooked River Subwatersheds: Allen Creek, Dry Creek, Juniper Canyon, Lower McKay Creek, Lytle Creek, McAllister Slough-Crooked River, Stearns Dam-Crooked River, Town of Prineville-Crooked River, Town of Prineville-Ochoco Creek, Upper McKay Creek Crook County, Oregon Oregon 2nd Congressional District	
Authorization	PL 83-566 Stat. 666 as amended (16 U.S.C. Section 1001 et. Seq.) 1954
Lead Sponsor	Deschutes Basin Board of Control and Ochoco Irrigation District (co-sponsor)
Proposed Action	The Ochoco Irrigation District (OID) Infrastructure Modernization Project is a large agricultural water conveyance efficiency project. The proposed action would pipe two high priority areas in the District: Grimes Flat laterals and the IronHorse section of the Crooked River Distribution Canal. The proposed action would also improve District infrastructure necessary to support the McKay Creek Water Rights Switch. These proposed action activities would include installing 4 new pump stations; raising the Crooked River Diversion weir; and improving the Crooked River Diversion Canal, Crooked River Distribution Canal, and upper middle portion of the Ochoco Main Canal.
Purpose and Need	The purpose of this project is to: • Provide the ability for District infrastructure to convey and pump additional water to meet the needs of McKay Creek irrigators • Improve water delivery reliability to McKay Creek irrigators and irrigators served by Grimes Flat laterals • Conserve water along District-owned Grimes Flat laterals and IronHorse section of the Crooked River Distribution canal • Improve public safety along District owned Grimes Flat laterals and IronHorse section of the Crooked River Distribution canal Implementation of the proposed action would meet PL 83-566 Authorized Project Purpose (v), Agricultural Water Management, through irrigation water conservation, water quality improvement, and more reliable agricultural water supply. Federal assistance through PL 83-566 would support the District in addressing the following watershed problems and resource concerns: water delivery and operations inefficiencies; instream flow for fish and aquatic habitat; water loss in District conveyance systems; and public safety. Implementing the proposed action would support the maintenance of agricultural production in a region undergoing rapid urbanization where environmental concerns necessitate federal action. The proposed action addresses the need to improve water delivery and reduce operational inefficiencies; improve diminished streamflow that limits fish and aquatic habitat; reduce conveyance water loss; and reduce public safety risk caused by open canals. These measures would increase the reliability and efficiency of water delivered for irrigation while permanently reducing the amount of water diverted, and legally protecting saved water instream.

Description of the Preferred Alternative	Under the Preferred Alternative, OID would install 16.8 miles of buried pipe, of which 0.6 mile would be pipe replacement; decommission 1.9 miles of canal; improve 15.2 miles of canal banks where necessary; improve District infrastructure; and install four new pump stations and associated pipe.
Project Measures	Under the Preferred Alternative, project sponsors would install 16.8 miles of pipe ranging from 4 to 78 inches in diameter and 39 turnouts would be upgraded to pressurized delivery systems. District infrastructure would be improved, including increasing canal capacity by raising canal banks where necessary along 15.2 miles of open canal, raising the Crooked River Diversion weir structure, upsizing pipe, and increasing the Ochoco Siphon size. Additionally, four pump stations and associated discharge pipe would be installed to lift and carry water to McKay Creek, Grimes Flat irrigators, and other District patrons. Construction of the Preferred Alternative would occur in three project groups over the course of 3 years.

Resource Information

Subwatersheds	12-digit Hydrologic Unit Code	Latitude and Longitude	Subwatershed Size (acres)	Planning Area Within Subwatershed (acres)
Allen Creek	170703050502	44.47598993, -120.8045971	18,259	40
Dry Creek	170703050101	44.20538338, -120.7705733	23,713	34
Juniper Canyon	170703051001	44.25966191, -120.7862886	12,596	58
Lower McKay Creek	170703050503	44.40382062, -120.7824765	24,763	4,992
Lytle Creek	170703051003	44.40822733, -120.9323611	16,616	1,153
McAllister Slough-Crooked River	170703051006	44.36146304, -120.9548765	27,377	1,660
Stearns Dam-Crooked River	170703050102	44.14429242, -120.858426	36,134	6
Town of Prineville-Crooked River	170703051002	44.27495235, -120.8776751	17,108	2,241
Town of Prineville-Ochoco Creek	170703050404	44.32655299, -120.8203773	12,052	1,713
Upper McKay Creek	170703050501	44.48350005, -120.6868679	20,478	2
Subwatershed Total Size	209,095 acres			
Planning Area Within Subwatershed Total Size	11,899 acres			

Ochoco Irrigation District Size	44,968 acres		
Climate and Topography	The District and its infrastructure are located in the rain shadow of the Cascade mountain range. OID's annual average precipitation is approximately 9 inches. The average high temperature for July is 86 degrees Fahrenheit and average low temperature for December is 24 degrees Fahrenheit. The land within OID is slightly undulating with an average elevation of 2,800 to 3,120 feet above mean sea level.		
OID Land Use (total 44,968 acres)	**Use**		**Acres**
	Agriculture (irrigated acres)		18,654
	Developed		5,626
	Undeveloped		20,687
OID Land Ownership (total 44,968 acres)	**Owner**		**Percentage**
	Private		88.4%
	State-Local		11.1%
	Federal		0.5%
Population and Demographics	The District's Infrastructure Modernization Project would occur within Crook County, Oregon. In 2018, the estimated population of Crook County was 23,867. The population growth rate between 2000 and 2018 was 13.8 percent. The population of the State of Oregon grew by 9.4 percent in the same time period.		
Population and Demographics		**Crook County**	**Oregon**
	Population 2018	23,867	4,190,713
	Unemployment Rate (October 2019)	4.6%	3.9%
	Median Household Income (2017$)	$41,777	$56,119
Relevant Resource Concerns	Resource concerns identified through scoping are water conservation and quality, aquatic and fish resources, soil and geologic resources, cultural resources, socioeconomics, wetlands, terrestrial wildlife, public safety, and vegetation resources.		
Alternatives			
Alternatives Considered	Nine alternatives were considered; seven were eliminated from full analysis because they did not fully meet the purpose and need for action, or because of cost, logistics, existing technology, social, or environmental reasons; or because OID lacks the legal authority to carry out, operate, and maintain works of improvement, which are requirements of project sponsors. 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 project would not occur and OID would continue to operate and maintain its existing canals and pipe system in their current condition. The need for the project would still exist; however, the District would only modernize its infrastructure on a project-by-project basis as funding became available. This funding is not reasonably certain to be available under a project-by-project approach at the large scale necessary to modernize the District's infrastructure.		

Proposed Action (Future with Federal Investment)	Under the Modernization Alternative, OID would install 16.8 miles of buried pipe, of which 6.6 miles would be fully pressurized, and the remainder would receive partial pressure. To increase the capacity of District infrastructure, approximately 15.2 miles of canal banks would be raised where necessary, District infrastructure would be improved, the Crooked River Diversion weir would be raised, and four new pump stations and associated discharge pipe would be installed. The Modernization Alternative has been identified as the National Economic Efficiency (NEE) plan and is also the Preferred Alternative.
Mitigation, Minimization, and Avoidance Measures	The National Wetland Inventory (NWI) geographic information systems data (USFWS 2016a) shows 42 wetland features near the proposed project area; wetland determinations or delineations at these sites have not occurred at this time. Generally, project canals and laterals are not considered wetlands or Waters of the United States by state or federal agencies; however, prior to project implementation consultation with Oregon Department of State Lands (ODSL) and U.S. Army Corps of Engineers (USACE) would occur to determine exemption applicability to canals and laterals in the District. Wetlands would be avoided to the extent practicable. Consultation between the District, NRCS as the lead federal agency, Tribal Historic Preservation Office (THPO), Oregon State Historic Preservation Office (SHPO), and consulting parties including affiliated tribes for compliance with Section 106 of the National Historic Preservation Act (NHPA) would occur prior to project implementation. Ground disturbances would be limited to only those areas necessary to minimize effects on soil, vegetation, and land use. Where possible and where a new alignment has not been proposed, construction activities would avoid or minimize effects on agricultural lands by confining construction activities to the existing right-of-way. In areas where the realignment would extend out of the existing rights-of-way, new easements have been discussed with landowners and would be legally obtained prior to project implementation. Stormwater best management practices (BMPs) would be employed during and after construction, and construction schedules would minimize disturbance to wildlife and the public. After construction, disturbed areas would be graded and replanted with a mix of native grasses and forbs to reduce the risk of erosion and spread of noxious weeds.

Project costs	**PL 83-566 funds**		**Other funds**		**Total**	
Construction	$21,342,000	75%	$7,114,000	25%	$28,456,000	100%
Engineering	$828,000	75%	$276,000	25%	$1,104,000	100%
SUBTOTAL COSTS	$22,170,000	75%	$7,390,000	25%	$29,560,000	100%
Technical Assistance	$300,000	100%	$0	0%	$300,000	100%
Relocation	Not Applicable					
Real Property Rights	Not Applicable					
Permitting	$0	0%	$41,000	100%	$41,000	100%
Project Administration	$591,000	67%	$296,000	33%	$887,000	100%

Annual O&M	Not Applicable					
TOTAL COSTS	**$23,061,000**	**75%**	**$7,727,000**	**25%**	**$30,788,000**	**100%**

Project Benefits	
Project Benefits	Implementation of the Preferred Alternative would improve water delivery reliability to OID Grimes Flat and McKay Creek irrigators, conserve 4.82 cubic feet per second (cfs) (2,046 acre-feet/year) of water for instream uses from piping projects, transfer 11.2 cfs (approximately 2,021 acre-feet/year) of live flow McKay Creek water rights instream, improve public safety along Grimes Flat laterals and the IronHorse section of the Crooked River Distribution Canal, reduce OID's O&M costs, and reduce irrigators' electricity costs from pumping.
Number of Direct Beneficiaries	39 patrons would directly benefit from the project.
Other Beneficial Effects-Physical Terms	Implementation of the Preferred Alternative would have long-term, beneficial effects on agricultural water availability, water quality, and fish and wildlife habitat.

Damage Reduction Benefits	**Proposed Project Group***		
	1	**2**	**3**
Other – Agricultural Yield Enhancement (Increased Net Returns)	$207,000	$4,000	$0
Other - Reduced O&M	$153,000	$185,000	$65,000
Other - Power Cost Savings	$21,000	$25,000	$4,000
Other - Social Value of Carbon (Avoided Carbon Emissions)	$0	$2,000	$0
Other – Transportation Infrastructure savings	$0	$0	$166,000
Other – Land Value Improvement	$0	$0	$8,000
Water Conservation	$144,000	$115,000	$32,000
Total Quantified Benefits	$525,000	$331,000	$275,000
Benefit to Cost Ratio	1.08	1.05	1.75

*Project group refers to groupings of infrastructure improvement that would undergo construction during the same period.
Infrastructure improvements under each project group are as follows.
Project Group 1. Ochoco Irrigation District improvements necessary for the completion of the McKay Creek Water Rights Switch Project and the installation of the new McKay pipeline and Cox pump station.
Project Group 2. Grimes Flat piping and pump station.
Project Group 3. IronHorse section of the Crooked River Distribution Canal piping.

Period of Analysis	
Installation Period (years)	3

Project Life	100 years

Funding Schedule

Year	PL 83-566	Other Funds	Total
2021-2023	$10,454,000	$3,525,000	$13,979,000
2022-2023	$4,100,000	$1,366,000	$5,466,000
2023-2024	$8,507,000	$2,836,000	$11,343,000

Environmental Effects

The Preferred Alternative would be planned, designed, and installed to have long-term net beneficial effects on agricultural production, water quantity, water quality, Endangered Species Act listed fish species and their habitats, and other aquatic species.

Implementation of the Preferred Alternative would result in minor, short-term adverse effects, such as impacts to vegetation and wildlife along the canals. Most short-term adverse effects would result from construction activities in the project area. The Sponsor would work closely with partners, contractors, and affected landowners to incorporate measures to avoid and minimize short-term adverse effects.

There would be minor, long-term adverse effects on vegetation and artificial wetland habitat within the project area; opportunistic hydrophytic vegetation growing along 9.25 miles of canals would be permanently removed. However, following construction, BMPs for ecological restoration would be followed and there would be an increase in native, upland vegetation in the project area, returning the project area to a more natural state. Loss of existing artificial wetland and riparian habitat would be offset by enhancement of naturally functioning wetland and riparian habitat in the Crooked River and McKay Creek. The Sponsor would implement BMPs and identified minimization measures to avoid adverse effects.

Other long-term impacts include improvement to ecosystem services as well as alterations to the visual landscape following elimination of the open canals.

Major Conclusions	The Preferred Alternative would improve water delivery reliability for OID's irrigators, protect an estimated 4.82 cfs from seepage loss, transfer 11.2 cfs instream in McKay Creek via the McKay Creek Water Rights Switch, enhance fish and aquatic habitat through greater instream flows, reduce OID's operations and maintenance costs, reduce electricity costs from patron pumping, and improve public safety.
Areas of Controversy	There have been no areas of controversy identified.
Issues to be Resolved	None
Evidence of Unusual Congressional or Local Interest	Comments on the Preliminary Investigative Report were received from the U.S. Fish and Wildlife Service, Oregon Department of Fish and Wildlife, local non-governmental organizations, and individuals. Comments on the Draft Plan-EA were received from U.S. Fish and Wildlife Service, Oregon Department of Fish and Wildlife, U.S. Army Corps of Engineers, Oregon Water Resources Department, local non-governmental organizations, and individuals.

Compliance	Is this report in compliance with executive orders, public laws, and other statues governing the formulation of water resource projects? Yes _X_ No____

1 Introduction

Aging infrastructure, growing populations, shifting rural economies, and changing climate conditions have increased pressure on water resources across the western United States (U.S.). Within the Deschutes Basin, irrigated agriculture is the main out-of-stream water use and relies on primarily 100-year-old infrastructure to divert, store, and deliver water to farms and ranches. In recent years, improving water resources to benefit irrigators and the environment has been a coordinated community focus of Ochoco Irrigation District (herein referred to as OID or the District) and the seven other irrigation districts within the Deschutes Basin (Figure 1-1).

The District seeks federal funding through the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) Watershed Protection and Flood Prevention Act, Public Law [PL] 83-566 (herein referred to as PL 83-566), to implement the proposed irrigation infrastructure modernization project (herein referred to as the project) within Crook County, Oregon.

The District and the U.S. Bureau of Reclamation (Reclamation) have a long-standing nexus that also encompasses the proposed project. The District relies on a network of pump stations to distribute water through 120 miles of District operated canals and laterals[1]. Much of this infrastructure was built or rehabilitated by Reclamation as part of the Crooked River Project, which is owned by the U.S. Government and which Reclamation administers. The District is responsible for the operation and maintenance of the entire Crooked River Project with oversight from Reclamation through various contract instruments. A map identifying ownership can be found in Appendix C, Figure C-6. Reclamation is a cooperating agency on this Final Watershed Plan-Environmental Assessment (Plan-EA).

Similar to other irrigation infrastructure around the Deschutes Basin, the majority of District-operated infrastructure is aging. The water distribution system consists primarily of open, earthen dug canals that are up to 102 years old, resulting in water lost to operational spills[2] from operational inefficiencies, and canal seepage or evaporation from conveyance inefficiencies. Critical pumping stations that carry and lift water into the distribution system are over 60 years old, making them unreliable and inefficient. In total, the District estimates that up to 20 percent of District-diverted water is lost to operational spills, canal seepage, or evaporation (OID 2017). Modernizing OID's aging water distribution system would increase system efficiency and help to address local water resource concerns.

Additionally, local stakeholders have identified addressing instream habitat issues in McKay Creek, one of the waterbodies operationally used by the District, as a priority. Agricultural producers who irrigate lands along the middle reach of McKay Creek, defined as the reach from River Mile (RM) 6.0 to RM 12.0, divert water directly from McKay Creek under their non-district water rights. Local

[1] "Laterals" refer to canals or pipelines that branch off from a main or larger canal or pipeline.

[2] The District operationally spills excess water that is not used by irrigators at the ends of its canals and laterals. This excess water typically spills into a ditch, creek, stream, or river and is referred to as "operational spills."

stakeholders have been working for years on the McKay Creek Water Rights Switch Project, which would enable irrigators along the middle reach of McKay Creek to receive water from Prineville Reservoir and in turn transfer their privately owned McKay Creek water rights instream.[3]

[3] The Crooked River Collaborative Water Security and Jobs Act (PL 113-244), expanded the District boundary to include approximately 2,742 acres in the vicinity of McKay Creek, of which approximately 685 acres are authorized to receive irrigation water pursuant to water rights issued by the State of Oregon. Currently, these lands are irrigated with McKay Creek live flow water rights.

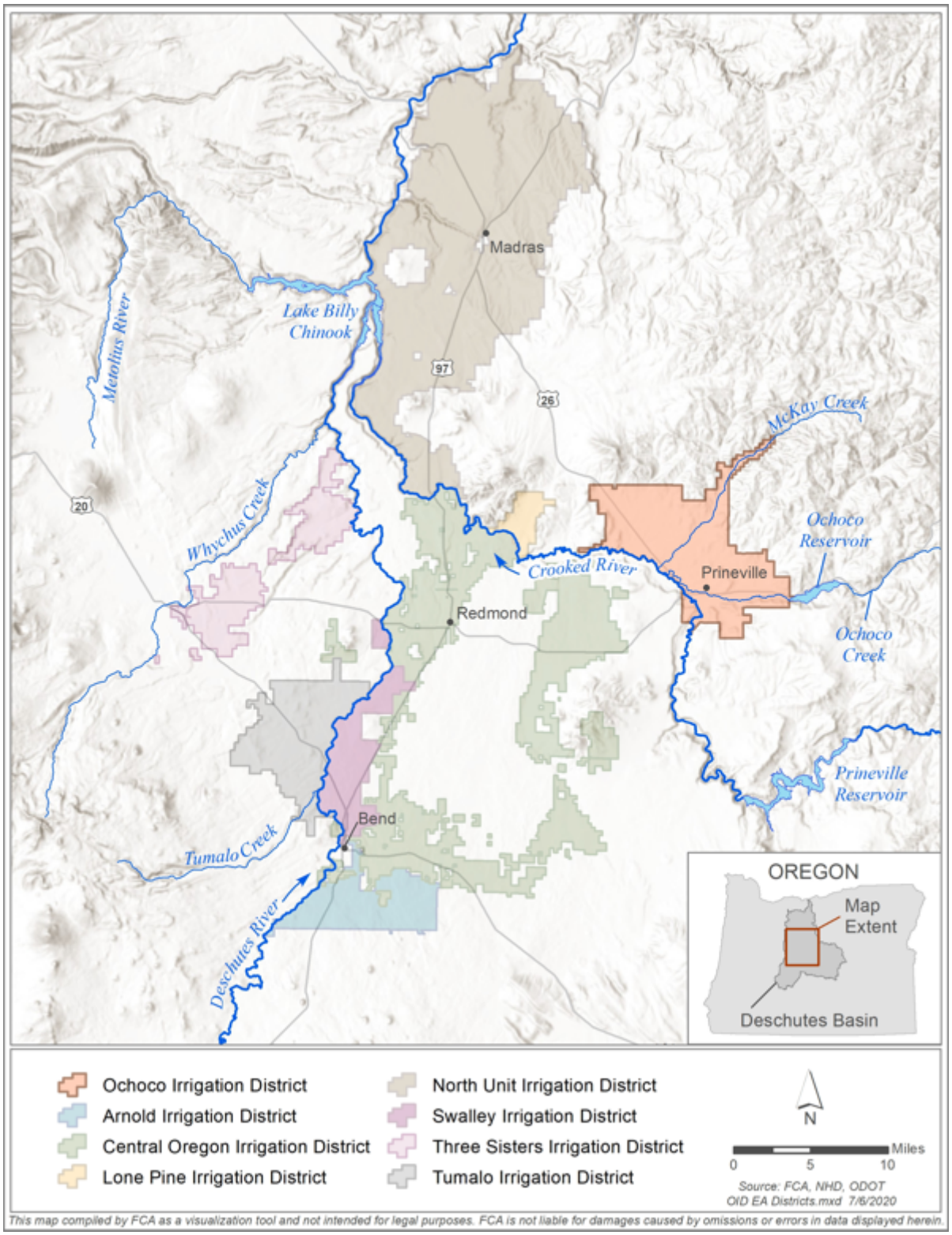


Figure 1-1. Irrigation districts within the Deschutes Basin.

1.1 Planning Area

The District is located in and around the City of Prineville in Crook County, Oregon. The District contains 20,062 irrigated acres used by 898 patrons. The two main points of diversion are on the Crooked River (RM 55.8) and Ochoco Creek (RM 20.6). There are additional withdrawals and water conveyance from McKay Creek, Lytle Creek, Johnson Creek, and elsewhere on Ochoco Creek that are utilized to supplement irrigation demands in the District. The planning area[4] is based on the irrigation problem area, includes the project area (all works of improvement), and is identified as the tax lots traversed by the proposed project (Table 1-1, Appendix C Figure C-2).

Table 1-1. Ochoco Irrigation District Planning Area.

Subwatershed Name	12-digit Hydrologic Unit Code	Planning Area Within Hydrologic Subwatersheds (acres)
Allen Creek	170703050502	40
Dry Creek	170703050101	34
Juniper Canyon	170703051001	58
Lower McKay Creek	170703050503	4,992
Lytle Creek	170703051003	1,153
McAllister Slough-Crooked River	170703051006	1,660
Stearns Dam-Crooked River	170703050102	6
Town of Prineville-Crooked River	170703051002	2,241
Town of Prineville-Ochoco Creek	170703050404	1,713
Upper McKay Creek	170703050501	2
	Total	**11,899**

1.2 Project Area

The project area is the portion of the planning area where the OID Infrastructure Modernization Project would occur. The project area, which comprises only a small portion of the District's total conveyance system, consists of District infrastructure that would be modernized (i.e., upgraded or improved), areas where new infrastructure would be built, and associated rights-of-way and/or easements where construction would take place and/or be staged (Figure 1-3).

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

1.3 Current Infrastructure

The District stores, diverts, and delivers water under multiple water rights and from multiple sources. Water stored in Prineville and Ochoco Reservoirs, both fed primarily by precipitation and snowmelt, provides a majority of the water diverted and delivered by the District. Prineville Reservoir is located on the Crooked River and stores water for multiple users, including the District. The reservoir was created following the construction of Bowman Dam (at RM 70.0 on the Crooked River) as part of Reclamation's Crooked River Project. Reclamation built and administers Bowman Dam and is responsible for storing and releasing water. The dam is operated and maintained by the District as "Reserved Works."[5] To deliver water from Prineville Reservoir to its patrons, allocated District water[6] is released from the reservoir into the Crooked River at RM 70.0; that water is conveyed through the river, and then it is diverted into the Crooked River Diversion Canal at RM 54.9.

Ochoco Reservoir and Dam, the other source of stored water used by the District, was initially built in 1920 and was twice rehabilitated by Reclamation in 1949 and extensively in the mid-1990s (Carter and Link 1998). Ochoco Reservoir is primarily fed by annual snowmelt, precipitation, and inflow from Ochoco Creek. Water from the reservoir is released directly into the Ochoco Main Canal and into the District's conveyance system as necessary to supply the District's water rights. The District owns, operates, and maintains this facility.

To extend the use of stored water from Prineville and Ochoco reservoirs further through the irrigation season, the District also diverts live flow diverted from Ochoco Creek and other intermittent creeks including Old Dry Creek, Johnson Creek, Lytle Creek, and McKay Creek when live flow is available. Live flow diversion typically occurs early in the irrigation season.

The District utilizes both its constructed canal system and natural creek beds to convey water. The District conveys water through three primary canals and a series of laterals that branch off them. In general, these canals and laterals are open, unlined, and predominantly move water from the southeast to the northwest. In the late 1960s and early 1970s, the District worked to conserve water by piping approximately 26.5 miles of canals and laterals with concrete. Since that time, some of these concrete pipes have started to leak due to concrete's brittle nature. The District also operates several minor diversions along McKay, Lytle, Old Dry, and Johnson Creeks, and it uses these waterbodies to convey irrigation water (OID 2012).

Due to the District's topography, eight pumping stations are required for lifting and distributing water through its canals and laterals. The District spills any undelivered water from the ends of its

[5] "Reserved Works" are facilities owned by Reclamation for which operations and maintenance are the responsibility of Reclamation. Although the responsibility for daily operations and maintenance maybe be contracted to another entity, the United States maintains the financial responsibility.

[6] Prineville Reservoir water is allocated to the District and several private entities as primary and supplemental storage (Fitzpatrick et al 2006).

canals and laterals into the Crooked River, Ochoco Creek, McKay Creek, and Lytle Creek. Figure 1-2 depicts the District's current infrastructure.

The project area only includes a subset of current District infrastructure to be modernized (Section 1.2) and is depicted in Figure 1-3. The lands included in the project area do not have water rights to Ochoco Reservoir or live flow from Ochoco Creek, Johnson Creek, or Old Dry Creek. Correspondingly, (1) Ochoco Creek and Reservoir water rights, (2) District releases into the Ochoco Main Canal, and (3) pump station infrastructure associated with conveying this aspect of the system will not be discussed further.

Current infrastructure operated by the District and included in the project area consists of, but is not limited to the following (Figure 1-3):

- Open, earthen canals and laterals
- Pump stations: Barnes Butte Pump, Ochoco Relift, Grimes Flat Pump
- Irrigation water diversion structures
- Prineville Reservoir/ Bowman Dam

As identified in Section 1, the U.S. Government owns and Reclamation administers much of the District-operated infrastructure (Appendix C, Figure C-6). All canals and laterals administered by Reclamation are "transferred works." Transferred works facilities were built by Reclamation, are administered by Reclamation, are operated and maintained by the District, and are owned by the U.S. Government. Reclamation also has easements along the transferred works canals; however, the District is responsible for the daily operation and maintenance (O&M) of these easements. The District is on a repayment contract with Reclamation for this infrastructure, some of which has been paid off (B. Scanlon, personal communication, October 29, 2019). Reclamation still holds title to these assets.

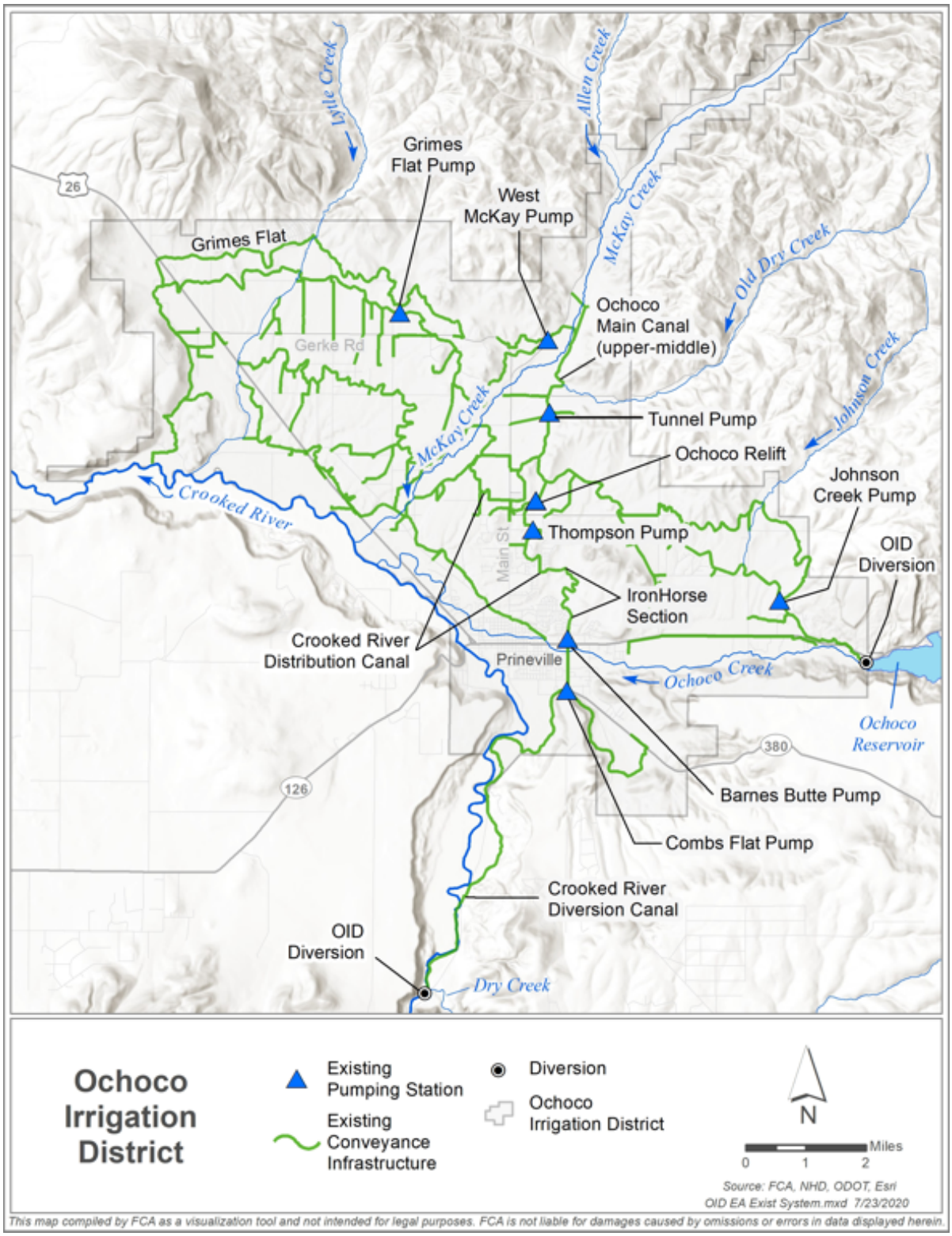


Figure 1-2. Current Ochoco Irrigation District infrastructure.

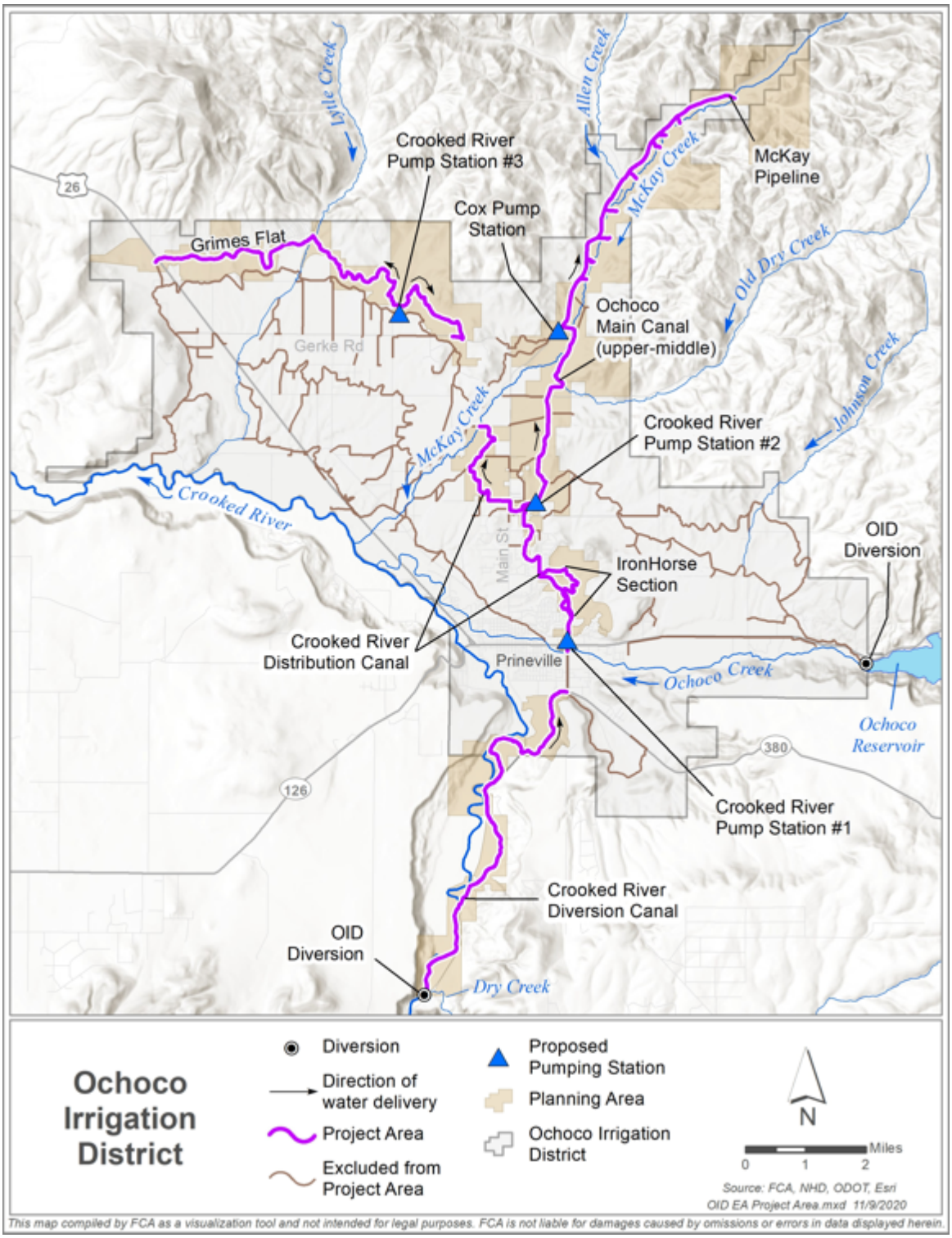


Figure 1-3. Location of the Ochoco Irrigation District's Infrastructure Modernization project area.

1.4 Decision Framework

This Plan-EA has been prepared to assess and disclose the potential effects of the proposed action. The Plan-EA is required to request federal funding through PL 83-566. Through this program, NRCS provides technical and financial assistance to project sponsors such as states, local governments, and tribes to plan and implement authorized watershed project plans for watershed protection; flood mitigation; water quality improvements; soil erosion reduction; rural, municipal, and industrial water supply; irrigation; water management; sediment control; fish and wildlife enhancement; and hydropower.

