Appendix A

Comments and Responses

All acronyms used in the responses in Table A-2, unless defined herein, are defined in and can be found in Section 12 of the Plan-EA.

Table A-1. Topics and Associated Codes.

Topic	Topic Code	Topic	Topic Code
Alternative Analysis	ALT	Project Cost	COST
Energy Production	ENRG	Purpose and Need	PURP
Fish and Aquatic Species	FISH	Project Scope	SCOP
General	GEN	Property and Easements	PROP
Irrigated Acres	IRA	Resource Concerns	RES
National Economic Efficiency Analysis	NEE	Water	WAT
Permitting	PRMT	Wetlands	WETL

Table A-2. Responses to Comments Received During the Ochoco Irrigation District Watershed Plan-EA Public Comment Period.

Comment ID	Topic Code	Comment	Response
1.00	ALT	When you drive up past Prineville res you see all these farms sucking the water out of the river all up stream farms should use underground water to water [their] farms. They are just sucking the river and creeks dry. Help them with irrigation and putting wells in. Use the money for this and have the farm on a lien for payment of the improvements.	The alternative of on-farm efficiency upgrades and the use of groundwater rather than surface water was included in the Plan-EA for analysis. Please see Appendix D.2 of the Plan-EA for a description on how potential alternatives were analyzed, selected for further evaluation in the Plan-EA, or eliminated from further evaluation in the Plan-EA.
2.01	WAT	I'm not in the area affected, but has any thought or studies gone into the effect of piping on the water table? I don't really know the underground hydrology of the area. Is recharge through leaking water from the canals a factor? Are people's drinking water wells going to go dry because of	Please see Sections 6.8.2.2 and 6.8.2.4 in the Plan-EA for a discussion about the potential effects of the project on groundwater resources.

		this? Has there been any discussion of ways to mitigate this i.e. drilling existing wells deeper, or running water mains at the same time?	
2.02	WAT	I would love to see more water in the river, but I don't want to see some citizens out a bunch of money for it. It's nice we are helping the ecosystem, but people are part of the ecosystem and need to be looked after as well. Thanks for your time.	The National Economic Efficiency Analysis in Appendix D.1 of the Plan-EA includes a detailed evaluation of the value of the benefits and costs of the project. The analysis includes benefits to agricultural and rural communities such as an increase in agricultural production.
3.00	GEN	I just want to show my support of the project. We need to improve our water systems to become more efficient and reliable. I fish Prineville Res and the Crooked and water is becoming a scarce resource we need to protect and use wisely.	Thank you for your comment.
4.00	GEN	We approve the infrastructure upgrades to buried irrigation pipes that reduces water loss due to evaporation. This will allow an increase of needed water to the Crooked and Deschutes watershed.	Thank you for your comment.
5.00	WAT	Regarding the Irrigation Practices in Central Oregon 1. Enclosing the precious water in the huge irrigation canals is an obvious way to help preserve the water from losses along the way. This water is transported many miles, losing volume the entire length. The desert rivers cannot support this during the climate warming crisis. 2. Using irrigation water to grow water-hungry crops like alfalfa and hay is not sustainable. We must move away from growing these crops. 3. Growing water-hungry crops to feed gargantuan methane belching cattle has got to stop as well. We do not have enough water to waste like this. Sustainable plant-based diets for humans needs to be emphasized to mitigate the water requirement on our water sources. 4. Plans for greatly reduced water flow due to decreasing snow at elevations below 7000 feet must be taken into account. “Water Rights”	1. The District selected the sections of their infrastructure as priority areas to pipe for a variety of reasons; please see response to Comment 15.05. 2. Conversion of crops on-farm is not within the scope of this project. 3. Addressing individuals' diet choices is outside the scope of this project. 4. Addressing existing water rights law is outside the scope of this project. 5. Urban and domestic water use is outside the scope of this project. 6. Addressing on-farm stock water impoundment is outside the scope of this project.

		dispersed 100 years ago when the science of estimating stream flows was non-existent has also got to be re-evaluated. 5. Urban development needs to be planned to accommodate water supply. Irrigating golf courses, allowing wealthy homeowners to impound water for personal reflective ponds on large grassy estates needs to be controlled. This water use is not in the interest of the greater good. 6. Impounding water for livestock needs to be greatly reduced as all of these thousands of ponds scattered over the landscape evaporate untold millions of gallons of water.	
6.00	GEN	As a concerned Oregonian currently impacted by the fires wrought by climate change and exasperated by drought, I strongly support all efforts to preserve for wise use our most precious natural resource: water. Installing a new pipeline in the upper reaches of McKay Creek would improve water supply reliability for farmers and ranchers in that area while restoring the seasonal flow of up to 11.2 cubic feet per second of streamflow in a portion of the creek. Converting open-ditch irrigation canals into underground, closed-pipe systems would reduce water loss from seepage by an estimated 5.9 cubic feet per second, of which 4.8 cfs would be allocated instream in the Crooked River. This project should be approved and initiated as soon as possible.	Thank you for your comment.
7.00	GEN	I will keep this short but clear. I strongly support the McKay Creek Water Rights Switch in order to restore the natural flow to McKay creek, a critical steelhead tributary. Please preserve and conserve via whatever means possible.	Thank you for your comment.
8.00	WAT	You had asked me to submit my comment about the irrigation season length for the Crooked River. The Crooked River Decree has designated the irrigation season between February 1 and December 1st of each year. There is a caveat though that during the early or late part of the season, the irrigation use is still restricted to beneficial use.	Language has been updated in Section 4.8.1 of the Plan-EA.
9.01	FISH	First I would like to thank everyone who put great effort into the proposed project. The draft report has great details and is very informative. Following are 5 general comments that I hope the sponsors, consultants and budget teams address before proceeding with	See the response to Comment 17.02 in regard to stream flow protection in McKay Creek. All of the District's diversions have fish screens. Fish screens at irrigation withdrawals for McKay Creek irrigators who are not

		the project. All comments are directed at the McKay Valley section of the project only. **1) Fish Protection – Stream Flow:** UmidaAG.com the company I work for deals with fish screen and stream flow management, so the first thing that stands out is the lack of detail to protect the stream flow from the McKay Valley farmers who have not given up their water rights. I notice that others during the public presentation on September 16th also express the same concern. **Fish Protection – Fish Screens:** The project also does not address any fish screening protection from water withdraws for the Steelhead juveniles. I feel the project needs to address both of these in more detail, including adding any additional cost to install fish screening and stream flow modulation at water withdraw/	participating in the McKay Creek Water Rights Switch Project are outside the scope of the Plan-EA.
9.02	NEE	**2) Farm Income:** The McKay Valley extension will provided reliable water to the McKay Valley farmers. It should be assumed that a percentage of the 686 aces in McKay Valley will transition to either perennial crops such as pears, cherries or with the valley's micro climate, the area could support high value vegetable crops. This path to higher dollar crop options could convince the remaining farmers in the McKay Valley to agree to the plan and transfer their water rights to the project.	Please see Section 3.1 of the National Economic Efficiency Analysis in Appendix D.1 of the Plan-EA for a discussion about how the McKay Creek Water Rights Switch would affect the participant's agricultural production.
9.03	ALT	**3) Water Resources:** The distribution of reliable irrigated water to the McKay Valley is a reallocation of the current impounded water resources. An alternative to consider and not listed in appendix D.2 Alternatives Consider During Formulating (Page 49 of supplemental appendix report). I would like to suggest the building and use of a impoundment pump storage dam. Such a dam would be located in one of the upstream offshoot valleys, such the valley across from Poppy Creek. Filling the pump storage dam could be accomplish by natural precipitation or by excessive flow on McKay creek during the high flow runoffs periods between February, March and April. This does not have to be limited to the valley suggested, but could be manage by a few impoundment dams upstream. Pump storage in the suggested valley does not have aquatic life to address and can be filled in the winter rain months by excess flow down McKay creek. The power is generated during the high peak grid period between 4pm to 8pm, the outflow water from power generation is retain	Please see Appendix D.2 of the Plan-EA for a description on how potential alternatives were analyzed, selected for further evaluation in the Plan-EA, or eliminated from further evaluation in the Plan-EA. An impoundment pump storage dam was added as an alternative considered for formulation in this section. For an impoundment pump storage dam alternative, the District would have to pay market price for the purchase of land and easements and negotiate with landowners, which could be a complex, expensive, and time-consuming process. Additionally, new water rights for the stored water in this impoundment reservoir would have to be applied for, which could similarly be a complex, expensive, and time-consuming process. Application for new water rights would potentially not be possible; Oregon Water Resource Department's Water Availability Analysis for McKay Creek above Allen Creek suggests that there would be no water available for new water rights in this watershed. An impoundment pump storage dam was eliminated from further evaluation because it would not

		in a lower holding pond, that is then repumped back up to the storage dam during a low cost energy period. Thus the water used to generate power is reused each day. Outflow to farmers: A percentage of the lower ponds daily volume is used to provide the McKay Valley farmers irrigation water resource by gravity flow. This eliminates the need for pump station at the base of the McKay Valley and the extra energy / emission associated with lifting water from Crooked River to the McKay Valley farmers. The above suggestion provides a reliable water source for McKay Valley farmers, power generation revenue for the Irrigation district and new impounded water resource for the irrigation district.	meet the purpose and need of the project, would not be effective, would not be efficient arising from high legal costs, and would not achieve the Federal Objective and Guiding Principles. An impoundment pump storage dam was added to the Alternatives Considered During Formulation section in Appendix D.2 of the Plan-EA. Reference: Oregon Water Resources Department. (2020). *Water Availability Analysis: Watershed ID #70594*. Retrieved from https://apps.wrd.state.or.us/apps/wars/wars_display_wa_tables/display_wa_table.aspx?ws_id=70594&exlevel=50&scenario_id=1. Accessed: October 29, 2020.
9.04	ALT	**4) E. Coli Mitigation:** The report highlights that McKay Creek has E. Coil year round from RM 0 to RM12. Such wide spread is most likely from a septic tank malfunction or livestock discharge at RM 12 or above. In either case the plan could address both septic tank malfunction and livestock discharge by working with McKay Valley farmers on mitigation solutions. The end goal is a farm management plan for both good land and water stewardship. Plus a mitigating human risk to downstream farmers and the population using the McKay Creek, Crooked River and the Deschutes Basin.	Water quality concerns in regard to septic tank malfunction and livestock discharge would be outside the scope of this Plan-EA. Please see Section 6.8.2.3 of the Plan-EA for a discussion about water quality as it relates to the proposed project.
9.05	NEE	**5) Alternative farm income:** Not calculated in the report is the addition of some farms as angler destination. The restoration of steelhead into the McKay Creek, could provide additional alternative income source to local farmers. This straightens the farm's income and places an economic value on the fish protection within the McKay stream, broadens the social impact of the project by including a larger sport anglers population interaction with the McKay Creek. The economic tourism benefits would spill over into the community of Prineville. Oregon as a state, has done a great job at quantifying angler tourism to local economies, this program may not be design to cover all the elements of developing the micro tourism to the McKay Valley, but should make an attempt to quantify the economic potential at both the farm level and the community level as a way to diversify the economic	The effects of water conserved instream on fish and aquatic species in McKay Creek are discussed in Section 6.9.2 of the Plan-EA. Farms becoming angler destinations as a result of the proposed project would not be reasonably certain to occur. Additionally, information and data supporting the connection between water conserved instream and increase in recreation was not available to qualitatively or quantitatively analyze the likelihood of farms becoming angler destinations. Please see the National Economic Efficiency Analysis in Appendix D.1 for information on how benefits of the project were calculated.

		base of the region. Example: www.ExperienceGR.com Like to thank everyone who has put countless hours in developing the plan and the extensive details. It is very well appreciated that suggests and comments are requested after all the hard work has been done.	
10.00	COST	The Installed Construction Cost SAVINGS from 30-50%..vs HDPE, PVC, FRP, RCB, Channel, and RCP. Service Life at 100yrs per ADOT criteria. Minimum cover for H20 and H25 (2'). Minimum cover for E80 loading Airport and Railroad (4'). Maximum cover from top of pipe (35'). VELOCITY-40 fps Manning "n" Value .014 Agencies...Irrigation District's,Sewer District's, Flood Control District's, Bureau of Reclamation, Bureau of Indian Affairs, Army Corp of Engineers, Federal Aviation Administration, Department of Transportation, Example Cost Comparison Installed... 120" FRP .. $1200.00 LF x 10 miles $64Million 120" ACI-346 & 346R $700.00 LF x 10 miles $37 MILLION $27 million dollar SAVINGS!!! Using ACI-346 &346R CIPCP.	Piping material is not selected as part of the Plan-EA. Pipe material would be selected during a bidding process as part of project implementation. See Footnote 33 in Section 5.3.2 of the Plan-EA for further information. Appendix D.4 of the Plan-EA provides information on how the project cost was estimated.
11.01	NEE	This proposal is a fiscally irresponsible use of taxpayer funds. The Draft-EA states that only 4.8 CFS will be conserved in the Crooked River. One cubic foot of water is 7.48 gallons, so 4.8 CFS is 35.90 gallons. The projected cost for the system improvements is $30,788,000. $13,979,000 of that is for a new pipeline to serve farms along the middle stretch of McKay Creek, the remaining $16,809,000 is for projects that will deliver the 4.8 CFS, which comes out to $468,217 a gallon. Further, only 39 farms will benefit from the project (out of 898 in OID) at a cost of $431,000 per farm. The Draft-EA states that there are only 15 agricultural jobs in the project area representing a total of $500,000 of annual income. After tens of millions of dollars in investment that would increase to $700,000 of income.	The National Economic Efficiency Analysis in Appendix D.1 includes a detailed evaluation of the value of the benefits and costs of the project. This analysis determined that the total value of the project's benefits would exceed the total value of the project's costs. See Section 8.8 of the Plan-EA for economic summary tables, and the National Economic Efficiency Analysis in Appendix D.1 for further information.

		State water law says that all water is owned by the public, but irrigators can take it at no cost as long as they beneficially use it without waste. We, the public, get no compensation for the water, and we are now going to pay for infrastructure upgrades, so that private interests can continue to make money and provide limited benefit in exchange. Simply put, the poor economic and environmental return on investment from this project makes it an irresponsible use of taxpayer dollars. Either we taxpayers should get far more benefit, or we should shoulder far less of the cost.	
11.02	WAT	A related issue is the soon to be released Deschutes Basin Habitat Conservation Plan. The HCP is a proposal by the City of Prineville and local irrigation districts on how to manage flows in local rivers for their benefit while not excessively killing endangered species like salmon and steelhead. The HCP includes an agreement to maintain minimum flows of 50 CFS in the Crooked River. Will it now be increased to 54.8 CFS? If not, there's no benefit to the Crooked River from the piping proposal at all.	The 4.82 cfs being allocated instream in the Crooked River through Oregon's Allocation of Conserved Water Program would not be in addition to the minimum 50 cfs that would be required if the HCP were approved. A footnote in Section 6.8.2.2.2 has been added for clarity. Please see Section 6.8.2.2.2 in the Plan-EA for more information on how streamflow would be realized in the Crooked River following project implementation.
11.03	ALT	Wouldn't it be cheaper for taxpayers and more environmentally beneficial to simply buy the least productive lands and return their water rights to the river? Was that analysis done? Even if we subsequently piped some canals, wouldn't retiring some farmland make piping cheaper? This line of thought makes even more sense if we acknowledge that our planet is rapidly heating. Water shortages are here now and will get worse. Low-value agriculture in the high desert will come under increasing scrutiny and economic pressure. Is this an area where we should invest taxpayer dollars that yield a low return on investment? Buying the land and investing in habitat restoration is not a crazy idea at all. Given the climate crisis, we are going to have to think outside the box sooner than anyone wants to acknowledge.	The alternative of fallowing lands and returning water instream—very similar to the concept of purchasing non-productive lands and returning water instream—was included in the Plan-EA for analysis. Please see Appendix D.2 of the Plan-EA for a description on how potential alternatives were analyzed and either selected for further evaluation in the Plan-EA or eliminated from further evaluation in the Plan-EA.
12.01	WAT	The Deschutes Red bands Chapter of Trout Unlimited has reviewed the Draft Plan-EA and supports the project proposal. Our earlier concerns stemming from previous descriptions of the project as "serving additional lands" have been addressed with the clarification that in exchange for these lands coming into the irrigation district, the existing	Please see the "Oregon Department of Fish and Wildlife" bullet in Section 8.4.2 of the Plan-EA regarding state requirements for fish passage that the weir raising would legally be required to meet. Additionally, clarifying language has been added to Section 6.9.2.1.

		non-district water rights from those lands will be put in-stream permanently. The stated objective is to restore the full natural hydrograph to that reach of McKay Creek which our Chapter fully supports. In reviewing the Draft Plan-EA, we did identify some areas of concern/clarification: 1. On page 56 it is noted that the Crooked River weir will be raised. Are there guarantees that adequate fish passage will be provided and, once completed, monitored for effectiveness as part of this weir project?	
12.02	WAT	2.On pages 73-76 ... regarding McKay water rights, it is stated that the water rights surrendered by the 15 irrigators as part of this "McKay switch" will be protected "all the way to Lake Billy Chinook." Given this, is there any potential conflict or overlap with the existing minimum flow contract between the Oregon Water Resource Department and North Unit Irrigation District? We want to be sure that these new protected flows earmarked for McKay Creek and destined for Billy Chinook do not become intertwined with this OWRD/NUID agreement.	This project would not alter the minimum streamflow requirements that North Unit Irrigation District complies with downstream from its pumps in the Crooked River. Clarifying language has been included in a footnote in Section 6.8.2.2.2 of the Plan-EA.
12.03	WAT	3. We would also like clarification regarding the fact that OID, being the senior in-stream water right holder within McKay Creek, has committed to let these additional flows resulting from the McKay Switch pass into the Crooked River. Is this commitment permanent and enforceable? If so, what is the mechanism for doing this? Our Chapter and its 600 members are conservationists and anglers. We view this Draft Plan-EA as a very expensive but necessary step toward re-introduction of steelhead into the lower Crooked River Basin.	Four mechanisms would ensure this commitment. First, by signing the agreement found in the front of the Plan-EA, if this Plan-EA were approved and the project were funded through PL 83-566, the project could not be substantially different than as proposed in this Plan-EA. Second, the District has already signed an agreement with the Deschutes River Conservancy that stipulates this commitment would have to occur as a condition of project funding under District's current funding plan. Third, the HCP, if approved, would be in place for 30 years and would require the District to pass this water following the completion of the project. Fourth, Section 5(c)(4) of the Crooked River Collaborative Water Security and Jobs Act guarantees that McKay Creek irrigators' water rights would be transferred instream in order for them to receive Prineville Reservoir storage water.
13.00	WAT	I would like to provide some corrections on the table 4-6 outlining the water rights for OID; the table is located on page 34. I have attached a scanned image with the corrections noted in my handwriting. I would also like to mention that the Oregon Water Resources	Language in the Plan-EA has been updated accordingly in Table 4-6 in Section 4.8.1.1 of the Plan-EA

		Department is supportive of efforts to improve efficiency of water use through new technology, improved delivery systems, monitoring and metering water usage. Any aspect of the plan that promotes, encourages and supports these effort are to be applauded and encouraged.	
14.01	COST	Thank you for the opportunity to comment on the Ochoco Irrigation District Infrastructure Modernization Project (Project) Environmental Assessment (EA). The Oregon Farm Bureau Federation (OFBF) and Crook-Wheeler County Farm Bureau (CWCFB) strongly support the Project, agree with the findings in the EA, and urge issuance of a Finding of No Significant Impact (FONSI). This project will provide strong environmental benefits and will help irrigators in the Project use their water more effectively and efficiency. The preferred alternative as outlined in the EA should move forward without significant revision. By way of background, OFBF is a voluntary, grassroots, nonprofit organization representing Oregon's farmers and ranchers in the public and policymaking arenas. As Oregon's largest general farm organization, its primary goal is to promote educational improvement, economic opportunity, and social advancement for its members and the farming, ranching, and natural resources industry. Today, OFBF represents nearly 7,000-member families professionally engaged in the industry. CWCFB represents farmers in Crook County, including several within the Ochoco Irrigation District. Agriculture is critical to the Central Oregon economy. According to the 2017 census of agriculture, Crook County has 620 farms spanning 799,845 acres that contribute $44,563,000 in market value to the state. The Ochoco Irrigation District supports many of those farms, providing irrigation to over 20,000 acres and serving almost 900 irrigators. Critically, these farms also rovide fish and wildlife habitat, protect water quality, and protect open space and recreational areas for Oregonians. It must also be noted that the cost to the patrons of the District of the Project must remain feasible for the patrons. The District's per acre charge paid by the patrons is now one of the highest in the region. Their ability to produce higher value crops is limited due to growing conditions in the region, so they cannot afford significant cost increases. We encourage OID to ensure that the patrons' obligation be based on ability to pay. The balance between federal funding and District funding	Thank you for your comment.

		outlined in the Project is critical, as the District cannot afford to assume additional debt.	
14.02	WAT	OFB and CWCFB strongly support the proposed project. The Project is critical to the long-term plans of OID to improve district infrastructure, improve water delivery reliability, and improve public safety. The project will also have important conservation values, resulting in the conservation of water that will improve instream flows for fish and support aquatic habitat. Proposed water transfers to in-stream flows must be reserved for the end of the project's construction period. Current water saving calculations are at best estimates and actual savings need to be measured before being permanently committed to a change in use.	Following the completion of each project group, Ochoco Irrigation District would work with the Oregon Water Resources Department and its partners to verify and measure all water savings prior to creating instream water rights through Oregon's Allocation of Conserved Water Program. Please see Section 6.8.2.1 of the Plan-EA for discussion about how the District would allocate water saved by the project instream and how the McKay Creek water rights would be transferred instream.
14.03	GEN	The EA correctly analyzes only the no action alternative and the preferred alternative because the preferred alternative is the only proposal that meets OID's needs while providing an environmental benefit. The EA was correct to exclude six of the eight potential alternatives from analysis as not meeting the purposes and need for the action, and we agree with this conclusion. The Project represents a critical opportunity for the agricultural community in Crook County, and will help support the County's agricultural base while at the same time providing critical conservation benefit important to all Oregonians. This Project represents a "win win" and we urge its approval. Thank you for the opportunity to comment and do not hesitate to contact us if you have any questions.	Thank you for your comment.
15.01	PURP	Thank you for this opportunity to provide scoping comments on the Ochoco Irrigation District ("OID" or "District") Infrastructure Modernization Project Draft Watershed Plan-Environmental Assessment (Draft EA). Central Oregon LandWatch is a conservation organization which has advocated for preservation of natural resources in Central Oregon for over 30 years. With over 200 members in Central Oregon, LandWatch has worked on water resource issues in the Deschutes River Basin and has succeeded in gaining special protection for Whychus Creek and the	The Preferred Alternative meets the Agricultural Water Management purpose. Agricultural Water Management was selected as the only appropriate authorized purpose due to the types of measures that would be included in the project. See the OMB Fact Sheet and Section 2 of the Plan-EA. The PL 83-566 authorized project purpose of "Public Fish and Wildlife" is defined in the National Watershed Program Manual Title 390-500. This title states that, "Fish and wildlife development areas may be included in a watershed project plan when the SLO agrees to operate and maintain a

		Metolius River and spring systems. LandWatch has lately been concerned about flows in the Crooked River watershed, and the impact of the management of irrigation diversions from the River and its tributaries. Though the Draft EA presents a marginal improvement from what was presented in the Scoping package for this Project, it still falls short of fulfilling the promise of using PL 83-566 funding in Central Oregon to reduce irrigation inefficiencies and restore instream flows for the benefit of public fish and wildlife. Instead, the Draft EA proposes a huge public expenditure that will benefit a small number of private irrigation patrons with disappointingly small benefits for our rivers. 1. Purpose and Need The Draft EA lists four proposed purposes for this project: • "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 and Grimes Flat irrigators. • Conserve water along District-owned Grimes Flat laterals and Iron Horse section of the Crooked River Distribution canal (herein referred to as Iron Horse section). • Improve public safety along District-owned Grimes Flat laterals and Iron Horse section[.]" (Draft EA at 11) Public Law 83-566 authorizes federal assistance for only Projects that fit at least one of eight listed purposes: Flood Prevention, Watershed Protection, Public Recreation, Public Fish and Wildlife, Agricultural Water Management, Municipal and Industrial Water Supply, Water Quality Management, and Watershed Structure Rehabilitation. National Watershed Program Manual Title 390, Part 500, Section 500.3(B). In which of these eight purposes does the Project fit? We request that the District list Public Fish and Wildlife as a purpose of the Project. Improved streamflows for the benefit of fish and wildlife are widely understood to be the primary motivating factor for water conservation Projects in Central Oregon. Our state's congressional delegation agrees.1 Senator Merkley, through his position on the Senate Appropriations Committee, found a funding mechanism intended to	reservoir or other area for public fish and wildlife access. Measures installed for public use of areas developed to improve the habitat or the environment for the breeding, growth, and development of fish and wildlife may be included in a watershed project plan" (NRCS 2014). The proposed action does not include the measures described; therefore, "Public Fish and Wildlife" would not be an appropriate authorized project purpose. Reference: U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2014. *Title-390 National Watershed Program Manual* (4th ed.). April. Website: https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=nrcseprd1466627&ext=pdf. Accessed: October 29, 2020.

		help irrigation districts in Central Oregon upgrade their infrastructure and improve their water management practices in order to address the water needs in the basin of fish and wildlife.	
15.02	PURP	The first stated purpose of the Project is to provide Crooked River water to McKay Creek irrigators. Draft EA at 11. This "McKay switch" project is also listed throughout section 2.1 Watershed Problems and Resource Concerns. The McKay switch is not an OID project, and OID would not direct or otherwise be responsible for it. The Draft EA proposes an infusion of federal money to replace the pump stations that would enable the McKay switch project to happen, but it is not a project that the District is committing to implement as part of this Draft EA and its request for PL 83-566 funding. The Draft EA frames the McKay switch as a major benefit that the Project will provide, but OID does not commit to implementing the project and ensuring its success. The Final EA/EIS should require OID to implement the McKay switch and ensure that any water savings from it will result in a transfer of water rights to the state for instream use. Otherwise, there is no guarantee that the benefits of the McKay switch will occur as a result of the funding sought in this Draft EA.	The District has been working in conjunction with the Deschutes River Conservancy for 15 years on the McKay Creek Water Rights Switch Project. The District would be responsible for ownership, operation, and maintenance of any McKay Switch infrastructure that is owned by the District. The District would be responsible for any operation and maintenance of Reclamation owned assets that are a part of or associated with the McKay Switch project such as the pump stations. 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. Please see the National Economic Efficiency Analysis in Appendix D.1 of the Plan-EA for additional discission benefit-cost ratios associated with the project. Clarifying language has been added to Section 8.6.2. See the response to Comment 12.03 regarding the District's commitment to water being left instream as a result of the McKay Switch. Section 5(c)(4) of the Crooked River Collaborative Water Security and Jobs Act guarantees that McKay Creek irrigators' water rights would be transferred instream. Please see the response to Comment 12.03 for additional discussion related to instream transfer commitments.
15.03	WAT	2. Amount and allocation of conserved water The Scoping and Preliminary Investigative Report (PIR) for this Project did not include any commitments to transfer water to the state for instream uses as a result of Project water conservation. We are marginally pleased to see that this Draft EA does propose to transfer some of the Project's water savings to the state for instream use. However, the amount of water to be restored to the Crooked River is a small amount: 4.8 cfs of a total 5.9 cfs of water that will be conserved. The District proposes to spend $30.8 million on a Project that results in a mere 4.8 cfs restored to the Crooked River, which computes to $6.42 million per cfs. This hugely expensive Project will do very little to meet the Crooked River fishery's needs.	The referenced $30.8 million project cost refers to the cost of implementing the Preferred Alternative. Please see Section 5.3.2 and Section 8.2 of the Plan-EA for a discussion of the full range of activities that would be included in the Preferred Alternative. Please see Section 6.8.2.1 of the Plan-EA for a discussion of the water rights that would be allocated instream in the Crooked River through Oregon's Allocation of Conserved Water Program. Please see Section 6.8.2.2 of the Plan-EA for a discussion of the effects to streamflow. The responses to Comment 12.03 and Comment 15.02 discuss the District's commitment to the McKay Switch.