NRCS is the lead federal agency for this Plan-EA and is responsible for issuance of a decision in accordance with the National Environmental Policy Act (NEPA). NEPA requires that Environmental Impact Statements (EISs) are completed for projects using federal funds that significantly affect the quality of the human and natural environment (individually or cumulatively). When a proposed project is not likely to result in significant impacts requiring an EIS, but the activity has not been categorically excluded from NEPA, an agency can prepare an EA to assist them in determining whether an EIS is needed (see 40 Code of Federal Regulations [CFR] 1501.4 and 1508.9; 7 CFR 650.8).

For purposes of NEPA compliance, the intent of this Plan-EA is to provide a programmatic approach for the implementation of the proposed action. OID is partnered with NRCS to implement the Infrastructure Modernization Project within OID's planning area under the watershed authority of the PL 83-566 program. Because Reclamation holds title to many of the assets and real property that are proposed to be modified, and because Reclamation would hold title to some of the new assets built under the proposed action, Reclamation has agreed to be a cooperating agency on this Plan-EA.

This Plan-EA follows a tiered approach to NEPA. Tiering is a staged approach to NEPA as described in the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500 to 1508). Broad programs and issues are described in initial analyses, while site-specific proposals and impacts are described in subsequent site-specific studies. The tiered process permits the lead agency to focus on issues that are ripe for decision and exclude from consideration issues already decided or not yet ready for decision. Tiering eliminates repetitive discussions of the same issues across site-specific areas through incorporation by reference of the general discussions.

NRCS has determined the need for a Plan-EA to implement the proposed action under PL 83-566 watershed authority. The proposed action is planned to be completed as three project groups phased over 3 years beginning in 2021 and ending in 2024.[7] Consistent with the tiering process as described above, before implementing each site-specific project, an onsite Environmental Evaluation review would occur using Form NRCS-CPA-52, Environmental Evaluation Worksheet. The Environmental Evaluation would determine if that particular individual project meets applicable project specifications and whether the site-specific environmental effects are consistent with those

[7] "Project group" refers to groupings of canals, laterals, and infrastructure that would undergo construction during the same period.

as they are described and developed in this Plan-EA. This process provides information for the Responsible Federal Official to determine if the proposed action has been adequately analyzed and if the conditions and environmental effects described in the Plan-EA are still valid. Where the impacts of the narrower project-specific action are adequately identified and analyzed in the broader NEPA document, no further analysis would occur and the Plan-EA would be used for purposes of the pending action.

If it is determined that the Plan-EA is not sufficiently comprehensive, is not adequate to support further decisions, or if resource concerns or effects have not been adequately evaluated through the programmatic approach, a separate site-specific supplemental EA would be prepared.

This Plan-EA has been prepared in accordance with applicable CEQ regulations for implementing NEPA (40 CFR 1500–1508), USDA NEPA regulations (7 CFR Part 650), NRCS Title 190 General Manual Part 410, and NRCS National Environmental Compliance Handbook Title 190 Part 610. The Plan-EA also meets the NRCS program policy of the 2015 NRCS National Watershed Program Manual (NWPM; NRCS 2015) and guidance of the 2014 NRCS National Watershed Program Handbook (NWPH; NRCS 2014). This Plan-EA serves to fulfill the NEPA and NRCS environmental review requirements for the proposed action.

Finally, in addition to the requirements and policies under NEPA listed above, the USDA will also conduct its analysis of this Plan-EA following the federal Principles and Requirements for Federal Investments in Water Resources[8] as well as the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies. The USDA issued guidance for analysis comprised of DM 9500-13 and DR 9500-13, which NRCS utilizes as the framework for evaluating water resources investments (USDA 2017a, b).

[8] Principles and Requirements are established pursuant to the Water Resources Planning Act of 1965 (PL 89-8), as amended (42 United States Code [U.S.C.] 1962a-2) and consistent with Section 2031 of the Water Resources Development Act of 2007 (PL 110-114).

2 Purpose and Need for Action

The purpose of this project is to:

- Provide the ability for District infrastructure to convey and pump additional water to meet the needs of McKay Creek irrigators.[9]
- Improve water delivery reliability to McKay Creek and Grimes Flat irrigators.
- Conserve water along District-owned Grimes Flat laterals and IronHorse section of the Crooked River Distribution canal (herein referred to as IronHorse section).
- Improve public safety along District-owned Grimes Flat laterals and IronHorse section

Federal assistance is needed to support the District in addressing the following watershed problems and resource concerns: water delivery and operation inefficiencies, diminished instream flows that limit fish and aquatic habitat, water loss in District infrastructure, and public safety risk caused by open canals. These topics are further discussed in Section 2.1.

To meet NRCS requirements for a federal investment in a water resources project, the project must meet the Federal Objective set forth in the Water Resources Development Act of 2007 and be an authorized project purpose under Sections 3 and 4 of PL 83-566.

Per the Federal Objective, water resource investments, including the proposed action put forth in this plan, should: "reflect national priorities, encourage economic development, and protect the environment by: (1) seeking to maximize sustainable economic development; (2) 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 (3) protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems".

The proposed project would be eligible for funding under PL 83-566 Authorized Project Purpose (v), Agricultural Water Management,[10] due to the proposed project's focus on irrigation water conservation and more reliable agricultural water supply delivery.

[9] These agricultural producers irrigate lands along the middle reach of McKay Creek from RM 6.0 to RM 12.0. Although the Crooked River Collaborative Water Security and Jobs Act (PL 113-244) expanded the District boundary to include these lands, agricultural producers along this reach currently irrigate their lands with water diverted directly from McKay Creek and are referred to herein as McKay Creek irrigators. Through the Crooked River Collaborative Water Security and Jobs Act (PL 113-244), McKay Creek irrigators can now trade their private McKay Creek water rights for OID water. The McKay Creek Switch Project (McKay Switch) would enable this switch to occur.

[10] A description of Authorized Purposes can be found in 390-NWPM, Part 500, Subpart A, Section 500.3B.

2.1 Watershed Problems and Resource Concerns

2.1.1 Water Delivery and Operations Inefficiencies

McKay Creek irrigators pump or divert water directly from McKay Creek (RM 6.0 to RM 12.0) when live flow is available. Variability in seasonal precipitation impacts the number of days that these irrigators are able to draw water; a typical irrigation season runs from April 1 through the end of June (N. Bellis, personal communication, January 21, 2020; J. Kochersberger, personal communication, January 16, 2020). This season is much shorter than the season for OID patrons. OID patrons typically receive water from April to October.

The Crooked River Collaborative Water Security and Jobs Act (PL 113-244) was passed in 2014. It allows irrigators who pump or divert directly from McKay Creek to transfer their live flow water rights instream in McKay Creek and switch to District water stored in Prineville Reservoir.

The District does not currently convey water to the McKay Creek irrigators. The water that would be conveyed to the McKay Creek irrigators would be additional to the water that the District currently conveys to its patrons.[11] The District's current infrastructure does not have the capacity to convey this additional water to supply McKay Creek irrigators. In some areas, District canals would not be able to hold additional water without overflowing, and current pump stations do not have the capacity required to lift and carry the additional water for McKay Creek irrigators. McKay Creek irrigators would not be able to receive stored water until the District's infrastructure were updated accordingly.

The District relies on a series of pump stations to lift and carry water across its delivery system. Most of these pumps were installed over 60 years ago and have increasingly become less reliable, less efficient at pumping water, and costlier to operate and maintain over time. The failure of pumps and associated parts and the temporary shutdown of pumps for repair or maintenance affects the District's ability to efficiently provide water to the irrigators they serve.

Due to the interconnectedness of the District, the District would rely on the same infrastructure to convey water north from the District's Crooked River diversion to serve the existing Grimes Flat irrigators, who currently receive water from the District, and the McKay Creek irrigators, who currently divert water from McKay Creek. The District's pump stations do not currently have the capacity to adequately serve both existing District patrons and the McKay Creek irrigators.

Once the District conveys water to the northern part of the District, the District's canals and laterals do not transport and deliver that water to Grimes Flat irrigators as precisely, accurately, or efficiently as a modernized system would. Operational inefficiencies including water loss through seepage, lack of measurement devices at turnout locations, and fluctuations in water demand make it much more challenging for the District to deliver the amount of water that Grimes Flat irrigators need when

[11] The Crooked River Collaborative Water Security and Jobs Act of 2014 (PL 113-244) specified that "not more than 2,740 acre-feet of water annually" would be supplied to McKay Creek irrigators and that stored water would be supplied by the District to McKay Creek irrigators "on an acre-per-acre basis contingent on the transfer of existing appurtenant McKay Creek water rights to instream use."

they need it. Furthermore, in earthen, open canals, the District must convey additional water to ensure that it can deliver the water that patrons need, particularly those patrons at the tail ends of its canals and laterals. This additional water is referred to as carry water. The challenge of assuring that irrigators at the tail end of the system receive water is compounded by operational inefficiencies, resulting in operational spills of water, including carry water, at various points within the District including into Lytle Creek from Grimes Flat laterals.

2.1.2 Instream Flow for Fish and Aquatic Habitat

Currently, waterbodies affected by the District's and McKay Creek irrigators' diversions experience altered hydrographs throughout the year. These altered hydrographs impact water quality and aquatic habitat. Stakeholders have consistently expressed interest in improving the hydrographs in waterbodies associated with District operations in a manner that would improve fish and aquatic habitat.

McKay Creek is tributary to the Crooked River and is critical for the successful reintroduction of salmon and steelhead. The creek historically provided habitat for steelhead to transition from fry to juveniles who would then migrate to other rearing habitats later in the summer. Irrigation withdrawals directly from the creek have contributed to an altered hydrograph and low to no streamflow between RM 6.0 and RM 12.0 in the summer months. Low summer streamflow has impacted steelhead rearing habitat, their ability to transition from fry to juveniles, and their migration, ultimately impeding steelhead reintroduction into the lower Crooked River (N. Bellis, personal communication, November 14, 2019).

2.1.3 Water Loss in District Conveyance Systems

Overall, the District's open canals and laterals lose about 20 percent[12] of their flow to seepage, evaporation, and operational spills[13] (OID 2017). During the irrigation season, Grimes Flat East Lateral and Grimes Flat West Lateral (collectively referred to as Grimes Flat laterals) loses 4.90 cubic feet per second (cfs) (2,080 acre-feet) season and the IronHorse section loses 1.02 cfs (432 acre-feet) (Appendix E.6). Water losses due to inefficient conveyance systems can prevent the District from delivering to its irrigators the full rate and duty associated with each water right. The District identifies that reducing or eliminating operational spills is a high priority to both conserve water and improve operational efficiencies. Details of water losses and demands can be found in Appendix E.6 of this Plan-EA and in the District's System Improvement Plan (SIP) (OID 2017).

[12] At the time of measurement, water loss data collected across the District showed that approximately 53 cfs of water was lost to a combination of seepage and evaporation (OID 2017). Water lost during District conveyance across the irrigation season is estimated to total approximately 18,000 acre-feet of the total 80,000 acre-feet the District diverts annually, or 20 percent (OID 2017).

[13] The District operationally spills excess water that is not used by irrigators at the ends of its canals and laterals. This excess water typically spills into a ditch, creek, stream, or river and is referred to as "operational spills."

2.1.4 Risks to Public Safety

The open laterals of Grimes Flat and the IronHorse section pose a risk to public safety year-round. In addition to multiple instances of injury and car accidents, several drowning deaths or near-drowning instances have occurred in OID and adjacent district canals (see Section 4.4 for more information) (OID 2018). The District's facilities, located in a mix of rural and urban areas, heighten the potential for safety issues. In particular, the IronHorse section is located adjacent to Barnes Butte Elementary School and a nearby IronHorse subdivision. Proximity of the IronHorse section to these areas poses a higher public safety risk than other areas of the District.

Canal breaching also poses a safety risk during the irrigation season. The District has experienced multiple canal breaching events. These events stop the District's pumping facilities, temporarily inhibit delivery of water to irrigators, and cause property damage from resulting flooding (OID 2018).

2.2 Watershed and Resource Opportunities

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

- Improved irrigation water management and irrigation water delivery to Grimes Flat and McKay Creek irrigators through improved conveyance efficiencies
- More natural McKay Creek hydrograph and enhanced water quality and aquatic habitat availability
- Permanent protection of conserved water in the Crooked River through Oregon's Allocation of Conserved Water Program and in McKay Creek through the transfer of McKay Creek water rights instream
- Minimized injury and loss of life potential associated with open Grimes Flat laterals and the IronHorse section
- Reduced operations and maintenance involved in delivering irrigation water to Grimes Flat and McKay Creek irrigators

3 Scope of the Environmental Assessment

3.1 Agency, Tribal and Public Outreach

Federal, state, and local agencies and representatives, as well as non-governmental organizations, received an invitation to participate in scoping the Draft Plan-EA. Advertisements announcing the scoping period and associated scoping meeting were placed in the Central Oregonian local newspaper in addition to multiple online locations including NRCS' website, the District's website, and Deschutes Basin Board of Control's (DBBC) website. Additionally, the District notified patrons of the scoping meeting and invited comments on the scope of the Draft Plan-EA.

NRCS conducted tribal consultation with the Tribal Historic Preservation Office (THPO) in accordance with the National Historic Preservation Act (NHPA) of 1966 and Executive Order (EO) 13175, *Consultation and Coordination with Indian Tribal Governments*, to maintain NRCS' government-to-government relationship between Native villages and tribes. NRCS sent a letter to the Confederated Tribes of Warm Springs (CTWS) requesting input and notifying them of the scoping process. CTWS responded and requested that they be consulted during the planning phase of the project.

3.2 Scoping Meeting

A scoping meeting was held on September 18, 2019, at Carey Foster Hall in Prineville, Oregon. Presenters at the meeting included Tom Makowski, NRCS; Bruce Scanlon, OID; Kristin Alligood, Farmers Conservation Alliance (FCA); and Raija Bushnell, FCA. The presentations covered the financial assistance available through PL 83-566, the project purpose and need, the EA process, and ways in which the public could get involved. After the presentations, attendees asked questions and provided comments for the public record. A total of 30 people attended the meeting, excluding staff from OID, NRCS, and FCA.

3.3 Identification of Resource Concerns

Resource concerns identified through scoping comments include surface water, aquatic resources, soils, cultural resources, socioeconomics, wetlands, terrestrial wildlife, vegetation, and visual resources. Table 3-1 provides a summary of resource concerns and their relevancy to the proposed action. Resource items determined not relevant have been eliminated from detailed study, and those resources determined relevant have been carried forward for analysis.

Table 3-1. Summary of Resource Concerns for the Ochoco Irrigation District Infrastructure Modernization Project.

Resource	Relevant to the Proposed Action?		Justification
	Yes	No	
Air			
Air Quality		X	Oregon Department of Environmental Quality (ODEQ) air quality data indicates that the entire project area is in attainment for all criteria pollutants. Emissions from equipment associated with construction activities would occur; however, such emissions are considered negligible when compared to background levels and the application of best management practices (BMPs).
Geology and Soils			
Geology		X	There are no active fault lines around the project area.
Soils	X		Construction and operation of the project could affect soils.
Prime Farmlands		X	The proposed project would not involve any change in land use or conversion of farmlands for development or construction of infrastructure.
Human Environment			
Environmental Justice		X	The proposed action is not located near any racial, socioeconomic, or environmental justice groups, and therefore would comply with EO 12898.
Historic Resources	X		Consultation with the State Historic Preservation Office (SHPO), THPO, and other consulting parties including affiliated Tribes is required for compliance with Section 106 of the NHPA.
Land Use	X		Construction and operation of the project could affect land use.
National Parks, Monuments, and Parklands		X	None occur in the project area or would be affected by the project.
Noise		X	No relevant impact to noise. With implementation of BMPs, noise impacts during construction would be negligible and temporary.

Public Safety	X		Drowning risk in certain open canals could be beneficially affected.
Recreation		X	No trails or parks occur in the project area, any changes in instream flows would not be large enough that they would affect the quality, access, or participation in river recreation.
Visual Resources	X		Construction and operation of the project could affect visual resources.
Socioeconomics			
Local and Regional Economy	X		The proposed action involves an expenditure of public funds that could affect the local and regional economy. An evaluation of the effects of providing NRCS funding is included.
National Economic Efficiency (NEE)	X		A NEE analysis has been completed as required by the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies.
Vegetation			
Invasive Species/Noxious Weeds		X	No relevant impact. With implementation of BMPs the spread of noxious weeds during construction would be avoided.
Special Status/Threatened or Endangered Species		X	None have been observed in the project area, and no designated critical habitat occurs in that area.
Water			
Floodplain Management	X		Construction and operation of the project would occur in the 100-year floodplain.
Groundwater Quantity, Aquifer Recharge	X		Construction and operation of the project could affect aquifer recharge.
Hydrology	X		A change in operational spills and seepage, as well as water rights protected instream, could affect hydrology.
Surface Water Quality	X		Operation of the project could beneficially affect surface water quality.
Water Rights	X		The proposed action could indirectly affect water rights through use of the Allocation of Conserved Water Program and water transfers.

Wild and Scenic Rivers		X	The project would have no relevant impact to any Outstanding Remarkable Values associated with Wild and Scenic Rivers.
Wetlands and Riparian Areas			
Wetlands and Riparian Areas	X		Wetlands and riparian areas in the project area could be affected by the project.
Fish and Wildlife			
Migratory Birds and Eagles	X		Migratory birds and eagles could occur within the project area.
Endangered Species	X		Steelhead and bull trout are known to occur in waterbodies that would be affected by the project.
Essential Fish Habitat (EFH)		X	Because neither the project nor affected waterbodies occur within EFH, consultation under the Magnuson Stevens Act is not expected to be required.
Fish and Fish Habitat	X		The proposed action could affect fish habitat in the waterbodies associated with District operations.
General Wildlife and Wildlife Habitat	X		Construction and operation of project components could affect wildlife in the vicinity of District operations.

3.4 Scoping Comments

Scoping comments were accepted from August 27 to October 18, 2019. Comments were submitted via the following methods:

- At the public meeting on September 18, 2019
- Email, Ochoco.id.comments@gmail.com
- Online, oregonwatershedplans.org
- Mail, Farmers Conservation Alliance, Attention Ochoco Watershed EA, 102 State St, Hood River, OR 97031
- Phone, Farmers Conservation Alliance, (541) 716-6085

Comments generally supported the project. Table 3-2 presents comments received and where they are addressed in this Plan-EA.

Table 3-2. Public Scoping Comment Summary.

Comments Received	Section Where Topic is Discussed
Request to include Public Fish and Wildlife as a purpose of the project	Section 2
Request that a reasonable range of alternatives be examined	Section 5
Request that on-farm and private lateral water conservation be considered in the EA	Section 5
Request that the District coordinate with ODFW and a restoration partner to develop wetlands to treat tailwater and return flow	Section 5
Request that consideration be given to on-farm improvements so that patrons do not over irrigate and flood neighboring properties	Section 5.1, Appendix D.2
Request that the District consider implementing mitigation measures to offset patron's continuing unfavorable farming conditions after piping and improving other patron's farming conditions	Section 5.1, Appendix D.2
Concern for homeowner safety if private landowners are unable to build solid fences to property line	Section 6.2
Concern for public safety if foot traffic is allowed to occur over revegetated pipeline	Section 6.3
How will the project affect moss and aquatic vegetation in canals?	Section 6.6
Concern about the aesthetics of the Proposed Action in neighborhoods that have open canals	Section 6.7
District should use Oregon Conserved Water statute to permanently protect conserved water instream	Section 6.8

Comments Received	Section Where Topic is Discussed
How will the project be impacted by drought years?	Section 6.8.2.5
How will saved water be used?	Section 6.8
What will happen to creeks during spring water events? Will there be a flooding issue if users aren't pumping McKay water anymore?	Section 6.8
Request that the District commit to transferring and protecting all water conserved by the project instream to restore streamflow and improve flows for fish and aquatic habitat	Section 6.8
Clarify patron water delivery pre- and post-Proposed Action	Section 6.8
Clarify the amount of water conserved by the Proposed Action	Section 6.8
Will any additional water rights be made available for purchase after water is saved by the project?	Section 6.8
Request that the maximum amount of saved water from the Proposed Action be converted instream to the uncontracted storage account in Prineville Reservoir	Section 6.8
Consider a modernization approach that allows for the greatest flexibility to conserve and return water to Ochoco and McKay creeks and the Crooked River.	Section 6.8
Consider State fish passage and screening requirements as changes to instream infrastructure occurs	Section 6.9
Address currently unscreened diversions	Section 6.9
Request to coordinate with U.S. Fish and Wildlife Service	Section 6.9
How will the project help fish?	Section 6.9
Concern for wildlife access to water if canals were piped	Section 6.11
Will the District assist patrons with pond removal when pressurized water becomes available?	Section 8.2
How will the Proposed Action impact power service and patron fees?	Appendix D.1 National Economic Efficiency Analysis
Concern about ownership between canal and patron service	Section 8.2
Request for specific information about the location of the pipeline in relationship to the canal	Section 6.3.2
What are the pumping stations like?	Section 5.3.2
Request that the District should not incur debt especially if the debt will fall on patrons	Section 8.6

4 Affected Environment

The following sections describe the existing ecological, physical, biological, economic, and social resources of the project area and areas that are affected by operation of the OID system. The project area is defined in Section 1.2.

Per requirements of the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies, where applicable, this Plan-EA describes the ecosystem services associated with each resource. Ecosystem services refer to the benefits that people and their communities derive from the natural environment in which they live. Contributions to 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 require an ecosystem services assessment to illuminate how management decisions will enhance, sustain, or degrade the benefits that nature provides (USDA 2017a; Olander et al. 2018). An assessment of links between ecological function and social well-being helps to ensure that beneficial and detrimental ecological impacts of a project are recognized and that detrimental impacts are minimized to the extent possible (EEA 2019).

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

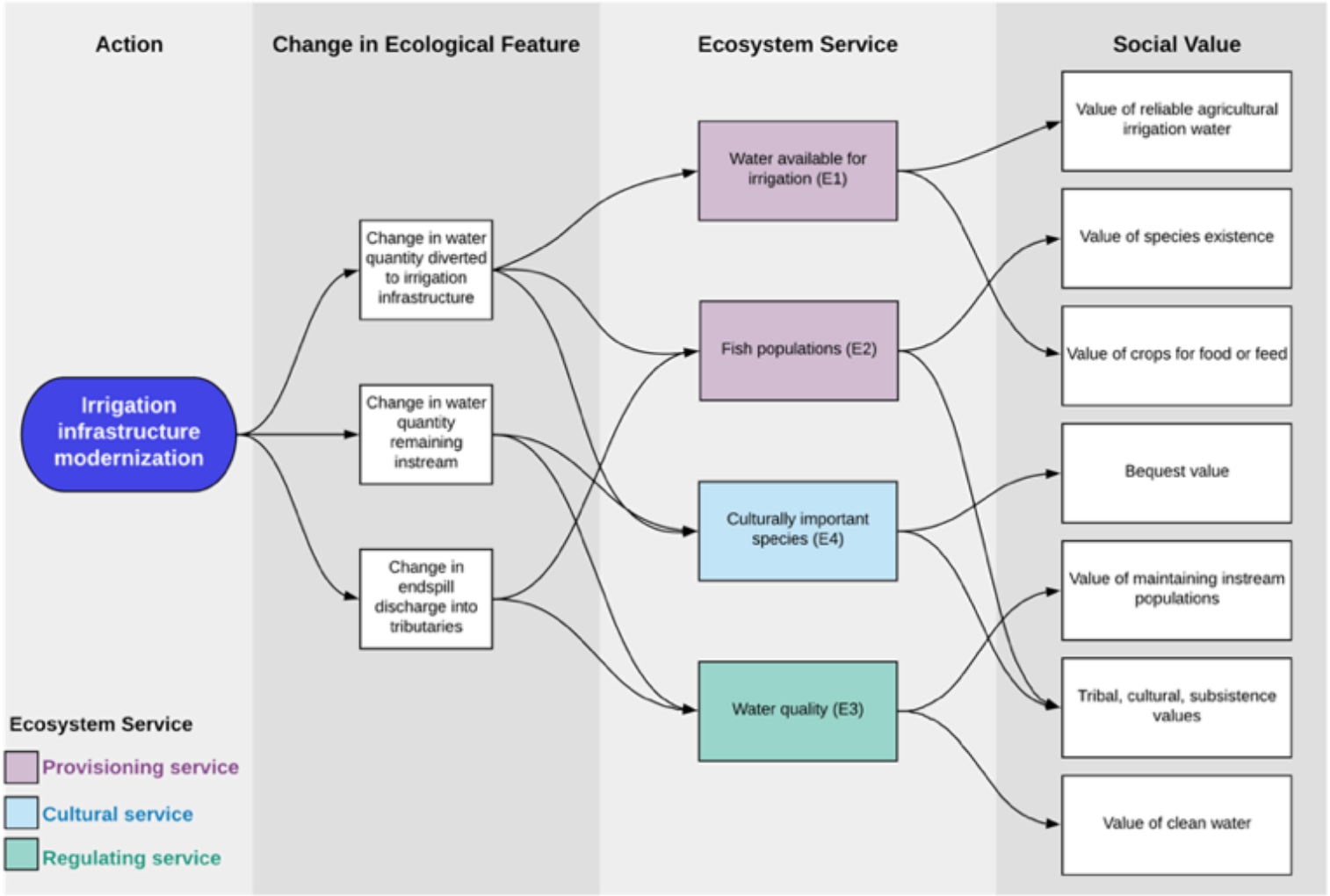
(1) Provisioning services: tangible goods provided for direct human use and consumption, such as food, fiber, water, timber or biomass;

(2) Regulating services: services that maintain a world in which it is possible for people to live, providing critical benefits that buffer against environmental catastrophe—examples include flood and disease control, water filtration, climate stabilization, or crop pollination;

(3) Cultural services: services that make the world a place in which people want to live—examples include spiritual, aesthetic viewsheds, or tribal values; and

(4) Supporting services: services that refer to the underlying processes maintaining conditions for life on Earth, including nutrient cycling, soil formation, and primary production.

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. This Plan-EA does not evaluate supporting services because they give rise to and support the final ecosystem services (Regulating, Provisioning, and Cultural) (EEA 2019; USDA 2017a).



Note: E1 through E4 refer to ecosystem services 1 through 4. These services are referenced and explained in more detail in the text below.

Figure 4-1. Ecosystem services concept diagram for the Ochoco Irrigation District Infrastructure Modernization Project.

4.1 Cultural Resources

Section 106 of the NHPA requires federal agencies to consider the effects of federally funded projects on historic properties, commonly referred to as cultural resources, prior to the expenditure of federal funds. The NHPA defines an historic property as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the National Register of Historic Places, including artifacts, records, and material remains related to such a property or resource" (ACHP 2019).

The Ochoco Main Canal was constructed between 1917 and 1920. In 1960, Reclamation altered the canal through widening, replacing turnouts, and adding pumping facilities (Gannon 2012). The Oregon Historic Sites Database lists the Ochoco Main Canal as eligible for listing in the National Register of Historic Places /contributing resources that contribute to the site's significance based on a 2015 reconnaissance level cultural significance survey (Oregon State Parks 2020). The project would improve approximately 3 of the 25 miles of the Ochoco Main Canal, the section between Crooked River Pump Station No. 2 and the Cox Pump Station (Figure 1-3).

The Crooked River Diversion and Distribution canals, Crooked River associated pump stations, and Grimes Flat laterals were built as part of Reclamation's Crooked River Project, authorized in 1956, and Crooked River Extension Project, authorized in 1959 (OID 2012). The Oregon Historic Sites Database does not list these structures as eligible or contributing (Oregon State Parks 2020).

4.2 Land Use

4.2.1 Land Ownership

The majority of lands traversed by and adjacent to the project area (including where potential new realignments would occur) are privately owned.[14] Reclamation has legal right-of-ways (ROWs) or easements for the majority of the existing infrastructure in the project area, while the District has ROWs or easements for the other segments of existing infrastructure in the project area (Appendix C, Figure C-6).

4.2.2 Land Use

Land use within the majority of the project area consists of irrigation water conveyance and pump stations as well as operations and maintenance of the irrigation water conveyance system. The District accesses its infrastructure through maintenance roads in the ROW and easements. Lands falling within the project area that currently do not contain OID infrastructure, but where new infrastructure would potentially be installed, are currently used for agricultural production or is a road ROW.

The project area traverses both lands served by the District and lands not served by the District. The majority of the system crosses and is adjacent to rural agricultural land. Irrigators who would be

[14] A few segments of the project area (approximately 1.6 miles in total) pass adjacent to or through land owned by the city and county school district. A table identifying the lengths of these segments can be found in Appendix E.3.

served by the project primarily grow alfalfa hay and grass hay. They also grow other crops such as pasture, grain, hemp, and carrot seed (OID 2012). The majority of the agricultural lands served by canals and laterals in the project area are zoned as Exclusive Farm Use (EFU).[15]

Due to the growth and urbanization of Prineville, canals in the project area also serve lands that fall within the Prineville Urban Growth Boundary.[16] Approximately 35 percent of the project area length passes through urban and developed lands (see Appendix E.3 for a table on land use). Developed lands adjacent to the project area contain residences, roads, commercial buildings, and other uses.

4.2.3 Ecosystem Services

Agricultural land receiving water from the District in the project area provides ecosystem services categorized as *Provisioning service: Water available for irrigation* (Figure 4-1, [E1]). As described in Sections 1.3 and 4.8, water from the Crooked River watershed is diverted into the District's irrigation conveyance system and delivered to patrons for agricultural purposes. Provision of this water allows lands to be maintained in agricultural production. Feed grasses, including hay and pasture, contribute to the production of meat and dairy food; this water may also be used to grow crops for food for people.

4.3 Soils

The project area is located within the John Day Ecological Province, which encompasses nearly the entire Crooked River Watershed (Anderson et al. 1998). The parent material of the Province's ancient sedimentary and tuffaceous geologic formations produce soils that are fine-grained and erode easily from precipitation (Anderson et al. 1998; DOGAMI 2019). In areas with fine-grained sedimentary deposits or dense lava flows, the ability of water to penetrate is low (Lite and Gannett 2012). The fine-grained sediment of the project area favors a surface water-driven hydrological system over a groundwater system (CRWC 2008).

NRCS has developed technical soil groups that are associated with a particular soil type and that soil's rating for agricultural commodity production (NRCS 2015). NRCS soil groupings within the project area are primarily prime farmland if irrigated (Appendix E.2).

4.4 Public Safety

The open canals in the project area pose a risk to public safety. Areas located near schools, such as the IronHorse section, are high priority for the District. During summer months when irrigation water is flowing at peak volume in the canals, water depths can be up to 5 feet and velocities may range from just over zero feet per second to 10 feet per second depending upon location, grades, and structures. These conditions make it difficult for a healthy, strong adult to stand in or climb out

[15] Oregon intends the EFU zoning designation to maintain the agricultural economy of the state and ensure adequate food production. The county is required to inventory and protect farmlands under Statewide Goal 3, Agricultural Land, Oregon Revised Statute [ORS] 215 and Oregon Administrative Rule [OAR] 660-033.

[16] This boundary is set to control urban sprawl and encroachment on agricultural and rural lands by mandating that the area inside the Urban Growth Boundary be used for higher-density urban development.

of a canal without assistance. A child or non-/weak swimmer would have a higher risk of drowning in a canal with these attributes. If a person or animal falls into a canal, they could have serious difficulty gaining a hold on the banks to climb out to safety.

In recent years, OID has seen several occasions of canal related injuries both when carrying water and when dry (Wade 2016; KTVZ 2016a, b). In 1998, an 8-year-old girl drowned in the Grimes Flat lateral during the non-irrigation season due to standing water (B. Scanlon, personal communication, January 27, 2020). For this reason, Grimes Flat is an area that is of particularly high priority for the District.

The failure of earthen canals, or lined canals, and risk of localized flooding is also a concern for the District, particularly in the Grimes Flat and IronHorse area.

4.5 Socioeconomic Resources

This section describes the socioeconomic conditions for the areas associated with the proposed action, which includes Crook County and the Prineville community therein. Surrounding areas and communities are also described. These areas include Deschutes and Jefferson Counties, and the communities of Redmond, Bend, and Terrebonne.

4.5.1 Population

The project area falls within Crook County. Nearby counties, cities, and towns include Deschutes and Jefferson counties, Redmond, Bend, Terrebonne, and Prineville. Generally, the area has seen stable growth over the past 10 years (2005 to 2015; Table 4-1). The Oregon Office of Economic Analysis estimates that by 2040, Deschutes County could reach a population of 241,223, Crook County could reach a population of 26,117, and Jefferson County could reach a population of 29,413 (OEA 2013).

Table 4-1. Population Characteristics by City, County, and State.

Area	Year 2000 Population (number of people)[1]	Year 2015 Population (number of people)[2]	Population Growth Rate 2000 to 2015	Year 2015 Population per Square Mile (number of people)
Cities and Towns				
Redmond	13,481	27,450	6.9%	1,635
Bend	52,029	87,780	4.6%	2,638
Terrebonne	1,469	1,182	-1.6%	262
Prineville	7,356	9,266	1.7%	849
Counties				
Crook	19,009	20,956	0.7%	7
Deschutes	115,367	166,622	3.0%	55
Jefferson	19,009	22,061	1.1%	12
State				
Oregon	3,421,399	3,939,233	1.0%	40

Source:
1 U.S. Census Bureau 2005
2 U.S. Census Bureau 2015

4.5.2 Area Employment and Income

Table 4-2 presents the labor force characteristics for Crook County, Deschutes County, Jefferson County, and the State of Oregon in 2017. Unemployment in Deschutes County is equal to the state average; however, both Jefferson and Crook Counties have higher unemployment rates. Agriculture, forestry, fishing and hunting, and mining consist of 5.5 percent of the employment rate in Crook County, 3.3 percent in Deschutes County, and 10.2 percent in Jefferson County (U.S. Census Bureau 2017).

Table 4-2. Labor Force Characteristics in the State of Oregon, Deschutes County, Jefferson County, and Crook County, 2017.

Indicator	Crook County	Deschutes County	Jefferson County	Oregon (State)
Labor Force	9,617	93,444	10,133	2,104,077
Employed	9,035	89,625	9,589	2,017,292
Unemployed	582	3,820	544	86,786
Unemployment Rate	6.1%	4.1%	5.4%	4.1%

Source: U.S. Census Bureau 2017

Household income and persons living in poverty are summarized in Table 4-3. Information is presented for two income indicators: median household income and per capita income. Median income in Deschutes County is the same as median income in the State of Oregon; both are comparable to the median income in the United States. Income in Crook and Jefferson Counties are lower than both the State of Oregon and the United States by at least 9 percent. The percentage of persons living in poverty in Deschutes County is similar to that of the United States, but slightly lower than the State of Oregon. Both Jefferson and Crook County have a higher percentage, by about 5 percent, of persons in poverty than Deschutes County, the State of Oregon, and the United States.

Table 4-3. Income and Poverty Rates in the State of Oregon, Deschutes County, Jefferson County, and Crook County, 2015.

Indicator	Crook County	Deschutes County	Jefferson County	Oregon (State)	United States
Median Household Income	$37,106	$51,223	$46,366	$51,243	$53,889
Per Capita Income	$21,496	$29,158	$21,341	$27,684	$28,930
Persons in Poverty	19.4%	14.6%	20.5%	16.5%	15.5%

Source: U.S. Census Bureau 2015

4.5.3 Agricultural Statistics

Table 4-4 presents agricultural information for the lands served by the District. Appendix E presents summarized agricultural information for Crook, Deschutes, and Jefferson Counties from the 2017 and 2012 USDA Census of Agriculture.

Table 4-4. Crops Grown in Ochoco Irrigation District.

Crop	Total Acreage
Grains (Barley, sorghum, wheat, triticale)	833
Alfalfa	10,164
Grass Hay	6,777
Sod/ Grass Seed	107
Specialty Crops	64
Total Farmed Cropland[1]	**17,945**

Source: FCA 2019

1.Estimate of total farmed cropland in the District. Total irrigated acres in the District is estimated to be 18,654.

4.6 Vegetation

4.6.1 General Vegetation

The common upland vegetation types found within the project area are sagebrush species, rabbitbrush, bitterbrush, wheatgrass, Ponderosa pine, and tall tumble mustard. Bunch grasses, some species of wildflowers, and other plant species commonly found in the dry Central Oregon steppe are also present. Few western junipers are found along the canals and laterals.

In some sections of the project area, a fringe of opportunistic hydrophytic (water-loving) plants has formed along the margins of the top of the canal bank, represented predominately by bulrush and tufted hair grass. The hydrophytic fringe occurs sporadically, is up to a few feet wide in scattered locations, and does not function as a habitat type due in part to infrastructure maintenance activities. Vegetation that develops within the canals is limited by grading and clearing during the off-season to minimize growth.

4.6.2 Special Status Species

No Endangered Species Act (ESA)-listed endangered or threatened plant species, plant species of concern, candidate plant species, their designated critical habitats, or Oregon special status plant species are known to occur within the project area (ODA 2019).

4.6.3 Common and Noxious Weeds

Scotch thistle, leafy spurge, and Canada thistle are the three major terrestrial noxious weeds that the District manages (D. Wood, personal communication, October 30, 2019). Table E-5 in Appendix E.4 offers a comprehensive list of the noxious and common weeds, with corresponding classifications, known to occur in the project area.

During the irrigation season, sago pondweed, horned pondweed, and filamentous algae grow within District-operated canals and laterals. The District typically initiates three major in-water chemical

treatments during the irrigation season to clear this vegetation. The District also treats the roadways along their easements with terrestrial spray product (B. Scanlon, personal communication, January 14, 2020).

4.7 Visual Resources

The project area passes through agricultural landscapes and developed landscapes, including commercial and residential areas. The open canal and laterals in the project area generally lie flat against the landscape. In some sections of the project area, the canals and laterals are a few feet lower than the landscape level, and the canal and lateral banks are indistinguishable from other landscape features.

In addition to the canal and laterals, the project area includes surrounding vegetation and dirt or gravel maintenance roads (Figure 4-2). Views of the canal and laterals change throughout the year. During the irrigation season, the canal and laterals carry water. Outside of the irrigation season, they do not carry water and are usually dry. The open canal and laterals can be seen from residences and public road crossings.

The existing pump stations that are within the project area consist of multiple pumps, a cinder block building that houses electronic components, and chain link fencing surrounding the station (Figure 4-3).

In segments of the project area where there would be new lateral alignments, there are currently no visible canals or laterals; the land is being used for agriculture. In the segment of the project area where the proposed Cox Pump Station would be located (Figure 1-3), the land is flat and located between an existing canal that is part of the project area and a two-lane road. In the segment of the project area where the proposed new Barnes Butte pump station would be constructed, the land is flat and immediately next to the current existing pump station.

Figure 4-2. IronHorse section of the Crooked River Distribution Canal and canal road looking north.

Figure 4-3. The Barnes Butte pump station looking northwest.

4.8 Water Resources

Waterbodies associated with District operations in the project area include Prineville Reservoir, the Crooked River from Prineville Reservoir (RM 70.0) to its confluence with Lake Billy Chinook (RM 0.0), McKay Creek from RM 12.0 to its confluence with the Crooked River, and Lytle Creek from RM 5.7 to its confluence with the Crooked River. The upstream end of Lake Billy Chinook at the confluence of the Crooked, Deschutes, and Metolius Rivers serves as the downstream boundary of the waterbodies associated with District operations in the project area. Groundwater resources

associated with District operations are limited to the area north of the Cooked River within the Lower Crooked River watershed and planning area (Table 1-1, Table 4-5, and Figure 4-4).

Table 4-5. Waterbodies Associated with District Operations in the Project Area

Name	Associated River Miles	Size	Tributary To	Project Nexus
Prineville Reservoir	Not Applicable	148,640 acre-feet	Crooked River	OID holds 60,639 acre-feet of stored water rights in this reservoir. This stored water includes 2,740 acre-feet of storage allocated for the McKay Switch under the Crooked River Collaborative Water Security and Jobs Act of 2014 (PL 113-244).
Crooked River	Bowman Dam at Prineville Reservoir (RM 70.0) to Mouth	Not Applicable	Deschutes River, confluence at Lake Billy Chinook	Releases from Prineville Reservoir affect streamflow in this reach; OID's diversion of up to 190 cfs at RM 54.9 affects streamflow downstream.
McKay Creek	Reach 1 (RM 0.0 to RM 6.0)	Not Applicable	Crooked River	Reach 1—The District diverts up to 40 cfs at Jones Dam and operationally spills water into McKay Creek at Jones Dam.
McKay Creek	Reach 2 (RM 6.0 to RM 12.0)	Not Applicable	Crooked River	Reach 2—Landowners (within the District boundary who are not District patrons) divert up to 11.2 cfs along this reach.
Lytle Creek	Lytle Creek (RM 5.7) to confluence (RM 0.0)	Not Applicable	Crooked River	Operational spills from the District's Grimes Flat West lateral at RM 5.7 affects streamflow in this reach.

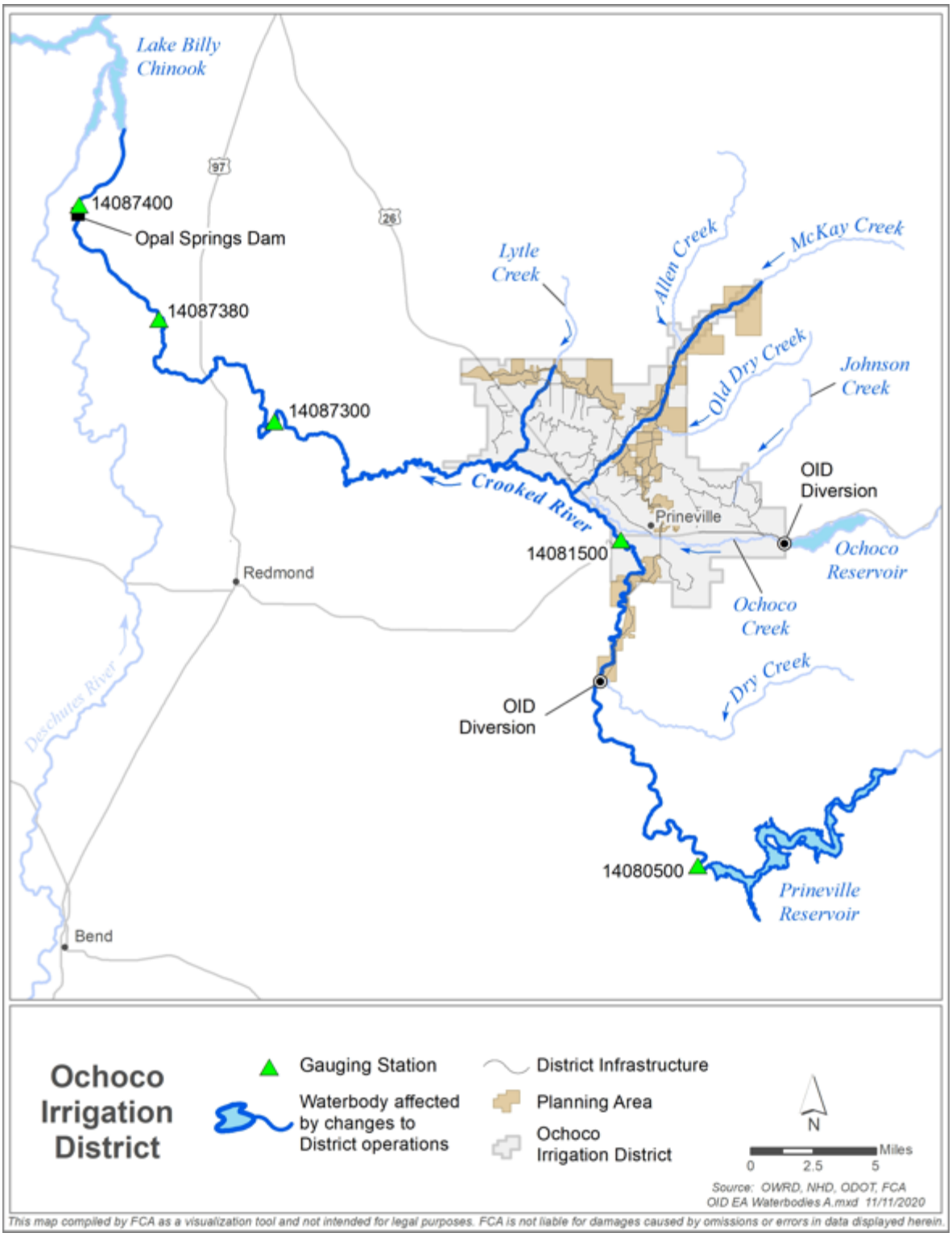


Figure 4-4. Waterbodies associated with district operations in the project area and locations of streamflow gauging stations.

4.8.1 Water Rights

4.8.1.1 District Water Rights

The District stores, diverts, and delivers water under multiple water rights with priority dates that fall primarily between 1869 and 1917[17] (Table 4-6.). This section discusses the water rights associated with the lands served by District infrastructure in the project area. Within the project area, these water rights allow the District to first divert live flow, when available, from the Crooked River, McKay Creek, and Lytle Creek. The District then supplements their live flow rights with up to 57,899 acre-feet of storage from Prineville Reservoir. During an average year, the District diverts approximately 31,717 acre-feet from the Prineville Reservoir/Crooked River system. The District holds no groundwater rights.

Prineville Reservoir is federally authorized for irrigation, hydropower, municipal, instream flows for fish and other aquatic species. The state has authorized the reservoir for multiple purposes, including instream flows for fish and wildlife.

During the irrigation season (February 1 through December 1),[18] water is released from Prineville Reservoir as necessary to supply the District's water rights. This water is conveyed from Prineville Reservoir and down the Crooked River to the District's diversion (RM 54.9).

[17] There is also a water right with the priority date of 1986.

[18] The District's active irrigation season is considered April 1 through October 31.

Table 4-6. OID Water Rights Associated with the Project Area.

Certificate	Source(s)	Priority Date	Uses	Start Date	End Date	Max Diversion Rate (cfs)	Duty
82246	Ochoco, McKay, Dry, Lytle, and Johnson Creeks and unnamed sources	8/10/1917	Irrigation, Industrial	2/1	12/1	209.7	4 acre-feet/acre
82247	Crooked River and Prineville Reservoir	4/8/1914	Irrigation, Supplemental Irrigation	2/1	12/1	190	4 acre-feet/acre
93660	Crooked River	4/8/1914	Storage-Mitigation, Irrigation, Fish and Wildlife	1/1	12/31	--	83,987 acre-feet
92200	Crooked River	4/8/1914	Storage-Irrigation	1/1	12/31	--	71,013 acre-feet
82249	Crooked River, Ochoco Creek and Springs, and McKay Creek	1869 to 1916	Supplemental Irrigation	2/1	12/1	59.93	4.0 acre-feet/acre

4.8.1.2 McKay Creek Water Rights Switch

To the north of the District, approximately 15 irrigators draw water directly from McKay Creek. Combined, these private irrigators have water rights amounting to 11.2 cfs. These users divert water from McKay Creek between RM 6.0 and RM 12.0, contributing to low streamflow during the irrigation season. The McKay Creek Water Rights Switch proposes to transfer these water rights instream and serve the appurtenant land with OID water, sourced from Prineville Reservoir. The Crooked River Collaborative Water Security and Jobs Act of 2014 (PL 113-244) modified the District's contract with Reclamation for Prineville Reservoir water to include 2,740 acre-feet of water annually to serve up to 685 acres on McKay Creek. The District may supply this water on an acre-per-acre basis contingent on the transfer of existing McKay Creek water rights to instream use.

Most McKay Creek irrigators have signed Letters of Intent outlining the basic elements of an agreement to participate in the McKay Creek Water Rights Switch, including the grant of pipeline easements and the proposed permanent instream transfer of their McKay Creek water rights contingent on the verification of full delivery of District water to their places of use. The Letters of Intent provide for the negotiation and execution of a legally binding Water Right Purchase Agreement prior to the implementation of the project.

4.8.2 Surface Water Hydrology

The project area and the waterbodies affected by District operations are within the Lower Crooked subbasin (Hydrologic Unit Code 8 #17070305). Hydrologic conditions in the basin have changed with construction and operation of reservoirs, dams, and diversions on the Crooked River and its tributaries. Water is now managed for irrigation use, resulting in lower flows downstream from reservoirs during the storage season (i.e., late fall, winter, and early spring), higher flows downstream from reservoirs during the irrigation season (April to mid-October), and lower flows downstream from irrigation diversions during the irrigation season.

The following sections summarize surface water hydrology in each waterbody associated with District operations in the project area (Table 4-5).

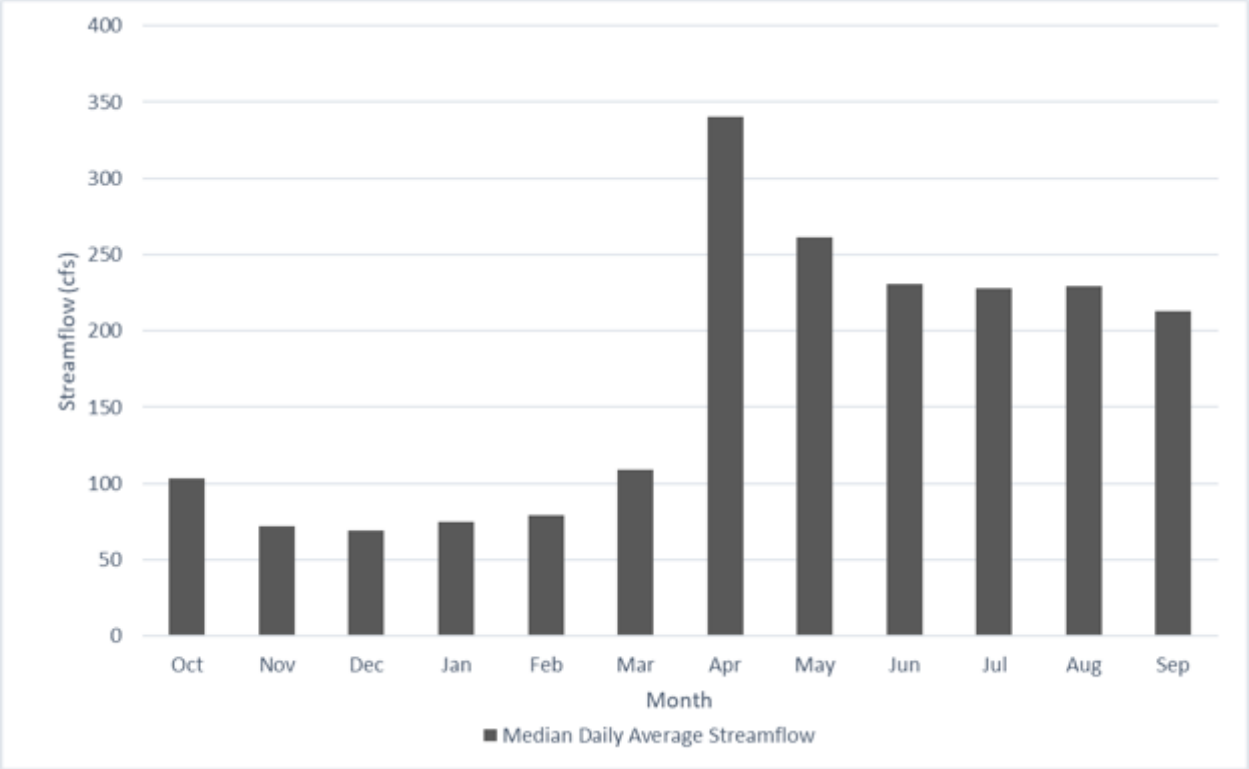
4.8.2.1 Prineville Reservoir

Prineville Reservoir is primarily fed by annual snowmelt, precipitation, and inflow from the Crooked River and smaller tributaries. The Reservoir has an active storage capacity of 148,640 acre-feet and is used for irrigation and flood control. Reclamation requires 60,000 acre-feet of storage space to be reserved for flood control between November 15 and February 15 each year. After February 15, the reserved space may be filled according to a fill rule curve developed by Reclamation and the U.S. Army Corps of Engineers (USACE) (OID 2012). All releases from Prineville Reservoir are gauged (Gauge No. 14080500) and the reservoir elevation is measured (Gauge No. 14080400).

4.8.2.2 Crooked River

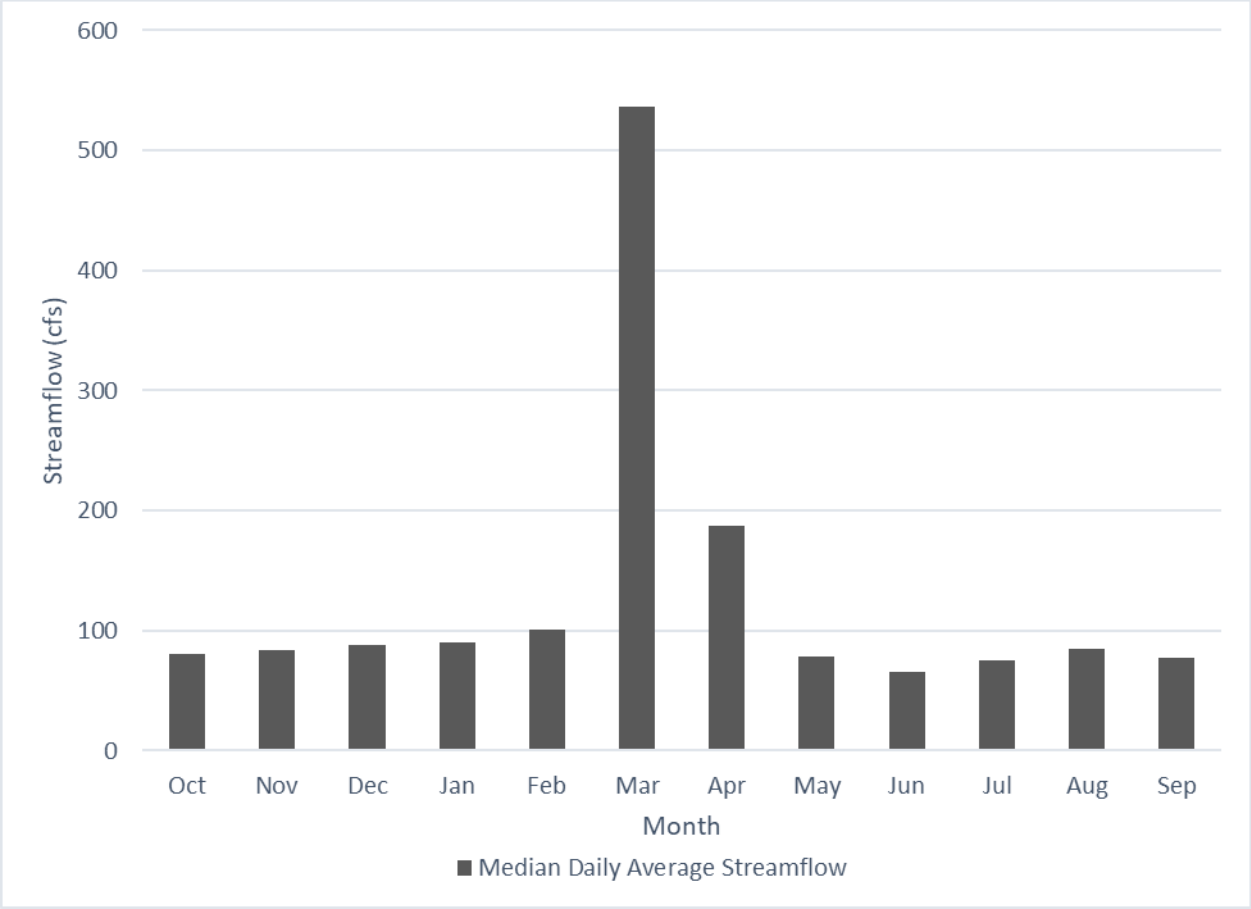
Reservoir releases, tributary inflows, irrigation diversions, and groundwater interactions drive streamflow in the reaches of the Crooked River between Bowman Dam (RM 70.0) and Lake Billy Chinook (RM 0.0). Prior to the construction of Bowman Dam, peak flows would occur with the spring snowmelt in April. Following construction, peak flow events have lasted longer and are more

frequent, beginning in March and decreasing in frequency into July (NRCS 2010; Figure 4-5, Figure 4-6, and Figure 4-7).



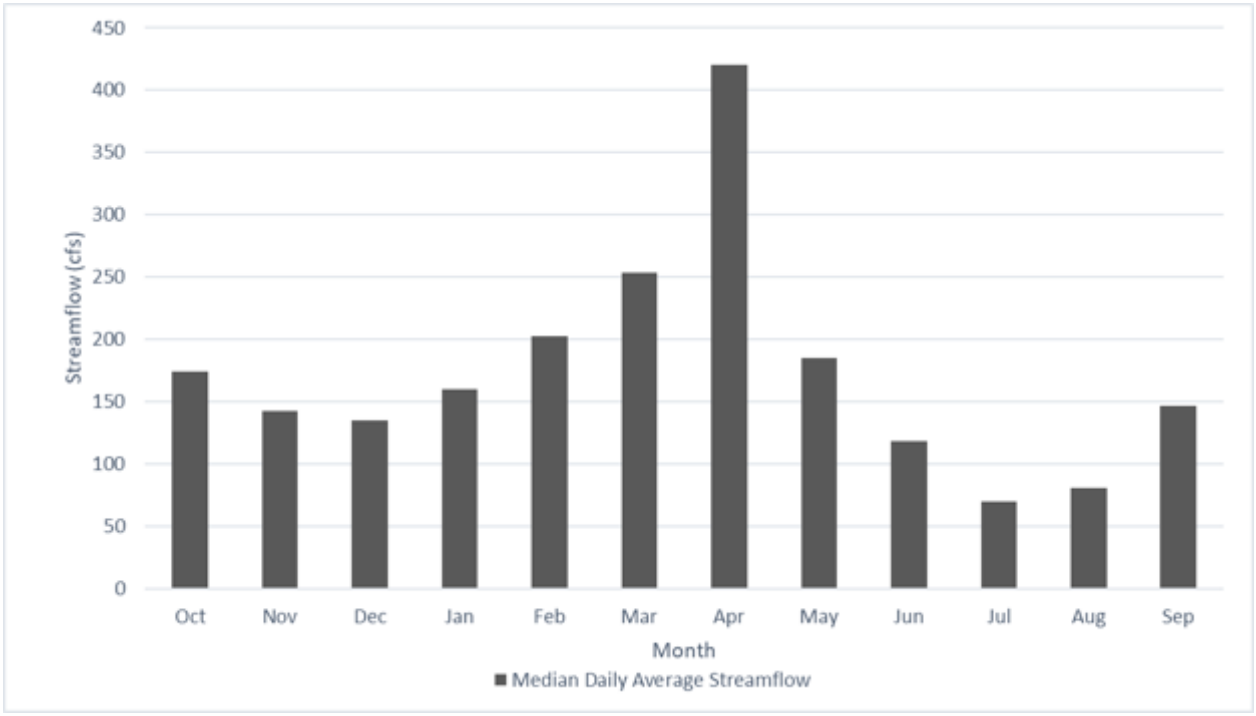
Notes:
Streamflow statistics represent data collected during water years 1998 through 2018.

Figure 4-5. Median daily average streamflow by month in the Crooked River below Prineville Reservoir at OWRD Gauge No. 14080500.



Notes:
Streamflow statistics represent data collected during water years 2015 through 2018.

Figure 4-6. Median daily average streamflow by month in the Crooked River at Prineville, Oregon at OWRD Gauge No. 14081500.



Notes:
Streamflow statistics represent data collected during water years 1993 through 2018.

Figure 4-7. Median daily average streamflow by month in the Crooked River near Terrebonne, Oregon at OWRD Gauge No. 14087300.

In 1990, Reclamation identified a 75 cfs minimum flow target for the Crooked River downstream from Prineville Reservoir during non-drought years and a 35 cfs flow target for drought years (CRWC 2002). In 2014, the Crooked River Collaborative Water Security and Jobs Act (PL 113-244) was signed into law. A section of this law authorizes and requires federal agencies to develop annual schedules to release stored water to benefit downstream fish and wildlife. Generally, it directs Reclamation to store in and release water from Prineville Reservoir according to that annual release schedule and to provide instream flows consistent with the recommendations included in the Deschutes Subbasin Plan (NPCC 2004).

Currently, in response to PL 113-244, there is a monthly coordination call between Reclamation, the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), Oregon Water Resources Department (OWRD), Oregon Department of Fish and Wildlife (ODFW), CTWS, the City of Prineville, and OID. Releases from Prineville Reservoir are set or updated each month on these calls, taking into account inflow to the reservoir, forecasts, and downstream need.

If federal agencies authorize the implementation of the Deschutes Basin Habitat Conservation Plan (HCP) (see Section 6.12.2.2), the streamflow schedules identified in the HCP would be in effect following that authorization (K. Gorman, personal communication, January 29, 2020).

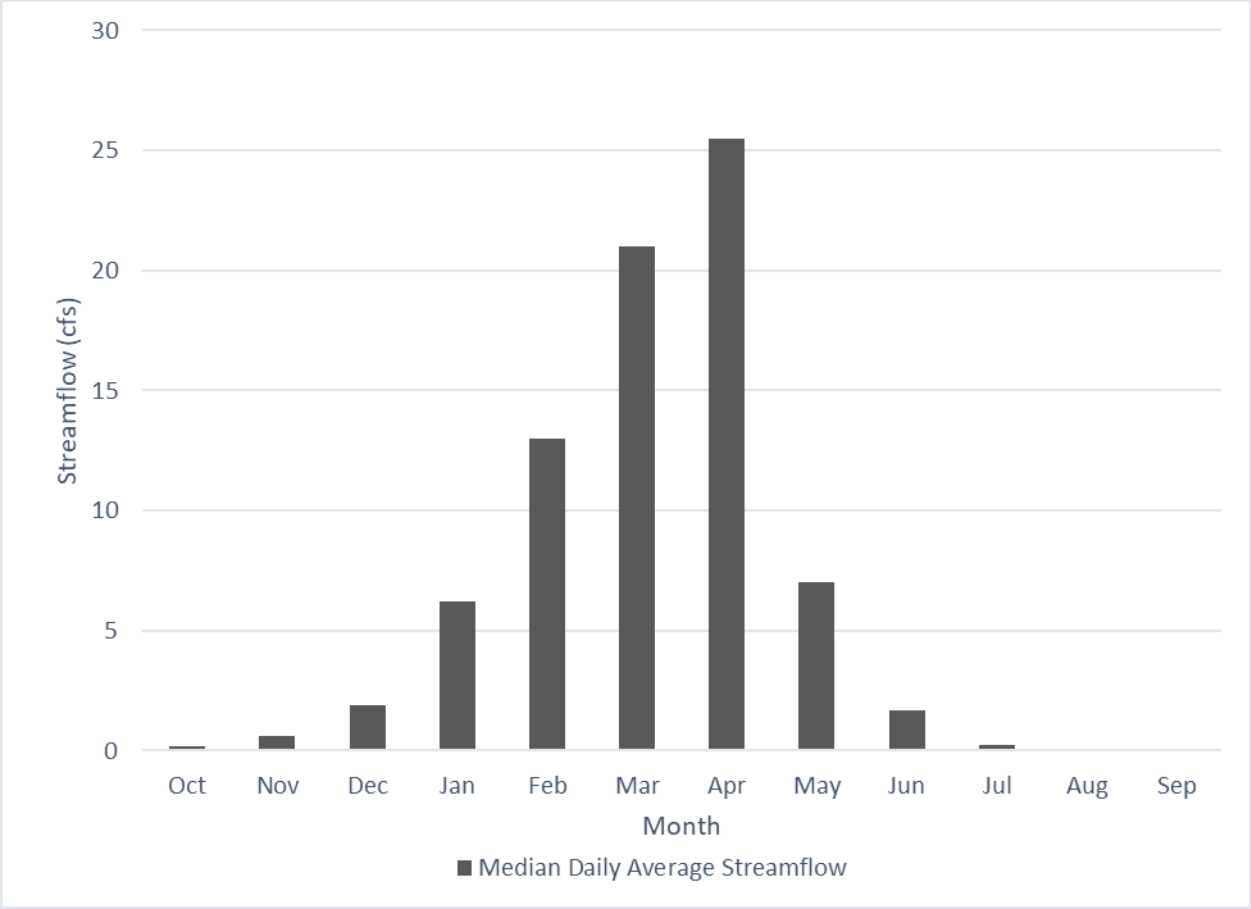
ODFW applied for an instream water right in this reach of the Crooked River under application IS-70354 in 1990. However, this water right was never issued by the State of Oregon.

The District diverts water for irrigation at the Crooked River Diversion (RM 54.9). This water can be live flow from Crooked River or water that has been stored in Prineville Reservoir and conveyed through the Crooked River. The District diverts an average of 31,717 acre-feet annually at this diversion. The District typically begins to divert water in mid-April and continues through October, with only light use in the final month. Downstream from the Crooked River Diversion, tributary inflows from Ochoco Creek, McKay Creek, Allen Creek, and Lytle Creek along with numerous minor intermittent and perennial streams, increase flows in this reach. In total, the Crooked River discharges an average of 1,131,000 acre-feet per year at Lake Billy Chinook (CWRC, 2008).

4.8.2.3 McKay Creek

McKay Creek, a tributary to the Crooked River, enters the Crooked River at RM 44.9 (Figure 4-4). The creek originates in the Ochoco Mountains and is fed by snowmelt, spring discharge, and tributary inflow. Allen Creek, a tributary to McKay Creek, joins McKay Creek in the project area at RM 8.3. McKay Creek and its tributaries provide more than 50 miles of stream habitat and drain about 103 square miles (R2 Resource Consultants, Inc. and Biota Pacific Environmental Sciences, Inc., 2013).

Over the past 100 years, flows in the McKay Creek have been altered due to irrigation withdrawals upstream of the District's boundary. Although quantitative data on streamflow is limited in this reach, recent efforts to restore flows have prompted limited studies to capture current conditions. OWRD Gauge No. 14085700, located on McKay Creek at Poppy Creek, measures streamflow upstream from the project area near the National Forest boundary. McKay Creek upstream from the project area follows a seasonal, snowmelt-dominated hydrograph (Figure 4-8). Streamflow at this gauge approximates streamflow entering the project area, with the understanding that several tributaries provide additional streamflow between the gauge and the project area and that irrigation diversions within the project area divert up to 11.2 cfs when its available during the irrigation season.



Notes:
Streamflow statistics represent data collected during water years 2009 through 2018.

Figure 4-8. Median daily average streamflow by month in McKay Creek above Poppy Creek near Prineville, Oregon at OWRD Gauge No. 14085700.

Mean monthly summer streamflow at OWRD Gauge No. 14086000, historically operated on McKay Creek downstream of Allen Creek and located within the project area, was measured at approximately 6 cfs (R2 Resource Consultants, Inc. and Biota Pacific Environmental Sciences, Inc., 2013). Monthly minimum streamflow can reach zero cfs at this gauge (R2 Resource Consultants, Inc. and Biota Pacific Environmental Sciences, Inc., 2013).

In the spring, when snowmelt and runoff are high, streamflow in the creek is elevated. During this time, the District diverts from McKay Creek at Jones Dam (RM 5.9) and other small tributaries, and to a lesser extent from Crooked River, Ochoco Creek, and their reservoirs. Flow in McKay Creek declines throughout the irrigation season, and the District correspondingly reduces its diversion rate from the creek as water becomes less available. The creek below Jones Dam, also serves as a conveyance method for return flows and operational spill from the District, providing the District with the opportunity to reuse water.