		The Draft EA claims that the McKay Switch will generate 11.2 cfs of water to be transferred to instream use in McKay Creek. Draft EA at 58. The Draft EA, though, does not guarantee this outcome. OID will not actually implement the project and there is no guarantee that the McKay Creek landowners will sign on to the project. In addition, McKay Creek is an ephemeral stream and the 11.2 cfs of paper water rights are not available instream all summer. Draft EA at 40. By June each spring, flow in McKay Creek naturally reduces to a trickle. Thus the proposed water rights "switch" to restore flows to McKay Creek will not result in continuous, year round benefits for fish and wildlife, but only during the few months (January through May) that McKay Creek has water. Every other month of the year, this is a transfer of dry "paper" water rights that do not represent actual live flow.	Section 6.8.2.2.3 of the Plan-EA discusses the effects that the Project would have on streamflow in McKay Creek.
15.04	WAT	Even if the 11.2 cfs of McKay switch water is successfully transferred to instream use by other entities (not the District), the cost per cfs of this Project is around $2 million. That is an absurd amount of public, taxpayer money to subsidize a Project that proposes very little public benefit. OID divulges elsewhere in the Draft EA that all of the water that could be conserved through piping of its canal system could be transferred to instream use and the District would still be able to provide full deliveries to its patrons: "For OID, the LAP was implemented throughout the District's primary canal and system laterals. Direct measurements identified a total seepage loss of approximately 53 cfs in the District's system. The District could allocate 41 cfs, or 77 percent, of the water saved through modernization instream and still maintain its ability to deliver its desired rate of 7.5 GPM/Acre. The District could retain 23 percent of the water saved through modernization to maintain its ability to deliver its desired rate under its existing water rights." (Draft EA Appendix at E-8) 7.5 GPM/Acre is a higher delivery rate than the District has historically delivered to its patrons, and would represent increased deliveries. This Project similarly proposes to increase deliveries, using 23% of the total water conserved, to the 39 patrons benefitting from this Project. Draft EA at xxiv, 97. The huge expenditure of public money proposed by the Draft EA should not result in private benefits, in the form of increased	Thank you for your comment.

		water deliveries, to 39 individual patrons. Instead, all of the water (5.9 cfs) to be conserved by this Project as proposed should be transferred to the state for instream use.	
15.05	SCOP	3.Scope of project The activities planned in the Project area that will result in conserved water are mainly the piping of two of the District's open canals, Grimes Flat and Iron Horse. Together, the length of these two canals is 10.1 miles. Draft EA at 97. The piping of these 10.1 miles will result in conservation of 5.9 cfs of water, Draft EA at 13, and will benefit only 39 individual district patrons. Draft EA at xxiv, 97. The total length of the District's canal system is 122 miles. 2018 OID System Improvement Plan at 14. If the District piped all of its open canals, 53 cfs of seepage, evaporation, and operational losses would be conserved. Draft EA Appendix E-8. The EA acknowledges that the Project area is "only a small portion of the District's total conveyance system." Draft EA at 4, 8. This Draft EA is a one-time effort to seek funding available through PL 83-566. The Draft EA should include a project area that is much larger than proposed in order to achieve maximize opportunity for water conservation, and it should inform the public with information about the benefits and consequences of using PL 83-566 funding on other portions of the District's infrastructure system. Why has the District chosen to address water conservation on only 10.1 miles of its 122 mile canal system? Why were these 10.1 miles of the Grimes Flat and Iron Horse canals chosen to receive precious federal funding? How many patrons, and how many cfs of water, could be conserved through piping of other portions of the District's canal system? When and how will the rest of the 53 cfs estimated to be lost in the District's canal system be conserved? Without this information that would allow comparison of this Project to other alternative water conservation opportunities in the District, the Draft EA fails to provide adequate information necessary for the public to meaningfully participate in the NEPA process and is arbitrary and capricious. It also fails to take a "hard look" at foreseeable direct,	Please see Section 5.3.2 of the Plan-EA for a discussion of the full range of activities that would be included in the Preferred Alternative. The activities proposed in the Preferred Alternative were selected for the following reasons: • The McKay Switch has been a priority for local stakeholders, including both agricultural and community interests, for over a decade. • The three existing District pumps that would be updated are essential for moving water across the District through the Crooked River. Distribution Canal as well as the McKay Water Rights Switch Project and are over 60 years old. • Piping the Grimes Flat laterals would provide opportunities to further improve water delivery and application efficiency through piping private laterals, installing measurement devices on private deliveries, and improving on farm efficiencies. • The proximity of the IronHorse section to an elementary school and subdivision make it a safety priority for the District and the City of Prineville. Please see the response to Comment 15.06 related to the range of alternatives identified and/or considered in the Plan-EA.

		indirect, and cumulative impacts of the preferred alternative relative to others.	
15.06	ALT	4.Range of Alternatives The Draft EA eliminates from consideration all project alternatives except for the preferred alternative (the "Modernization Alternative"). The Draft EA dismisses all other alternatives: "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 were removed from consideration (NWPM 501.37; USDA 2017a)." (Draft EA at 51) The four listed Project purposes are conveniently tailored such that only the preferred alternative, and its piping of two District canals (Grimes Flat and Iron Horse), can meet the four purposes. Draft EA at 11. If the Project purposes were broadened to describe the actual needs for water management in the District and in the Crooked River – to decrease irrigation inefficiencies and increase instream flows for the benefit of fish and wildlife – then it would be obvious that other project alternatives would meet those purposes and would do so at a much lower cost. A basic requirement of NEPA is that a Project such as this considers a reasonable range of alternatives. The results from the recently completed Upper Deschutes Basin Study Work Group study show that the most cost-effective way for irrigation districts to conserve water is through on-farm efficiency upgrades, piping of private laterals, voluntary duty reductions, and market-based water leasing and transfers. These alternatives are proven to be feasible, would meet the Project's purpose and need, and in doing so would conserve more water for less public money. The Upper Deschutes Basin Study Work Group, which included OID, found that these alternatives are not unreasonable because of cost, logistics, existing technology, or environmental reasons, and could be implemented at less cost than canal piping. Here, however, OID in simply unwilling to propose any solutions outside of the narrow scope of the preferred alternative. This Draft EA	Appendix D.2 discusses the alternatives that were considered and eliminated from further study during the formulation stage. They include the alternatives suggested in this comment. In response to this comment, piping private laterals was considered as an alternative, eliminated from further study and, correspondingly, included in Appendix D.2. Canal lining was brought forward as an alternative for further analysis because it would meet the four project purposes. Per the USDA's Guidance for Conducting Analysis under the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies and Federal Water and Resource Investments (USDA 2017), "After preliminary consideration, agencies may remove from detailed study those alternatives that do not achieve the Federal Objective and Guiding Principles. In addition, alternatives that may at first appear reasonable but clearly become unreasonable because of cost, logistics, existing technology, social, or environmental reasons may also be eliminated from further analysis." Canal lining was eliminated due to cost. See Section 5.2.1 of the Plan-EA for further discussion of canal lining. The Modernization Alternative carried forward was the only alternative that both met the sponsors' objectives and was not unreasonable after being evaluated against the four criteria identified in USDA (2017). Please see Comment 15.02 in regard to the District's involvement in the McKay Switch Project. Reference: U.S. Department of Agriculture (USDA). 2017. Guidance for Conducting Analysis Under the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies and Federal Water and Resource Investments. DM 9500-013.

		proposes a Project that pushes onto the public the extraordinary cost of piping 10.1 miles of District-owned canal to benefit 39 individual patrons, with a minimal benefit to public fish and wildlife. The District also proposes to take credit for the most significant environmental benefit of the Project – the McKay switch project – but without committing to overseeing that project and ensuring that it will occur	
16.01	NEE	WaterWatch of Oregon is a river conservation group that works to protect and restore river flows statewide. We have been working to protect river flows in the Deschutes Basin for nearly three decades, including the Crooked River specifically. We have a great interest in the development of a PL-566 Watershed Plan for OID that is crafted in a way that would maximize projects within the district that would result in permanent water restored instream. To that end, we offer the following comments on the draft EA. Public Investment in PL 566 Watershed Plans and commensurate public benefits: According to NRCS, the purpose of the Watershed Protection and Flood Prevention Program (also known as Public Law 83-566 or PL-566), authorized by Congress in 1954, is to provide technical and financial assistance to public entities for planning and implementing authorized projects that protect watersheds, mitigate floods, improve water quality, reduce soil erosion, enhance fish and wildlife habitat, and create opportunities for hydroelectric power production. OID's Watershed Plan includes a number of components. Those that will result in protected water instream appear to fit squarely within the purposes of PL 566, however others appear less directed at improving overall watershed health. As such, as a general matter, we are concerned that the public benefits from OID's Watershed Plan are not commensurate with the investment.	Please see the response to Comment 11.01 regarding the cost and benefits of the project.
16.02	WAT	The EA notes that OID's current conveyance system loses approximately 53 cfs (EA pg. 13). Despite the significant opportunity that this provides for conservation, OID's Watershed Plan narrowly targets efficiency projects that will return only 4.8 cfs instream. And while the project also seeks to build infrastructure to allow the McKay swap which will transfer 11.2 cfs of live flow rights instream, this is separate and distinct from the 53 cfs of loss due to inefficient works. Between OID's inefficient works and the McKay swap, it appears that	Please see the response to Comment 15.05 for discussion related to the District's prioritizing the actions included in the Modernization Alternative. Please see Section 6.8.2 of the Plan-EA for discussion of the effects of the Modernization Alternative on instream water rights and streamflow. The purpose of the Watershed Program extends beyond only protecting

		there is the potential to return a total of 64.2 cfs to the Crooked River system. Given the significant investment of public funds in this project1 if approved, NRCS should ensure that OID's Watershed Plan targets a suite of conservation projects that will return water instream rather than funding infrastructure improvements that are more appropriately shouldered by the District.	water instream. The National Watershed Management Program Manual Title 390, Part 500, Section 500.3(A) describes one of the general purposes of the Watershed Program as "[f]urthering the conservation, development, utilization, and disposal of water." (NRCS 2014). The Modernization Alternative would meet that purpose. National Watershed Management Program Manual Title 390, Part 500, Section 500.3(B) describes the allowable purposes of projects to be included in the Watershed Program (NRCS 2014). This project would meet the Agricultural Water Management purpose. Reference: U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2014. *Title-390 National Watershed Program Manual* (4th ed.). April. Website: https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=nrcseprd1466627&ext=pdf. Accessed: March 24, 2020.
16.03	WAT	Legal protection of water instream: The EA represents that the 4.8 cfs that will be put instream via canal improvements will go through the Conserved Water Act and will be permanently protected instream by an instream water right down to Lake Billy Chinook (EA pg. 58). The EA promises a similar structure for the McKay swap rights that the transferred water will be protected instream both in McKay Creek and then in the Crooked River down to Lake Billy Chinook (EA, pg. 72). WaterWatch strongly supports this commitment to legally protect the water against other users all the way to Lake Billy Chinook and encourages NRCS to make this a condition of funding.	Section 6.8.2.1 of the Plan-EA describes OID's commitment to putting the water made available by the project instream in perpetuity. If a Finding of No Significant Impact were issued, the Plan-EA were authorized, and OID were to proceed with the project with financial assistance through PL 83-566, OID would enter into a contract with NRCS, obligating OID to complete the project. The failure of OID to meet the terms of the contract would require OID to reimburse NRCS for the financial assistance provided for the project.
16.04	WAT	McKay Creek Swap: A major component of the Crooked River Collaborative Water Security and Jobs Act of 2014 (Crooked River Act) was the expansion of OID boundaries to include McKay Creek lands, and the granting of then unallocated stored water from Prineville Reservoir to water to serve those lands upon transfer of the live flow rights instream (Section 6(a)(2) and 5(c) of the Crooked Act). It has been nearly six years since the passage of the Act. This funding could serve as the lynchpin to bring that project to fruition. That said, while WaterWatch supports completion of this project , the EA makes clear that the public funds provided would only fund the infrastructure; there	Please see the response to Comment 15.02.

		is no commitment by the District to ensure that all landowners participate in the project that we could find. Before receiving funds, OID should be required to provide to NRCS agreements from landowners who are now squarely within OID boundaries that they will use OID stored water in lieu of live flow rights (with the live flow rights transferred instream as required by the Crooked Act). Without this, there is great uncertainty that the expected outcomes will come to fruition. For instance, at least one McKay Creek landowner who attended of the public meeting appeared to have no interest in participating in the McKay swap. If this landowner does not participate, not only will his live flow rights still be active, but depending on priority dates he could reap the benefits of other junior rights putting their water instream. For this program to work, there needs to be 100% participation. That was what was represented during negotiations on the Crooked River Act. This should be a condition of funding of PL 566 funds.	
16.05	PURP	Purpose and Need: The purpose and need statement does not directly declare that a purpose of OID's Watershed Project is to restore water instream and/or to facilitate instream transfers on McKay Creek. We have commented on this same issue on other watershed plans coming out of the basin, but have seen no change in approach. This appears a purposeful tactic to undermine accountability. As a reminder, Senator Merkley's public statements on PL 566 funds for the Deschutes Basin have been clear the expectation is that PL 566 funds are to be used for projects that not only to increase efficiencies for irrigation, but also restore flows for imperiled species. Simply listing instream flows as a "benefit" rather than a "purpose" undercuts both the intent of the Deschutes "earmarks" and also, importantly, oversight of the instream components of the plan.	Per NRCS Directive 610.B.27, "A need is a problem or an opportunity... For NRCS conservation programs the need is usually related to improving the condition of one or more natural resources the program is authorized to address. The purpose of an action is the goal to be attained, or an end or aim to be kept in view while meeting an underlying need." With that definition in mind, enhancing instream flows was as identified as a need rather than a purpose. Please see the response to Comment 16.03 regarding the District's commitment to allocating and transferring water rights instream. Please see Section 6.2.2.2 of the Plan-EA for a discussion of the effects of the Modernization Alternative on surface water hydrology, including streamflow. Reference: United States Department of Agriculture, Natural Resources Conservation Service (NRCS). 2006. eDirectives: 610.B.27 Writing a Purpose and Need Statement. Website: https://directives.sc.egov.usda.gov/viewerFS.aspx?hid=21288#:~:text=The%20statement%20of%20purpose%20and,considere

			d%20in%20an%20environmental%20document. Accessed: November 18, 2020.
16.06	PURP	Additionally, the stated "purpose and need" related to McKay Creek is not in accordance with the Crooked River Act. The Crooked River Act was very purposeful in its language; use of OID stored water is contingent upon the live flow rights being transferred instream. In other words, the Crooked Act requires a one to one swap in order for OID stored water to be used on McKay lands. The Act does not allow the use of OID stored water as "additional" water to supplement the live flow rights. The narrative on this point in the "purpose and need" section needs to be corrected	The water that the District would convey to the McKay Creek irrigators through the McKay Switch would be additional to the water that the District currently conveys through its conveyance system. This water would only be conveyed as a part of the McKay Switch as consistent with the Crooked River Collaborative Water Security and Jobs Act of 2014 (PL 113-244). Clarifying language has been added to Section 2.1.1.
16.07	GEN	Conclusion: We support provisions that will result in permanent water instream. That said, as noted, it appears that there is potential to incorporate irrigation efficiency projects that will result in greater water instream than the 4.9 cfs identified in this EA. We would encourage NRCS to work with OID to explore additional alternatives that would result in additional water instream from irrigation efficiencies. As to wholly new works, as noted, while we support the McKay swap that could result in 11.2 cfs instream to Lake Billy Chinook, before funding is approved OID should have to provide NRCS with documentation from landowners that they will participate in the project. Thank you for your consideration of our comments.	Please see the response to Comment 16.02 about other water conservation opportunities along District infrastructure. Please see the response to Comment 15.02 related to landowner participation in the McKay Switch.
17.01	WAT	The Oregon Department of Fish and Wildlife (ODFW) appreciates the opportunity to comment on the draft Watershed Plan-Environmental Assessment for the Ochoco Irrigation District infrastructure modernization project. ODFW continues to support OID in this opportunity to improve water conservation, water delivery reliability, public safety, and the resulting benefits to fish and wildlife habitat by restoring streamflow and improving water quality. After reviewing the EA, we have comments and questions that would help improve water restoration efforts. In regards to the McKay Water Switch, the draft EA states there are approximately 15 irrigators with 11.2 cfs of water rights in McKay Creek and that most of them have signed Letters of Intent to participate in the switch. The amount of water to be transferred instream (up to 11.2 cfs)	Please see the response to Comment 15.02 related to landowner participation in the McKay Switch Project. Clarifying language regarding the amount of water that would be delivered to McKay Creek irrigators has been included in Section 2.1.1 and Section 6.8.2.2.2 of the Plan-EA. The 11.65 cfs of water that would be delivered to McKay Creek irrigators, to which the commentor is referring, was included in error. Please see Section 6.8.2.2.2 of the Plan-EA for an updated description of the amount of water that would be supplied to the McKay Creek irrigators.

		is contingent upon the number of irrigators that participate and the quantity of water available in their individual water rights. Expected benefits from conserved water in McKay Creek are speculative without knowing this information. ODFW requests more specificity in regards to the actual number of signed Letters of Intent and associated water quantity. We also have questions regarding the quantity of water being supplied to the irrigators. The draft EA states irrigators hold water rights for 11.2 cfs, yet 11.65 cfs will be provided. In order to account for loss, 010 will add 4.35 cfs to the delivery system for a total of up to 16 cfs. Before project improvements, 010 estimates loss of about 20% system-wide, yet they are accounting for 27% loss in the McKay Water Switch.ODFW requests clarification if the 4.35 cfs is needed to ensure delivery or if there is potential to save more water through the upgrades.	
17.02	WAT	In addition, ODFW recognizes the benefit to fish and wildlife through OlD's intention to transfer the water instream, however, we have concerns about the amount of water actually being protected instream and the distance it will be protected. As part of the Habitat Conservation Plan, OID would allow the water to pass the Jones Diversion, even though their water right is senior, but there is no mention of other senior water right holders downstream. Because the instream transfer is subject to prior appropriation, other senior water right holders, aside for OID, can consume the instream water before it reaches Lake Billy Chinook. In order to evaluate the species benefit of this project, information regarding the seniority of other water right holders in McKay Creek and the Crooked River is needed.	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. If senior water rights holders were to divert the water restored instream through the McKay Switch, as described in this comment, their diversion would decrease the magnitude of the beneficial effects of the Preferred Alternative on fish and aquatic resources. Clarifying language has been added in a footnote in Section 6.9.2 of the Plan-EA.
17.03	WAT	The McKay Water Switch has the potential to reestablish a more natural hydrograph in McKay Creek, dependent upon the number of irrigators and the seniority of those users that participate in the switch. However, it is unclear if the proposed use of the Conserved Water Statute for 4.82 cfs in the Crooked River will do the same. The EA is unclear on which water right OID will be using for the transfer- stored water right or live flow right. Given the current State limitations for transfers of stored water, which water right utilized for the transfer will dictate the season of benefit- either irrigation season or storage season. Our research indicates the most important time period of flow impacts on fish populations in the Crooked River occurs during winter, when flow is typically the lowest. ODFW recommends O1D's stored water right be transferred instream as live flow and protected to Lake Billy Chinook so	The Modernization Alternative would create instream water rights in the Crooked River through Oregon's Allocation of Conserved Water Program, which allows for the allocation of stored water to instream use, rather than transferring stored water rights instream. The District would allocate 4.82 cfs of conserved water instream in the Crooked River from Bowman Dam to Lake Billy Chinook during the District's practical irrigation season (April 1 through October 31). 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. Clarifying language has been included in Section 6.8.2.1 of the Plan-EA.

		that sufficient winter flows are ensured. Additionally, one of the resource concerns and rationale identified in the EA are instream flows for fish and aquatic habitat. In order to fulfill this need, and consistent with the spirit of mutually beneficial gains of this project, ODFW recommends OID support ODFW's instream water right application IS-70354 by lifting their protest.	The District's protest of ODFW's water right application IS-70354 is outside of the scope of this Plan-EA.
17.04	FISH	ODFW appreciates OID's willingness to maintain fish passage and screening throughout the project. Two infrastructure improvements identified in the draft EA include raising the Crooked River diversion weir and a drum screen in the Crooked River diversion canal. The weir raise will most likely trigger ODFW's fish passage laws so we request more detailed information in order to assess if remedial action (ie. fish ladder) is needed, which may require additional costs to the project. It was unclear why a new drum screen is needed at the Crooked River diversion canal, but ODFW encourages OID to use this opportunity to identify and address other screening needs. Our staff are available to help assess these needs and we encourage coordination as early as possible.	Conversations with ODFW regarding the weir raise were initiated on October 27, 2020, and would be on going. Further detailed information on the weir raise would be provided during the engineering design process. All of the District's diversions are currently screened. The drum screen that was previously located on the Crooked River Diversion Canal was removed in the year 2000 when the new fish screen was installed. However, the remining concrete structures and walls remain. These structures do not have the capacity to pass the water that the District would need to convey to McKay Creek landowners under the McKay Switch. The Crooked River Diversion Canal Drum Screen improvement referenced in Table 8-1 of the Plan-EA refers to activities that would remove the concrete structures and realign this section of canal to allow for the new additional water to be conveyed through this segment of the system. Clarifying language has been added to Table 8-1 in Section 8.2 of the Plan-EA.
17.05	GEN	Infrastructure improvements such as piping canals and installing measurement devices will allow OID to deliver water more efficiently and accurately, reducing the amount oftailwater and returning flows to public waterbodies. This will lead to improved water quality in public waterbodies and improved habitat for aquatic species. ODFW would also encourage OID to coordinate with ODFW and a restoration partner to develop wetlands to treat tailwater and returning flows to public waterbodies. ODFW appreciates and supports OID's willingness to implement projects that restore streamflow and improve aquatic habitat in public waterbodies as these actions will support the conservation of native and reintroduced anadromous fishes. We look forward to working with them	Thank you for your comment.

		to identify ways to maximize benefits for all involved pmties from the successful implementation of this project.	
18.01	WAT	The Deschutes River Conservancy (DRC) restores streamflow and improves water quality in the Deschutes Basin using a coordinated, collaborative and voluntary approach. Founded in 1996 as a consensus-based, multi-stakeholder organization, the DRC's Board of Directors includes diverse representation from irrigated agriculture, hydropower, tribal, environmental and governmental (federal, state and local) interests. The DRC has worked to restore streamflow and improve water quality in the Crooked River basin since its inception and works annually with Ochoco Irrigation District (OID) to provide instream flow in the Crooked River, Ochoco Creek and McKay Creek though our annual water leasing program. The DRC has worked with OID and local partners on the McKay Creek Water Rights Switch (the Switch) for over a decade. This priority project will restore the natural hydrograph, or all available flows, to a six-mile reach of McKay Creek, improving habitat and water quality for reintroduced steelhead and native redband trout. In addition, the Switch will provide McKay Creek irrigators with an enhanced irrigation season and water right reliability, enabling a more productive agricultural economy on McKay Creek. The DRC offers the following comments regarding OID's Plan-EA: 1) McKay Creek irrigators do not own water rights. They own land to which state-or public-owned water rights are appurtenant. The state provides McKay Creek irrigators a usufructary right to use these water rights. (ORS 527.110). DRC suggests referring to McKay Creek irrigators as holding non-district water rights to McKay Creek.	Language in Section 1 of the Plan-EA has been updated accordingly.
18.02	WAT	2) The McKay Creek Switch will provide for the delivery of 11.2 cfs of OID water to McKay Creek irrigators, not 11.6 as stated on page 12 and page 75.	The number was removed in Section 2.1.1 and updated accordingly in Section 6.8.2.2.2 of the Plan-EA.
18.03	WAT	3) The EA's statement on page 31 that the "District's diversion at Jones Dam (RM 5.9) of up to 40 cfs affects streamflow in [the lower McKay] reach" is misleading and gives the impression that the lower reach is flow-limited when in fact it is not. McKay Creek rarely provides 40cfs in	Clarifying language has been added to Table 4-5 in Section 4.8 of the Plan-EA.

		natural streamflow for OID to divert at Jones Dam. Additionally, OID operationally spills irrigation water at Jones Dam, using the lower reach of McKay (from river mile 0-6) as conveyance for this water, enhancing natural flow available in this reach.	
18.04	WAT	4) The EA describes mean monthly streamflow downstream of the Allen Creek confluence on McKay Creek via historical gage data from a discontinued United States Geological Survey gage (gage number 14086000) that operated between 1924 and 1932. (page 40). This information might be useful for some types of historical analyses including how climate change has impacted streamflow on McKay Creek, but has limited relevance to current streamflow conditions. More relevant is DRC's recent streamflow data from a similar location on McKay Creek. DRC has operated a streamflow logger and taken live streamflow measurements at a site just downstream from the Allen Creek confluence every year since 2014. Mean monthly streamflow for this time period has average cfs. Adding more recent streamflow data to the EA would enhance the public's understanding of current streamflow conditions on McKay and illustrate more accurate benefits of the McKay Switch project. Furthermore, DRC has added additional streamflow measurements sites on McKay Creek to accurately capture pre and post-project conditions. This data will allow DRC and OID to quantify ecological benefits associated with the project over time. DRC is enhancing this monitoring effort by collecting groundwater, macroinvertebrate, stream temperature and riparian vegetation data at the same measurement sites	The Plan-EA used the best available data in the Plan-EA that was available at the time. This data was also used to represent the McKay Creek streamflow as part of the HCP (R2 Resource Consultants, Inc. and Biota Pacific Environmental Sciences, Inc. 2013). Additional streamflow data from the Deschutes River Conservancy's (DRC) stream gauge on McKay Creek below the confluence of Allen Creek were obtained from DRC for analysis in the Plan-EA on October 15, 2020. The 2015-2019 data provided support the hydrologic trend documented at the OWRD Gauge No. 14085700 in McKay Creek above Poppy Creek described in the Plan-EA (Section 4.8.2.3; Appendix Section E.6, Table E-12). The location of the DRC stream gauge does show increased streamflow as compared to Gauge No. 14085700 due to input from upstream tributaries; however, the streamflow trend is similar. McKay Creek generally experiences peak flow in late March and April, then declines into the early summer months. By July, streamflow is low, and the creek may experience no natural streamflow by August. As measured at DRC's stream gauge, pre-project minimum flows in McKay Creek during the months of March through July are as follows: March [20.1 cfs], April [7.7 cfs], May [1.52 cfs], June [0.53 cfs], July [0.1 cfs]. Post-project flows are assumed to increase streamflow by up to 11.2 cfs at this site in April through June. Therefore, when water is available, minimum flows in McKay Creek at the DRC stream gauge post-project are assumed to be as follows: April [18.8 cfs], May [12.72 cfs], June [11.73 cfs]. These data are consistent with the discussion and analysis included in section 4.8.2.3 and 6.8.2.2.3 of the Plan-EA. Please see Appendix D Section 3.1.7 of the Plan-EA for further discussion of the value of instream water. Reference: R2 Resource Consultants, Inc. and Biota Pacific Environmental Sciences, Inc. 2013. Deschutes Basin Habitat Conservation Plan Study 11

			Report – Phase 1: Identification and Evaluation of Existing IFIM and Other Data for Application to the DBHCP.
18.05	WAT	5) The EA notes that "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." (footnote 27 on page 53, also mentioned on page 73 and 76). This allowance is applicable only to McKay Creek instream water rights that are junior to OID's 1916 McKay Creek water right. All instream water rights of higher priority are not subject to diversion by OID under the prior appropriation doctrine and Oregon Water Law. Priority dates on McKay Creek for the reach from river miles 6-12 range from 1874-1978.	Clarifying language has been added to the relevant footnote in Section 5.3.2 of the Plan-EA. A footnote has also been added to Section 6.8.2.1.2 for clarification and a reference to this footnote was included in Section 6.8.2.2.3.
18.06	PROP	6) Footnote 29 on page 56 is inaccurate. An agreement with the landowner on easements and build area for the Cox Pump Station has not been secured. OID and DRC are currently negotiating with the landowner on an easement and build area and have drafted a letter of intent that is not yet signed.	The relevant footnote in Section 5.3.2 of the Plan-EA has been updated.
18.07	WAT	7) In regards to the conserved water saved from the piping of Grimes Flat and Iron Horse, the EA does not describe which water right OID will diminish by 4.82 cfs when transferring this water instream under the Conserved Water Program. The originating certificate defines the characteristics of the instream water right including season of use. If OID transfers 4.82 cfs from its Crooked River live flow right, the instream right will be protected during irrigation season. If OID transfers its Crooked River storage right, the instream right will be protected during the storage season. Protection of the instream right during these two different periods has different ecological benefits for native fish and salmonid species.	Please see the response to Comment 17.03.
18.08	IRA	8) The EA lists inconsistent acreage amounts for the McKay Switch Project on page 67 (730 acres) and 73 (685 acres). The acreage should match that in the Crooked River Act.	The acreage amount described in Section 6.4.2.1 of the Plan-EA has been corrected from 730 acres to 685 acres.
18.09	RES	9) The DRC will work with McKay Creek irrigators and funding partners to implement on-farm improvements prior to or concurrent with the McKay Switch implementation. Irrigators cannot effectively	The language in Section 6.12.3.8 has been updated.

		access the pressurized water produced from the project without these improvements. DRC recommends changing the EA description of on-farm improvements on page 90. Thank you for the opportunity to provide comments on the Draft Watershed Plan-Environmental Assessment for the Ochoco Irrigation District (OID) Infrastructure Modernization Project.	
19.01	WAT	I oppose this proposal for a variety of reasons. First I must say that the proposal has been written to check all the boxes required to obtain funding, but it glosses over some very concerning inconsistencies. While the proposal touts the savings of 4.8 CFS, the main canal will be increased in size and the height of diversion weir (dam)at dry creek will be increased (OID System Improvement Plan). Clearly more water will be removed to provide water to the addition 650 acres and 39 new patrons along McKay Creek. How much water will be removed from the Crooked River at Dry Creek? Will the diversion weir require a fish ladder to maintain genetic connectivity among native fishes and to provide access to spawning grounds for anadromous fishes?	See Section 6.8.2.2.2 of the Plan-EA for an updated description of the amount of water that would be diverted at the Crooked River Diversion to serve the McKay Creek irrigators and the effects to streamflow in the Crooked River under the Modernization Alternative. The Crooked River weir raise would be required to meet Oregon's fish passage laws and permitting requirements during and after construction. Please see Section 6.9.2 and Section 8.6.2 of the Plan-EA for further discussion.
19.02	ENRG	The proposal also touts the benefit of providing pressurized water to users who will no longer need pumps to irrigate their fields. But the proposal also indicates that three pumping stations will be upgraded and a fourth new pump station will be built to supply water to McKay Creek farms. In terms of electricity used to irrigate farms, is this a wash? Since the public is funding these pumps, each station should be required to have a meter. Not only would that inform the public of water use, it would inform OID of best steps to conserve water.	The four pumping stations would be essential for lifting and carrying water across the District to deliver it to patrons. The District pumps would have a meter. See Section 1.3 and Section 5.3.2 of the Plan-EA for further discussion. Clarifying language has been added to Section 5.3.2. An analysis of the effects of the Project on electricity use by patrons and the District is included in Section 2.2.2.2 and Section 3.1.3 of the National Economic Efficiency Analysis in Appendix D.1 of the Plan-EA.
19.03	WAT	The piping of the Grimes Flat laterals seems to be where the 4.8 CFS will be saved. But Grimes Flat is a long way from Dry Creek. Where will additional water enter the Crooked River? And how much water will be saved? Will it offset the additional water removed at Dry Creek? This proposal should not be approved without clarifications of these issues.	Please see Section 6.8.2.1.1 of the Plan-EA for a discussion of the amount of water that would be saved by piping the Grimes Flat laterals and Section 6.8.2.2.2 for a discussion of where that water would be allocated instream. Please see Section 6.8.2.2.2 of the Plan-EA for a discussion of the effects to surface water hydrology from the additional water that would be released from Prineville Reservoir, conveyed through the Crooked River, and diverted by OID under the McKay Switch.