The District operates four operational spills and one drain into McKay Creek; however, only two of these operational spills are within the project area and would be affected by the project. The first of the two spills, the Ochoco Main Canal Spill is located at Jones Dam. Spills at this location occur throughout the irrigation season and release an average of 5 to 10 cfs into the creek (B. Scanlon, personal communication, July 28, 2020). The second of the two spills, the Crooked River Distribution Canal Spill at Reynolds, is located at RM 3.2. Spills at this location also occur throughout the irrigation season and release an average of 3 to 5 cfs into the creek.

ODFW has applied for and received two instream water rights on McKay Creek. These water rights include Certificate 73199 (shown in Table 4-7), on the upper reach, and Certificate 73200 (shown in Table 4-8), on the lower reach (Appendix E.6).

Table 4-7. Instream Water Right on the Upper Reach of McKay Creek

Instream Rate (cfs)											
Jan	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
5.64	14.6	17.3	17.6	10.9	3.27	0.59	0.19	0.19	0.26	0.82	3.16

Source: Water right Certificate 73199
Notes: The reach of the water right extends from Allen Creek (RM 8.3) to Little McKay (RM 14.7)

Table 4-8. Instream Water Right on the Lower Reach of McKay Creek[1]

Instream Rate (cfs)											
Jan	**Feb[2]**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
11	26/ 28.4	33.7	34.4	21.2	6.37	1.16	0.36	0.36	0.51	1.59	6.16

Source: Water right Certificate 73200
[1] The reach of the water right extends from the Mouth to Allen Creek (RM 8.3)
[2] February is split into two half-month intervals.

4.8.2.4 Lytle Creek

Lytle Creek is a tributary to Crooked River that enters the Crooked River at RM 41.8 (Figure 4-4). The District diverts water from Lytle Creek in the spring when water is available. Later in the irrigation season, the creek's flow is often intermittent. The District also uses Lytle Creek to convey return flows and operational spills. The District's operational spills occur at the Grimes Flat West Lateral (RM 5.7), Ochoco Main Canal (RM 5.0), Crooked River Distribution Canal (RM 3.0) and the Ryegrass Canal (RM 1.3).

4.8.2.5 Drainage Courses

The District does not allow its canal and lateral system to be intentionally utilized for stormwater management system due to concerns regarding the potential for contaminating irrigation water with pollutants picked up in stormwater. Portions of District's conveyance system, including portions of the Grimes Flat laterals, may intercept stormwater associated with overland flow in the area adjacent to the District's conveyance system. Any interception of stormwater is incidental to the purpose of conveying water for irrigation.

4.8.3 Surface Water Quality

The Oregon Department of Environmental Quality (ODEQ) maintains a list of all surface waters in the state that are considered impaired because they do not meet water quality standards under Section 303(d) of the Clean Water Act (CWA) (33 United States Code [U.S.C.] 1251 et seq.). The 2012 303(d) list is effective for CWA purposes. Waterbodies associated with District operations in the project area are included on Oregon's 303(d) list for not meeting state water quality standards for temperature, biological criteria, dissolved oxygen (DO), pH, and, E. Coli (Table 4-9).

Water management on the Crooked River, McKay Creek, and Lytle Creek has altered seasonal streamflow patterns, increasing streamflow above historic levels in some reaches and decreasing streamflow below historical levels in other reaches. Low streamflow affects water quality by exacerbating temperature and DO problems. The following sections describe existing 303(d)-listed impairments in the waterbodies associated with District operations.

Table 4-9. Impaired Waterbodies Associated with District Operations in the Project Area.

Waterbody Name	Listed Reach Associated with District Operations	Parameters Included on Oregon's 303(d) List
McKay Creek	RM 12.0 – RM 0.0	Temperature (year-round), E. Coli (summer), pH (summer)
Lytle Creek	RM 5.7 – RM 0.0	Temperature (summer)
Crooked River	RM 70.0 – RM 51.0	Biological Criteria (year-round), pH (summer), DO (year-round)
	RM 51.0 – RM 0.0	Biological Criteria (year-round), Temperature (summer), E. Coli (summer), pH (year-round), DO (year-round)

Source: ODEQ 2012

The open canals and laterals provide an opportunity for contaminants such as herbicides, pesticides, and animal wastes to enter the District's conveyance system. Any contaminants that do enter these laterals would be conveyed to patrons with their irrigation water and/or enter waterbodies associated with District operations in the project area through operational spills.

4.8.4 Groundwater

Groundwater resources associated with District operations are limited to resources in the area north of the Cooked River within the Lower Crooked River watershed.

As described in Section 4.2, the area surrounding the District boundary is closely connected with the geology of the John Day Ecological Province. The low permeabiltity of the John Day Ecological Province coupled with low precipitation of the Lower Crooked River watershed results in limited interchange between surface and groundwater. Rather than seeping into the ground, most precipitation runs off the landscape as surface water (AID et al. 2019).

The District is underlain by shallow, unconfined aquifers and a deeper artesian aquifer. Some of the water conveyed through irrigation canals is lost to seepage. It is generally thought that this water infiltrates into the shallow, unconfined aquifers moving towards Ochoco Creek and the Crooked River, and it may contribute to recharge of the deeper artesian aquifer (Robinson and Price 1963). Discharge from these aquifers generally occur at seeps and springs in or near the Prineville area (Robinson and Price 1963).

The District does not use any groundwater resources (i.e., pump groundwater) in its operations.

4.8.5 Ecosystem Services

Water associated with the Crooked River and McKay Creek provides the following ecosystem services:

- *Provisioning Service, Irrigation water* (Figure 4-1, [E1]): As described in Sections 1.3 and the following, water from the Crooked River is stored, conveyed, and diverted, affecting the Crooked River below Bowman Dam. Live flow is also diverted from McKay Creek. This water provides irrigation for food production, feed production, and maintenance of agricultural lands.
- *Regulating Service, Water quality* (Figure 4-1, [E3]): The amount of water instream impacts water quality including temperature, turbidity, sediment, and pollutants. In general, low streamflow challenges a waterbody's ability to resist warming because less water heats faster than more water. Because of this property, greater instream flow helps to keep water cool—an important factor for temperature-sensitive, aquatic species that live in these stream habitats (Section 4.9). Given pollutant input, less water also leads to a higher concentration of pollutants than does more water. Therefore, greater streamflow also helps to dilute pollutants. However, while increasing streamflow generally improves water quality, an increase in streamflow from operational spills can be counterproductive if the quality of water spilled is low. Open irrigation canals can collect contaminants, and they can become warmer than surrounding waterbodies due to low water volume in the canals. This provides a source for heat and contaminate transfer into waterbodies, resulting in lower stream water quality (Section 4.8.3).

4.9 Fish and Aquatic Resources

The affected environment for fish and aquatic species includes waterbodies that are associated with OID operations and the project area (Table 4-6.). These waterbodies include Prineville Reservoir, the Crooked River from Bowman Dam (RM 70.0) to its confluence with Lake Billy Chinook (RM 0.0), McKay Creek (RM 12.0) to its confluence with the Crooked River at RM 44.4, and Lytle Creek (RM 5.7) to its confluence with the Crooked River.

Since the development of agriculture in the late 1800s, the diversion of water, construction of reservoirs, addition of fish passage barriers, land drainage, and other activities have affected the aquatic environment in the Lower Crooked River watershed (Section 4.8.2). Low streamflow and

water quality impairments are still recognized as key limiting factors for fish populations in the basin (Section 4.8.3) (NMFS 2009).

The Lower Crooked River watershed, part of the Deschutes Basin, is part of 10 million acres of lands ceded to the United States by the CTWS. Under rights reserved by federal treaty, tribal members harvest salmon and steelhead from the rivers of the Deschutes Basin. Tribal fishing opportunity has become severely restricted because of low fish abundance due to fish passage barriers and the need to protect weak or threatened stocks (CTWS 2019). CTWS, ODFW, Portland General Electric, and local partners are actively engaged in efforts to recover fish populations through fish passage barrier removal, habitat restoration, hatchery supplementation, research and monitoring, and harvest management (ODFW and CTWS 2008).

4.9.1 General Fish and Aquatic Species

The District's canals do not support game fish, salmonids, or threatened and endangered aquatic species. Fish screens compliant with ODFW standards have been installed on all District diversions in waterbodies that support fish (AID et al. 2019). These fish screens separate water diverted for consumptive use from water left instream and prevent any fish from entering the District's irrigation conveyance system.

Fish and aquatic species documented in the waterbodies associated with District operations are listed in Appendix E.5, Table E-7.

Anadromous fish including, steelhead, Chinook salmon, and sockeye salmon were all historically distributed in waterbodies associated with District operations but were eliminated throughout the 20th Century by passage barriers and habitat limitations. Steelhead trout and Chinook salmon distributions were restricted in the Crooked River by the construction of Bowman Dam (RM 70.0) and creation of Prineville Reservoir in 1961, which do not provide for fish passage. In 1968, access to the Crooked River and Crooked River tributaries by steelhead, Chinook salmon, and sockeye salmon[19] was eliminated by the construction of the Pelton-Round Butte (PRB) Dam complex and creation of Lake Billy Chinook, which together provided ineffective fish passage. The non-migratory variant of sockeye salmon, kokanee, is resident in Lake Billy Chinook. Although the majority of kokanee spawn primarily in the Metolius River and tributaries, some kokanee migrate up the Crooked River to spawn below Opal Springs Dam (RM 6.7), another fish passage barrier constructed in 1985 (Marx 2003; ODFW 2019; AID et al. 2019).

Ongoing reintroduction efforts of anadromous fish prompted the construction of a new fish passage system for the PRB Dam complex. By 2010, the PRB passage barrier was reduced and fish returns of varying magnitude have been documented since 2011 (ODFW and CTWS 2008). Fish passage improvements at the PRB Dam complex have necessitated truck-and-haul methods of returning fish around the Opal Springs Dam barrier. The fish passage at Opal Springs Dam has been fully

[19] Sockeye salmon were indigenous to a portion of the Deschutes Basin. Historically, these fish returned to Lake Billy Chinook before migrating into the Metolius River and tributaries. Sockeye salmon typically did not migrate up the Crooked River to spawn and, therefore, will not be discussed further.

functioning since late 2019. It will assist in the restoration of anadromous fish to their historical distributions in the Crooked River and tributaries up to Bowman Dam.

Native redband trout and mountain whitefish are abundant in river reaches within the Lower Crooked River watershed. The 8-mile reach below Bowman Dam acts as a productive tailwater fishery[20] with favorable rearing conditions even during the hot, dry summer months.

In addition to fish, other aquatic species are potentially found within or along waterbodies that are associated with District operations. These other aquatic species include bullfrog (*Lithobates catesbeianus*), western toad (*Anaxyrus boreas*), Pacific treefrog (*Pseudacris regilla*), and long-toed salamander (*Ambystoma macrodacylum*). The western toad, Pacific treefrog, and long-toed salamander are native to Oregon and may be present in open irrigation canals and adjacent banks where there is suitable vegetation (S. Wray, personal communication, November 17, 2017). The bullfrog is an invasive species that was introduced to Oregon in the early 1900s. Bullfrogs are voracious predators that eat any animal they can swallow. These species of these amphibians are listed as species of least concern by the International Union for Conservation of Nature (IUCN 2019).

Three species of mollusks may be found in waterbodies associated with District operations: floater species mussels (*Anodonta spps.*), western pearlshell mussel (*Margaritifera falcata*), and western ridged mussel (*Gonidea 45ngulate*). Both the floater species and the western ridged mussel are currently ranked as vulnerable by IUCN (2019) and recognized as being "Species of Greatest Conservation Need" within the State of Oregon. The western pearlshell mussel is ranked as near threatened by IUCN (2019).

4.9.2 Federally Listed Fish and Aquatic Species

A list of fish and aquatic species protected under the ESA (16 U.S.C. 1531 et seq.), as amended in 1998, was obtained using the USFWS Environmental Conservation Online Information for Planning and Consultation (IPaC) System. IPaC indicated that two federally listed fish and aquatic species, bull trout and steelhead, are or may be found in the waterbodies affected by District operations within the project area (USFWS 2019). None of these species are known to occur within the irrigation canals and laterals within the project area.

USFWS lists bull trout as threatened under the ESA. Bull trout are known to be present in the Crooked River arm of Lake Billy Chinook upstream to the Opal Springs Dam (RM 7.0); since the completion of fish ladder at that site, 136 bull trout (between November 15, 2019, to August 1, 2020) have used the ladder to migrate upstream (M. Barry, personal communication, August 7, 2020). Designated critical habitat for bull trout occurs in the Crooked River from the Highway 97 bridge crossing (RM 18.0) downstream to Lake Billy Chinook (Appendix C, Figure C-3). The Primary Constituent Elements (PCEs) for bull trout describe habitat that has aquatic connectivity, complex habitat structure, water temperatures ranging from 2 degrees Celsius to 15 degrees Celsius, natural variability in streamflow, a sufficient food base, and the absence of non-native predatory and

[20] Large reservoirs typically develop steep temperature gradients with cold water stored at the bottom and warm water at the top. Tailwater fisheries occur at the outflow of large dams that constantly release cold, bottom water.

competing fish (70 *Federal Register* 56211, 2005). A detailed list of Critical Habitat PCEs for bull trout is provided in Appendix E.5.

Steelhead populations listed as threatened under the ESA are present within waterbodies affected by District operations within the project area (Appendix C, Figure C-4). However, the population in the Deschutes and Crooked rivers (Middle Columbia River steelhead) is classified as a non-essential experimental population under Section 10(j) of ESA and critical habitat is not designated (76 *Federal Register* 28715, 2011). Because of this classification, and because the non-essential experimental population is located outside of a National Wildlife Refuge System and a National Park System, the population is treated as "proposed for listing" under ESA Section 7 (76 *Federal Register* 28715, 2011; 81 *Federal Register* 33416, 2016).

4.9.3 State-Listed 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 rule (Oregon Administrative Rule [OAR] 635-100-0105) (ODFW 2017). There are no threatened, endangered, or candidate fish or aquatic species known to occur within the waterbodies associated with OID operations or in the irrigation canals and laterals within the project area.

4.9.4 Ecosystem Services

Fish and aquatic species in the Crooked River and McKay Creek provide the following ecosystem services:

- *Provisioning Service, Instream fish populations* (Figure 4-1 [E2]): The waterbodies associated with District operations support redband trout, mountain whitefish, and other game fish (Appendix E.5). There are ongoing efforts to reestablish steelhead in these waterbodies as well.

- *Culturally important fish 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). To many residents of Central Oregon, the conservation of anadromous fish and aquatic life has come to represent the restoration of the Crooked River ecosystem. In addition, members of the CTWS have fishing rights and rely on the Deschutes River fisheries for subsistence.

  Pacific salmon are a premier cultural icon of the West Coast, contributing to educational, recreational, and community values. Of particular importance are the contributions of Pacific salmon to native traditions and religious practices (Bottom et al. 2009). The Deschutes Basin is part of the ceded lands of the CTWS with usual and accustomed fishing stations. The Basin provides subsistence and ceremonial fisheries for tribal members under fishing rights reserved by their treaty with the U.S. Government (Treaty with the Tribes of Middle Oregon 1855, 12 Stats., 963., Ratified Mar. 8, 1859).

Salmon and steelhead populations have dwindled over the years because of impacts to habitat; however, CTWS has been working in the basin to rebuild these populations for conservation purposes and to provide consistent harvest opportunity (CTWS 2019; PGE 2015).

4.10 Wetlands and Riparian Areas

Wetland and riparian areas affected by District operations occur in the project area and the 84.7 miles of natural waterbodies associated with District operations in the project area (Table 4-5).

Wetlands perform a number of valuable functions including water storage, water filtration, and biological productivity. They can also support complex food chains that provide sources of nutrients to plants and animals and 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.

The USACE administers Section 404 of the CWA with the oversight of the U.S. Environmental Protection Agency (USEPA). This law regulates the dredge or fill of wetlands over which the USACE has jurisdiction.

Section 404 of the CWA defines wetlands as "those areas inundated or saturated by surface or groundwater 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" (USACE 1986).

The Oregon Department of State Lands (ODSL) implements the Removal-Fill Law (Oregon Revised Statute [ORS] 196.800-990), which regulates the removal or fill of material in wetlands or waterways, requiring any person who plans to "remove or fill" material within "waters of the state" to obtain a permit from ODSL.

Per the Oregon Removal-Fill statute OR 141-085-0515(9), an irrigation ditch is not jurisdictional under Oregon Removal-Fill permitting if it meets both of the following (ODSL 2013):

- The ditch is operated and maintained for the primary purpose of irrigation; and
- The ditch is dewatered[21] outside of the irrigation season except for isolated puddles in low areas.

On July 24, 2020, the USACE and USEPA signed a memorandum providing a clear, consistent approach regarding the application of the exemptions from the regulation under Section 404(f)(1)(C) of the CWA for the construction or maintenance of irrigation ditches and for the maintenance of

[21] "Dewatered" means that the source of the irrigation water is turned off or diverted from the irrigation ditch. A ditch that is dewatered outside of the irrigation season may be used for temporary flows associated with stormwater collection, stock water runs, or fire suppression.

drainage ditches. As defined in this memorandum, "irrigation ditch" is defined as a ditch that either conveys water to an ultimate irrigation use or place of use, or that moves and/or conveys irrigation water away from irrigated lands. Additionally, as proposed in the memorandum, should the irrigation ditch not occur in Waters of the United States, the proposed activity is not prohibited by nor regulated under Section 404 of the CWA.

Riparian areas are transition zones between waterbodies and adjacent upland areas that support hydrophytic vegetation that is dependent upon the hydrology of the waterbody. Riparian areas are defined by Section 404 of the CWA as "areas next to or substantially influenced by water. These may include areas adjacent to rivers, lakes, or estuaries" (USEPA 2015). Riparian areas are typically associated with high-water tables due to the close proximity to aquatic ecosystems, certain soil characteristics, and a range of vegetation that requires free water or conditions that are moister than normal (Oakley et al. 1985).

4.10.1 Wetland and Riparian Areas Along the Project Area

Water typically flows through the canals and laterals during the irrigation season (April through October). Water may also be present outside of the irrigation season as standing water following rain or snow events. Hydrophytic plants are sometimes found along the banks of the canals and laterals within the project area, or in adjacent low-lying areas outside of the project area, as the hydrology provided by the canals and laterals can create favorable growing conditions during a portion of the year; however, the canals are not classified as wetlands according to ODSL or USACE.

Through an analysis of the National Wetland Inventory[22] (NWI) geographic information systems data (USFWS 2016a) and aerial imagery, there were 42 potential sites identified as Freshwater Emergent Wetlands, Freshwater Forested/Shrub Wetland, or Riparian within or adjacent to the project area that could be affected by implementation of the proposed project. The NWI data is used as a first-step approach in identifying and evaluating potential wetlands in the project area; wetland determinations or delineations at these sites have not occurred at this time. Generally, project canals and laterals are not considered wetlands or Waters of the United States[23] by state or federal agencies; however, prior to project implementation consultation with ODSL and USACE would occur to determine exemption applicability to canals and laterals in the District.

4.10.2 Wetland and Riparian Areas Along Natural Waterbodies Associated with District Operations

Wetlands and riparian areas of varying size and quality are found within and sporadically adjacent to Prineville Reservoir and the 84.7 miles of Crooked River, McKay Creek, and Lytle Creek associated

[22] The NWI code uses the Cowardin classification system. For further information about Cowardin classifications, refer to *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979).

[23] Under the Navigable Waters Protection Rule (85 *Federal Register* 22250) effective June 22, 2020, irrigation ditches, which are otherwise excluded from the definition of Waters of the United States, can be considered tributaries and therefore subject to regulation if they relocate a tributary, are constructed in a tributary, or are constructed in an adjacent wetland as long as the ditch is perennial or intermittent and contributes surface flow to a traditional navigable water or territorial sea in a typical year.

with District operations. Low streamflow associated with upstream reservoir storage and irrigation withdrawal limits riparian vegetation and water accessibility to wetlands in these reaches. Because streamflow is strongly correlated with critical physical and biological characteristics of the river, it influences the functions of associated riparian areas (NRC 2002). As riparian areas become hydrologically disconnected from their adjacent stream channels with reduced streamflow, they lose many of their ecological functions.

4.11 Wildlife Resources

4.11.1 General Wildlife

Generally, wildlife present within OID's agricultural lands 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 species such as deer, elk, coyote, skunk, grey squirrel, raccoon, and red-tailed hawk (Blair 1996; Ditchkoff et al. 2006; McKinney 2002; and Shochat et al. 2006).

Wildlife within the project area may use the canal and lateral system as a water source and dispersal corridor. Additionally, where not cleared, vegetation along canals and laterals can provide food, cover, and breeding sites for many wildlife species throughout the year. Interaction between large ungulates and open canals sometimes results in wildlife injury or death if the animal falls into the open canal and is unable to find its way out (G. Jackle, personal communication, November 15, 2019).

4.11.2 MBTA/BGEPA Species

There are multiple bird species with the potential to occur within or close proximity to the project area, some of which are protected under the Migratory Bird Treaty Act (MBTA) or the Bald and Golden Eagle Protection Act (BGEPA). Although migratory birds are known to travel through the project area and its vicinity, limited habitat is provided within the project area and OID's ROW due to maintenance activities that remove vegetation on an annual basis.

USFWS maintains a database of known golden and bald eagle nesting sites. The Crooked River Diversion Canal and Crooked River Distribution Canal each have a section that is between approximately 0.2-0.5 mile from known golden eagle nesting sites (E. Weidner, personal communication, November 15, 2019). Early coordination with a USFWS biologist regarding MBTA/BGEPA species is ongoing (E. Weidner, personal communication, November 15, 2019). Appendix E.7 has a list of MBTA/BGEPA species potentially occurring within the project area.

4.11.3 Federally Listed Species

A review of available USFWS data showed that the gray wolf (*Canis lupus*) "is known or expected to be on or near the project area" (USFWS 2019). Although the gray wolf is listed as federally endangered throughout the species' range, which includes the project area, only two locations of known wolf activity occur in Oregon—the Rogue area in southern Oregon and areas surrounding La Grande in northeast Oregon. There is no known wolf activity in the project area; therefore, the gray wolf will not be discussed further (E. Weidner, personal communication, November 15, 2019; IPaC 2019). Federally listed aquatic species are discussed in 4.9.2.

4.11.4 State Listed 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 rule (OAR 635-100-0105) (ODFW 2019). There are no state-listed terrestrial wildlife species known to occur within the project area.

5 Alternatives

5.1 Formulation Process

The formulation of alternatives followed the CEQ's regulations for implementing NEPA and numerous USDA-NRCS watershed planning policies. Scoping comments were also incorporated into the formulation process of alternatives.

Many alternatives were initially considered. 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).

5.2 Alternative Eliminated from Detailed Study

The following subsection describes an alternative that met the formulation criteria but, after further consideration, was not analyzed in detail as a viable alternative. Alternatives that did not address the purpose and need for action, did not achieve the Federal Objective (Section 2) and Guiding Principles (Appendix E.9), or became unreasonable because of cost, logistics, existing technology, or environmental reasons are removed from consideration (NWPM 501.37; USDA 2017a).

5.2.1 Canal Lining

Canal lining the Grimes Flat laterals would involve covering the bottom and sides of the currently open laterals with a geotextile liner and shotcrete to prevent water from seeping into the underlying soils and rock. Canal lining would require sub-grade preparation, geotextile liner installation, and application of a layer of shotcrete to protect the geotextile liner across open canal and laterals.

Lining would increase water velocity in the canal and laterals because the shotcrete cover is a smoother surface than the existing underlying rock. This makes the sides of the canal and laterals slippery and more difficult for people in the water to grasp onto and climb out than earthen canals. To address public safety concerns caused by the installation of lining, safety ladders would be installed every 750 feet in channels deeper than 2.5 feet to provide the opportunity for human and animal escape.

The canal lining alternative would meet the project purpose of conserving water and improving public safety. Lining would reduce water loss from seepage during the irrigation season and fences and ladders would increase public safety. Water loss in an open, lined system is estimated to be 10 percent based on studies of canal lining (Swihart and Haynes 2002). Lined canals, however, are vulnerable to tears or cracks in the lining; seepage from torn or cracked lined canals is similar to that from unlined canals.

The lining materials would be expected to have a lifespan of 33 years before needing to be replaced. Before replacement, the system would likely require progressively increasing maintenance to account for lining cracks and tears as it aged.

The capital costs of canal lining were estimated based on the size of the existing open canal and laterals. Annual operating costs associated with canal lining were estimated based on OID's current operating budget, with a 25 percent increase in equipment, maintenance, and labor costs due to the relatively fragile nature of a lined canal compared to an unlined canal. The capital costs, replacement costs, and annual O&M costs for lining the Grimes Flat laterals was estimated at $35,356,000 (2019 dollars) over 100 years. This is $30,405,000 greater than the cost of the Preferred Alternative over 100 years. Based on this cost,[24] canal lining was eliminated from further study (see Appendix D for cost details). This alternative does not achieve the Federal Objective and Guiding Principles.

5.3 Alternatives Description

Of the project alternatives that were considered for OID's Infrastructure Modernization Project, two were selected for further evaluation and are discussed in the following sections. These alternatives include only OID-owned infrastructure.

5.3.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the District would continue to operate and maintain the existing canal and lateral system in its current condition. If District pumping stations experience operational issue or failure, the District would repair the problem to the extent that funds are available. This alternative assumes that modernization of the District's system would not be reasonably foreseeable to occur, as funding is not reasonably certain to be available. The No Action Alternative is a continuation of the District's standard operations and maintenance. The McKay Switch would not occur under the No Action Alternative.

The No Action Alternative would not meet the purpose and need. There would be no improvement to water loss from seepage in District infrastructure, water delivery reliability for farmers, or streamflow and habitat conditions for fish and aquatic species. Water delivery and operation inefficiencies would remain the same and potentially worsen over time. Since no water would be conserved or permanently allocated instream, the No Action Alternative would not achieve the Federal Objective to protect the environment. Similarly, because no water would be conserved, the No Action Alternative would not accomplish the Healthy and Resilient Ecosystem Guiding Principle that seeks to support resilient ecosystems that can respond to climate change, or the Sustainable Economic Development Guiding Principle that seeks to manage water resources sustainably to ensure water supply and water quality for present and future generations.

5.3.2 Modernization Alternative (Future with Federal Investment)

The Modernization Alternative is OID's desired alternative. The Modernization Alternative would update infrastructure and install new pumping stations essential to move water to McKay Creek and Grimes Flat irrigators in the northern section of the District and pipe the Grimes Flat laterals. The District has determined that this alternative is technically feasible and addresses the project's purpose and need (OID 2017). The project would be installed as three separate project groups.

[24] A cost estimate for renovation or replacement of the suspension bridge was beyond the scope of the SIP (OID 2017) and not included; therefore, it was not included in this cost estimate.

Under the Modernization Alternative, OID would pipe and upgrade District-owned turnouts[25] in two high priority areas: Grimes Flat laterals (Project Group 2) and the IronHorse section (Project Group 3) (Figure 5-1). Piping these laterals would save water previously diverted from the Crooked River by eliminating seepage, evaporation, and the operational spill into Lytle Creek from the Grimes Flat laterals. The saved water would be used to restore and protect instream flows and improve agricultural water supplies.[26] In the case of the IronHorse section, the District would realign the canal for piping and would decommission and backfill the currently sinuous canal path. Piping these laterals would also reduce the risk to public safety.

The Modernization Alternative would also include specific activities to implement the McKay Switch (Project Group 1). As part of the McKay Creek Water Rights Switch, private irrigators who currently pump water from McKay Creek would switch their source from live flow water from McKay Creek to Prineville Reservoir storage water and become patrons of OID.[27] McKay Creek irrigators would transfer their private, live flow McKay Creek water rights instream to McKay Creek.[28] Under the Modernization Alternative, the District would construct a pipeline to carry the new irrigation District water to the landowners and install a new 800-horsepower pump station (the Cox Pump Station) to lift and pressurize water for the new pipeline (Figure 5-1). The disturbance area for construction of the Cox Pump Station is expected to not exceed 100 feet by 150 feet (15,000 square feet).[29]

To accommodate the additional water being carried to new patrons along McKay Creek through OID's existing system, the Modernization Alternative would include the following activities to allow for greater conveyance capacity: raising the Crooked River Diversion weir; raising canal banks; installing canal geomembrane liners when necessary along portions of the Crooked River Diversion Canal, Crooked River Distribution Canal, and Ochoco Main Canal; and upsizing various infrastructure such as siphons and intakes (Figure 5-1).

[25] As necessary, each turnout would be modified with an appropriately sized tee from the mainline or lateral, a pressure relief valve, a gear-actuated plug valve (or gate or possibly butterfly valve in smaller turnout situations), a magnetic meter, a combination air and vacuum relief valve and associated hardware, and spool pipe segments (OID 2017).

[26] As described in Appendix E.6, Table E-8 the District expects to save up to 4.9 cfs (2,080 acre-feet/year) through piping the Grimes Flat laterals and would allocate up to 3.8 cfs (1,613 acre-feet/year) instream. The District expects to save and allocate instream up to 1.02 cfs (432 acre-feet/year) from piping the IronHorse section.

[27] The Crooked River Collaborative Water Security and Jobs Act (PL 113-244) specifically allocated Prineville Reservoir storage water for the McKay irrigators.

[28] Following the transfer of water rights instream to McKay Creek, the District would allow this water to pass their diversions as described in the Draft Deschutes Basin Habitat Conservation Plan Measure CR-3: McKay Creek Flow (AID et al. 2019). This allowance would be applicable only to McKay Creek instream water rights that would be junior to the District's 1916 McKay Creek water right. Instream water rights that would be senior to the District's 1916 McKay Creek water right would not be subject to appropriation by the District under the prior appropriation doctrine and Oregon water law.

[29] Disturbance area includes the footprint in which construction would occur. Staging and entrance areas are not included in estimate.

As mentioned in Section 1.3, pumps are essential to lifting and moving water across the District to patrons. In addition to the new Cox Pump Station, the District would install three variable frequency drive booster pumps that would be essential to lifting and carrying water for McKay, Grimes Flat, and many other irrigators across the District. The Crooked River Pump Station No. 1 would be a 2,150-horsepower pump station with a 63-inch discharge pipe; disturbance area for construction is not expected to exceed 115 feet by 180 feet (20,700 square feet).[30] Crooked River Pump Station No. 2 would be a 1,850-horsepower pump station with a 63-inch discharge pipe; disturbance area for construction is not expected to exceed 120 feet by 135 feet (16,200 square feet).[30] Crooked River Pump Station No. 3 would be a 250-horsepower pump station with a 24-inch discharge pipe; disturbance area for construction is not expected to exceed 60 feet by 60 feet (3,600 square feet).[30] The new pumps would enable the District to provide water efficiently and reliably (Figure 5-1). All of the new pumps would be equipped with meters to measure their electricity use.

Construction of the Modernization Alternative would occur over the course of 3 years. Construction would occur predominantly during the non-irrigation season (November through March), with construction beginning as early as the 2021 non-irrigation season.

[30] Area referenced includes area for constructing the new pump station and decommissioning the old infrastructure. All referenced area identified occurs within the existing site disturbance footprint.

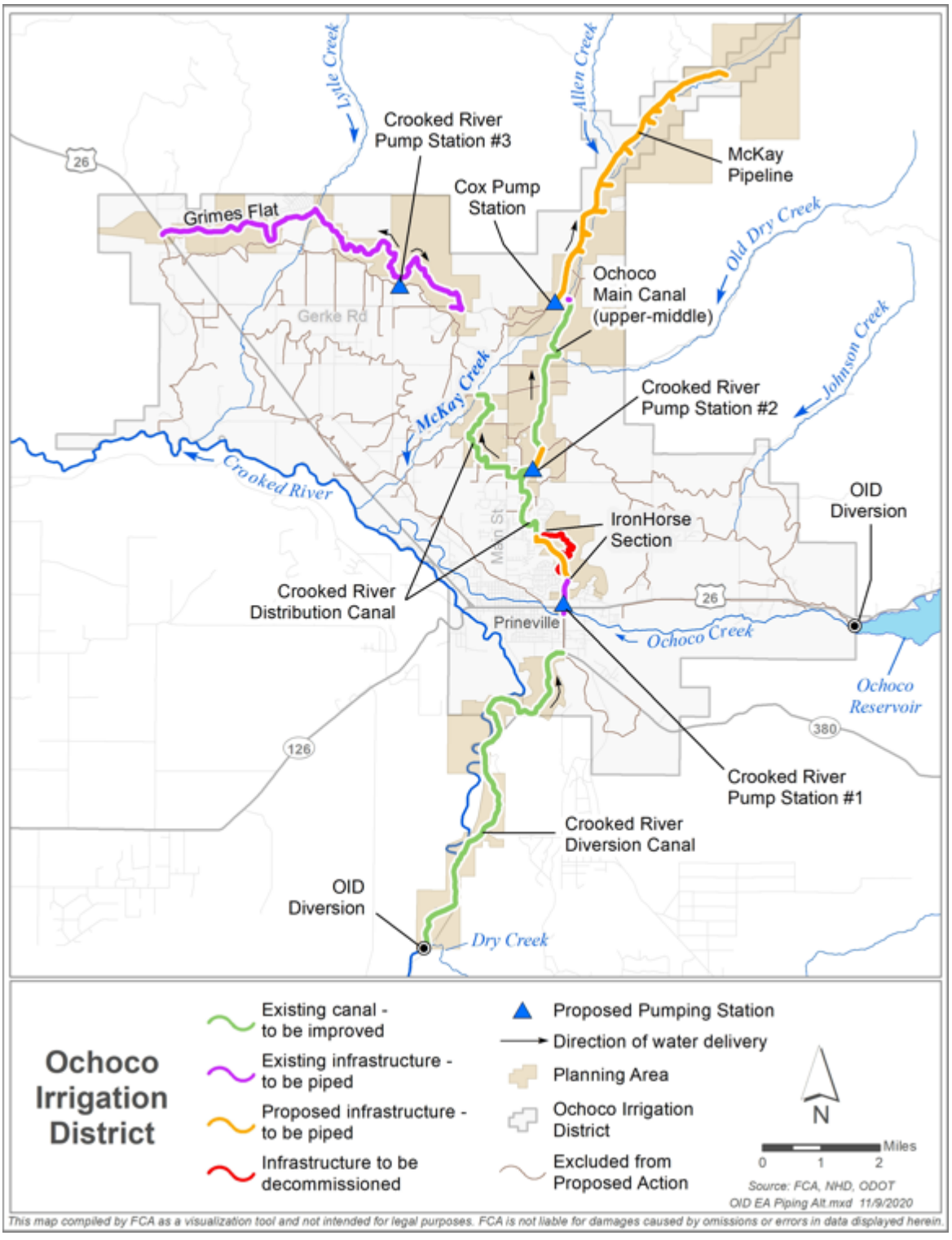


Figure 5-1. Overview of the Modernization Alternative for the Ochoco Irrigation District Infrastructure Modernization Project.