20.00	GEN	I support the proposed improvements and reduction in evaporative loss for the multiple end uses identified in the EIA.	Thank you for your comment.
21.00	WILD	Thank you for the opportunity to provide recommendations and input during your National Environmental Policy Act (NEPA) process for the Ochoco Irrigation Modernization Project (Project). The US Fish and Wildlife Service (Service) supports piping the canals and laterals and is eager to see the resulting conserved water returned to Ochoco and McKay creeks and the Crooked River. The Service has been leading a large-scale conservation planning effort for water management that benefits threatened and endangered species in the Deschutes River Basin in Central Oregon. The goal of this planning effort is to develop an Endangered Species Act (ESA) Habitat Conservation Plan (HCP) under section 10(a)(1)(B) of the ESA that provides non-Federal parties the opportunity to conserve the ecosystems upon which listed species depend, ultimately contributing to their recovery. The Deschutes Basin HCP (DBHCP) has been in development for several years and includes eight Central Oregon irrigation districts (constituting the Deschutes Basin Board of Control) and the City of Prineville (collectively the Applicants). The Applicants' goal is to complete the planning process in 2020. Currently, a Draft HCP and a Draft Environmental Impact Statement (EIS) have undergone public review and the final documents are being prepared. The goal of the DBHCP is to manage water in the Deschutes River Basin in a manner that addresses the long-term certainty for water users but provides the necessary water for species covered by the plan. Species covered by the DBHCP include Oregon spotted frog (*Rana pretiosa*), bull trout (*Salvelinus confluentus*), and steelhead (*Oncorhynchus mykiss*), sockeye salmon (*Oncorhynchus nerka*) and spring Chinook salmon (*Oncorhynchus tshawytscha*). One of the various tools available for the Applicants' conservation approach is to modernize their existing irrigation infrastructure and return the conserved water instream to support the conservation of the covered species. The Deschutes Basin HCP does not prescribe which conservation tool the Applicants must use; instead, it is designed to set a series of flow milestones in the future that the Applicants must meet using all available tools. Currently, low flows in the Deschutes River Basin result in myriad	The language regarding the Bald and Golden Eagle Protection Act has been updated in Section 8.4.3 of the Plan-EA.

		impacts on fish and wildlife resources. Water management that alters water levels has reduced habitat suitability, and increased flows are necessary to meet the life history demands of the covered species and other species of conservation concern such as the inland Columbia Basin redband trout (*Oncorhynchus mykiss gairdneri*). Further, low flows impact water quality by increasing temperature and decreasing dissolved oxygen. Less than optimal water quality often contributes to the spread and extent of invasive aquatic species (plants and wildlife), and these problems interact synergistically to degrade wildlife habitat within and around the Ochoco and McKay creeks and the Crooked River. Higher flows and subsequent cooler water temperatures enable optimal growth for young salmonid fry. Restoring hydrographs in these systems helps address limiting factors for the covered species, including low flow, altered hydrology, high water temperature, and impaired fish passage. The Service is providing you with the following comments in the context and spirit of our mutual ongoing efforts and responsibilities to conserve listed and unlisted species. The proposed plan aligns with the DBHCP and the Crooked River Collaborative Water Security and Jobs Act of 2014 (HR 2640), and the Service supports the Districts and NRCS' efforts to reduce losses via water conveyance and returning those flows instream to benefit fish, wildlife, and their habitats. Since the conservation need is high, the Service supports the use of all tools available for conservation. We recommended considering an approach that allows for the greatest flexibility over time to conserve water and return it to Ochoco and McKay creeks and the Crooked River. Given the long-term nature of the Project and the high conservation need, we suggest using a more integrated approach. While the Service wants to see the piping commence, the funding opportunity that PL 83-566 provides may also be used to achieve conservation through the use of other tools. If needed, the Service is happy to provide more substantive feedback about specific conservation tools that would complement the Project. Again, the Service is supportive of piping canals and laterals and appreciates NRCS' endeavors to facilitate those efforts through PL 83-566. We want to ensure that all tools remain available to achieve the significant conservation gains we need to see in Ochoco and McKay creeks and the Crooked River.	

		We appreciate the ongoing coordination related to migratory bird species and bald and golden eagles. The draft EA discusses the Bald and Golden Eagle Protection Act (BGEPA) and various measures intended to avoid any nest disturbance. The Service has a comment related to content on page 106. The draft EA states, "The Act only covers intentional acts or acts in "wanton disregard" of the safety of bald or golden eagles." This is not accurate and this language does not apply to the Bald and Golden Eagle Protection Act (BGEPA) nor bald and golden eagles. Non-purposeful take is prohibited under BGEPA. As discussed in previous meetings, if seasonal and temporal restrictions cannot be adhered to then permits are available. We look forward to coordinating with you throughout the development of the final EA. We will provide input and technical assistance as needed during the formulation of your final document. If you have any questions or if we can be of any assistance, please contact Emily Weidner or me at 541-383-7146.	
22.01	PRMT	The U.S. Army Corps of Engineers (Corps) has received your request to review and comment on the draft watershed plan environmental assessment (Draft Plan EA) for the Ochoco Irrigation District Infrastructure Modernization Project (Project) located in Crook County, Oregon. The Draft Plan-EA identifies multiple activities within several Lower Crooked River sub-watersheds proposed to be implemented in 2021 and completed over several years. We have reviewed the Draft Plan EA pursuant to Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act (RHA). Under Section 404 of the CWA, the Corps regulates the discharge of dredge or fill material into waters of the United States. Under Section 10 of the RHA, the Corps regulates work in or affecting navigable or historically navigable waters of the United States. The Crooked River and its tributaries are not regulated under Section 10 of the RHA; therefore, based on the maps included in the Draft Plan-EA, it appears a Section 10 Department of the Army (DA) permit would not be required for the Project.	Thank you for your comment.

22.02	WETL	Section 404 of the CWA, 33 U.S.C. § 1344, prohibits discharges of dredged or fill material into waters of the United States, including wetlands, unless the work has been authorized by a DA permit or has been determined by the Corps to be exempt from regulation under Section 404. The Navigable Waters Protection Rule (NWPR) defines the limits of jurisdictional waters. The NWPR became final on June 22, 2020. The Draft Plan EA states that coordination with the Corps would occur prior to implementation of each site-specific project to ensure the proper authorizations are obtained. However, to assist in project planning and to minimize impacts to jurisdictional water the following three paragraphs discuss NWPR elements and exemptions that may apply to the Project. Corps regulations at 33 CFR 323.4(a)(3) define exempt activities, activities not requiring a permit, as the construction or maintenance of farm or stock ponds or irrigation ditches or the maintenance (but not the construction) of a drainage ditch. Discharges associated with siphons, pumps, headgates, wingwalls, weirs and diversion structures and other facilities appurtenant and functionally relating to irrigation ditches are included in this exemption. The enclosed Army & EPA Joint Memo - Exempt Construction or Maintenance of Irrigation Ditches and Exempt Maintenance of Drainage Ditches (Memo) dated July 24, 2020, supersedes RGL 07-02. The Memo provides a framework for determining the applicability of the ditch exemptions and the "recapture provision." In Section IV (e) Step 5, the Memo discusses the two parts which must be met to "recapture" an activity, which brings the activity into the scope of regulation under CWA Section 404, such that a permit would be required. The rule and subsequent guidance make clear piping of a jurisdictional water would generally require a permit under Section 404. The NWPR defines a tributary as a naturally occurring surface water channel that contributes surface water flow to the territorial sea or to waters which currently are used, were used, or may be susceptible to use in interstate or foreign commerce (including waters subject to the ebb and flow of the tide). A tributary would not lose its jurisdictional status if it contributes surface water flow to downstream jurisdictional water in a typical year through a channelized, non-jurisdictional surface water feature, a culvert, dam, tunnel or similar artificial feature, a debris pile or boulder field or through any other excluded feature under paragraph b of the NWPR (33 CFR 328.3(b)).	Section 4.10 and Section 6.10.2.3 of the Plan-EA have been updated to reflect the information provided in this comment.

		The term "tributary " would also apply to any ditch that has either relocated a tributary, is constructed in a tributary or is constructed in an adjacent wetland as long as the ditch is perennial or intermittent and contributes surface water flow to a Traditional Navigable Water (TNW) or territorial seas in a typical year. A ditch may also be considered an adjacent wetland where a ditch was constructed in an adjacent wetland that contributes less than perennial or intermittent flow to a territorial sea or traditional navigable water in a typical year and meets the definition of wetlands and adjacent wetlands of the NWPR.	
22.03	PRMT	In addition to potential Corps' Regulatory review for impacts to waters of the United States, the Corps must consider potential impacts to federally authorized projects. Section 14 of the Rivers and Harbors Act of 1899, codified in 33 U.S.C. § 408 (referred to as "Section 408"), authorizes the Secretary of the Army, on the recommendation of the Chief of Engineers, to grant permission for the alteration or occupation or use of a Corps federally authorized project if the Secretary determines that the activity will not be injurious to the public interest and will not impair the usefulness of the project. An alteration is defined as any action that builds upon, alters, improves, moves, occupies, or otherwise affects the usefulness, or the structural or ecological integrity of a Corps federally authorized project. This Draft Plan-EA does not include sufficient information to determine if any activities would require permission under Section 408. The Draft Plan EA states that coordination with the Corps would occur prior to implementation of each site-specific project to ensure the proposed action either meets exemption criteria or that proper authorizations are obtained. Where permits would be required, the Corps will consider the need for compensatory mitigation based on the 2008 Mitigation Rule (33 CFR part 332). I encourage coordination with my staff regarding the applicability of the Corps jurisdiction and authority over non-exempt activities associated with your Project. If you have any questions, please contact Ms. Anita Andazola at the letterhead address, by telephone at (541) 465-6894, or email anita.m.andazola@usace.army.mil.	Thank you for your comment.

Appendix B

Project Maps

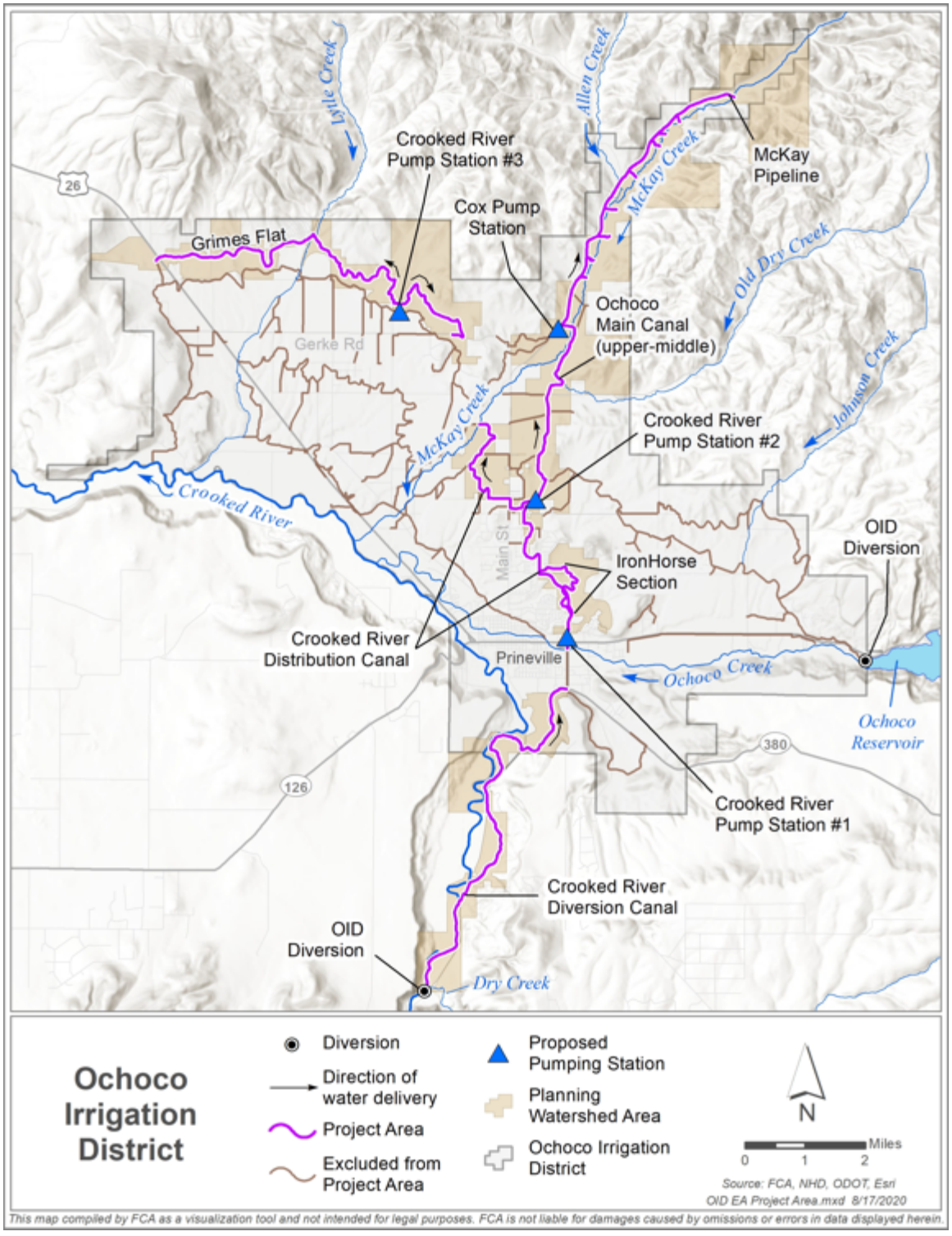


Figure B-1. Ochoco Irrigation District Infrastructure Modernization project area.

Appendix C

Supporting Maps

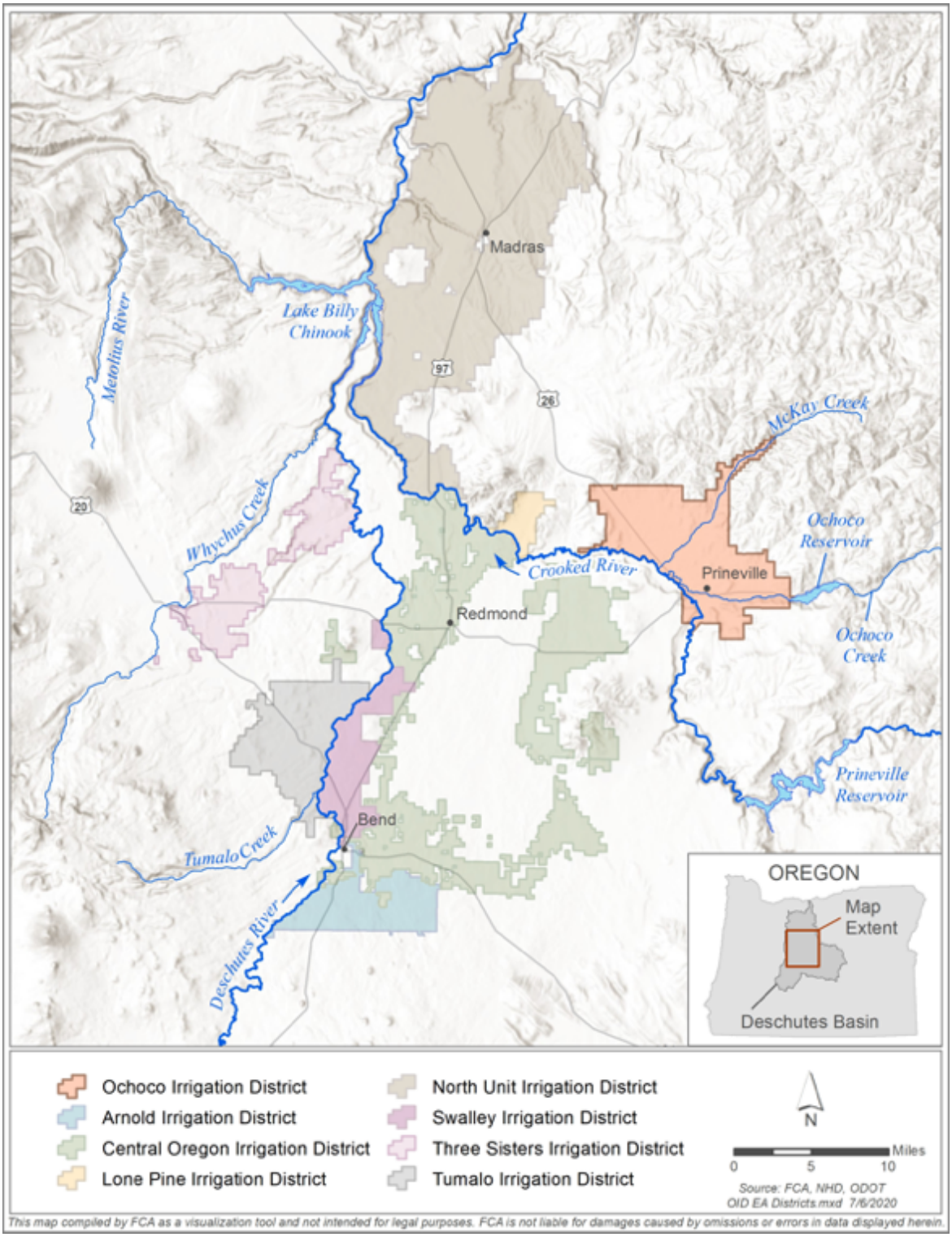


Figure C-1. Irrigation districts within the Deschutes Basin.

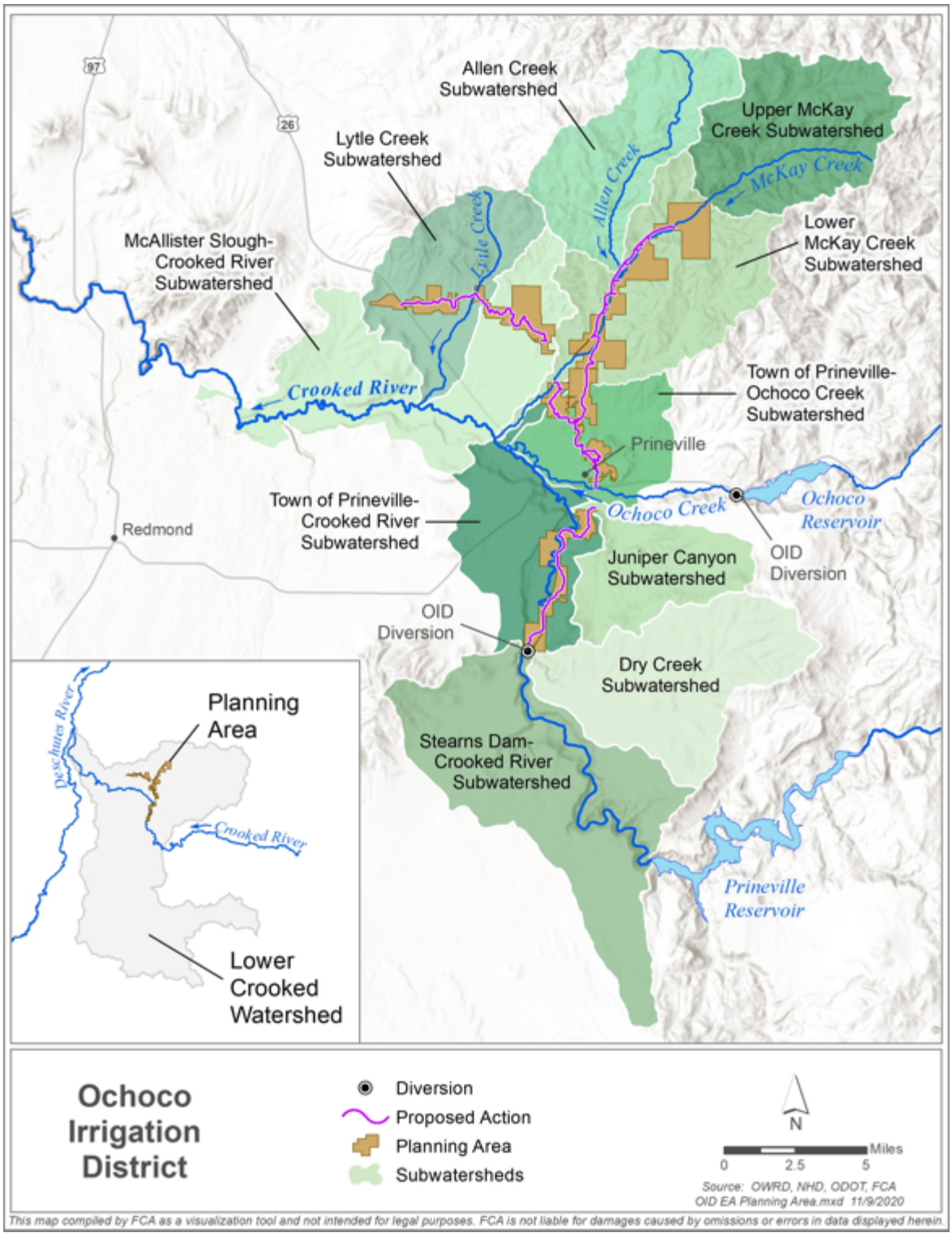


Figure C-2. The Ochoco Irrigation District planning area.

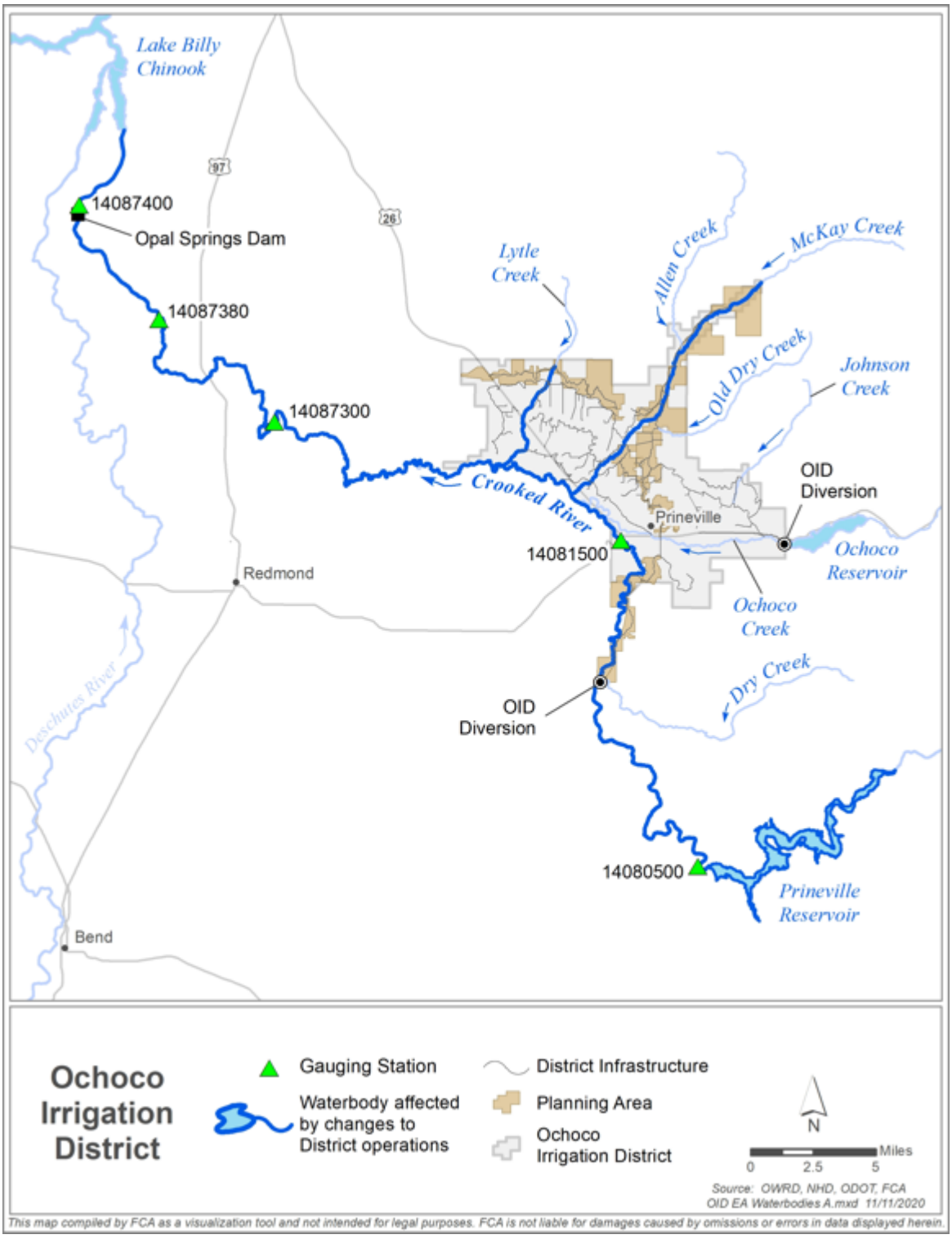


Figure C-3. Waterbodies affected by changes to District operations and locations of streamflow gauging stations.

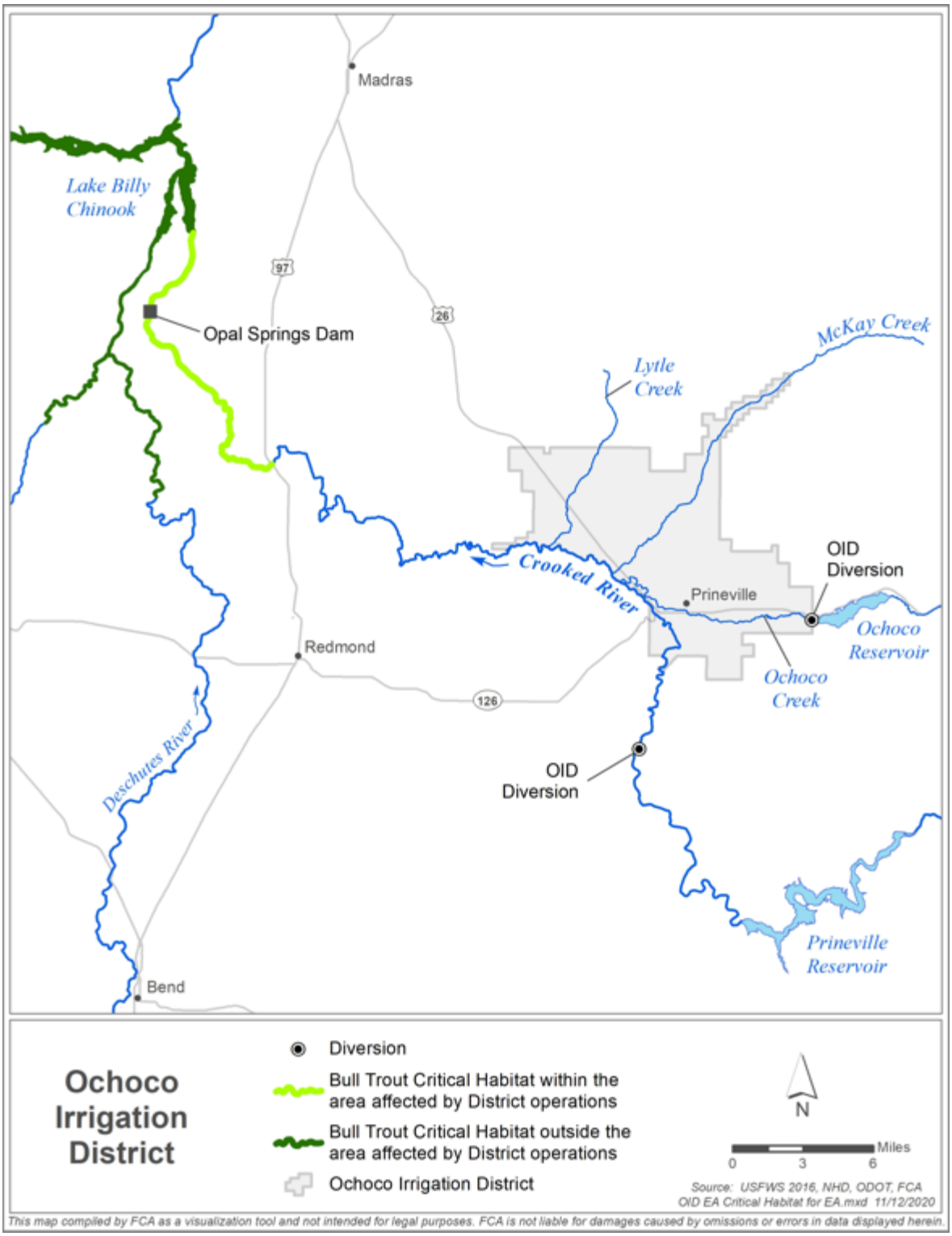


Figure C-4. Bull trout critical habitat within and outside of areas affected by District operations.