Construction of the Grimes Flat, IronHorse, and McKay pipelines would include mobilization and staging of construction equipment, delivery of pipe to construction areas, excavation of trenches, fusing of pipelines, placement of pipe, compaction of backfill, and restoration and reseeding of the disturbed areas. OID's existing maintenance roads would be used during construction when possible. Pipe installation would require storage areas for pipe, construction equipment, and other materials. Areas that have been previously disturbed would be used when possible. No fence currently exists along the open laterals of Grimes Flat or IronHorse section, and the District would not install a fence as part of the Modernization Alternative.

Where landowners would grant new easements,[31] the most direct route possible would be used to access the construction area and as-built surveys would be created to attach to new easements following pipeline installation. To facilitate restoration, any temporary travel routes would be left in their natural condition, with only minimal alteration when necessary to allow travel during construction.

Construction of the pump stations associated with the Modernization Alternative would include grading and preparing the site for raising the pump station buildings, concrete construction, masonry, installing the pumping equipment (including discharge piping and valves), establishing motor controls and building electrical systems for instrumentation, constructing utility poles, and interconnecting the station to the nearby utility grid. Crooked River Pump Stations No. 1, No. 2, and No. 3 would be located immediately adjacent to the existing stations (Figure 1-2), and the existing stations would be decommissioned. The Cox Pump Station would be erected on private land to the east of N McKay Creek Rd.[32]

Construction related to increased canal capacity and bank heights would include staging of construction equipment, delivery and compacting earth material, and welding canal geomembrane liners if necessary.

Actions to raise the Crooked River Diversion weir would likely include temporary coffer damming of the river on a side by side basis to accommodate construction and installation of a welded steel weir extension above the existing weir from bank to bank. Coordination with permitting agencies would occur prior to implementation.

Within OID's ROW and easement, vegetation clearing before construction, vegetation and weed management during construction, and reseeding after construction would be completed according to OID's current vegetation management practices, Reclamation vegetation guidance, and NRCS'

[31] Most McKay Creek irrigators have signed Letters of Intent outlining the basic terms and conditions, including the grant of pipeline easements and the proposed permanent instream transfer of their McKay Creek water rights resulting from the implementation of the McKay Creek Water Rights Switch. The Letters of Intent provide for the negotiation and execution of a legally binding Water Right Purchase Agreement prior to the implementation of the project. Most McKay Creek irrigators have given consent for the development of new easements, however, easements have not yet been secured (N. Bellis, personal communication, January 27, 2020).

[32] The District and Deschutes River Conservancy are currently working to secure an easement with the landowner. The easement would be secured prior to construction (N. Bellis, personal communication, September 30, 2020).

Oregon and Washington Guide for Conservation Seedings and Plantings (NRCS 2000). During construction, vegetation clearing would be minimized to the extent practicable. Trees would only be removed if there were no other alternative to access the construction site or they posed a safety threat to construction crews working in the canal or lateral trench. The area where new McKay pipeline would be installed consists mostly of upland vegetation, and after construction, the area would be recontoured and reseeded in accordance with OID's vegetation management program and NRCS Oregon and Washington Guide for Conservation Seedings and Plantings (NRCS 2000). In some cases, the pipeline would be covered with crops.

Operations and maintenance under the Modernization Alternative would consist of an ongoing pipe inspection program that would systematically cover the entire system over a period of several years (most likely a 10-year cycle). During the irrigation season from April through October, work would be performed on an as-needed basis. Outside the irrigation season, OID would perform system component maintenance and/or repairs to District meters, valves, and air and vacuum infrastructure.

The District's and Reclamation's ROWs and easements currently allow access to District operated canals, laterals, and pipelines for operations and maintenance. These ROWs and easements would not change under the Modernization Alternative, and the proposed action would not allow for additional access along District operated canals, laterals and pipelines.

The following describes the extent to which the Modernization Alternative would meet the purpose and need and how the Modernization Alternative contributes to the sponsors' objectives and the Federal Objective and Guiding Principles:

- Increase water delivery reliability to irrigators: Modernizing the system infrastructure would improve irrigation water delivery reliability for Grimes Flat and McKay Creek irrigators. This alternative would improve operational efficiencies to ensure that irrigators receive the water they need at the time they need it and eliminate the need to spill excess water. Under this alternative, the District would retain 23 percent of the saved water to support water delivery reliability. The remaining 77 percent would be allocated instream. Additionally, McKay Creek irrigators incorporated into OID would now receive water based on the District's typical season. This change would mean their irrigation season could be extended by up to four months in some years.

- Enhance streamflow and habitat conditions for fish and aquatic species: This alternative would increase streamflow by up to 11.2 cfs and enhance habitat conditions for fish and aquatic species in McKay Creek (RM 0.0 to RM 12.0) by implementing the McKay Switch. This alternative would also increase streamflow and improve aquatic habitat conditions in the Crooked River by creating instream water rights through the State of Oregon's Allocation of Conserved Water Program when piping Grimes Flat and the IronHorse section. The District would permanently protect up to 4.82 cfs (2,046 acre-feet/year) instream in the Crooked River (RM 70.0 to the mouth of Lake Billy Chinook at RM 0.0) during the irrigation season, legally reducing its water right by this amount of conserved water. The District would permanently protect the conserved water instream following completion of the project and verification and measurement of the total water savings. Streamflow and habitat conditions along the Crooked River and McKay Creek would benefit incrementally.

- Improve water conservation: This alternative would reduce water loss from canal seepage, evaporation, and operational spills in the Grimes Flat laterals and IronHorse section. This would result in an estimated annual savings of 2,512 acre-feet/year.

- Reduce O&M costs: Piping Grimes Flat laterals and the IronHorse section would eliminate the need to inspect, repair, and remove obstructions from these areas. Piping would also reduce the District's costs associated with in-canal aquatic herbicide treatment in this area.

- Reduce risk to public safety: This alternative would reduce the risk to public safety by piping high priority canals in the Grimes Flat laterals and IronHorse section. General development in the surrounding areas and proximity to a school makes these sections of OID's system a public safety concern.

In addition, the Modernization Alternative achieves the Federal Objective to protect the environment by increasing and protecting streamflow in the Crooked River and McKay Creek. By improving operational efficiencies and reducing operational spills in Lytle Creek, thereby improving water quality in the Crooked River, the Modernization Alternative achieves the Federal Objective and Guiding Principle of sustainable economic development. Lastly, this alternative also achieves the Guiding Principles of Healthy and Resilient Ecosystems by contributing to a more resilient ecosystem in the face of a changing climate.

The estimated installation cost for the Modernization Alternative is $29,556,000. With additional project administration and technical assistance costs, the total project cost would be $30,788,000.[33]

[33] The Modernization Alternative was priced using HDPE as the piping material. Appendix D.4 provides more information on other piping materials (steel and polyvinyl chloride) that were considered. The availability of piping materials, prices, and new products change over time. At the time of project implementation, a different piping material could be selected if the material (1) would meet the NEE requirements; (2) meet construction requirements; and (3) result in no change or a minor change to project effects described in Section 6 of this Plan-EA, as determined through the tiered decision. framework approach outlined in Section 1.4. The NRCS State Conservationist would possess the final discretion to select the appropriate piping material.

5.4 Summary and Comparison of Alternatives

Table 5-1 compares the No Action/Future without Federal Investment (Alternative 1) and the Modernization Alternative (Alternative 2). The table summarizes measures addressed as well as environmental, social, cultural, and economic effects.

Table 5-1. Summary and Comparison of Alternative Plans.

Item or Concern	Alternative 1 No Action (Future without Federal Investment)	Alternative 2 Modernization (NEE Recommended)
Alternative Plans		
Locally Preferred		✓
National Economic Efficiency (NEE)		✓
Socially Preferred		✓
Environmentally Preferred		✓
Guiding Principles Check marks indicate that the Guiding Principles (Appendix E.9) have been met		
Healthy and Resilient Ecosystems		✓
Sustainable Economic Development		✓
Floodplains		✓
Public Safety		✓
Environmental Justice		✓
Watershed Approach		✓
Provisioning Services		
Irrigation water	No effect. Irrigation water would continue to be unreliable for patrons.	Piping, pressurization, new pump stations, and District infrastructure upgrades would help provide more secure and reliable irrigation water for patrons.

Item or Concern	Alternative 1 No Action (Future without Federal Investment)	Alternative 2 Modernization (NEE Recommended)
Instream fish species	No effect. Resident and anadromous fish populations would not be affected. Harvest of anadromous fish would be available only when runs are sufficiently large to sustain fishing.	4.82 cfs (2,046 acre-feet/year) of water allocated and protected instream in the Crooked River and approximately 11.2 cfs transferred instream to McKay Creek would help improve habitat for resident and anadromous fish species and would assist in the recovery efforts. Bolstering anadromous fish populations may allow for more consistent fishing for harvest and consumption.
Regulating Services		
Water quality	No effect. Instream water would continue to be warmer than State standards and low-quality water from operational spills would continue to contribute pollutants and warm water to the Crooked River and McKay Creek.	4.82 cfs (2,046 acre-feet/year) of water allocated and protected instream in the Crooked River and approximately 11.2 cfs transferred instream in McKay Creek would help to improve water quality in these reaches. These changes would help to improve pH, DO, and water temperature toward ODEQ's acceptable criteria in these reaches and, potentially, downstream affected waterbodies.
Cultural Services		
Culturally important species	No effect on habitat supporting populations of culturally important fish species. Habitat limitations for culturally significant anadromous fish would continue to affect fishing, community, health, cultural identity, subsistence, and religious tribal values.	4.82 cfs (2,046 acre-feet/year) of water protected instream in the Crooked River and approximately 11.2 cfs transferred instream to McKay Creek would help improve culturally important fish and aquatic species habitat and populations. Improving populations would benefit cultural values such as tribal and religious values and bequest values.
National Economic Efficiency Analysis		
Installation Costs		
Federal PL 83-566	$0	$23,061,000
Local only or Matching PL 83-566	$0	$7,727,000
Total	$11,869,000	$30,788,000

Item or Concern	Alternative 1 No Action (Future without Federal Investment)	Alternative 2 Modernization (NEE Recommended)
Project Group 1		
Average Annual Cost		
Installation[1]	$0	$398,000
Other[2]	$0	$86,000
Total	$0	$484,000
Annual Benefits	$0	$525,000
Annual Costs	$0	$484,000
Annual Net Benefits[3]	$0	$41,000
Project Group 2		
Average Annual Cost		
Installation[1]	$0	$316,000
Other[2]	$0	$0
Total	$0	$316,000
Annual Benefits	$0	$331,000
Annual Costs	$0	$316,000
Annual Net Benefits[3]	$0	$15,000
Project Group 3		
Average Annual Cost		
Installation[1]	$0	$157,000
Other[2]	$0	$0
Total	$0	$157,000
Annual Benefits	$0	$275,000
Annual Costs	$0	$157,000
Annual Net Benefits[3]	$0	$118,000
[1] The Modernization Alternative Average Annual Cost is the additional average annual installation costs above the No Action Alternative Average Annual Cost. [2] Average Annual Cost "Other" includes District pumping, groundwater pumping, and carbon emissions. [3] Annual Net Benefits shown for the Modernization Alternative are the additional net benefits compared to the No Action Alternative.		
Regional Economic Impacts		
Annual Local Jobs during Construction	20	110

Item or Concern	Alternative 1 No Action (Future without Federal Investment)	Alternative 2 Modernization (NEE Recommended)
Annual Jobs from Recreation	Not Applicable	Magnitude/direction of recreation visitation impacts not known, so no Rural Economic Development (RED) benefits quantified.
Annual Jobs from Agriculture (including direct/indirect/induced)	20	25
Beneficial Effects Annualized[1] (Millions, 2019$)		
Region	$1.0	$1.5
Rest of Nation	Some ripple income/employment effects expected, but not estimated.	Some ripple income/employment effects expected, but not estimated.
Adverse Effects Annualized[2] (Millions, 2019$)		
Region	Not Available	-$0.6
Rest of Nation	Not Applicable	$0.9

[1] Beneficial effects include only those related to labor income, and do not include the net economic benefits quantified in the NEE.
[2] Note that this includes only direct costs (no indirect/induced costs are included). Negative adverse effects indicate that the region will receive benefits (i.e., a cost savings).

6 Environmental Consequences

This section evaluates the environmental consequences of the No Action Alternative and the Modernization Alternative. The beneficial and adverse effects of the two alternatives on each resource identified 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 used to categorize and define the range of expected effects.

6.1 Cultural Resources

6.1.1 No Action (Future without Federal Investment)

The District's ongoing O&M activities are not expected to affect historic or archaeological resources because these activities are expected to occur in previously disturbed areas.

6.1.2 Modernization Alternative (Future with Federal Investment)

NRCS would consult with State Historic Preservation Office (SHPO) for the proposed action by providing a project description and a map identifying the Area of Potential Affect. The District would hire a cultural resource specialist to complete surveys for archaeological resources and built environment historic resources in the project area. Specifically, the new McKay Switch alignment would require a below ground survey for archaeological resources. Existing canals and laterals would require both above-ground and below-ground surveys by a cultural resources specialist who meets Secretary of Interior Professional Qualification Standards (36 CFR 61).

The Ochoco Main Canal is documented as eligible for listing in the National Register of Historic Places /contributing resources that contribute to the site's significance in the project area (Section 4.1). If other eligible resources are documented by the cultural resource specialist, consultation would occur between the District, NRCS, SHPO, THPO, and consulting parties including affiliated tribes to determine the effect on such resources and identify appropriate mitigation if that becomes necessary. Mitigation measures[34] would be identified and formalized before construction and completed concurrent with or after construction. The potential cost of mitigation for effects on cultural resources is included in the project cost.

If archaeological resources are inadvertently discovered during construction, an Inadvertent Discovery Plan would be followed (Appendix E.8). Construction would stop in the vicinity of the discovery; the area would be secured and protected; a professional archaeologist would assess the discovery; consultation with SHPO, THPO, and NRCS cultural resources staff would occur as appropriate; and consulting parties including affiliated Tribes and Advisory Council on Historic

[34] Based upon previous mitigation measures implemented by other districts in the Deschutes Basin, if mitigation were to be required it could include, but not limited to, actions such as working with the historic society to create a board with documentation and photos of the canal and laterals, which would be available at the District's office and on the District's website, and creating a sign and kiosk.

Preservation would be notified and have the opportunity to comment. Continuation of construction would occur in accordance with applicable guidance and law.

Through the use of minimization and mitigation, as required by state and federal law, any effects on cultural resources would not exceed a moderate threshold.

6.2 Land Use

6.2.1 No Action (Future without Federal Investment)

The No Action Alternative would have no direct effect on land use or land ownership within the project area or on lands served by canals and laterals in the project area. Ecosystem services of water for irrigation would not be affected (see Section 6.14).

6.2.2 Modernization Alternative (Future with Federal Investment)

In segments of the project area with existing District infrastructure, all construction would occur in the District's and Reclamation's existing ROW or easements and adjacent landowners would be notified prior to the start of construction. Within segments of the project area where open canals would be converted to pipes, any ground that was disturbed and the newly covered pipes would be reseeded with a mix of native grasses and forbs. There would be negligible effects on these segments as land use would continue to be used for the conveyance of irrigation water.

Prior to construction, the District would obtain all necessary easements and agreements to build new infrastructure and realign pipe segments across patrons' lands. In the segment of the project area where a new pipe alignment and pump station would be built to serve irrigators that are part of the McKay Switch, the District would secure a new easement for the pipe and pump station. Similarly, the District would secure new easements where the pipe realignment would occur for the IronHorse section. During construction of new pipe alignment, there would be short-term effects as trenches are dug to lay the pipe. Once pipe was laid, the trench would be backfilled and best management practices (BMPs) would be followed to return the land to its previous use. There would be minor effects on land use in these segments because although there would be changes to how land is used, it would be consistent with ownership, easements, and ROWs.

Under the Modernization Alternative, 1.9 miles of currently open canals in the IronHorse section of the project area would be backfilled and covered with earth, as water would now be running through the new realigned piping. Enclosing the open canal would enhance access to adjacent land as well as provide an opportunity for future development. This would result in a long-term moderate effect on land use in this segment because, in this localized area, the way land is used would shift from water conveyance to a land development opportunity.

Implementation of the Modernization Alternative would support existing zoning designations and existing agricultural land use. Ecosystem services of water for irrigation would be supported through the improvement of delivery infrastructure (see Section 6.14). During and after construction of the Modernization Alternative, there would be no direct effect on agricultural land use in the project area or served by project canals and laterals. Construction would take place outside the irrigation season, causing no interruption to water deliveries or long-term change in the agricultural land use.

Increased water delivery reliability would have beneficial indirect effects on agricultural land served by the project, as it would reduce farmers' water uncertainty and increase their resiliency.

Overall, based on the project-related effects on land use described above, NRCS has determined that the Modernization Alternative would result in negligible to moderate effects over the long-term.

6.3 Public Safety

6.3.1 No Action (Future without Federal Investment)

Under the No Action Alternative, 100 percent of existing canals and laterals would remain open and the risk of drowning and injury would remain unchanged. In some areas, the risk of drowning, flooding, and other serious accidents would increase as residential development and population grows and surrounds more of the District.

6.3.2 Modernization Alternative (Future with Federal Investment)

During construction, vehicle and heavy equipment traffic would enter and leave the project area. Construction traffic could interact with motor vehicles, pedestrians, and bicyclists traveling through the project area. Standard safety protocols and BMPs would be followed during construction to minimize any risk to public safety; therefore, a minor, short-term effect on public safety is anticipated during construction.

Over the life of the project, the Modernization Alternative would minimize the risk of drowning in open Grimes Flat laterals and the IronHorse section because these areas would be piped. This action would result in beneficial effects on public safety for these areas. The District would continue to prohibit public access along the Grimes Flat laterals. If the public illegally accessed the piped areas, the public safety risk to private landowners and adjacent properties would be expected to be consistent with the general landscape and surrounding areas.

The additional water volume conveyed for McKay Creek irrigators, diverted from the Crooked River at OID's diversion and conveyed north, would have a minor to moderate effect on the risk to public safety in canals remaining open. The additional water volume conveyed would cause an increase in water velocity and an increase in water depth in the canals, however, these changes would likely not be noticeable to the public. In some cases, canal banks would be raised to accommodate Reclamation freeboard[35] standards. However, because the canals would remain earthen, opportunities to find footings would be easier than with a lined canal. Public access would continue to be prohibited (per the existing ROW) in these areas. Similar to the No Action Alternative, risk of serious accident would increase in areas of the District that experience greater residential development and population growth despite prohibited access.

Overall, the Modernization Alternative would have a beneficial effect on public safety at the Grimes Flat laterals and IronHorse section that would be converted from open canal to pipe. In segments of the project area where the District would raise canal banks along open canals, there would be a

[35] Freeboard refers to the distance between the water surface and the top of the canal.

minor to moderate, long-term impact to public safety because higher banks, increased water velocity, and increased water depth could make exiting the canals more challenging. The bank raises would occur along only a proportion of the open canals and laterals to be improved rather than along the full, minimizing the increase in risk and keeping the effect localized. In the segments of the project area where the canals would remain open and unaltered, the impacts of the Modernization Alternative would be the same as those described in the No Action Alternative.

6.4 Socioeconomic Resources

To estimate the total economic impacts of the proposed project in terms of jobs and income supported, this analysis uses a 2017 IMPLAN economic impact model of Crook County, linked through multi-regional analysis to Deschutes and Jefferson counties to include ripple effects of spending in those two counties.[36]

6.4.1 No Action (Future without Federal Investment)

For the No Action alternative, the total economic activity supported by agricultural production in the area served by Project Groups 1 and 2 (McKay Switch and Grimes Flat areas) is estimated at approximately 20 jobs (approximately 15 jobs in agriculture and an additional 5 jobs in other economic sectors) and $0.8 million in average annualized income ($0.5 million in agricultural income and an additional $0.3 million in income in other sectors benefiting from agricultural expenditures and income). In addition, due to anticipated pump replacement in Project Years 3 through 10, the no action also is anticipated to result in economic activity associated with pump maintenance and installation.

The no action construction expenditures of $15.4 million (for pump O&M and pump replacement during Years 3 through 10) would support construction sector jobs and income in Crook County, as well as economic ripple effects increasing jobs and income in other economic sectors in Crook, Deschutes, and Jefferson counties. Economic ripple impacts would result from the construction sector spending more on labor, materials, and services, which would spur increased sales and economic activity in other sectors (such as hardware stores and construction equipment businesses supplying construction businesses). Impacts of construction sector spending in these other sectors are known as indirect impacts. As household income rises in construction and indirectly impacted economic sectors, household spending will also increase and generate increased economic activity in such sectors as retail, wholesale trade, personal services industries, and real estate (known as induced impacts). Total job and income impacts of the economic activity supported by the proposed Project are the sum of the direct impacts (construction sector) and the indirect/induced impacts (in other economic sectors).

The $15.4 million in construction expenditure is spread over 8 years, supporting approximately 20 jobs and $2.6 million in average income during each year of the 8-year period (annualized over 103

[36] Total construction expenditures were modeled in IMPLAN Construction Sector 57, construction of new commercial structures, including farm structures.

years[37] this equates to approximately $0.2 million in annualized average income benefits from construction, as shown in the table). Of the impacts during the 8-year period, approximately 20 jobs and $2.1 million in annual income are in the construction sector (direct impacts) while the remaining 5 jobs and $0.5 million income are in other sectors.

6.4.2 Modernization Alternative (Future with Federal Investment)

6.4.2.1 Rural Economic Development

The Modernization Alternative construction expenditures of $31.5 million would also support construction sector jobs and income in Crook County, as well as economic ripple effects increasing jobs and income in other economic sectors in Crook, Deschutes, and Jefferson counties. The $31.5 million in construction expenditure is spread over 3 years, supporting approximately 110 jobs and $6.1 million in average income in each year of the 3-year construction period (annualized over 103 years[38] this equates to approximately $0.5 million in annualized average income benefits from construction, as shown in the table). Of the impacts during the three year construction period, approximately 80 jobs and $4.7 million in annual income are in the construction sector (direct impacts) while the remaining 30 jobs and $1.4 million income are in other sectors.

The Modernization Alternative also is expected to result in increased agricultural production due to increased water supplies that are expected to result in full crop irrigation of the approximately 685 acres in the McKay Switch project area that under no action would only have one cutting of hay (instead of three cuttings of hay), as well as avoided damages to agricultural production associated with possible pump failure over the next ten years. With this benefit, the average annual total economic activity supported by agricultural production in Project Group 1 (McKay Switch and Grimes Flat) is estimated at approximately 25 jobs (approximately 15 jobs in agriculture and an additional 10 jobs in other economic sectors) and $1.0 million in average annualized income, as shown in the table above ($0.7 million in agricultural income and an additional $0.3 million in income in other sectors benefiting from agricultural expenditures and income).

The Modernization Alternative would also result in reduced Operations, Maintenance, and Repair (OM&R) expenses for OID and its patrons. However, there are not anticipated effects on District wages and employment. Reduced OM&R and pumping costs may largely result in an income transfer between OID patrons, OID staff, and the local construction/repair/electricity sectors. As such, there are expected to be limited RED effects of this reduced expenditure (i.e., less than the rounding margin of error) so effects are not quantified in this RED analysis. To the extent that increased flows enhance recreation and support additional recreation visitation and spending in Crook County, the long-term, positive regional economic contribution of the project would be much larger, and vice versa.

[37] Note that each project has a 100-year life, but that since construction takes 3 years, benefits extend out to year 103, so the analysis period is 103 years.

[38] Note that each project has a 100-year life, but that since construction takes 3 years, benefits extend out to year 103, so the analysis period is 103 years.

6.4.2.2 National Economic Efficiency Benefits

A NEE benefit cost analysis has been performed to evaluate the benefits of the Modernization Alternative (Appendix D). This evaluation includes an identification of the No Action economic damages and an estimation of the NEE benefits of the alternatives to the identified problems (the Modernization Alternative). The analysis uses NRCS guidelines for the evaluation of NEE benefits as outlined in the Economic and Environmental Principles and Guidelines for Water Related Land Resources Implementation Studies, and NRCS' Natural Resources Economics Handbook.

6.5 Soils

6.5.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the continued operation of the District's conveyance system would have no effects on soils. Ongoing erosion of open canals and maintenance along the District's irrigation system would have minor effects on soils.

6.5.2 Modernization Alternative (Future with Federal Investment)

Under the Modernization Alternative, soils would be disturbed, vegetation would be cleared, and backfilling and grading would occur in the project area. Clearing, compaction, and construction would increase soil erosion and sedimentation potential. BMPs would be implemented to minimize erosion and contain runoff onsite, and they could include silt fencing; straw wattles; geotextile filters; and applying water to disturbed soils to prevent wind erosion (Section 8.3.4). Impacts from the construction of the Crooked River Diversion weir would be minor and short-term and minimized by implementation of BMPs (Section 8.3.6).

During the construction of pipelines, canal improvements, and pump stations, soils adjacent to canals and soils within the surrounding area of the pump stations would be impacted due to construction equipment access and staging. Existing maintenance roads and access routes commonly used for O&M would be used when possible.

Canal improvements would occur where necessary along 15.2 miles of existing canal in the project area to support new water conveyance for the McKay Switch. When possible, earth material from past canal cleanout operations would be used to raise the necessary canal banks. Excavation for the new pipe alignment (outside of existing canals) would occur along 6.6 miles for the McKay Pipeline, which parallels McKay Creek Road, and 1.2 miles for IronHorse pipeline realignment. Where topsoil is excavated, it would be segregated and saved for placement on top after trenches are filled.

After construction, the new McKay, Grimes Flat, and IronHorse pipelines would be buried, and all disturbed areas would be re-contoured and planted with a seed mix of native grasses and forbs in consultation with NRCS.

Along most of the project area, effects on soil resources would be short-term and minor because BMPs would be implemented (Section 8.3.4). The effects on soil resources would only occur in a relatively small portion of the larger project area and only during the construction period. While building the McKay Creek and IronHorse pipelines, impacts to soils would be short-term and

moderate along 6.6 miles and 1.2 miles of the project area, respectively, where excavation for new pipe alignment would occur. Effects at this location would also be minimized through BMPs.

6.6 Vegetation

6.6.1 No Action (Future without Federal Investment)

Under the No Action Alternative, there would be no effect on vegetation associated with open irrigation canals and laterals or to adjacent native upland vegetation.

Ecosystem services provided by vegetation in the project area would not be impacted by the No Action Alternative.

6.6.2 Modernization Alternative (Future with Federal Investment)

6.6.2.1 General Vegetation

Construction of the Modernization Alternative would have a minor, short-term effect on vegetation in the project area. Vegetation would be cleared in some areas where new pipe is installed, banks are raised, the new pump building is erected, or access for construction equipment is necessary. Disturbance would occur over a small proportion of the District, and BMPs designed to minimize effects on vegetation, such as revegetating with native grasses and forbs in consultation with NRCS, would be implemented (BMPs are identified in Section 8.3).

When trenching for pipe placement in existing canals and laterals or in new pipeline areas, existing maintenance roads within the ROW would provide access to most of the project area. Given that the pipe segments would be installed in 40- or 50-foot lengths, some temporary travel routes within the ROW would be necessary along canals and laterals that are not accessible by existing roads. Selection of construction areas adjacent to canals and travel routes would consider existing vegetation and avoid mature trees to the extent practicable. Herbaceous, shrub, and woody vegetation along the canals, laterals, turnouts, and new alignments would be temporarily disturbed through activities such as clearing, crushing, and digging.

After pipeline construction, the project area would be re-contoured and planted with a seed mix of native grasses and forbs. Planting would be done in consultation with NRCS. Vegetation within the ROW would return to an upland type, such as was present prior to the construction of the canal. Some trees that are dependent upon the canal for water may not survive the construction of the Modernization Alternative.

In the long-term, native vegetation would be gained because 10.1 miles[39] of open canals and laterals would be piped, covered with topsoil and seeded. A double track dirt access/maintenance trail would be maintained for District access. Over the project's life, vegetation within the ROW would be maintained according to OID's vegetation management program and NRCS Oregon and

[39] 10.1 miles of open canal would be filled and reseeded, of that, 8.2 miles would be piped, filled, and reseeded, and the remaining 1.9 miles would be decommissioned; 8.01 miles of the proposed project would be within a new alignment, which is currently either farmland or upland vegetation and would be returned to its previous condition.

Washington Guide for Conservation Seedings and Plantings (NRCS 2000). Trees would not be allowed to establish above the buried pipe because roots may interfere with future O&M activities.

In segments of the project area that would remain as open canal, the fringe of opportunistic hydrophytic vegetation that line the canals would be disturbed where canal banks are raised. This vegetation does not function as habitat and is in place due to infrastructure and maintenance activities.

Little vegetation would be disturbed during the construction of Crooked River Pump Stations Nos. 1, 2, and 3. These pump stations would be built on graveled areas adjacent to existing pump stations.[40] Vegetation would be disturbed during construction of the Cox Pump Station; however, impacts would be minimized through implementation of BMPs (Section 8.3).

Consideration of the project effects described above indicates that the Modernization Alternative would result in short-term minor effects due to vegetation disturbance in localized areas and long-term benefits due to vegetation gain.

6.6.2.2 Noxious Weeds

Soils exposed during construction would create temporarily susceptible areas where weeds could establish themselves. The movement of construction vehicles could provide opportunities to transport weeds to new locations. During construction, the contractor would utilize BMPs such as avoiding unnecessary ground disturbances and using erosion control measures that are free of weeds and weed seeds to ensure that any effects do not exceed a moderate threshold.

In the project area where piping would occur, the Modernization Alternative would have a long-term beneficial effect on noxious weed reduction. This would occur because there would no longer be an opportunity for aquatic noxious weeds to be washed to other areas of the District. Growth of aquatic moss would also be eliminated in piped areas, reducing the need for in-water herbicide treatment. Non-piped sections would still have the same issue with at the aquatic moss as exists currently. During O&M, weeds would be managed according to the protocol in NRCS' Oregon and Washington Guide for Conservation Seedings and Plantings (NRCS 2000).

In the short term, the Modernization Alternative would not exceed a moderate impact threshold and would result in long-term benefits.

6.7 Visual Resources

6.7.1 No Action (Future without Federal Investment)

Under the No Action Alternative there would be no effect on visual resources.

[40] Land under Crooked River Pump Station No. 1 is U.S. owned and managed by Reclamation. Reclamation owns the easements for Crooked River Pump Stations Nos. 2 and 3.

6.7.2 Modernization Alternative (Future with Federal Investment)

Under the Modernization Alternative, construction activities would be visible to anyone adjacent to the project area. Vegetation would be cleared within the project area in some areas where pipe is installed, the new pump building is erected, or access for construction equipment is necessary. There would be minor, short-term effects on visual resources because the construction activities would draw attention to the setting. However, similar large equipment is used in agricultural work and in canals maintenance and is therefore not an uncommon feature in the landscape. Construction would be scheduled in the winter off-season during daytime hours, and the BMPs discussed below would further minimize any visual disruptions.

After construction, in segments of the project area that would remain open canal, the banks would be higher, and the open canal would not be as visible. The bank raises would not make the District infrastructure any more visible or noticeable than it already is and would not substantially change the existing views of the landscape. In segments of the project area where open canals would be converted to pipe, the disturbed areas, including the newly buried pipes, would be planted with a seed mix of native grasses and forbs in consultation with NRCS. The view of the open canals and laterals would change from an open channel (with or without water depending on the season) to a corridor of native upland vegetation. In the segment of the project area that consists of the new lateral alignment, the area would be recontoured to match the landscape and replanted to match prior conditions. There would be a negligible, long term effect on visual change because any visual changes would be localized and not contrast with the existing landscape.

There would be no visual effects on the three pump stations where the new pumps would be installed; the installations would be similar to the existing modified landscape. The Cox Pump Station that would be constructed under the Modernization Alternative, would be a permanent fixture in the landscape. The building and station would be similar in appearance to other pump stations throughout the District and would be fenced per Oregon Department of Transportation requirements. BMPs, such as the use of muted or matching colors for permanent visible equipment and the building exterior, would further reduce visual contrast.

Overall, the visual change from the conversion of canal to buried pipe, the raising of canal banks, and the construction of the Cox Pump Station would be expected to have a negligible to minor, long-term effects because visual changes would be localized and either blend in with or not dominate the existing landscape. This visual change and effects would be included in Section 106 consultation, as it pertains to the historic viewshed.

6.8 Water Resources

6.8.1 No Action (Future without Federal Investment)

6.8.1.1 Water Rights

6.8.1.1.1 DISTRICT WATER RIGHTS

Under the No Action Alternative, OID would maintain its existing water rights. Water in the Grimes Flat laterals and the IronHorse section would continue to be lost to seepage and evaporation. This water would continue to be neither available for agricultural production in the

District nor as protected streamflow in the Crooked River and McKay Creek. There would be no effect on District water rights.

6.8.1.1.2 McKay Creek Water Rights Switch

Under the No Action Alternative, there would be no effect on the private water rights held by McKay Creek irrigators. Agricultural producers would continue to divert up to 11.2 cfs from McKay Creek under these water rights. Without the Modernization Alternative, the McKay Switch would not occur, McKay Creek irrigators would not receive water from Prineville Reservoir, McKay Creek irrigators would continue to maintain and use their McKay Creek water rights for irrigation, and McKay Creek water rights would not be transferred instream.