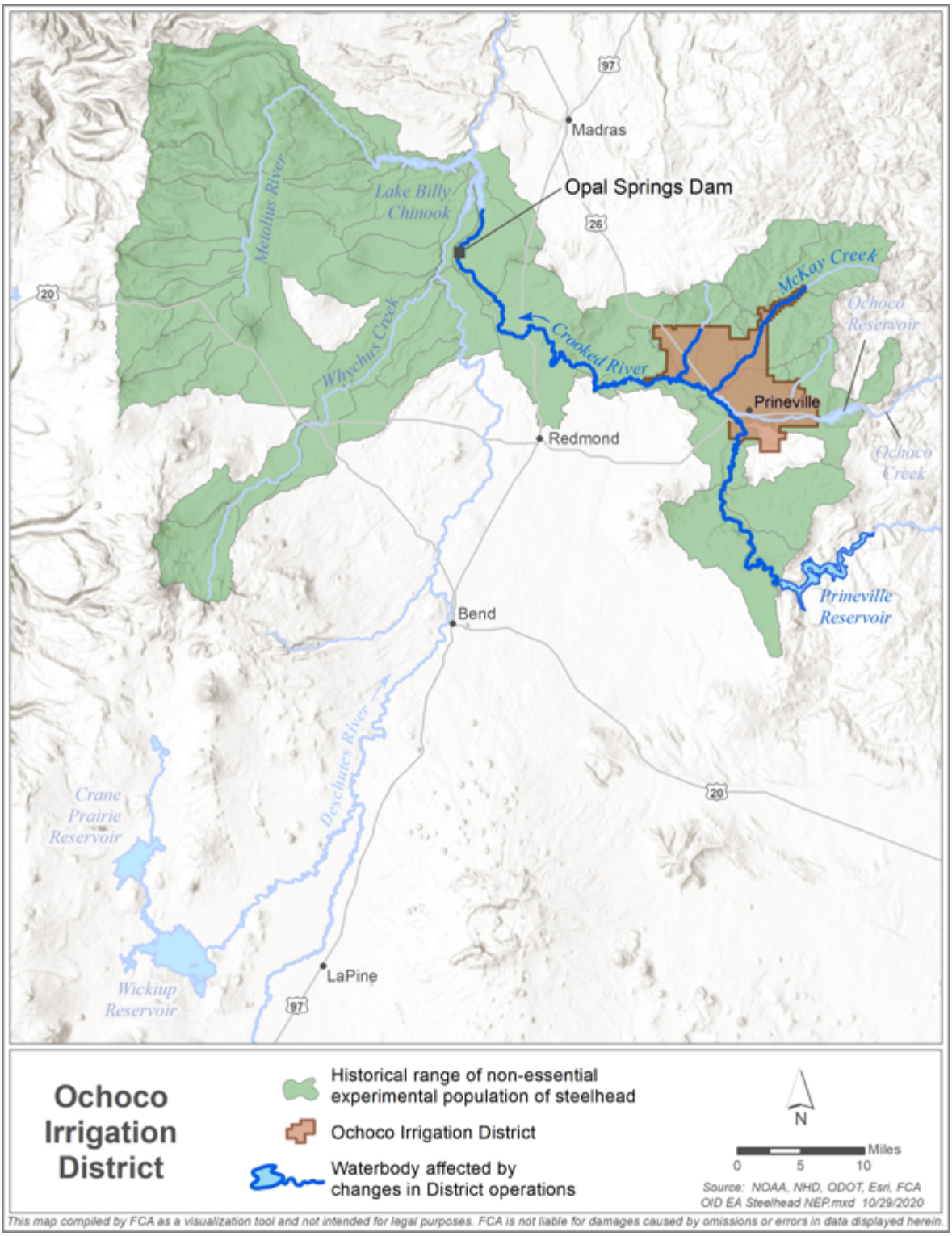
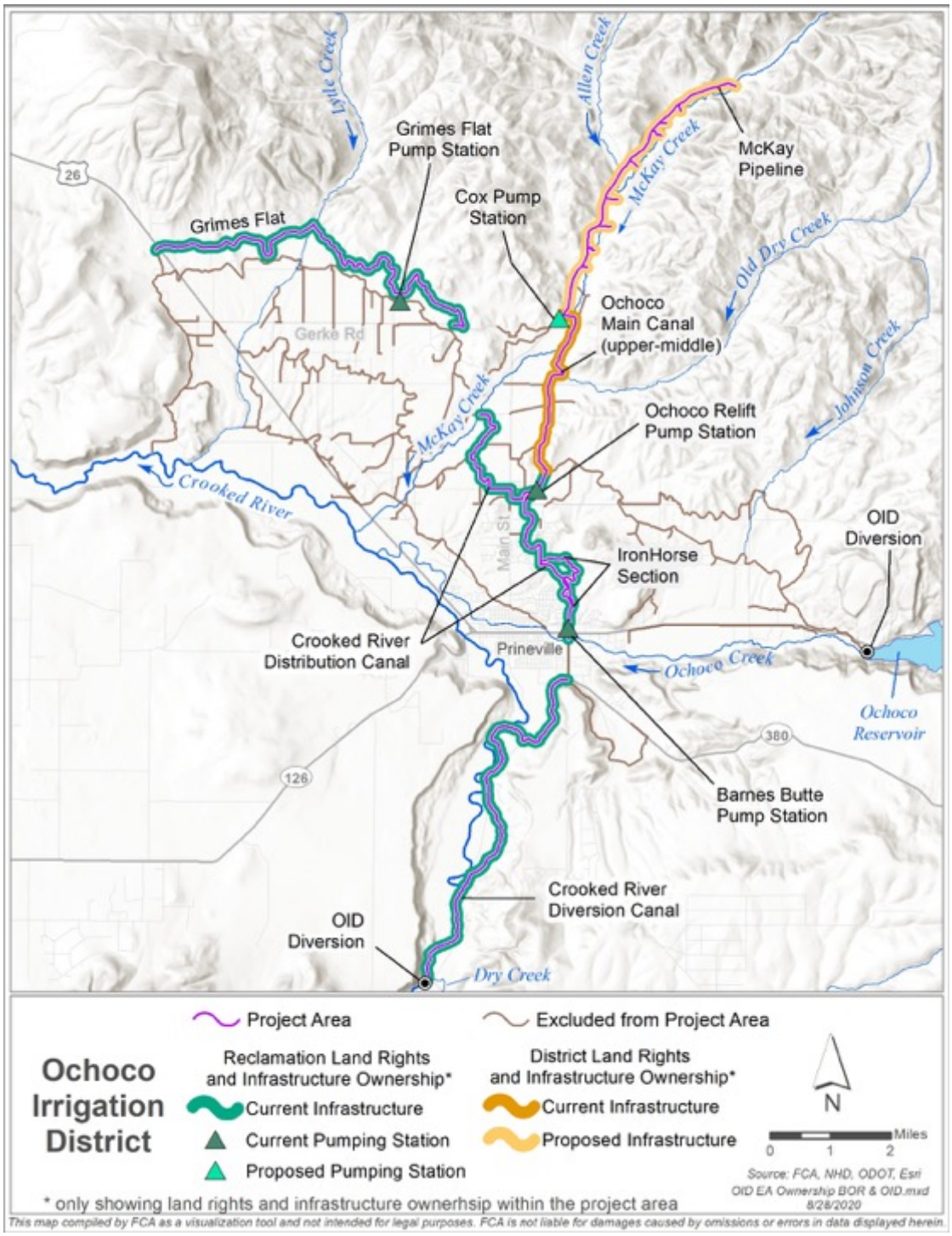
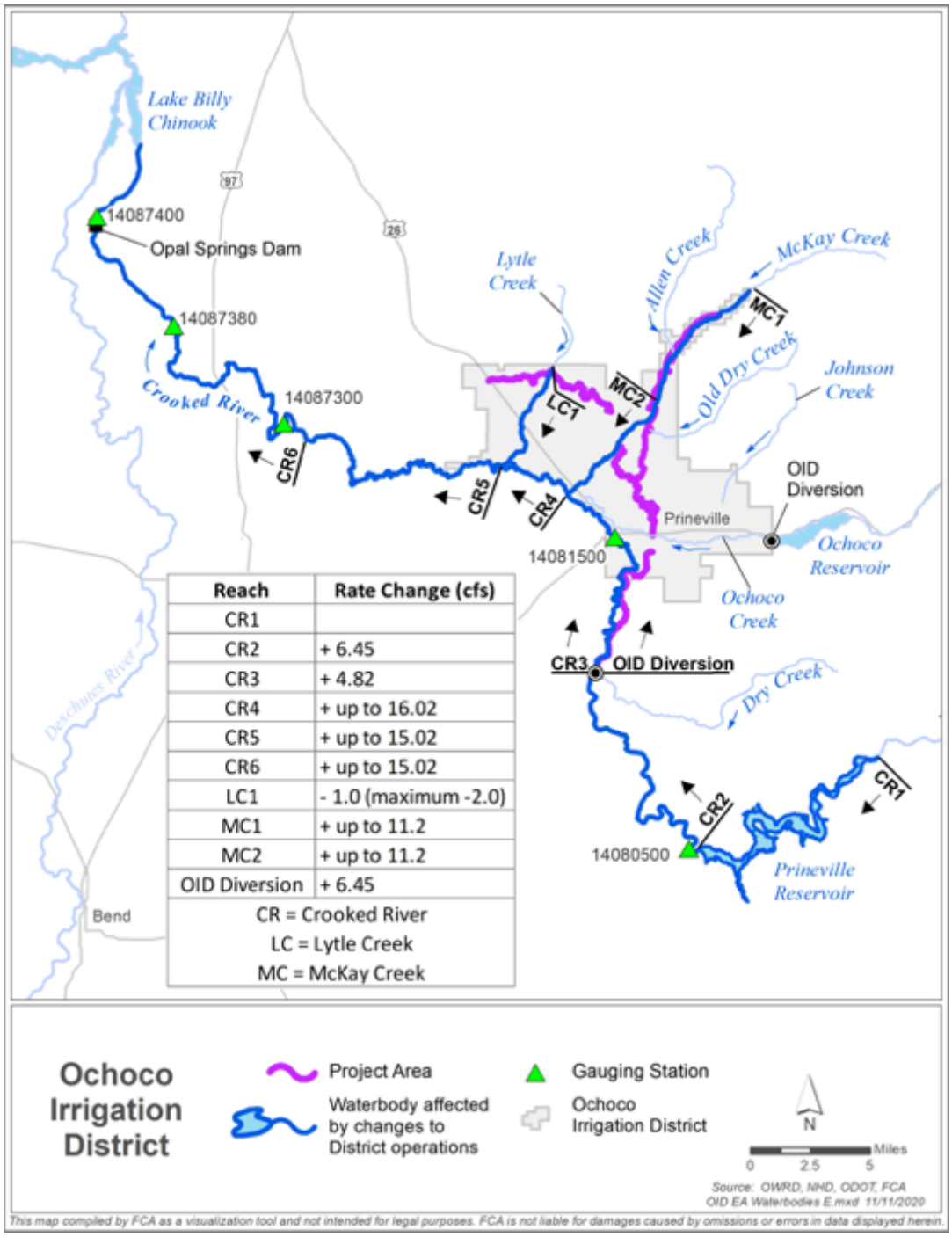


Figure C-5. Steelhead non-essential experimental population within and outside of area affected by District operations.



Note: Current pump station infrastructure including Barnes Butte Pump Station, Ochoco Relift Pump Station, and Grimes Flat Pump Station are owned by Reclamation and would be decommissioned following installation of proposed pump stations Crooked River Pump Station No. 1-3 (Figure B-1). Reclamation would also own and hold title to the new pump station installations.

Figure C-6. District and Reclamation land rights and infrastructure ownership within the project area.



Note: This map depicts the Project Area (purple) and the portions of waterbodies that would be affected by changes in District operations (blue) due to the proposed action. The project area only shows District conveyance infrastructure that would be modified or constructed by the proposed action. District infrastructure that is not modified by the project is not shown. The rate change (cfs) in the figure table reflects the cumulative change in streamflow in a reach. For example, on average, the streamflow in LC1 would be reduced by 1.0 cfs (2.0 cfs maximum), which would result in 1.0 cfs (2.0 cfs maximum) less streamflow in CR5. Therefore, CR5 is expected to have a total increase in streamflow of 15.02 (14.02 cfs maximum).

Figure C-7. Waterbodies and associated change in streamflow as a result of the Ochoco Irrigation District Irrigation Modernization proposed action.

Appendix D

Investigation and Analysis Report

D.1 National Economic Efficiency Analysis

Highland Economics LLC

National Economic Efficiency Analysis

Barbara Wyse and Winston Oakley
1/20/2020

1. Introduction

This section provides a National Economic Efficiency (NEE) analysis that evaluates the costs and benefits of the Modernization Alternative over the No Action Alternative for the Ochoco Irrigation District (OID) Infrastructure Modernization Project (herein referred to as 'Project'). The analysis uses Natural Resources Conservation Service (NRCS) guidelines for evaluating NEE benefits as outlined in the NRCS Natural Resources Economics Handbook and the U.S. Department of Agriculture's (USDA) Guidance for Conducting Analyses Under the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies and Federal Water Resource Investments (DM 9500-013).

All economic benefits and costs are provided in 2020 dollars and have been discounted and amortized to average annualized values using the fiscal year 2020 federal water resources planning rate of 2.75 percent. All values in this analysis are rounded to the nearest $1,000

2. Costs of the Modernization Alternative

This section evaluates the costs of the Modernization Alternative over the No Action Alternative. Under the No Action Alternative, the District would continue to operate and maintain the existing canal and lateral system in its current condition and configuration. However, in the No Action Alternative, the District's pumping stations are projected to be entirely replaced in project Year 10 (instead of in Years 0-2 in the Modernization Alternative). In the meantime, over the next 10 years, if the District pumping stations experience operational problems or failure, the District would repair the problem to the extent that funds are available. The installation of pumps under the No Action Alternative have been included as a benefit from avoided costs under the Modernization Alternative. See Section D.3.1.2 for further discussion.

2.1 Analysis Parameters

This section describes the general parameters of the analysis, including funding sources and interest rates, the evaluation unit, the project implementation timeline, the period of analysis, and the project purpose.

2.1.1 Funding

Public Law (PL) 83-566 funds would cover $23,061,000 or 75 percent of the project cost. OID would be required to fund $7,727,000 or 25 percent of the project. OID would cover their funding through a combination of sources including grants, partnerships, and loans. OID would pursue loan funding through the Oregon Department of Environmental Quality's Clean Water State Revolving Fund. OID expects that funding from this source would be at an interest rate of 2.5 percent with a 0.5 percent annual fee paid on the remaining loan balance. These financing costs are not included in the NEE analysis. All funding sources other than PL 83-566 are from non-federal funds.