6.8.1.2 Surface Water Hydrology

Under the No Action Alternative, there would be no effect on waterbodies associated with District operations in the project area nor would there be an effect on drainage courses in the project area. The District would continue to divert water at the same rates and volumes as it has previously, no additional water would be protected instream, and the operational spill along the Grimes Flat West lateral would continue to be used.

6.8.1.3 Surface Water Quality

The No Action Alternative would have no effect on surface water quality in the waterbodies associated with District operations in the project area (see Table 4-9). These waterbodies would continue to be included on Oregon's 303(d) list for not meeting temperature, biological criteria, DO, pH, and E. Coli water quality standards. Contaminants could continue to enter the Grimes Flat laterals and the IronHorse section. Operational spills along the Grimes Flat West lateral would continue to occur, likely contributing nonpoint source pollutants into Lytle Creek and downstream waterbodies.

6.8.1.4 Groundwater

The No Action Alternatives would have no effect on groundwater. Water lost to seepage in the Grimes Flat laterals and the IronHorse section would continue to infiltrate into the shallow, unconfined aquifers and may contribute to the deep artensian aquifer and/or move towards Ochoco Creek and the Crooked River (Robinson and Price 1963).

6.8.1.5 Ecosystem Services

The No Action Alternative would not affect ecosystem services associated with water resources (Section 4.8.4).

6.8.2 Modernization Alternative (Future with Federal Investment)

6.8.2.1 Water Rights

6.8.2.1.1 District Water Rights

Under the Modernization Alternative, piping the Grimes Flat laterals and IronHorse section would eliminate evaporation and seepage loss, which would make approximately 2,046 acre-feet/year[41] of water available for conservation instream (OID 2017). Following construction of the Modernization Alternative, OID would create permanent instream water rights for approximately 2,046 acre-feet/year in the Crooked River through Oregon's Allocation of Conserved Water Program (ORS 537.470). If applied at a consistent rate across the practical irrigation season, an instream water right of 4.82 cfs would be created. The new instream water right would be met with live flow when live flow would be sufficient to meet the 4.82 cfs. Live flow would be supplemented with stored water released from Prineville Reservoir when live flow would not be sufficient to meet the 4.82 cfs. The conserved water would be protected instream incrementally following the completion of each project group.

Following the completion of each project group, OID would work with OWRD and its partners to verify and measure all water savings prior to creating instream water rights. The District would not apply for any additional out-of-stream water rights under this alternative. See Appendix E.6 for more information on the methodology used to establish these numbers.

6.8.2.1.2 McKay Creek Water Rights

Following completion of Project Group 1 of the Modernization Alternative, the McKay Switch would be implemented. Irrigators along McKay Creek between RM 12.0 and RM 6.0 would receive water delivered from Prineville Reservoir. The 11.2 cfs of McKay Creek irrigators' water rights would be transferred instream and permanently protected in McKay Creek and the Crooked River. These water rights would be permanently protected instream under Oregon water law (ORS 537.348 and 540.505-540.585) from the original points of diversion, located between RM 12.0 and RM 6.0, to the confluence with the Crooked River. These water rights would also be protected in the Crooked River from RM 44.9 at the mouth of McKay Creek, to RM 0.0 at Lake Billy Chinook.

The Crooked River Collaborative Water Security and Jobs Act of 2014 (PL 113-244) modified the District's contract with Reclamation for Prineville Reservoir water to include 2,740 acre-feet of water annually to serve up to 685 acres on McKay Creek. The District would supply this water on an acre-per-acre basis following the transfer of existing McKay Creek water rights to instream use. Water supplied would be sourced from Prineville Reservoir, providing irrigators along McKay Creek with more water security throughout the irrigation season.

The water rights transferred to instream use in McKay Creek through the proposed action would be a mixture of rights junior and senior in priority to the McKay Creek water rights held by the District for out-of-stream use. Following the transfer of these water rights instream to McKay Creek, the District would allow the junior water rights restored instream in McKay Creek to pass its senior

[41] The estimated volume of conserved water is calculated using the average loss (5.92 cfs for both the Grimes Flat laterals and the IronHorse section) minus the water to be used for District operations (1.1 cfs) multiplied by the number of days in an average irrigation season (214 days) and multiplied again by 1.9835 (acre-feet/day conversion rate).

water diversion at RM 5.9 and remain instream (AID et al. 2019).[42] Any senior water rights would not be subject to appropriation by the District under the prior appropriation doctrine and Oregon water law.

6.8.2.2 Surface Water Hydrology

The Modernization Alternative would have long-term, beneficial effects on surface water hydrology in waterbodies associated with District operations (Table 4-5 in Section 4.8.2) as a result of increased streamflow during the irrigation season. Effects on individual waterbodies are identified below.

6.8.2.2.1 *PRINEVILLE RESERVOIR*

While the District would allocate the water saved from piping the Grimes Flat laterals and the IronHorse section instream, this change would not affect Prineville Reservoir levels. Prior to the proposed action, the District would have released this water, as the dam's operator, from the reservoir for irrigation use. Following the proposed action, the District would release this water from the reservoir for instream use.

Following the completion of the McKay Creek Water Rights Switch, the District, as the dam's operator, would release, divert, and convey up to 2,740 acre-feet of additional Prineville Reservoir storage water annually to irrigators on McKay Creek. Prineville Reservoir has an active capacity of 148,640 acre-feet, of which the District holds 57,899 acre-feet of water rights for irrigation. Using an additional 2,740 acre-feet of water allocated to McKay Creek Water Rights Switch would have a negligible effect on Prineville Reservoir levels.

6.8.2.2.2 *CROOKED RIVER*

The Crooked River would see long-term beneficial effects as a result of the Modernization Alternative.

Implementation of the Modernization Alternative would eliminate canal seepage in both the Grimes Flat laterals and the IronHorse section, which would affect the associated groundwater discharge into the Crooked River and its tributaries (see Section 6.8.2.4 for information on the effects on groundwater).

As a result of water conserved by piping the Grimes Flat laterals and the IronHorse section, the District would permanently protect up to 2,046 acre-feet of water instream from Prineville Reservoir (RM 70.0) through Lake Billy Chinook (RM 0.0)[43] during the District's practical irrigation season (April 1 through October 31) each year. Even without the proposed project, this water would have

[42] This allowance would be applicable only to McKay Creek instream water rights that would be junior to the District's 1916 McKay Creek water right. However, OID and Deschutes River Conservancy expect that all McKay Creek water rights transferred instream (up to 11.2 cfs) would be protected against all diverters for the length of McKay Creek to its confluence with the Crooked River (N. Bellis and B. Scanlon, personal communication, November 11, 2020). If other senior water rights holders in the Crooked River were to divert the water restored instream through the McKay Switch, their diversion would decrease the magnitude of the beneficial effects of the Preferred Alternative on water resources.

[43] This project would not alter the minimum streamflow requirements that North Unit Irrigation District complies with downstream from its pumps in the Crooked River.

been released into the Crooked River for Grimes Flat and IronHorse irrigators; therefore, this transfer of instream water rights would not affect streamflow between Bowman Dam (RM 70.0) and the District's diversion (RM 54.9). If the conserved water were applied at a consistent rate across the season,[44] 4.82 cfs of conserved would be released from Prineville Reservoir, pass the District's diversion (RM 54.9), and be protected to Lake Billy Chinook (RM 0.0). The conserved water from piping the Grimes Flat laterals and the IronHorse section would be protected instream incrementally following the completion of each project.

In order to serve the McKay Creek irrigators participating in the McKay Switch, Reclamation would release up to an additional 2,740 acre-feet from Prineville Reservoir (RM 70.0),[45] as described in the Crooked River Collaborative Water Security and Jobs Act of 2014, during the District's practical irrigation season. This volume of water would be released from Prineville Reservoir (RM 70.0) and conveyed through the Crooked River to the District's diversion (RM 54.9) at a rate of 6.45 cfs, if it were released at a consistent rate across the season. The District would divert this 6.45 cfs for delivery to McKay Creek irrigators in addition to the water that it would normally divert to serve its current patrons (which would decrease due to the conservation associated with piping the Grimes Flat laterals and the IronHorse section).

In practice, the rate of stored water released from Prineville Reservoir and conveyed through the Crooked River may vary depending on irrigation demands. The District's conveyance system would be operationally designed to allow for a release from Prineville Reservoir of a maximum instantaneous rate of 16 cfs for delivery to McKay Creek irrigators. However, this maximum rate would rarely be released and this Plan-EA assumes that, following the implementation of the Modernization Alternative, water would be protected instream or conveyed through this reach at a consistent rate during the irrigation season. Following that assumption, the average increase in streamflow in this reach of the Crooked River, downstream from Prineville Reservoir (RM 70.0) to the District's diversion (RM 54.9), would be 6.45 cfs.

Cumulatively with the conserved water allocated instream from piping the Grimes Flat laterals and the IronHorse section and the additional water being released from Prineville Reservoir for delivery to McKay Creek irrigators, the Crooked River would see an average increase in 6.45 cfs downstream from Prineville Reservoir (RM 70.0) to the District's diversion (RM 54.9) and 4.82 cfs downstream from the District's diversion to Lake Billy Chinook (RM 0.0).

The McKay Switch project would also increase flows in the Crooked River. After implementation of Project Group 1 once the District's delivery system can support delivering water to McKay Creek irrigators, 11.2 cfs of McKay Creek water rights would be transferred to instream use in McKay Creek. This would increase streamflow in the Crooked River from RM 44.9, the mouth of McKay Creek, to RM 0.0, Lake Billy Chinook. As described below, these contributions would diminish

[44] This conserved water would not be in addition to the minimum flows required by the Deschutes Basin Habitat Conservation Plan.

[45] The District operates Bowman Dam (see Section 1.3), but Reclamation stores and releases water.

throughout the irrigation season as streamflow naturally declined in the creek upstream from the project.

Appendix C, Figure C-7, and Appendix E6 illustrate possible effects on streamflow in the Crooked River in greater detail.

6.8.2.2.3 *McKay Creek*

The Modernization Alternative would provide a means to implement the McKay Creek Water Rights Switch. Upon completion of the McKay Creek Water Rights Switch, Project Group 1 of the Modernization Alternative, 11.2 cfs of water rights would be permanently transferred to instream use in McKay Creek. The Modernization Alternative would eliminate the need for these irrigators to divert from McKay Creek, restoring a more natural hydrograph in the reach from RM 12.0 to RM 6.0.

The District would allow the water restored instream to pass its Jones Dam diversion (RM 5.9) (Section 4.8.2.3) despite the District's holding McKay Creek water rights of higher seniority, restoring a more natural hydrograph in the creek from RM 5.9 to RM 0.0.[42]

McKay Creek follows a seasonal runoff pattern, with higher streamflow in late winter and early spring and seasonal streamflow declines throughout the late spring and early summer (see Appendix E.6). The streamflow restored instream through the Modernization Alternative would approximate the natural hydrograph of the creek. In a typical year, this alternative would restore a full 11.2 cfs to McKay Creek early in the irrigation season. This rate would decrease as the irrigation season progressed and streamflow upstream from the project naturally declined.

It is not expected that the protection of this water instream would cause any flooding as the creek already carries more than 11.2 cfs during spring runoff events.

Appendix C, Figure C-7, and Appendix E6 illustrate possible effects on streamflow in McKay Creek.

6.8.2.2.4 *Lytle Creek*

The reduction of operational spill from the Grimes Flat West lateral into Lytle Creek (RM 5.7) would decrease overall flow in the creek during the irrigation season. This change would move the creek towards a more natural hydrograph as an intermittent stream.

Appendix C, Figure C-7, and Appendix E6 illustrate possible effects on streamflow in Lytle Creek.

6.8.2.2.5 *Drainage* Courses

The conversion of the open Grimes Flat laterals and the IronHorse section to a piped system would return the landscape along the canal to its original grade and to the natural surface runoff patterns that existed prior to the presence of the open canal and laterals. This change could present some stormwater management challenges to areas downgradient of the newly installed pipelines, as there would be no open laterals that would capture stormwater. Coordination with the District and landowners in the area would occur to mitigate potential unintended consequences. The elimination of the Grimes Flat laterals and the IronHorse section as a drainage course would result in a minor, long-term adverse effect.

In areas where canals remain open, there would be no effect on current drainage courses.

6.8.2.3 Surface Water Quality

Additional streamflow would benefit water quality in the Crooked River downstream from Bowman Dam (RM 70.0) to Lake Billy Chinook (RM 0.0) and in McKay Creek from RM 12.0 to its confluence with the Crooked River, neither of which currently meet water quality standards under Section 303(d) of the CWA (33 U.S.C. 1251 et seq.). Section 4.8.3 provides more detail on these impaired reaches.

Although the increased flow in both the Crooked River and McKay Creek would not provide sufficient streamflow to decrease temperatures enough to meet ODEQ's water temperature standards, increasing streamflow in these reaches could have a beneficial effect on water temperatures. A decrease in water temperature could have indirect, beneficial effects on other water quality components including pH and DO. Increasing streamflow would also benefit wetland and riparian areas within this reach by improving their ecological function, subsequently enhancing water quality.

Piping the Grimes Flat laterals and removing the operational spill to Lytle Creek would prevent contaminants such as herbicides, pesticides, and animal wastes from entering the laterals and being spilled to Lytle Creek. Piping the Grimes Flat laterals and the IronHorse section would also reduce the potential for contaminants to enter the water delivered to OID's patrons and applied on-farm. The potential for these contaminants to remain on-farm or get carried by wind deposition, infiltration, groundwater flow, and groundwater recharge to surface water would continue; however, the Modernization Alternative would eliminate nonpoint source contamination from entering the system along the Grimes Flat laterals and the IronHorse section.

6.8.2.4 Groundwater

The Modernization Alternative would have a long-term, negligible effect on groundwater resources. Piping the Grimes Flat laterals and the IronHorse section would eliminate the seepage of 2,513 acre-feet of water annually; however, the additional water being delivered to McKay irrigators would increase seepage loss by an estimated 210 acre-feet of water annually in the open canals and laterals during conveyance. These changes to water seepage would have negligible effects on the shallow, unconfined aquifers that generally discharge at seeps and springs in or near the Prineville area or contribute to recharge of the deeper artesian aquifer.

For a discussion about how the change in seepage would likely impact surface water hydrology in the Crooked River under the Modernization Alternative, see Section 6.8.2.2.

6.8.2.5 Ecosystem Services

The Modernization Alternative would affect ecosystem services provided by water in the Crooked River and McKay Creek in the following ways:

Provisioning Service, Irrigation water: Implementation of the Modernization Alternative would have a beneficial effect on irrigation water deliveries. Water conveyance through closed pipe would improve efficiency by eliminating water loss due to seepage, evaporation, and operational spills, which in turn would allow the District to deliver adequate and reliable water to patrons while

diverting less water from McKay Creek. Modernizing District irrigation infrastructure would enable the District to be more resilient to environmental changes and maximize the efficiency of water conveyance.

Regulating Service, Water quality: Implementing the Modernization Alternative would eliminate the need for agricultural producers to divert live flow from McKay Creek between RM 6.0 and RM 12.0 and would protect that live flow instream. The water conserved by the District following its piping the Grimes Flat laterals and the IronHorse section of the Crooked River Distribution Canal would be protected instream, increasing streamflow in the Crooked River downstream from the District's diversion. The addition of water instream during the irrigation season, particularly in McKay Creek, would assist in regulating water temperature against hot, ambient temperatures of the summer months and would potentially assist in moving water temperatures towards ODEQ's criteria for McKay Creek and the Crooked River (Section 4.8.3). Overall, the Modernization Alternative would have a long-term, beneficial effect on water quality.

6.9 Fish and Aquatic Resources

6.9.1 No Action (Future without Federal Investment)

6.9.1.1 General Fish and Aquatic Species

The District would continue to operate ODFW-compliant fish screens at its diversions, and canals and laterals would not provide fish habitat. Therefore, the No Action Alternative would have no effect on fish and aquatic species within the project area.

Under the No Action Alternative, there would be no effect on fish and aquatic species in waterbodies associated with District operations because the District would continue to divert water at the current rate from the Crooked River and McKay Creek for consumptive use and maintain operational spills that return to Lytle Creek. McKay Creek irrigators would continue to divert and pump water directly from McKay Creek for irrigation. These practices would continue to alter the natural streamflow regime in the Crooked River, McKay Creek, and in tributaries receiving operational spills. Under the No Action Alternative, aquatic conditions and habitat supporting general fish and aquatic species would be similar to current conditions. During the irrigation season, reduced streamflow in the Crooked River and McKay Creek would continue to diminish the availability of fish habitat and contribute to warmer temperatures for fish and aquatic species.

6.9.1.2 Federally Listed Fish and Aquatic Species

There would be no effect on habitat supporting steelhead or bull trout populations under the No Action Alternative. McKay Creek would continue to have an altered natural hydrograph limiting salmonid rearing grounds. Bull trout populations reside in lower reaches of the Crooked River and in Lake Billy Chinook, and the critical habitat supporting this population would likely not change from its current state.

6.9.1.3 Ecosystem Services

Ecosystem services provided by fish and aquatic species living in the Crooked River and McKay Creek are impacted by the No Action Alternative in the following ways:

Provisioning service, Instream fish populations: Harvest of anadromous fish would not be affected and would be available when runs are sufficiently large to sustain fishing. Although ODFW and CTWS are working to restore anadromous fisheries in the Basin, the pace is likely to be slow and limited to available habitat instream.

Cultural service, Culturally important fish species: There would be no effect on habitat supporting populations of culturally important fish species. Any improvement would be incremental and tied to the pace of modernization for which the timing and certainty are unknown. Habitat limitations for culturally significant anadromous fish would continue to affect fishing, community, health, cultural identity, subsistence, and religious tribal values.

6.9.2 Modernization Alternative (Future with Federal Investment)

6.9.2.1 General Fish and Aquatic Species

During and following project construction, there would be no direct or indirect effects on any fish in the project area where canal banks were raised, pump stations built, or pipelines installed because fish are not able to pass the District's ODFW-compliant fish screens into the conveyance system. Construction to raise the Crooked River Diversion weir would have minor and temporary effects on fish because construction would be localized, and mitigation measures would be taken following coordination with permitting agencies. Actions to raise the Crooked River Diversion weir would likely include temporary coffer damming of the river on a side by side basis to accommodate construction and installation of a welded steel weir extension above the existing weir from bank to bank. The weir raising during and after construction would be required to meet Oregon State fish passage laws and permitting requirements (see Section 8.6.2 for further discussion).

Common aquatic species such as western toad, Pacific treefrog, and long-toed salamander have been known to use open canals and laterals. Implementation of the Modernization Alternative would have a long-term, moderate effect on these species because habitat in open canals and laterals would be eliminated with piping or modified or disturbed with canal bank raises and the addition of new canal geomembrane liners. However, the habitat that would be eliminated, modified, or disturbed is occurring in a limited number of areas, is low-quality, and is not considered critical to the long-term survival of these species (S. Wray, personal communication, November 17, 2017). Further, there would be a long-term, moderate effect on the invasive bullfrog species that also utilize open canals and laterals when they are removed during construction.

There would be beneficial, indirect effects on fish and aquatic species in the Crooked River because streamflow would be increased during the irrigation season. There would be a beneficial effect on fish and aquatic species in McKay Creek due to increased streamflow and improved water quality.

Following the piping of the Grimes Flat laterals and IronHorse section, a total of up to 4.82 cfs (2,046 acre-feet/year) of conserved water would be allocated to and permanently protected in the Crooked River from Bowman Dam (RM 70.0) to the mouth of Lake Billy Chinook (RM 0.0) during the irrigation season. Because of the conserved water allocated instream (Section 6.8.2.1.1 and 6.8.2.2.2), there would be a beneficial effect on fish and aquatic species.

Following the McKay Creek Water Rights Switch, up to 11.2 cfs that was previously pumped out of McKay Creek would be allowed to remain instream,[46] through instream water right transfers, and would improve the creek's natural hydrograph (N. Bellis, personal communication, October 16, 2019). This action would benefit fish and aquatic species in McKay Creek because streamflow would be increased and extended in the spring and summer seasons. Extending the days of available streamflow would enable steelhead to transition from fry to juveniles and migrate to suitable summer rearing habitats. The additional streamflow would also improve the quantity of suitable habitat for spawning, rearing, and migration of salmon and steelhead, and contribute to improved water quality and riparian habitat for these species. Resident fish species and their macroinvertebrate prey would also benefit from improved habitat with the additional streamflow.

Up to 11.2 cfs from the McKay Creek Water Rights Switch would be protected by Oregon water law (ORS 537.348 and 540.505-540.585) in McKay Creek and also from the confluence of McKay Creek with the Crooked River (RM 44.9) through Lake Billy Chinook. The increased streamflow in the Crooked River during the spring and early summer months (April through June) from the McKay Creek Water Rights Switch would be small relative to the average streamflow of the Crooked River during this time of year (Section 4.8.2.2). The effect of the increased streamflow in this reach would be beneficial to fish and aquatic species.

Overall, based on the project-related effects on general fish and aquatic species described above, NRCS has determined that the Modernization Alternative would result in minor, temporary effects and beneficial effects over the long-term.

6.9.2.2 Federally Listed Fish and Aquatic Species

The Modernization Alternative could affect two federally listed, threated species including bull trout and steelhead.

Bull trout critical habitat is located within the affected area (Appendix C, Figure C-3.), and bull trout are known to migrate up the Crooked River to the base of Opal Springs Dam (RM 6.7). Since the completion of the Opal Spring Dam Fish Ladder in November 2019, however, bull trout have been utilizing the fish ladder and migrating further up the Crooked River. USFWS anticipates that, in time, bull trout may recolonize the Crooked River and McKay Creek (P. Lickwar, personal communication, June 9, 2020). Any effect on bull trout populations or PCEs identified in the critical habitat designations as a result of increased streamflow from implementation of the Modernization Alternative would be beneficial over the long term (P. Lickwar, personal communication, June 9,

[46] Water rights transferred instream through the McKay Switch would be subject to prior appropriation, and they would not be protected against diversion by senior water rights holders other than OID (see Section 6.8.2.1.2). However, OID and Deschutes River Conservancy expect that all McKay Creek water rights transferred instream (up to 11.2 cfs) would be protected against all diverters for the length of McKay Creek to its confluence with the Crooked River (N. Bellis and B. Scanlon, personal communication, November 11, 2020). If other senior water rights holders in the Crooked River were to divert the water restored instream through the McKay Switch, their diversion would decrease the magnitude of the beneficial effects of the Preferred Alternative on fish and aquatic resources.

2020; USFWS, 2005). Informal consultation has been initiated.[47] USFWS concurrence with a "May Affect-Not Likely to Adversely Affect" determination was received November 23, 2020.

Following implementation of the Modernization Alternative, the 11.2 cfs that would remain instream in McKay Creek would be beneficial to the Middle Columbia River steelhead population and recovery effort (S. Carlon, personal communication, September 29, 2020). Currently, this population is classified as a non-essential experimental population under Section 10(j) of ESA until January 2025 when the population will be listed as threatened (76 *Federal Register* 28715, 2011). Informal consultation has been initiated.[47] NMFS concurrence with a "May Affect-Not Likely to Adversely Affect" determination was received December 7, 2020.

6.9.2.3 Ecosystem Services

The Modernization Alternative would affect the ecosystems services provided by fish and aquatic resources in the following ways:

Provisioning Service, Instream fish species: Over the long-term, increased streamflow as a result of the Modernization Alternative would have a benefitting effect on habitat for resident and anadromous fish species during the irrigation season and would assist in the recovery efforts of ODFW and CTWS. Bolstering anadromous fish populations may allow more consistent fishing for harvest and consumption.

Cultural Service, Culturally important fish: Following the modernization project, up to 16.02 cfs would be allocated or transferred instream, 4.82 cfs would be allocated to the Crooked River during the District's practical irrigation season, and 11.2 cfs would be transferred instream to McKay Creek and the Crooked River during the irrigation season (Section 6.8.2.2). The allocated water would have a beneficial effect on instream habitat for culturally important fish such as salmon and steelhead, which would positively affect Central Oregon community member values and contribute to CTWS goals including enhancement of fishing, community, health, cultural identity, subsistence, and religious tribal values.

6.10 Wetlands and Riparian Areas

6.10.1 No Action (Future without Federal Investment)

Under the No Action Alternative, there would be no effect on wetland and riparian vegetation. Wetland and riparian vegetation associated with the network of open irrigation canal and laterals would persist, and, although the canal and laterals within the project area are mechanically and chemically managed to clear vegetation, seepage supporting wetland and riparian features adjacent to the canal and laterals would remain in its current condition.

6.10.2 Modernization Alternative (Future with Federal Investment)

6.10.2.1 Wetland and Riparian Areas Along the Project Area

The canal and laterals within the project area are mechanically and chemically managed to clear vegetation. The NWI geographic information systems data (USFWS 2016a) shows 42 wetland

[47] Coordination with USFWS and NMFS has been completed as required by the provision of PL 83-566 Section 12.

features near the project area; however, wetland determinations or delineations at these sites have not occurred at this time.

Construction would result in the disturbance of all canals and laterals in the project area. Seasonal opportunistic hydrophytic plants that sporadically occur within and directly adjacent to canals and laterals would be removed or buried during excavation, fill, placement of pipe, or other construction activity. However, all wetlands within and adjacent to the project area would be avoided to the extent practicable, and the District would follow appropriate reclamation procedures in order to revegetate disturbed areas as uplands.

Generally, project canals and laterals are not considered wetlands or Waters of the United States by state or federal agencies; however, consultation with ODSL and USACE would occur prior to project implementation to determine exemption applicability.

In locations where piping would occur, seepage losses would be eliminated, potentially limiting the water available to adjacent wetlands if they are dependent upon canal seepage for hydrology. Additionally, wetlands in the project area may provide some wildlife habitat that would be permanently changed to upland areas after project construction.

Because the effects of this alternative could reduce water availability to wetlands and hydrophytic vegetation occurring in places near or adjacent to the open canals and laterals in the project area, minor effects are assumed to occur to wetland habitat along canals and laterals within the project area.

The Modernization Alternative would have no effect on excavated water storage ponds that occur adjacent to the project area, and the hydrophytic vegetation along these ponds would not be disturbed.

Prior to the construction of the in-water work in the Crooked River, permits from ODSL and USACE, consultation with ODFW, and a 401 Water Quality Certification from ODEQ would be required to confirm that the proposed action meets water quality and temporary fish passage standards (see Section 6.10.2.3 for more information regarding compliance). Moderate effects would occur to the exisiting bank and vegetation during construction; however, the bank and vegetation would be restored to pre-construction conditions following construction. Potential spill sources from construction would derive primarily from heavy equipment that would operate within the Crooked River during construction, and the contractors would be required to follow strict BMPs.

6.10.2.2 Wetland and Riparian Areas along Natural Waterbodies Associated with District Operations

The construction of the proposed weir raise would occur on the Crooked River at RM 54.9 and would have moderate, short-term effects on wetlands and riparian areas in and directly downstream. This construction would alter habitat in the area and elevate levels of suspended sediments. Sediment deposited downstream can alter streambed composition, embeddedness, and morphology; however, effects are typically short-term and recovery to post-construction conditions is generally apparent within a year (Golder Associate Ltd. 1998). Contractors would follow BMPs for spill prevention control, to reduce erosion, and meet numerical turbidity limits as required by ODEQ.

The construction of the proposed project would require construction near and along McKay Creek, Lytle Creek, and Allen Creek. Contractors would perform directional boring or drilling[48] under these creeks to minimize habitat alteration in the area and eliminate disturbance to wetland and riparian areas. Contractors would follow BMPs for spill prevention control and to reduce erosion.

The Modernization Alternative would result in improvements in water quality and habitat function in the 12 miles of natural riverine systems of McKay Creek as a result of increased streamflow during the irrigation season. This streamflow would contribute towards a more natural hydrologic regime. Restablishing a more natural hydrologic regime in these reaches could allow the river channel to supply water to wetlands and riparian areas via infiltration through channel banks, thus enhancing wetland and riparian function by facilitating processes such as surface and groundwater exchange, physical and chemical transformations, and supporting riparian plant communities.

The proposed action would have negligible effects on the 67 miles of natural riverine system along the Crooked River downstream of Bowman Dam (RM 70.0) to Lake Billy Chinook (RM 0.0).

Overall, the Modernization Alternative would have beneficial effects in the long-term on wetlands and riparian areas along the natural waterbodies associated with District operations. However, construction of the weir raising would have moderate, short-term effects in and directly downstream of the project area within the Crooked River. Unavoidable effects on wetlands and riparian areas would be minimized using BMPs to ensure that any effects do not exceed a moderate threshold.

6.10.2.3 Permitting and Compliance

The memorandum signed by the USACE and USEPA on July 24, 2020, (Section 4.10) states that if the proposed activity will not occur in Waters of the United States, the proposed activity is not prohibited nor regulated under Section 404 of the CWA. Under this exemption, it would be expected that no permit would be required for the disturbance to wetlands within OID's existing canal and lateral system. However, the Crooked River Diversion weir raise would require a CWA Section 401 and 404 Removal/Fill Permit from ODSL and USACE in addition to a 1200-C permit from DEQ. Coordination and consultation with ODSL, USACE, and ODEQ would occur prior to implementation of each site-specific project to ensure the proposed action either meets exemption criteria or that the proper permitting and construction activities are conducted in accordance with the permits' requirements. Where permits would be required, USACE will consider the need for compensator mitigation based on the 2008 Mitigation Rule (33 CFR part 332).

EO 11990 requires federal agencies to avoid wetlands development when there are practibable alternatives, provide early public notice when considering undertaking or providing financial assistance for new construction in wetlands, and minimze impacts when proposing actions in wetlands. EO 11900 at Section 2 (a) states that agencies "shall avoid undertaking or providing assistance for new consturction located in wetlands unless the head of the agency finds (1) that there

[48] Direction boring or drilling is a process that allows for trenchless construction across an area. In this process, a borehole is drilled under the area and a prefabricated segment of pipe is installed through the borehole. This process avoids direct disturbance to the surface.

is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimze harm to wetlands which may result from such use." EO 11990 defines "new construction" as "draining, dredgeing, channelizing, filling, diking, impouding, and related activities and any structures or facilities…" Directional boring or drilling beneath a wetland is not considered to fall within this definition of "new construction" and unless determined unable to work from an engineering perspective, is exclused from the 8 Step Process of required in EO 11990.

EO 11988 requires federal agencies to avoid to the extent possible the long- and short-term effects associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Consultation with the Crook County Floodplain Administrator determined that the conversion of District canal and laterals located within the 100-year floodplain to buried, pressurized pipelines are not within mapped regulatory floodways (A. Beier, personal communication, October 31, 2019) and, therefore, would have no effect on the floodplain elevation.

6.11 Wildlife Resources

6.11.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the wildlife communities in the project area would continue to interact with open canals. Wildlife that use the artificial wetland habitat with opportunistic hydrophytic plants created by the District's open canal and lateral system would continue to do so. Wildlife dependent on the wetland and riparian habitat along the Crooked River and McKay Creek would utilize instream flow and riparian areas as currently existing. Risks that the canals pose to larger wildlife species crossing the canal, such as drowning, would remain. Overall, the No Action Alternative would have no effect on wildlife resources.

6.11.2 Modernization Alternative (Future with Federal Investment)

The canals and laterals within the project area are mechanically and chemically managed to clear vegetation; therefore, very little habitat for wildlife exists. During construction, terrestrial wildlife could experience noise disturbance due to heavy equipment operation, habitat removal due to tree cutting and other vegetation removal, or injury due to collision with construction equipment or habitat removal. Canals are located in agricultural areas where heavy equipment use is commonplace; therefore, most wildlife in the area is accustomed to noise and these disturbances are anticipated to be minor. Although construction activities would cause a short-term increased human presence throughout the project area, over the long-term, piping canals and laterals would potentially reduce human presence, because fewer trips to maintain ditches and headgates would be necessary. This would result in fewer human–wildlife conflicts and improve seclusion for wildlife.

Wintering or migrating birds would be minimally affected by construction disturbance because they have the flexibility to move away from disturbances to other suitable areas. There is no expected effect on breeding migratory songbirds or waterbirds as construction activities would occur outside the nesting season. Clearance surveys would be completed prior to construction to ensure that project activity would not disturb the nests of non-raptor species, and early coordination with USFWS is ongoing (E. Weidner, personal communication, November 15, 2019).

The District would follow USFWS guidelines to ensure minimal disturbance to bald or golden eagles nesting near the project area. The critical nesting period for bald and golden eagles is January 1 through August 31. A section of project area on the Crooked River Diversion Canal is within 0.2 miles from the Crooked River Rim Golden Eagle nesting area and a section of the Crooked River Distribution Canal is within 0.5 miles from the Barnes Butte Golden Eagle nesting area. Because of the proximity of the project area to nesting sites, a seasonal restriction for the use of hydraulic hammers is in effect for these segments of the project area. Clearance surveys would be completed prior to implementation, and early coordination with USFWS is ongoing (E. Weidner, personal communication, November 15, 2019).

Wildlife interact with open canals and laterals. While some species may use canals as a water source, the canals also present a barrier to terrestrial movement and pose a risk of drowning. In areas where the canal and lateral systems are piped, the water source would be removed, however, nearby canals and laterals could continue to be open. Ungulates and other terrestrial wildlife would have ample time and opportunity to find new water sources. Traversing the landscape would also be made easier for wildlife as they could use cross the piped area without the risk of drowning or injury (Beier et al. 2008).

Wildlife would be negligibly affected in areas where canal banks would be raised. If wildlife use canals as a water source, that source would continue to be available. However, the barrier to terrestrial movement and risk of drowning or injury would negligibly increase.

The Modernization Alternative would provide increased instream flows in McKay Creek and the Crooked River that could enhance riparian habitat. Improved streamflow would allow more consistent access to water for hydrophytic plants, which would enhance riparian wildlife habitat. Overall, based on project effects described above and implementation of BMPs to minimize unavoidable effects on wildlife, the Modernization Alternative would have a minor, long-term effect on general wildlife in the project area..

6.11.2.1 Threatened and Endangered Species

The Modernization Alternative would have no effect on threatened or endangered terrestrial species. As noted in Sections 4.9.2 and 4.9.3, no federally or state-designated species or federally designated critical habitat occurs within the project area. Effects on federally or state-designated species, or federally designated critical habitats within waterbodies affected by District operations are discussed in Section 6.9.2.2.

6.12 Cumulative Effects

This section includes a description of past, current, reasonably foreseeable future actions, and cumulative effects organized by resource.

6.12.1 Past Actions

Past actions include land development activities that include irrigated agriculture (consisting of construction of the canal system, previous piping projects, and diversions), urban and suburban development, industrial land and water uses, commercial development, water diversions for non-

agricultural uses, the Crooked River Collaborative Water Security and Jobs Act (PL 113-244), and transportation infrastructure. The nature and extent of these past actions and how they have influenced the existing environment are described for each resource in Section 4.

6.12.2 Current and Reasonably Foreseeable Future Actions

Current actions are those projects, developments, and other actions that are presently underway, either because they are under construction or are occurring on an ongoing basis. Reasonably foreseeable future actions generally include those actions formally proposed or planned, or highly likely to occur based on available information. Various sources including local, state, and federal 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 current actions and reasonably foreseeable future actions.

6.12.2.1 Land Use and Development

Ongoing agricultural activities, including farming and grazing in the project area, are not expected to change from current conditions. Land use development in the project area is managed according to the Crook County zoning regulations and is implemented by the associated County Planning Department. Land development activities are expected to continue into the future, and would include agricultural, residential, commercial, and industrial land uses.

6.12.2.2 Habitat Conservation Plan

The District, other irrigation districts in the Deschutes Basin, state and federal agencies, local municipalities, and environmental groups are collaborating to develop a multi-species HCP for the upper Deschutes Basin (including the hydrologic Lower Crooked Watershed) for listed species and those that may become listed during the 20- to 50-year life of the HCP: Oregon spotted frog, bull trout, chinook salmon, steelhead salmon, and sockeye salmon. The HCP is anticipated to be completed by the end of the year 2020. The Final HCP was published in the Federal Register on November 6, 2020 (85 *Federal Register* 71086, 2020; covered activities include:

- Storage and release of irrigation water from:

    Crane Prairie Reservoir

    Wickiup Reservoir

    Crescent Lake Reservoir

    Prineville Reservoir

    Ochoco Reservoir

- Diversion of irrigation water
- Conveyance and delivery of irrigation water
- Irrigation return flows

- Existing hydropower
- City of Prineville water use activities.

6.12.2.3 Deschutes Basin Irrigation District Modernization

Other irrigation districts in the Deschutes Basin are working to pipe their infrastructure, and would implement projects similar to those proposed by OID in this Plan-EA. Three districts (Tumalo Irrigation District [TID], Swalley Irrigation District [SID], and Central Oregon Irrigation District [COID]) have authorized Plan-EAs. TID plans to pipe approximately 68.8 miles of its canals and laterals over the course of 11 years. SID plans to pipe approximately 16.6 miles of its canals and laterals over the course of 7 years. COID plans to pipe approximately 7.9 miles of its system over 4 years. The districts most likely to obtain necessary funding and permitting in the next 2 years are Lone Pine Irrigation District (LPID) and Arnold Irrigation District (AID). LPID plans to pipe approximately 11.3 miles of its canals and laterals over the course of 3 years and AID plans to pipe 13.2 miles of its main canal over 7 years. These projects are contingent on the availability of funding.[49] These five districts are anticipated to cumulatively convert approximately 117.8 miles of open canals and ditches to piped systems and save up to 130.5 cfs of water that would otherwise be lost to seepage and evaporation.[50] This infrastructure modernization project does not impact other irrigation modernization projects in the Upper Deschutes Basin because of OID's location.

6.12.2.4 Lower Crooked River Strategic Restoration Project

The Lower Crooked River Strategic Restoration (LCRSR) is a comprehensive project led by Crooked River Watershed Council (CRWC) and intended to address degraded fish and wildlife habitat, water quality, and riparian plant communities over 17 miles of the Crooked River. Proposed restoration activities include both instream and riparian restoration to improve habitat for fish and wildlife, water quality, and agricultural productivity. In addition, the project would reduce the threat of regulatory enforcement associated with the federal ESA and compliance with non-point source impacts from agriculture under Sections 303 and 319 of the federal CWA.

The project area is within the Lower Crooked River watershed on the mainstem Crooked River from approximately RM 30.0 to RM 47.0. The project area is approximately 6,200 acres, with the boundaries being State Highways to the east and south and a county road to the west. The north boundary is partially set by a county road and partially by the topographic change from existing basalt ridgelines which create a sharp break from irrigated agriculture to a more upland landscape.

The project area is a major focus for the reintroduction of anadromous fish to the Upper Deschutes Basin above the Pelton-Round Butte hydroelectric complex on the mainstem Deschutes River. This project would leverage the impact of the completed and remaining fish passage activities to increase the ecological benefits and vastly improve the habitat potential for anadromous fish in the Lower

[49] The North Unit Irrigation District is also interested in pursuing PL 83-566 funding and has initiated the Watershed Planning process. The potential saved water and the extent of the project is still being determined.

[50] Not all water saved would be protected instream.

Crooked River. Funding for this project was awarded by NRCS and USDA in 2018. The project is planned to be complete by 2022.

6.12.2.5 McKay Creek Restoration

GeoEngineers developed a McKay Creek Restoration and Prioritization Plan on behalf of CRWC (GeoEngineers 2014). This plan would improve McKay Creek watershed conditions including fish rearing habitat improvements, bank erosion reduction, riparian vegetation improvement, and floodplain enhancement. The McKay Creek Restoration and Prioritization Plan is reasonably foreseeable to occur if the McKay Creek Water Rights Switch takes place. If the McKay Creek Water Rights Switch does not occur, McKay Creek restoration would not move forward.

6.12.2.6 Bowman Dam Hydropower Project

The District, the City of Prineville, and Crook County are proposing to develop a 3 MW hydropower project on Reclamation's Bowman Dam. The project would utilize regular releases from the dam for irrigation, flood, or environmental flows to generate electricity. A preliminary permit for the project was issued from FERC in 2016. This permit allows the proponents to continue to pursue a FERC license for the hydropower development. OID submitted a pre-application document to FERC in 2018. Currently, Bowman Dam does not have fish passage; the proponents are currently consulting with fisheries agencies to determine if fish passage would be required to be installed in order to license the hydropower project. As of October 2020, Oregon Fish and Wildlife Commission has denied a waiver request to move forward on the project without fish passage. If the project is determined to be feasible, it would continue to undergo the FERC hydropower licensing process.

6.12.2.7 Opal Springs Fish Passage

The Opal Springs Fish Passage Project construction began in May 2018 and was completed in late 2019. The project and created upstream fish passage past Opal Springs Dam for the first time since the 1960s. This project was led by the CRWC. The project raised the existing dam's pool height by three feet and installed a fish ladder, furthermore, the project generates an additional 1,010 megawatt hours of renewable energy per year. With the implementation of the project, salmon and steelhead would be allowed to return to the Crooked River above Opal Springs Dam.

6.12.3 Cumulative Effects by Resource

Cumulative effects are considered for each resource using the intensity threshold matrix (Appendix E.1) in combination with past, present, and reasonably foreseeable future actions.

6.12.3.1 Cultural Resources

The District is proposing to modernize its primary and secondary canal systems and other infrastructure to lessen seepage and flow losses, improve water delivery reliability, and to provide the ability to meet the needs of McKay Creek irrigators. Although the canal system has undergone changes in the past (e.g., improvements between 1920 to present), the basic operations of the District would not be altered due to the proposed improvement efforts. To date, the District's entire irrigation system has not been evaluated for its eligibility for listing on the National Register of Historic Places (NRHP).

Cumulative impacts on cultural resources would occur if other past, present, or reasonably foreseeable actions or projects affect the same historic properties/cultural resources as the proposed action. Cumulative impacts can result from individually minor but collectively significant actions that occur over a period of time. Where impacts on historic properties, including any previously recorded, unevaluated or not yet documented resources such as archaeological sites, architectural sites, cultural landscapes, traditional cultural properties, etc., are unavoidable, measures to mitigate the adverse effects would be identified in a Section 106 agreement document (memorandum of agreement, programmatic agreement) developed in consultation with consulting parties.

Any cumulative impacts on the District irrigation system, a possible historic property, by future actions such as new piping, pump station replacement, etc., would be analyzed in light of the NRHP eligibility status of the irrigation system. Cumulative impacts would not be expected if the irrigation system is determined not eligible for the NRHP. However, if the irrigation system is determined eligible for the NRHP, and a future action would result in adverse effects under Section 106 of the NHPA, they would be addressed in consultation with SHPO, THPO, and other consulting parties including affiliated tribes to mitigate adverse impacts. The cumulative impact analysis would consider whether the impact and proposed mitigation is adverse or beneficial for the human environment.

All other projects considered in this cumulative impact analysis would be required to comply with Section 106 of the NHPA, which requires federal agencies to assess and mitigate adverse effects, including cumulative effects, on historic properties/cultural resources. The District has developed a plan to address unanticipated discoveries of cultural resources and human remains during construction of the proposed action. Other federal projects would implement similar plans and measures. These cultural resource studies, agreement documents, and plans ensure proper documentation, protection, and avoidance, minimization or mitigation of important cultural resources.

6.12.3.2 Soils

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

6.12.3.3 Land Use

The project area has been substantially altered over the past century by a variety of human activities, including agricultural development, livestock grazing, urban and suburban development, and road construction. Implementation of the proposed action would support existing land uses; therefore, any cumulative effects on land uses would be beneficial.

6.12.3.4 Public Safety

Cumulative effects on public safety due to the implementation of ongoing and reasonably foreseeable future actions are not anticipated.

6.12.3.5 Socioeconomic Resources

Past actions, including agricultural and other land development and recently completed projects, have established the socioeconomic setting of the Crooked River watershed by supporting development and agriculture. Current and reasonably foreseeable future actions will continue to support agriculture through improved infrastructure, and they will continue to support economic development through both the installation of hydropower capacity and improved fish habitat. Since the proposed action would also support socioeconomics through construction expenditures and intensified agricultural production, it would contribute to a cumulative benefit to socioeconomic resources in the area.

6.12.3.6 Vegetation

Agricultural activities, livestock grazing, vegetation control along roads, and urban and suburban development are responsible for most of the past and ongoing effects on vegetation in the project area and in the region. 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, livestock grazing, vegetation control along roads, and other utility corridors in the area. Current and reasonably foreseeable future actions also would have negligible (Bowman Dam Hydropower and Opal Springs Fish Passage) or beneficial (HCP and Lower Crooked River Strategic Restoration Project) effects on vegetation, as these projects have localized effects on vegetation as the proposed action, but in different areas. Ongoing effects of past actions are not expected to change measurably from current conditions, and additional effects from the proposed action would be minor, resulting in a minor contribution to cumulative effects on vegetation.

6.12.3.7 Visual Resources

The visual quality of lands in the Crooked River Watershed has changed due to past and present development, and these changes are expected to continue. The impact to visual resources from the Modernization Alternative would be a minor, long-term effect that would be similar in character to the existing landscape and development; therefore, combined with other actions, the cumulative effects on visual resources would be low.

6.12.3.8 Water Resources

Past actions include land development activities such as irrigated agriculture (consisting of construction of the canal system, 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. Past actions over the last 120 years that have affected water resources include urban and agricultural development, road construction, road maintenance, and other irrigation projects.

Ongoing and reasonably foreseeable future actions that could affect OID water resources include on-farm water conservation work, implementation of the HCP, and water resource effects from climate change. Actions resulting from on-farm water conservation work and implementation of the HCP, accompanied by the proposed action, have and would continue to cumulatively increase streamflow in the Crooked River and its tributaries. Additionally, the Deschutes River Conservancy, a lead partner on the McKay Creek Water Rights Switch, would work with McKay Creek irrigators

and funding partners to implement on-farm improvements prior to or concurrent with the McKay Switch implementation. These on-farm projects would seek to move the irrigation method from flooding to sprinklers. At this time, the cost and timing of this project remain unknown.

The proposed action, implementation of the HCP, and reasonably foreseeable on-farm conservation work would cumulatively contribute to water quality improvements anticipated from the reduction in erosion from the District's canals, increased streamflow and reduced operational spills in waterbodies affected by District operations. Any effects during construction, such as sedimentation or erosion, would be localized and short term and would not contribute to any cumulative degradation of water quality.

Changing climate conditions in Central Oregon are expected to result in a decline in streamflow, groundwater recharge, and water availability (Geos Institute 2011). Increased instream flow in the Crooked River and McKay Creek as a result of this project would assist in sustaining the hydrological connectivity between the rivers and adjacent wetlands and floodplains. Climate change projections also show that streamflow during late spring, summer, and fall are likely to decline (Geos Institute 2011) and, therefore, the increased streamflow during the irrigation season as a result of the proposed action would help mitigate these effects.

6.12.3.9 Fish and Aquatic Species

Past and ongoing land uses, water diversions, and reservoir operations are responsible for most of the past and ongoing direct and indirect changes in water availability, seasonality, and access to habitat that has cumulatively affected aquatic communities and habitat in the Crooked River watershed.

Past and ongoing land use activities in the project area are not expected to change from current conditions. Current and future habitat improvement projects, including the Opal Springs Dam Fish Passage Project, the Lower Crooked River Habitat Restoration Project, McKay Creek Restoration, as well as the HCP and the proposed action are all proposed for the purpose of improving habitat for fish and aquatic species in the Crooked River watershed, with the proposed action contributing to this cumulative beneficial effect. The Bowman Dam Hydropower Project would not affect fish passage if fish passage is not installed as a component of the project. The Bowman Dam Hydropower Project, as proposed, may assist in reducing the levels of total dissolved gasses that currently occur during the regular spring high flow releases, which could reduce the instances of gas bubble disease in fish below the facility. Research on total dissolved gasses in the Crooked River and how to implement strategies in the Bowman Dam Hydropower Project design to reduce total dissolved gasses below Bowman Dam are underway (MHE 2019; OID 2019; USFWS 2016b). The Bowman Dam Hydropower Project would add to cumulative benefits to fish.

The construction of any of these projects, including the proposed action, may cause short-term and temporary effects on fish, such as sediment inputs or aquatic habitat disturbance, and could potentially affect waters within the same watershed as the proposed action. However, because of the short term and localized nature of these effects, these effects would not be anticipated to be cumulative.

6.12.3.10 Wetlands and Riparian Areas

Past actions that have affected wetlands, riparian areas, and floodplains in the Crooked River watershed include land development, agricultural activities and infrastructure, water diversions, and reservoir operations. These activities are expected to continue. Effects on wetlands from the proposed action, and also any effects from other current and reasonably foreseeable irrigation modernization projects, would be anticipated to be localized and short term; therefore, implementation of the proposed action would not be anticipated to have a cumulative impact to wetlands in the Deschutes Basin.

The improvements in streamflow in the Crooked River watershed that would be anticipated from implementation of the Modernization Alternative, coupled with the Lower Crooked River Strategic Restoration Project and McKay Creek Restoration, would improve hydrology for riparian vegetation and have a minor cumulative benefit to the hydrology of riparian areas in the Crooked River watershed.

6.12.3.11 Wildlife

Past and ongoing land use activities including agriculture, urban, and suburban development have affected wildlife and wildlife habitat in the Crooked River watershed starting in the late 1800s. Agricultural activities have substantially altered the habitat in the region by removing native vegetation communities in some areas and diverting streamflow. Livestock grazing occurs in much of the region around the project area and can result in the introduction and spread of weed species, the degradation of native habitat, and trampling of riparian and wetland areas. Some native habitats have been replaced with disturbance-tolerant or introduced species assemblages that may support different wildlife than previously existed. These ongoing activities would continue to affect wildlife and wildlife habitat in the project area.

Effects on wildlife due to implementation of both the proposed action and past, current, and future irrigation modernization projects would be localized and temporary and limited to disturbance during construction and effects on those wildlife that use open canals and laterals as a water source. Implementation of the proposed action would cause wildlife to find other water sources, as they did prior to installation of the canals. Since the effects on wildlife have and would happen over a period of time in which animals would be able to adapt, the cumulative effect on wildlife from implementation of the proposed action would be minor.

In addition, vegetation control activities, including herbicide applications to control noxious weeds and mechanical cutting of vegetation, are ongoing actions that contribute to wildlife habitat changes. The amount of wildlife habitat that would be affected by the proposed action is small compared to the area affected by past and ongoing agricultural activities, livestock grazing, vegetation control, and urban and suburban development in the area. In addition, the intensity of these ongoing actions is not expected to change measurably in the future, resulting in minor additional cumulative effects.

6.12.3.12 Wild and Scenic Rivers

Sections of the Crooked River have been designated as Wild and Scenic under the National Wild and Scenic Rivers Act. These designations aim to protect these areas from changes that generally alter the scenic, recreational, and ecological qualities of these areas. Changes to the current and

future management of these river sections, which are in areas affected by District operations, are expected to be negligible. These Wild and Scenic waterways would continue to be managed by federal and state agencies consistent with their designations.

6.12.3.13 Ecosystem Services

All reasonably foreseeable actions regarding the modernization of irrigation infrastructure in the Crooked River watershed would collectively improve water conservation and water availability to irrigators (Section 6.14.3.9). Past and ongoing actions described in the sections above have also contributed to water availability for irrigations and for instream flow. Past, ongoing, and reasonably foreseeable actions in the Crooked River watershed could all impact ecosystem services in the proposed action watershed. However, the implementation of the proposed action, when combined with other future actions, is anticipated to have a minor, beneficial, cumulative effect on all ecosystem services assessed.

7 Consultation, Coordination, and Public Participation

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

A Preliminary Investigative Report (PIR; FCA 2019) was prepared to provide sponsors, local partners, agencies, and the public with information to evaluate the goals and objectives of the project. During the development of the PIR, project sponsors conducted initial consultation with natural resource agencies and stakeholders in the Deschutes Basin.

Public participation activities prior to release of the PIR included:

Public announcements

- Natural Resources Conservation Service public notice (August 27, 2019) https://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/newsroom/pnotice/?cid=nrcseprd1475014
- Central Oregonian – three public notices (August 27, September 3, September 10, 2019)
- Natural Resources Conservation Service news release (August 27, 2019) https://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/newsroom/releases/?cid=NRCSEPRD1478621

Public website

Information about the proposed project was added to a website to inform the public. Oregonwatershedplans.org includes the following information:

- Overview of NRCS' PL 83-566 funding program
- Overview of NEPA and EA public participation process
- Frequently Asked Questions about the EA process
- Documents related to the proposed project including the Draft Plan-EA and appendices, the PIR 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 September 18, 2019 from 6:30 p.m. to 7:30 p.m. at Carey Foster Hall, 1280 S Main Street in Prineville, Oregon. 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 August 27, 2019 through October 18, 2019.

7.1 List of Persons and Agencies Consulted

Table 7-1 describes communications with agency personnel that were consulted during development of the EA. 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 29, 2019	Reclamation	Requested to be a cooperating agency on the project given their history and nexus with the District.
September 17, 2019	NRCS, FCA, Reclamation	Coordination meeting to discuss the project.
October 30, 2019	Debbie Wood, Crooked River Weed Management Area Coordinator	Discussion regarding noxious weeds in the Crook County area.
October 31, 2019	Ann Beier, Crook County Community Development Department	Discussion regarding floodplains in the project area.
November 4, 2019	Rachel Gebauer, NRCS Christine Horting-Jones, Reclamation	Discussion of cultural reviews and background information Reclamation has for the District.
November 15, 2019	Emily Weidner, USFWS	Discussion of wildlife in the District area. Requested guidance for addressing MBTA/BGEPA species if they occur around the project area.
November 18, 2019	Emily Weidner, USFWS	Continued coordination regarding MBTA/BGEPA.
November 20, 2019	Scott Carlon, NMFS	Discussion of the status of steelhead in the Crooked River.

Date	Contact, Agency	Communication
January 16, 2020	Jonathan Kochersberger, U.S. Forest Service	Discussion regarding flows in McKay Creek.
January 21, 2020	Jerry Cordova, USFWS	Confirming MBTA/BGEPA species in OID.
January 29, 2020	Kyle Gorman, OWRD	Confirming releases from Prineville Reservoir are coordinated at monthly call between Reclamation, USFW, NMFS, OWRD, ODFW, CTWS, City of Prineville, and OID.
April 23, 2020	Gregg Garnett, Reclamation	Coordination about how Reclamation, FCA, and NRCS will work together to review OID's Plan-EA and engineering.
April 24, 2020	Gregg Garnett, Reclamation	Coordination between Reclamation and NRCS to develop a plan to review engineering designs for OID.
May 8, 2020	Tom Osborn, Bonneville Power Association	Discussion about reserved and supplemental power in OID.
May 12, 2020	Bridget Moran, USFWS	Review of OID's project impacts to bull trout.
May 29, 2020	Gregg Garnett, Reclamation	Coordination between Reclamation, FCA, and NRCS for OID Plan-EA review.
June 9, 2020	Peter Lickwar, USFWS	Technical assistance regarding impacts of OID's Modernization Alternative on bull trout in the Crooked River.
June 18, 2020	Gregg Garnett, Reclamation	Coordination between Reclamation, FCA, and NRCS for OID Plan-EA review.
July 14, 2020	Anita Andazola, USACE	Coordination regarding wetland delineation and the new Navigable Waters Protection Rule.
July 24, 2020	Christine Horting-Jones, Reclamation	Review of OID's cultural resources in Plan-EA.
July 31, 2020	Gregg Garnett, Reclamation	Coordination between Reclamation, FCA, and NRCS for OID Plan-EA review.
August 6, 2020	Wade McGilvra, Reclamation	Review of natural resource sections of OID's Plan-EA for Reclamation NEPA compliance.

Date	Contact, Agency	Communication
August 7, 2020	Nancy Coleman, Reclamation	Review of OID's Plan-EA for NEPA compliance.
August 12, 2020	Anita Andazola, USACE	Coordination between USACE, FCA, and NRCS to discuss the proposed project and when consultation should occur.
September 29, 2020	Scott Carlon, NMFS	Discussion on the necessity to cover steelhead in OID's biological assessment. Although not necessary due to 10(j) status, FCA would cover steelhead in OID's biological assessment.
October 2, 2020	Bobby Brunoe, CTWS	Correspondence with CTWS to consult with NRCS about OID's Plan-EA.
October 9, 2020	Bridget Moran, USFWS	Coordination between USFWS, NMFS, and Reclamation to discuss covered actions in OID's biological assessment.
October 16, 2020	Peter Lickwar, USFWS	Coordination about OID's expected streamflow changes following project implementation.
November 2, 2020	Peter Lickwar, USFWS	Received NUID's 2018 and 2019 pumping data for Crooked River streamflow analysis.
November 5, 2020	Bridget Moran, USFWS Scott Carlon, NMFS	Provided draft biological assessment for USFWS review.
November 6, 2020	Scott Carlon, NMFS	NMFS acknowledged that they have no comments or edits to OID's draft biological assessment.
November 12, 2020	Bridget Moran, USFWS	USFWS acknowledged that they have no comments or edits to OID's draft biological assessment.
November 13, 2020	Bridget Moran, USFWS Scott Carlon, NMFS	Joint correspondence with the Services to initiate informal consultation on a May Affect-Not Likely to Adversely Affect Letter of Concurrence regarding OID's final biological assessment.
November 23, 2020	Bridget Moran, USFWS	May Affect-Not Likely to Adversely Affect Letter of Concurrence received
December 7, 2020	Scott Carlon, NMFS	May Affect-Not Likely to Adversely Affect Letter of Concurrence received

7.2 Review of the Draft Plan-EA

NRCS published the proposed Draft Plan-EA on oregonwatershedplans.org for public review on September 1, 2020, for a 30-day comment period ending on September 30, 2020. During the comment period, NRCS hosted a virtual public outreach meeting on September 16, 2020, via Zoom. Specific public outreach activities for the Draft Plan-EA included:

- NRCS Public Notice (September 1, 2020) https://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/newsroom/pnotice/?cid=nrcseprd1643221
- NRCS News Release (September 1, 2020) https://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/newsroom/releases/?cid=NRCSEPRD1643223
- OID postcard to patrons (September 1, 2020)
- OID website announcement (September 1, 2020)
- Central Oregonian public notice (September 1, September 8, September 15, 2020)
- FCA emails to stakeholder list (September 1, September 15, September 28, 2020)
- Virtual public outreach meeting hosted via Zoom Webinar (September 16, 2020) from 6:00 p.m. to 7:00 p.m—A recording of the meeting is available at oregonwatershedplan.org/ochoco-id

NRCS sent an initial letter on August 30, 2020 to the CTWS Tribal Historic Preservation Officer outlining the project and initial planning. CTWS provided no comments on the Draft Plan-EA. NRCS followed up with CTWS on October 2, 2020, to complete tribal consultation.

Comments on the Draft Plan-EA were submitted by email to ochoco.id.comments@gmail.com, online at oregonwatershedplans.org, and by mail to Farmers Conservation Alliance, 101 State St, Hood River, OR 97031.

During the review period, 22 comments on the proposed Draft Plan-EA were received. These comments were received from individuals, non-governmental organizations (Central Oregon Land Watch, Water Watch, Trout Unlimited, Deschutes River Conservancy, Oregon Farm Bureau), ODFW, OWRD, and USFWS.

NRCS has reviewed all public comments and has made changes, as appropriate, to this Final Plan-EA based on those comments and internal review. Each comment received consideration in the development of the final rule. According to the NEPA Handbook 6.9.2.1, substantive comments do one or more of the following:

- Question, with reasonable basis, the accuracy of information in the EIS or EA.
- Question, with reasonable basis, the adequacy of, methodology for, or assumptions used for the environmental analysis.

- Present new information relevant to the analysis.
- Present reasonable alternatives other than those analyzed in the EIS or EA.
- Cause changes or revisions in one or more of the alternatives.

A summary of recurring comments received on the Draft Plan-EA are listed below. For a full list of comments and responses, see Appendix A.

- Effect on local groundwater levels and private wells from reduced groundwater recharge.
- Request that all water saved by the project be verified after implementation.
- Request for clarification about McKay Creek water rights and prior appropriation.
- Request that additional alternatives be considered.
- Request that fish passage be preserved following the Crooked River weir raise.
- General support for water that would be conserved by the project.

8 Preferred Alternative

8.1 Selection and Rationale for the Preferred Alternative

NRCS has selected the Modernization Alternative as the Preferred Alternative[51] based on its ability to meet the purpose and need for the project and provide the most beneficial effects on environmental and social resources. The Preferred Alternative is the only alternative that meets each of the purpose and need, funding requirements, and NEE benefit-cost ratio requirements. The Modernization Alternative is the alternative that would most maximize net economic benefits[52]. The District has agreed that the Modernization Alternative is their Preferred Alternative.

Although the Modernization Alternative would have minor effects on various resources (Section 6), those effects would be mitigated through BMPs and other compliance measures. As a tradeoff to those effects, the Modernization Alternative would permanently protect instream flows in the McKay Creek and Crooked River, supporting ecological resources in and along the creek and river system, particularly habitat and water quality resources. Additionally, as analyzed in the NEE, there would be positive economic benefits from this alternative, including increased instream flow, agricultural yield enhancement and reduced O&M costs. When compared to the No Action Alternative, in the face of current conditions and future environmental changes, the Modernization Alternative would support the health and resiliency of Crooked River and McKay Creek ecosystems well as the agricultural resiliency of District patrons.

8.2 Measures to be Installed

The District would install 16.8 miles of buried pipe, of which 6.6 miles would be fully pressurized and 10.2 miles partially pressurized. Pipe would range in diameter from 4 to 78 inches. A new pump station and new pipeline (6.6 miles) would be installed along McKay Creek to allow OID water to reach McKay Creek irrigators (Project Group 1). The District would install three new pump stations and raise the Crooked River Diversion weir to accommodate the additional water carried through the system to the McKay Pipeline (Project Group 1). The four pump stations installed would include meters to measure electricity use. The District's open Grimes Flat laterals (8.2 miles) would be converted to buried pipe and a fourth pump station would be installed to improve water delivery along these laterals (Project Group 2). 1.9 miles of the District's IronHorse section open canals would be decommissioned, and 1.2 miles of pipe would be installed in a new alignment to replace the decommissioned section (Project Group 3).

In total, the District would upgrade 39 turnouts to pressurized delivery systems. After the District turnouts, any on-farm upgrades, such as pond removal, would not be included in this project and would be the irrigator's responsibility.

[51] The "Preferred Alternative" is defined in the NWPH as, "The option and course of action that the SLO and NRCS agree best addresses the stated purpose and need" (NRCS 2014).

[52] Net economic benefits are benefits minus costs and are not the same as the "benefit-cost ratio."

Prior to installation engineering designs would be reviewed by Reclamation and NRCS Montana. The improvements and new installations would be encompassed in three project groups with construction occurring over 3 years. Table 8-1 summarizes the measures to be installed. Sections 8.6 and 8.7 provide more detailed information about construction and O&M of the Preferred Alternative. Appendix D includes a detailed breakdown of project costs.

The construction of the Preferred Alternative would include mobilization and staging of construction equipment, delivery of piping to construction areas, excavation of trenches, fusing of pipelines, removal of existing pipe in certain areas, placement of pipe, compaction of backfill, and restoration and reseeding of disturbed areas. In some locations, construction access would need to be created prior to bringing pipes or equipment into construction areas. Creating this access could include the removal of vegetation within the construction area. Appropriately sized construction equipment would be used to minimize disturbance in the construction area. Borrow material would most likely be needed to backfill the canal surrounding pipelines, assuming little to no material is available from prior canal dredging activities.

Construction would occur during the non-irrigation season (November through March), which could be extended on either end depending on water availability. Project construction could begin as early as the 2021-2022 non-irrigation season. The construction of the project is anticipated to require three non-irrigation seasons to complete.

Table 8-1. Proposed Features for the Preferred Alternative within Ochoco Irrigation District.

Type	Project Feature	Quantity	Subtotal
Pipe	McKay Creek Pipeline	6.6 miles	$3,735,000
Pipe	Grimes Flat piping	8.2 miles	$2,831,000
Pipe	IronHorse piping realignment	1.2 miles	$4,271,000
Decommission	IronHorse canal decommission	1.9 miles	--[1]
Pipe	Pipe replacement	0.1 miles	$535,000
Canal improvement	Canal bank raises	15.2 miles[2]	$1,501,000
	Total new or improved canal infrastructure	**33.2 miles**	**$12,873,000**
Pump Station	Cox Pump Station	1	$1,287,000
Pump Station	Crooked River No. 1 Pump Station/ associated pipe	1/ 0.2 miles	$4,711,000
Pump Station	Crooked River No. 2 Pump Station/ associated pipe	1/ 0.3 miles	$4,097,000
Pump Station	Crooked River No. 3 Pump Station	1	$512,000
	Total pump stations installed/ associated pipe	**4/ 0.5 miles**	**$10,607,000**
General infrastructure improvement	Crooked River Diversion Weir Raise	1	$61,000
General infrastructure improvement	Crooked River Diversion Canal Old Drum Screen Structure Removal[3]	1	$82,000
General infrastructure improvement	Ochoco Creek Weir/ Spill Structure	1	$26,000
General infrastructure improvement	Ochoco Siphon Size Increase	1	$133,000
	Total general infrastructure improved	**4**	**$302,000**
		Subtotal	$23,782,000
		Engineering, Construction Management, Survey[4]	$1,776,000
		Construction Contractor Markup[4]	$887,000
		Contingency[4]	$3,111,000
		TOTAL	**$29,556,000**

Totals are rounded to nearest $1,000.

[1] Cost of IronHorse canal decommissioning is included in IronHorse pipe realignment

[2] Canal improvements would occur over an estimated 9 miles of 15.2 miles of open canal or where necessary.

[4] The drum screen is no longer needed and was removed years ago; only the concrete structures remain.

[3] Percentages for Engineering, Construction Contractor, and Contingency vary across project features.

8.3 Minimization, Avoidance, and Compensatory Mitigation Measures

Project design features and BMPs that would be applied during construction of the Preferred Alternative to avoid and minimize effects on environmental and social resources are described below.

8.3.1 Temporary Access

Prior to construction, the District would contact each landowner along the proposed route to discuss the project and approve an easement agreement if necessary. Adjacent landowners would be provided a construction schedule before construction begins. Where possible, work would be confined to the existing and new easements. In addition, construction limits would be clearly flagged to preserve existing vegetation and private property. Access to residences, farms, and businesses would be maintained during construction. Construction would occur during the daytime in the winter to minimize disturbance to any landowners or other individuals in the construction area vicinity. Following project completion in an area, all temporary access roads that were created would be decommissioned and obliterated.

8.3.2 Staging, Storage, and Stockpile

Mechanized equipment and vehicles would be selected, operated, and maintained in a manner that minimizes adverse effects on the environment. Construction staging areas would be selected and used to minimize effects on vegetation and avoid the removal of trees. Construction equipment and vehicles would be parked a minimum of 150 feet away from streams, wetlands, ditches, and other waterbodies at the end of each workday. Fueling and maintenance operations would be performed on a flat surface, away from moving equipment, and at least 150 feet away from any water source. These areas are included in the project area (Section 1.2).

8.3.3 Roads and Traffic Control

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

8.3.4 Erosion Control

Silt fencing, straw wattles, geotextile filters, straw bales, or other erosion control measures would be used to minimize soil erosion and prevent soil erosion from entering waterbodies during construction. Erosion control measures would be free of weeds and weed seeds. During construction of the Crooked River weir, turbidity testing would be conducted downstream from the weir during construction to monitor for total dissolved solids. Drainage measures would be incorporated into the engineering design to minimize effects of piping canals on local flooding.

8.3.5 Spill Prevention, Control, and Countermeasure

Spill kits would be located at fuel storage areas and the construction crew would have adequate absorbent materials and containment booms on hand, to enable the rapid cleanup of any spill.

Immediately upon learning of any fuel, oil, hazardous material including uncured concrete, or other regulated substance spill, or upon learning of conditions that would lead to an imminent spill, the person discovering the situation shall initiate actions to contain the fluid or eliminate the source of the spill and notify the Spill Coordinator or crew Foreman immediately. If it is determined that a spill is beyond the scope of on-site equipment and personnel, an Environmental Emergency Response Contractor would be contacted immediately to contain or clean up the spill. Any spill into a waterbody or along the adjacent streambed would be reported immediately to Oregon Emergency Response Service at 1-800-452-0311 and the National Response Center at 1-800-424-8802. The Spill Coordinator would complete a Spill Report Form for each release of a regulated substance, regardless of volume.

8.3.6 In-water Construction

All equipment would be inspected for aquatic invasive species before use within a waterbody. Equipment in water would be treated on-site for removal of all aquatic remnants (plants, seeds, and animals), mud, and soil. Concrete BMPs would be followed, including concrete washout practices, pour containment, drip and spill control, pH moderation, proper disposal of excess concrete, and disposal of wash water. Sediment control would be used onsite and turbidity testing would be conducted downstream from Crooked River weir raising during construction to monitor for total dissolved solids.

8.3.7 Wetland and Riparian Areas

Measures would be followed to minimize the destruction, loss, or degradation of wetlands and are required in order for the proposed action not be subject to the 8 Step Process required by EO 11990. The District would document that a qualified professional engineer has determined that the boring or drilling is of sufficient depth below the wetland and that the entry and exit points are of sufficient distance laterally from the wetland to avoid puncturing the wetland pan, draining the wetland, or causing similar adverse impacts to the wetland. All staging areas would follow that stated in Section 8.3.2. Construction would be avoided during sensitive times of the year to minimize impact to fish spawning and bird nesting habitats.

8.3.8 Invasive Species Control

Measures would be followed to avoid introduction of invasive plants and noxious weeds into project areas. Any gear to be used in or near water would be inspected for aquatic invasive species, including Zebra mussel, and cleaned off-site prior to mobilizing. Ground disturbances would be limited to those areas necessary to safely implement the Preferred Alternative.

8.3.9 Revegetation

During excavation for new piping alignments, topsoil would be saved and replaced as the top layer after trenches are filled. Areas disturbed for access purposes or during construction would be regraded to their original contours. When necessary, compacted areas, such as access roads, stream crossings, staging, and stockpile areas would be loosened to facilitate revegetation and improved infiltration. Disturbed areas would be planted with a native seed mix appropriate to the habitat. Revegetation practices would follow NRCS Oregon and Washington's Guide for Conservation

Seedings and Plantings (NRCS 2000). Pruning would occur entirely within the ROW and would not exceed what is required for equipment clearance. At adjacent landowners' requests and during the non-irrigation season, the District would remove trees in the ROW that do not survive piping for 2 years following construction.

Disturbance of wetlands not associated/concomitant with irrigation canals would be avoided during construction.

8.3.10 Wildlife Mitigation

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

A section of project area on the Crooked River Diversion Canal is within 0.2 mile from the Crooked River Rim Golden Eagle nesting area, and an additional section of the Crooked River Distribution Canal (near the IronHorse neighborhood) is within 0.5 mile from the Barnes Butte Golden Eagle nesting area. Because of the proximity of the project area to nesting sites, a seasonal restriction for the use of hydraulic hammers is in effect for these segments of the project area. Clearance surveys would be completed prior to implementation, and early coordination with USFWS is ongoing (E. Weidner, personal communication, November 15, 2019).

In appropriate cases and under consultation with USFWS, ramps would be placed in open pipeline trenches during construction to avoid the potential for wildlife to become trapped overnight.

8.3.11 Fish Passage Preservation

Fish passage would be maintained for any fish likely to be present during construction of the weir. The District and contractors would work with ODFW or USFWS personnel to implement activities in accordance with required permits.

8.3.12 Cultural Resources

If archaeological resources are inadvertently discovered during construction, an Inadvertent Discovery Plan would be followed (Appendix E.9). Construction would stop in the vicinity of the discovery, the area would be secured and protected, a professional archaeologist would assess the discovery, consultation with SHPO, NRCS cultural resources staff, THPO, and other consulting parties including affiliated tribes would occur as appropriate. Continuation of construction would occur in accordance with applicable guidance and law.

8.3.13 Land Rights and Easements

Not all the Modernization Alternative would be located within the District's existing easements. The 6.6 miles of McKay Pipeline and the IronHorse realignment would require new easements (Section 4.8.1.2 and Section 6.2.2). Prior to construction, the District would communicate with landowners

and obtain an easement agreement. Following pipeline installation, as-built surveys would be completed and attached to easements.

8.4 Permits and Compliance

8.4.1 Local and County

- **Crook County Planning**: Under OAR Chapter 340, Division 18, a Land Use Compatibility Statement would be submitted for county approval prior to construction.

8.4.2 State

- **Department of Environmental Quality**: The National Pollutant Discharge Elimination System program, implemented by ODEQ, would require a permit for construction activities including clearing, grading, excavation, materials or equipment staging and stocking piling that would disturb one or more acres of land and have the potential to discharge into a public waterbody. The proposed Crooked River Diversion weir raise would require a 1200-C permit to fulfill CWA Section 402 requirements.

- **Oregon Water Resources Department**: To change the place of use, character of use, and/or point of diversion/appropriation of a water right, a water right transfer application must be approved by OWRD. The District would apply for an Allocation of Conserved Water associated with the Preferred Alternative under ORS 537.

- **Department of State Lands**: Prior to project implementation, consultation with ODSL would occur to perform wetland determinations for sites throughout the project area and determine exemption applicability to canals and laterals in the District. Oregon's Removal-Fill Law (ORS 196.795-990) requires any person who plans to remove or fill material within waters of the state to obtain a permit from the Department of State Lands. A removal-fill permit from ODSL would be obtained for the proposed Crooked River Diversion weir raise.

- **Oregon Department of Fish and Wildlife:** Since August 2001, the owner or operator of an artificial obstruction located in waters in which native migratory fish are currently or were historically present must address fish passage requirements prior to certain trigger events, such as the construction, installation, replacement, extension, or repair of culverts, roads, or any other hydraulic facilities. Laws regarding fish passage are found in ORS 509.580 through ORS 509.910 and in OAR 635, Division 412. Functioning fish screens are present at OID's irrigation diversions, and no fish are present within existing canals and laterals; therefore, no additional consultation or permitting is required for activities pertaining to the District's canals and laterals.

  ODFW fish passage criteria (OAR 635-412-035) and/or guidance must be met for in-water work. Prior to construction of the proposed Crooked River Diversion weir raise, the District would be required to obtain from ODFW an approval determination of a fish passage plan that meets the requirements of OAR 635-412-0035 for the specific artificial obstruction or obtain from ODFW a programmatic approval of a fish passage plan for multiple artificial

obstructions of the same time. Programmatic approvals are only valid so long as the owner or operator complies with the conditions of the programmatic approval.

8.4.3 Federal

- **National Historic Preservation Act Section 106**: Pursuant to 36 CFR Part 800 of the NHPA (1966, as amended in 2000), and the regulations of the Advisory Council on Historic Preservation implementing Section 106 of the NHPA (54 U.S.C. 306108), federal agencies must take into account the potential effect of an undertaking on "historic properties," which refers to cultural resources listed in, or eligible for listing in the National Register of Historic Places. Consultation with SHPO, NRCS, THPO, and other consulting parties including affiliated tribes to fulfill Section 106 obligations would be completed for the project prior to implementation.

- **Clean Water Act:**

  Section 404: Under Section 404(f)(1)(C) of the CWA, discharges of dredged or fill material associated with construction or maintenance of irrigation ditches, or the maintenance (but not construction) of drainage ditches, are not prohibited by or otherwise subject to regulation under Section 404. Discharges of dredged or fill material associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant to and functionally related to irrigation ditches are included in the exemption for irrigation ditches. Under 33 CFR 323.4(a)(1)(iii)(C)(1)(i), "[c]onstruction and maintenance of upland (dryland) facilities such as ditching and tiling, incidental to the planting, cultivating, protecting, or harvesting of crops, involve no discharge of dredged or fill material into [W]aters of the United States, and as such never require a Section 404 permit." The construction and maintenance of irrigation ditches and maintenance of drainage ditches may require the construction and/or maintenance of a farm road. Subsection 404(f)(1)(E) exemption for discharges of dredged or fill material associated with the construction or maintenance of farm roads applies where such related farm roads are constructed and maintained in accordance with BMPs. However, in 33 CFR 323.4(a)(6) and 40 CFR 232.3(c)(6), there must be assurance that flow and circulation patterns and chemical and biological characteristics of Waters of the United States are not impaired, that the reach of the Waters of the United States is not reduced, and that any adverse effect on the aquatic environment would be otherwise minimized. Prior to construction activities, coordination and consultation with USACE would occur and measures taken as required to identify and mitigate impacts to potential jurisdictional wetlands and Waters of the United States.

  The proposed Crooked River Diversion weir raise would include construction activities in Waters of the United States. A Section 404 permit is required from the USACE when a project require fill or other modification of Waters of the United States. A request for a USACE permit to affect Waters of the United States involves other resource and regulatory agencies as part of the interagency review process and applications for a Section 404 permit would be prepared and submitted prior to construction activities.

  Section 401: Implemented by ODEQ, see above.

- **Farmland Protection Policy Act:** The Farmland Protection Policy Act (7 U.S.C. 4201 *et seq.*) directs federal agencies to identify and quantify adverse impacts of federal programs on farmlands. The Act's purpose is to minimize the number of federal programs that contribute to the unnecessary and irreversible conversion of agricultural land to nonagricultural uses. The project occurs primarily in EFU zones; however, all work would be done within existing and new easement agreements and ROW. The project would support agricultural productivity and the intention of the Act.

- **Endangered Species Act:** The ESA establishes a national program for the conservation of threatened and endangered species and the preservation of the ecosystems on which they depend. The ESA is administered by the USFWS for wildlife and freshwater species, and by NMFS for marine and anadromous species. The ESA defines procedures for listing species, designating critical habitat for listed species, and preparing recovery plans. It also specifies prohibited actions and exceptions. Section 7 of the Act, called "Interagency Cooperation," is the mechanism by which federal agencies ensure the actions they take, including those they fund or authorize, do not jeopardize the existence of any listed species. Under Section 7, federal agencies must consult with USFWS when any action the agency carries out, funds, or authorizes (such as through a permit) *may affect* a listed endangered or threatened species.

  Under the Modernization Alternative, increased streamflow in the Crooked River and McKay Creek (see Section 6.9.2.2), would have a negligible to minor, but beneficial, impact to bull trout and Middle Columbia River steelhead populations (P. Lickwar, personal communication, June 9, 2020; USFWS, 2005). Informal consultation under Section 7 has been initiated.[53]

  Because Middle Columbia River steelhead is a non-essential experimental population located outside a National Wildlife Refuge or National Park, and because implementation of the Modernization Alternative would not affect the continued existence of the species, consultation with NMFS is not necessary (76 *Federal Register* 28715, 2011; 81 *Federal Register* 33416, 2016).

- **Magnuson Stevens Act:** The Magnuson-Stevens Act established requirements for including Essential Fish Habitat (EFH) descriptions in federal fishery management plans, and it requires federal agencies to consult with NMFS on activities that may adversely affect EFH (Pub. L. No. 104-297). EFH can include all streams, lakes, ponds, wetlands, and other viable waterbodies, and most of the habitat historically accessible to salmon necessary for spawning, breeding, feeding or growth to maturity. As the project would not affect EFH, consultation under the Magnuson Stevens Act is not required.

- **Safe Drinking Water Act**: Since the project would have no direct or indirect discharge to groundwater, permitting under the Safe Drinking Water Act is not required.

- **Migratory Bird Treaty Act:** The MBTA implements various treaties and conventions between the US and other countries, including Canada, Japan, Mexico, and the former Soviet

[53] Coordination with USFWS in ongoing as required by the provision of PL 83-566 Section 12.

Union, for the protection of migratory birds (16 U.S.C. 703–712). Under the Act, taking, killing, or possessing migratory birds, or taking, destroying, or possessing their eggs or nests, is unlawful. The Act classifies most species of birds as migratory, except for upland and nonnative birds such as pheasant, chukar, gray partridge, house sparrow, European starling, and rock dove. As the project would not affect MBTA species, consultation under the Migratory Bird Treaty Act is not required.

- **Bald and Golden Eagle Protection Act**: The BGEPA prohibits anyone from "taking" bald and golden eagles (including their eggs or nests) without a permit from the Secretary of the Interior. (16 U.S.C. 668–668d). A section of project area on the Crooked River Diversion Canal is within 0.2 mile from the Crooked River Rim Golden Eagle nesting area, the section of the Crooked River Distribution Canal near the IronHorse neighborhood is within 0.5 mile from the Barnes Butte Golden Eagle nesting area. Because of the proximity of the project area to nesting sites, requirements of the Protection Act would be implemented appropriately.

8.5 Costs

Table 8-3 presents the total project cost of $30,788,000 for the Preferred Alternative. PL 83-566 funds would support $14,334,000 of the total project cost where the $11,592,000 remainder of the cost would be contributed by other, non-federal funds. Table 8-4 itemizes the costs for each project feature and the distribution of how the costs would be shared by the sponsors and NRCS for each cost item.

- Construction costs account for all material, labor, and equipment necessary for the installation of piping and the construction of the siphon river crossing associated with the Preferred Alternative. These costs were estimated based on costs for similar installations at nearby irrigation districts in Central Oregon. The planning construction costs are estimated using the best available information about the project without having detailed design information.
- Engineering costs were estimated as a percentage of the cost of construction.
- The costs presented are planning level estimates and do not reflect final costs. Detailed designs and construction cost estimates would be completed prior to initiating the project. Final construction costs would only reflect the time and materials to perform the work.

8.6 Installation and Financing

The following sub-sections present the installation and financing of the Preferred Alternative. Included in this section is a framework for implementing the Preferred Alternative, the sequence of installation, responsibilities, contracting, real property and relocations, other agencies, cultural resources, financing, and conditions for providing assistance.

8.6.1 Framework for Carrying out the Plan

The Preferred Alternative would be implemented in a planned sequence as discussed in Section 8.6.2. The responsibilities of NRCS and the sponsors for the project are outlined in Section 8.6.3.

No cost-shared on-farm measures are involved with this project; therefore, the responsibilities of individual participants do not need to be discussed. No preconditions are anticipated for installing the project.

8.6.2 Planned Sequence of Installation

The District would obtain all approvals and permits for the project prior to the start of construction. The District would complete mitigation either prior to the start of construction or during construction as necessitated by the resource. The entire project would be completed over a 3-year period commencing in 2021 and ending by 2024 (Table 8-2). The District developed an appropriate project phasing schedule that focused on addressing District priorities but also worked within engineering and funding constraints to meet District, patron, and community development needs. No federal funds would be expended on Project Group 1, which would update District infrastructure to enable the McKay Switch until enough McKay Creek irrigators have committed to participate to ensure that Project Group 1 would have a benefit-cost ratio of greater than 1.

Table 8-2. Preferred Alternative Planned Sequence of Installation

Construction Year	Works of Improvement	PL 83-566 Funds	Other, Non-Federal Funds	Total Construction Costs
0	Project Group 1	$10,454,000	$3,525,000	$13,979,000
2	Project Group 2	$8,507,000	$2,836,000	$11,343,000
1	Project Group 3	$4,100,000	$1,366,000	$5,466,000
	Total	**$23,061,000**	**$7,727,000**	**$30,788,000**

Price Base: 2020 dollars Prepared August 2020

8.6.3 Responsibilities

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

As a cooperating agency, Reclamation is responsible for assisting in the planning effort; review of engineering designs to ensure construction methods meet Reclamation standards; participation in Section 106 of NHPA as the owner of the infrastructure; providing language for the Environmental Assessment; and providing subject matter experts to answer questions such as the history of the Crooked River Project, operations and maintenance plans, past Endangered Species Act consultations, and other topics as needed.

Each of NRCS and Reclamation would prepare its own Finding of No Significant Impact (FONSI) statement if warranted. Further site-specific environmental compliance may be required for specific implementation activities. Each agency would be responsible for preparing categorical exclusions or other such instruments for implementation.

8.6.4 Contracting

The piping and pressurization of the delivery system would be completed using NRCS funding mechanisms. The District would be primarily responsible for overseeing and administering the construction of the project in coordination with NRCS. Reclamation would be consulted as needed.

8.6.5 Real Property and Relocations

Any real property acquisition or relocations needed would be completed in conjunction with Reclamation. All construction would be completed under either existing, OID-operated and maintained easements or the newly obtain easement agreements as described in Section 8.4.

Reclamation Realty staff would provide feedback and review internal documentation of existing ROW descriptions and stipulations.

8.6.6 Financing

NRCS would provide 75 percent of the total project cost for the Preferred Alternative through PL 83-566. The District is responsible for securing funding for the remaining 25 percent of the costs, including funds that are not eligible under the National Watershed Program (project administration and technical assistance). Table A in the NEE presents annual installation costs of the project and the proportion of funding through PL 83-566 funding and other funding sources.

The majority of the required match funding would be expected to be provided through grants. If necessary, a portion of the project cost would be financed through loans. If financing is required, OID expects to apply for funding through the ODEQ Clean Water State Revolving Fund. The District expects that funding from this source would be at an interest rate of 2.5 percent with a 0.5 percent annual fee OID on the remaining loan balance. These financing costs are not included in the NEE analysis. The District does not anticipate changing per acre annual rates or the overall base assessment fee as a result of any capital improvement project that is fully funded through grants.

O&M costs after project completion would be provided through the revenues of OID. O&M costs would not increase due to the project and would be budgeted on an annual basis.

NRCS reserves the authority and right to discontinue or reduce program benefits based on changes in agency priorities, funding availability, or the failure of OID to fulfill the provisions of their agreement.

8.6.7 Conditions for Providing Assistance

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

8.7 Operation, Maintenance, and Replacement

The District would be responsible for the O&M of the project for the 100 years of its design life. Prior to construction, a separate O&M agreement, based on 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 and NRCS would make annual inspections of project measures to assure the quality of ongoing operations and maintenance. The District would be responsible for scheduling operations and maintenance inspections and responsible for any necessary work. The District's O&M would consist of a pipe inspection program and the ongoing Canal Inspection process with Reclamation that would systematically cover inspection of piped areas over a period of several years. As a cooperating agency, Reclamation and the District are in communication about project actions and are exploring the possibility of a title transfer for all Reclamation easements along the canals that would be filled.

The proposed system would continue its current operation schedule of April through October, in which 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 the project sponsor and NRCS.

8.8 Economic and Structural Tables

A summary of the economic analysis of the Preferred Alternative (NEE Alternative) and No Action Alternative (the Future without Federal Investment) is provided in Section 5.4. The full NEE Analysis can be found in Appendix D. The costs and benefits associated with the project are further detailed in the following tables in this section. Table 8-3 (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 project. Table 8-4 (NWPM Economic Table 2, 506.12) presents the project's cost as well as the proportion of PL 83-566 funding and other funding sources. The average annual NEE costs are shown in Table 8-5 (NWPM 506.18, Economic Table 4). Table 8-6 (NWPM 506.20, Economic Table 5a) presents the average annual watershed protection damage reduction benefits. The Preferred Alternative damage reduction benefits include agricultural yields, power cost savings, reduced O&M costs, improved fish and wildlife habitat and avoided carbon emissions. Using the resulting benefits and costs from the previous two tables, Table 8-7 (NWPM 506.21, Economic Table 6) presents a comparison of the NEE average annual benefits and average annual costs. Table 8-8 (NWPM 506.17, Structural Table 3b) presents the existing structural data of the irrigation canals that would be modified.

Table 8-3. Economic Table 1—Estimated Installation Cost of the Modernization Alternative, Water Resource Project Measures, Deschutes Watershed, Oregon, 2020$.[1,2]

Works of Improvement	Unit	Number			Estimated cost (dollars)						
					PL 83-566 Funds			Other Funds			
		Non-Federal land	Federal land	Total	Non-Federal land NRCS[3]	Federal land NRCS	Total	Non-Federal land	Federal land	Total	Total
Project Group 1	Miles	17.7	0.2	17.9	$10,425,000	$29,000	$14,334,000	$3,515,000	$10,000	$3,525,000	$13,979,000
Project Group 2	Miles	8.2	0.0	8.2	$8,507,000	$0	$8,507,000	$2,836,000	$0	$2,836,000	$11,343,000
Project Group 3	Miles	1.2	0.0	1.2	$4,100,000	$0	$4,100,000	$1,366,000	$0	$1,366,000	$5,466,000
Total project					**$23,032,000**	**$29,000**	**$23,061,000**	**$7,717,000**	**$10,000**	**$7,727,000**	**$30,788,000**

Notes: Totals may not sum due to rounding Prepared: August 2020

[1] Price base: 2020 dollars

[2] Project cost as identified in the OID SIP prepared by Black Rock Consulting, 2017, and by communications with Black Rock Consulting, 2020. All costs updated to 2020 dollars and including an additional 3 percent project administration cost and $300,000 technical assistance cost per the DBBC FY19 contract.

[3] Federal agency responsible for assisting in installation of works of improvement

Table 8-4. Economic Table 2—Estimated Modernization Alternative Cost Distribution, Water Resource Project Measures, Deschutes Watershed, Oregon, 2020$.[1,2]

Works of Improvement	Installation Costs—PL 83-566 Funds				Installation Cost—Other Funds				
Piping	Construction	Engineering	Project Admin[3]	Total PL 83-566	Construction	Engineering	Project Admin[3]	Total Other	Total
Project Group 1	$9,732,000	$317,000	$268,000	$10,454,000	$3,244,000	$106,000	$134,000	$3,525,000	$13,979,000
Project Group 2	$7,737,000	$443,000	$218,000	$8,507,000	$2,579,000	$148,000	$109,000	$2,836,000	$11,343,000
Project Group 3	$3,873,000	$68,000	$105,000	$4,100,000	$1,291,000	$22,000	$53,000	$1,366,000	$5,466,000
Total Costs	**$21,342,000**	**$828,000**	**$591,000**	**$23,061,000**	**$7,114,000**	**$276,000**	**$296,000**	**$7,727,000**	**$30,788,000**

Notes: Totals may not sum due to rounding Prepared: August 2020

[1] Price base: 2020 dollars

[2] Project cost as identified in the OID SIP prepared by Black Rock Consulting, 2017, and by communications with Black Rock Consulting, 2020. All costs updated to 2020 dollars and including an additional 3 percent project administration cost and $300,000 technical assistance cost per the DBBC FY19 contract. Of total estimated costs presented in the SIP and in communications, Black Rock Consulting estimated 96 percent is for construction and 4 percent for engineering.

[3] Project Admin includes project administration, technical assistance costs and permitting costs.

Table 8-5. Economic Table 4—Estimated Average Annual NEE Costs Over the No Action Alternative, Deschutes Watershed, Oregon, 2020$.[1]

Project Group	Project Outlays (Amortization of Installation Cost)	Other Direct Costs[2] (Increased Pumping Costs Elsewhere in Basin from Reduced GW Recharge)	Total Cost
Project Group 1	$398,000	$86,000	$484,000
Project Group 2	$316,000	$0	$316,000
Project Group 3	$157,000	$0	$157,000
Total	**$871,000**	**$86,000**	**$957,000**

Prepared: August 2020

[1] Price base: 2020 dollars, amortized over 100 years at a discount rate of 2.750 percent.
[2] Other direct costs include the uncompensated economic losses due to changes in resource use or associated with installation, operation or replacement of project structures.

Table 8-6. Economic Table 5a—Estimated Average Annual Watershed Protection Damage Reduction Benefits Ochoco Irrigation District 2020 Watershed Plan, Deschutes Watershed, Oregon, 2020$.[1]

Item	Damage Reduction Benefit, Average Annual	
	Agricultural-Related[1]	Non-Agricultural- Related[1]
Project Group 1		
On-Site Damage Reduction Benefits		
Other - Agricultural Yield Enhancement (Increased Net Returns)	$207,000	--
Other - Reduced O&M	$153,000	--
Other - Power Cost Savings	$21,000	--
Subtotal	$381,000	--
Off-Site Damage Reduction Benefits		
Other - Social Value of Carbon (Avoided Carbon Emissions)[2]	--	$0
Transportation Infrastructure Savings	--	$0
Land Value Improvement	--	$0
Water Conservation	--	$144,000
Subtotal	--	$144,000
Total Quantified Benefits	**$344,000**	**$144,000**
Project Group 2		
On-Site Damage Reduction Benefits		
Other - Agricultural Yield Enhancement (Increased Net Returns)	$4,000	--
Other - Reduced O&M	$185,000	--
Other - Power Cost Savings	$25,000	--
Subtotal	$214,000	--

Item	Damage Reduction Benefit, Average Annual	
	Agricultural-Related[1]	**Non-Agricultural- Related[1]**
Off-Site Damage Reduction Benefits		
Other - Social Value of Carbon (Avoided Carbon Emissions)[2]	--	$2,000
Transportation Infrastructure Savings	--	$0
Land Value Improvement	--	$0
Water Conservation	--	$115,000
Subtotal	--	$117,000
Total Quantified Benefits	**$214,000**	**$117,000**
Project Group 3		
On-Site Damage Reduction Benefits		
Other - Agricultural Damage Reduction	$0	--
Other - Reduced O&M	$65,000	--
Other - Power Cost Savings	$4,000	--
Subtotal	**$69,000**	--
Off-Site Damage Reduction Benefits		
Other - Social Value of Carbon (Avoided Carbon Emissions)[2]	--	$1,000
Transportation Infrastructure Savings	--	$166,000
Land Value Improvement	--	$8,000
Water Conservation	--	$32,000
Subtotal	--	$206,000
Total Quantified Benefits	**$69,000**	**$206,000**

Notes: Totals may not sum due to rounding. Prepared: August 2020

[1] Price base: 2020 dollars amortized over 100 years at a discount rate of 2.750 percent.

[2] These benefits would also accrue to local residents, but the majority of the value would be experienced outside the proposed project area.

Table 8-7. Economic Table 6—Comparison of Average Annual NEE Costs and Benefits, Ochoco Irrigation District 2020 Watershed Plan, Deschutes Watershed, Oregon, 2020$.[1]

	Agriculture-Related[1]			Non-Agricultural[1]						
Works of Improvement	Agricultural Yield Enhancement	Reduced O&M	Patron Pumping Power Cost Savings	Carbon Value	Instream Flow Value	Transportation Infrastructure Savings	Land Value Improvement	Average Annual Benefits[1]	Average Annual Cost[1,2]	Benefit–Cost Ratio
Project Group 1	$207,000	$153,000	$21,000	$0	$144,000	$0	$0	$525,000	$484,000	1.08
Project Group 2	$4,000	$185,000	$25,000	$2,000	$115,000	$0	$0	$331,000	$316,000	1.05
Project Group 3	$0	$65,000	$4,000	$0	$32,000	$166,000	$8,000	$275,000	$157,000	1.75
Total	**$211,000**	**$403,000**	**$50,000**	**$2,000**	**$291,000**	**$166,000**	**$8,000**	**$957,000**	**$1,763,000**	**1.18**

Notes: Totals may not sum due to rounding. Prepared: August 2020

[1] Price base: 2020 U.S. dollars amortized over 100 years at a discount rate of 2.75 percent.

[2] From Economic Table 4.

Table 8-8. Structural Table 3b—Channel Work. Ochoco Irrigation District 2020 Watershed Plan, Deschutes Watershed, Oregon.

						Channel Dimensions				*n* Value		Velocities (feet/ second)					
Channel name (reach)	**Station**	**Drain area (mile)**	**Year freq. design discharge (feet/ second)**	**Water surface elev. feet (mean sea level)**	**Hydraulic Gradient (feet/ feet)**	**Grad-ient**	**Bottom width (feet)**	**Elev. (feet/ mean sea level)**	**Side slope**	**Aged**	**As built**	**Aged**	**As built**	**Excava-tion volume (yard)**	**Type of work**	**Existing channel type**	**Present flow condi-tion**
Crooked River Diversion Canal	5,000 linear-feet	N/A	N/A	N/A	N/A	0.00026	12	2900.44	1.5:1	0.0225	0.0225	2.17	2.17	6,500 cubic-yard fill	Bank Raise	Earthen, Trap-ezoidal	Sub-critical
Crooked River Distributio n Canal	12,500 linear-feet	N/A	N/A	N/A	N/A	0.00035	9	2954.32	1.5:1	0.025	0.025	1.97	1.97	15,500 cubic-yard fill	Bank Raise	Earthen, Trap-ezoidal	Sub-critical
Ochoco Main Canal (middle upper)	16,600 linear-feet	N/A	N/A	N/A	N/A	0.00023	9	--	1.5:1	0.0225	0.0225	1.98	1.98	71,000 cubic-yard fill	Bank Raise	Earthen, Trap-ezoidal	Sub-critical

Prepared: August 2020

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10 List of Preparers

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

Table 10-1. List of Preparers.

Name	Title	Education	Professional Experience	Area Responsible For
FCA Watershed EA Team				
Kristin Alligood	Program Specialist	Ph.D. Biology B.A. Neuroscience	4 years	Alternatives, Fish and Aquatic Species, Geology and Soils, Purpose and Need, Vegetation, Wildlife, General
Raija Bushnell	Program Specialist	M.P.A. Natural Resource Policy M.S.E.S Natural Resource Management B.A. Political Science	6 years	Alternatives, Land Use, Vegetation, General
Brett Golden	Program Manager	M.E.M Environmental Management A.B. Environmental and Evolutionary Biology	14 years	General
Tyler Martin	Contractor/ Consultant	B.S. Communication Studies	11 years	Water resources
David McKay	Program Specialist	M.P.A. Environmental Policy B.A. Political Science	5 years	Cultural Resources, Public Scoping
Amanda Schroeder	Program Specialist	B.S. Natural Resource Management	5 years	Water resources, Wetlands
NRCS - Oregon				
Gary Diridoni	Natural Resource Specialist	Fisheries Management Graduate Certificate B.S. Wildlife Management B.S. Interdisciplinary Studies, Ecosystem Conservation	17 years	General
Tom Makowski	Assistant State Conservationist-Watershed Resources and Planning	Ph.D. Rural Sociology M.S. Social Psychology B.S. Recreation Resource Management	30 years	General

Name	Title	Education	Professional Experience	Area Responsible For
Lakeitha Ruffin	Agricultural Economist	M.S. Agricultural Economics B.S. Agricultural Economics	8 years	Economic and Socioeconomic Analysis, Alternative Analysis, Overall Watershed Planning
Employees from Firms Under Contract with FCA				
Barbara Wyse	Principal and Senior Economist, Highland Economics	M.S. Environmental and Natural Resource Economics B.A. Environmental Sciences and Policy	13 years	Economic Analysis
Winston Oakley	Research Economist, Highland Economics	M.S. Applied Economics B.S. Environmental Sciences, Policy, and Management	4 years	Economic Analysis
Sandy Slayton	Senior Project Manager, ERM	M.A. Ecology B.A. Environmental Science	15 years	General

11 Distribution List

A Notice of Availability for this Final Plan-EA will be distributed to federal, state, and local agencies, community representatives, and area non-governmental organizations. The agencies, representatives, and organizations on the mailing list include the following:

- Business Oregon
- Central Oregon Land Watch
- City of Prineville
- Coalition for the Deschutes
- Crook County
- Crook County Soil and Water Conservation District
- Deschutes River Conservancy
- National Marine Fisheries Service
- Oregon Department of Agriculture
- Oregon Department of Energy
- Oregon Department of Environmental Quality
- Oregon Department of Fish and Wildlife
- Oregon Department of State Lands
- Oregon Department of Transportation
- Oregon Governor's Office
- Oregon Water Resources Department
- Oregon Watershed Enhancement Board
- State Historic Preservation Office
- Trout Unlimited
- U.S. Army Corps of Engineers
- U.S. Bureau of Land Management
- U.S. Bureau of Reclamation
- U.S. Department of Agriculture, U.S. Forest Service, Ochoco National Forest
- U.S. Fish and Wildlife Service
- Upper Deschutes Watershed Council
- WaterWatch of Oregon

In accordance with EO 13175, Consultation and Coordination with Indian Tribal Governments, NRCS will contact CTWS regarding the availability of this Final Plan-EA.

The names of private stakeholders and members of the public who will receive notice of this Final Plan-EA are not listed for privacy.

12 Acronyms, Abbreviations, and Short-forms

BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
CEQ	Council on Environmental Quality
cfs	cubic feet per second
CFR	Code of Federal Regulations
CRWC	Crooked River Watershed Council
CTWS	Confederated Tribes of Warm Springs
CWA	Clean Water Act
DBBC	Deschutes Basin Board of Control District
DO	dissolved oxygen
EA	Environmental Assessment
EFH	Essential Fish Habitat
EFU	Exclusive Farm Use
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FCA	Farmers Conservation Alliance
HCP	Habitat Conservation Plan
HDPE	high-density polyethylene
IPaC	Information for Planning and Consultation
IUCN	International Union for Conservation of Nature
OID	Ochoco Irrigation District
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NEE	National Economic Efficiency
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
NWPH	National Watershed Program Handbook
NWPM	National Watershed Program Manual

O&M	operation and maintenance
OAR	Oregon Administrative Rule
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ODSL	Oregon Department of State Lands
OMB	Office of Management and Budget
ORS	Oregon Revised Statute
OWRD	Oregon Water Resources Department
PCE	Primary Constituent Element
PIR	Preliminary Investigative Report
PL	Public Law
PL 83-566	Watershed Protection and Flood Prevention Program, Public Law 83-566
Plan-EA	Watershed Plan-Environmental Assessment
PRB	Pelton-Round Butte
Project	Ochoco Irrigation District Infrastructure Modernization Project
Reclamation	United States Bureau of Reclamation
RED	Rural Economic Development
RM	River Mile
ROW	right-of-way
SHPO	State Historic Preservation Office
SIP	System Improvement Plan
THPO	Tribal Historic Preservation Office
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
U.S./US	United States

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14 Appendix A-E

Appendices are provided in a separate document.

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