2.1.2 Evaluation Unit

The proposed project is grouped into three project groups, each of which is defined as the evaluation unit. Each of the project groups could be completed as stand-alone projects and have a positive net benefit. All elements in each project group are required in order to produce the benefits from each project group (i.e., no elements should be separated into further sub-evaluation units for incremental analysis). Note that for the incremental analysis, costs for constructing any given project group would not change if it were the only project group to be constructed.

2.1.3 Project Implementation Timeline

Based on conversations with the District manager and staff, if PL 83-566 funds are made available, it is likely that construction would be completed over approximately three years. Project Group 1 is expected to begin construction in Year 0 and be completed in Year 2. Project Group 2 is expected to begin in Year 2 and finish the same year. Project Group 3 is expected to begin in Year 1 and be completed in the same year. The analysis assumes that full benefits would be realized the first year after construction is completed. Table summarizes the approximate construction timeline and the breakdown of funding for construction.

Table D-1. Construction Timeline and Installation Costs by Funding Source for the Modernization Alternative, Deschutes Watershed, Oregon, 2020$.[1]

Construction Year	Works of Improvement	Public Law 83-566 Funds	Other, Non-Federal Funds	Total Construction Costs
0-2	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 Project		**$23,061,000**	**$7,727,000**	**$30,788,000**

1/ Price Base: 2020 dollars. Prepared August 2020

2.1.4 Analysis Period

The analysis period for each project group is defined as 101 to 103 years since the installation period is one to three years and 100 years is the expected project life of buried high-density polyethylene (HDPE) pipe. Construction and installation of Project Group 1 is assumed to occur from Year 0 to Year 2, with project life from Year 3 through Year 102. Project Group 2 would be constructed during Year 2 and have a project life from Year 3 to Year 102. Project Group 3 would be constructed in Year 1 and have a project life from Year 2 to Year 101.

2.1.5 Project Purpose

The purpose of this project, as identified in the Watershed Plan-EA, 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 and Grimes Flat irrigators.
- Conserve water along the District-owned Grimes Flat laterals and IronHorse section of the Crooked River Distribution canal (herein referred to as IronHorse section).

The project is multipurpose, that is, it provides multiple benefits. Because no project cost items serve a single purpose separately, this analysis does not allocate costs or benefits by purpose.

2.2 Proposed Project Costs

Table 8-3 (NWPM 506.11, Economic Table 1) and Table 8-4 (NWPM 506.12, Economic Table 2) in Section 8 of the Plan-EA summarize installation costs, distribution of costs, and total annual average costs for the Modernization Alternative. Table D-2 summarizes the average annual costs of the Modernization Alternative over No Action Alternative. Table D-3 and Table D-4 present other direct costs associated with the Modernization Alternative.

Average annual costs of the Modernization Alternative include those associated with installation and other direct costs. There are four potential types of other direct costs: increased pumping costs from increased depth to groundwater due to reduced recharge from unlined canals, costs of increased District pumping, social costs of increased carbon emissions (from increased pumping energy use), and potential reduction in aesthetic values to area residents due to the removal of canals. Of these, groundwater recharge costs and aesthetic costs are qualitatively discussed but not quantified in this analysis due to a lack of available quantitative information and likely insignificant economic impacts. District pumping and carbon emissions act as either a cost or a benefit depending on whether they increase or decrease under the Modernization Alternative; this is further discussed in their respective sections. As OID expects cost savings, not cost increases, for infrastructure maintenance, repair, and replacement of the Modernization Alternative, these are included as benefits in this analysis (Scanlon, 2020).

2.2.1 Project Installation Costs

According to estimates by Black Rock Consulting, Inc., the cost of piping and associated turnouts, pump station installation, and improvements to OID's infrastructure is projected to be approximately $29,556,00. See Appendix D.4 for detailed cost derivation by pipe size, cost category, etc. All values in this analysis are presented in 2020-dollar values and rounded to the nearest $1,000. Adding three percent for project administration from OID and NRCS, $300,000 for technical assistance from NRCS, and $41,000 for permitting costs, the total cost for the Modernization Alternative is estimated at $30,788,000. The average annual cost of installation is $871,000 for the Modernization Alternative, as shown in Table D-2.

The Modernization Alternative would install a total of four pump stations, three of which would replace existing District pump stations and one would be a new pump station. The three existing pump stations would be decommissioned after being replaced. Two of the pump stations, Crooked River Pump Station (CRPS) No. 1 and CRPS No. 2, help transport water from the Crooked River to both Project Group 1 and Project Group 2. In fact, District infrastructure could not deliver Crooked River water to Project Group 2 without these two pumps. For this reason, the analysis apportions the costs of these two pumps among the project groups according to the proportion of water they deliver to each project group. In total, the pump stations move around 11,097 acre-feet of Crooked River water annually, of which 47 percent supports Project Group 1 and 53 percent supports Project Group 2 (Farmers Conservation Alliance, 2020). Accordingly, we apportion 47 percent of the installation costs to Project Group 1 and 53 percent of costs to Project Group 2. We also apportion the avoided operations, maintenance, and replacement (OMR) costs (discussed in Section 0 of the Plan-EA) of the replacement pump stations using this same percent allocation.

Table D-2. Estimated Average Annual Costs for Modernization Alternative Above No Action Alternative, Deschutes Watershed, Oregon, 2020$.[1]

Works of Improvement	Project Outlays (Amortization of Installation Cost)	Other Direct Costs[2]	Total
Project Group 1	$398,000	$86,000	$484,000
Project Group 2	$316,000	$0	$316,000
Project Group 2	$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 2.75 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. Other direct costs are presented for increased pumping costs for the District (discussed in Section 0 of the NEE) and increased carbon emissions (discussed in Section 0 of the NEE). This does not include operations, maintenance, and repair costs because these decline under the Modernization Alternative, so these are presented as a benefit.

2.2.2 Other Direct Costs

2.2.2.1 Groundwater Recharge Costs

Water seepage from canals is one source of recharge for groundwater in the Deschutes Basin. Reduced recharge from canals may lead to groundwater declines, and thereby increase pumping costs for all groundwater users in the basin. A 2013 study by the U.S. Geological Survey estimated the effects of changes in climate (reduced precipitation), groundwater pumping, and canal lining and piping on Central Deschutes Basin groundwater recharge (Gannett & Lite, 2013). The U.S. Geological Service estimated that since the mid-1990s, groundwater levels have dropped by approximately 5 to 14 feet in the central part of the Deschutes Basin[1], with approximately 10 percent of this decline (0.5 to 1.4 feet) in groundwater level due to canal lining and piping during this period. The cumulative effect of piping over the 12-year study period (1997 to 2008) was 58,000 acre-feet of reduced recharge annually by 2008.[2] The Modernization Alternative would reduce canal seepage and other conveyance inefficiencies, and associated groundwater recharge, by up to approximately 2,513 acre-feet annually in this part of the Deschutes Basin. However, the additional water being delivered to McKay irrigators would increase seepage loss during conveyance by an estimated 210 acre-feet of water annually in the open canals and laterals. Once the project is completed, a net 2,303 acre-feet of groundwater recharge would be reduced. Given the relatively small change in groundwater elevations estimated in other parts of the basin from the 58,000 acre-feet of reduced recharge annually, we expect very minor changes in local groundwater elevations and associated groundwater pumping costs in the region due to the Modernization Alternative and the associated reduced recharge of 2,303 acre-feet annually.

2.2.2.2 District Pumping Costs

Two factors are expected to increase the District's demand for energy under the Modernization Alternative. First, new pumps would be installed along the McKay Pipeline, increasing energy demand. Second, some

1 The portion of the basin that extends north from near Benham Falls to Lower Bridge, and east from Sisters to the community of Powell Butte.

2 Assuming a uniform increase in canal lining/piping over this timeframe, in 1997 the decreased canal seepage was 4,833 acre-feet, rising each year by another 4,833 acre-feet until the reduced canal seepage in 2008 was 58,000 acre-feet. Cumulatively, this represents 377,000 acre-feet of reduced recharge from canals during this period.

existing District pumps in Project Group 1 are expected to increase their horsepower under the Modernization Alternative, thereby also increasing energy demand. However, the pump station in Project Group 2 (CRPS No. 3) is expected to decrease its energy demand, acting as a cost-saving benefit of the project. In total, the annual electricity demand for District pumping in Project Group 1 is expected to increase by 5,138,171 kWh under the Modernization Alternative, while annual demand in Project Group 2 is expected to decrease by 88,589 kWh.[3]

The District receives its power under an agreement with the U.S. Bureau of Reclamation and pays $0.01255 per kWh under a 2019 supplemental power rate for all electricity use exceeding 5,000,000 kWh per year (U.S. Bureau of Reclamation, 2019).[4] At this rate, the District would pay an additional $64,000 for pumping energy to supply Project Group 1 under the Modernization Alternative, while Project Group 2 would see a savings of roughly $1,000 (as shown in Table D-3). Project Group 1's cost increase is included as an "Other Direct Cost" in Table D-2. Project Group 2's energy savings is included as a benefit under "Pumping Cost Savings" in Table D-5.

Table D-3. District Energy Cost Changes under Modernization Alternative, Deschutes Watershed, Oregon, 2020$.[1]

Works of Improvement	District Energy Changes Under Modernization Alternative (kWh)	Undiscounted Annual Energy Cost Changes	Discounted Average Annual Change in Energy Costs[1]
Project Group 1	5,138,171	$64,000	$61,000
Project Group 2	-88,589	-$1,000	-$1,000
Project Group 3	0	$0	$0
Total	**5,049,582**	**$63,000**	**$60,000**

Prepared August 2020

1/Price Base: 2020 dollars amortized over 100 years at a discount rate of 2.75 percent.

2.2.2.3 Carbon Costs

Changes in energy use are expected to result in changes in carbon dioxide emissions from power generation. Every MWh change of energy use is estimated to translate into a change of 0.7521 metric tons (Mt) of carbon emissions.[5] The Modernization Alternative would decrease some carbon emissions (from reducing some pumping energy use by District patrons and a District pump station) and increase other emissions (by increasing some District pump station energy use). Compared to the No Action Alternative, under the Modernization Alternative, the on-farm annual energy savings (described in Section 0 in the Plan-EA) would reduce CO_2 emissions by approximately 392 Mt (approximately 521 MWh multiplied by 0.7521). District

[3] Analysis conducted by FCA and Kevin Crew of Black Rock Consulting.

[4] Because OID uses roughly 10.5 million kWh per year, the additional electricity demanded by the District would fall under the supplement power rate (U.S. Bureau of Reclamation, 2019).

[5] This assumes that marginal changes in energy demand are met with fossil fuel-based production (renewable energy is typically used first, and then fossil fuel powered generation is used), such that 100 percent of energy use reduction and green energy production result in reduced fossil fuel powered generation. Furthermore, this estimate assumes 0.7521 metric tons of carbon emitted from one MWh of fossil fuel powered electricity generation based on 1) the current proportion of fuel sources–oil, natural gas, and coal–for fossil fuel powered electrical power generation in the West, and 2) the associated metric tons of CO_2 produced per MWh powered by each fossil fuel source, as reported by the Energy Information Administration.

pumping in Project Group 1 would increase emissions by 3,867 Mt per year, while reduced District pumping in Project Group 2 would reduce emissions by 67 Mt per year. No change in emissions would be expected in Project Group 3 from reduced District pumping. In sum, when combined with changes in patron energy use, there would be a net average annual increase of 3,408 Mt of emissions (see Table D-4).

To value the reduced carbon emissions, this analysis uses an estimate of the social cost of carbon (SCC). The SCC represents the estimated total cost to society of emitting carbon, based on the expected economic damages of future climate change. There are many estimates of the SCC, and the estimates vary based on what types of damages are included, the discount rate chosen, the geographic area under consideration (such as global damages versus U.S. domestic damages), and the projected level of global warming and associated damages. SCC damage values used by federal agencies have varied over the years. At first, federal agencies developed and applied their own estimates. Then, the Office of Management and Budget convened an Interagency Working Group (IWG) on the Social Costs of Greenhouse Gases, which developed a set of SCC estimates that could be used across federal agencies. In the year 2020, the IWG estimate for SCC was estimated to be approximately $52.28 per Mt (2020 dollars) (Interagency Working Group on Social Cost of Greenhouse Gases, 2013).[6] However, in 2017, Executive Order 13783 disbanded the IWG, indicated that IWG estimates were not representative of government policy, and removed the requirement for a harmonized federal policy for SCC estimates in regulatory analysis.

Since this time, the Environmental Protection Agency (EPA) and other federal agencies have developed interim alternative estimates of the SCC, largely relying on the methodology used by the IWG, but using different discount rates and focusing on direct damages projected to occur within the borders of the United States. For example, the EPA developed interim SCC values for the *Regulatory Impact Analysis for the Repeal of the Clean Power Plan, and the Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units* published in June of 2019 (Environmental Protection Agency, 2019). As these interim EPA SCC estimates are indicative of current federal agency policy on SCC applications for federal cost benefit analysis, they are employed in this analysis. This analysis uses the EPA interim value of the SCC for 2020, based on a 3 percent discount rate, which is $7 per metric ton of carbon. We apply this value to the net change in carbon emissions each year throughout the project life to estimate the change in carbon emissions from the Modernization Alternative.

As Table D-4 below shows, there is a net increase in carbon emissions in Project Group 1, resulting in an annualized cost of $25,000. This cost is included as an "Other Direct Cost" in Table D-2 above. Project Group 2 has a net decrease in carbon emissions, representing an annualized benefit of $2,000. This benefit is included under "Carbon Emissions" in Table D-5. There is no cost or benefit associated with Project Group 3. Overall, the Modernization Alternative increases carbon emission for a net annualized cost of $23,000.

[6] We adjusted the original cost of $42 in 2007 dollars to 2020 dollars using the Consumer Price Index.

Table D-4. Annual Change in Carbon Costs of Modernization Alternative by Project Group, Deschutes Watershed, Oregon, 2020$.[1]

Works of Improvement	Annual Avoided Emissions from Reduced OID Patron Energy Use (Mt Carbon)	Annual Emissions Change from OID Pump Station Changes (Mt Carbon)	Annual Net Change in Emissions	Average Annual NEE Carbon Cost Change (Social Cost of Carbon)
Project Group 1	144	3,867	3,723	$25,000
Project Group 2	210	-67	-277	-$2,000
Project Group 3	38	0	-38	$0
Total	**392**	**3,800**	**3,408**	**$23,000**

Prepared August 2020

1/ Price Base: 2020 dollars amortized over 100 years at a discount rate of 2.75 percent.

2.2.2.4 Change in Aesthetics and Associated Property/Recreation Values

The project is located in a mix of rural and urban areas. A potential direct cost is that some local residents may experience adverse effects on property values and quality of life due to the change in aesthetics from piping the canals (as some people enjoy the aesthetics of the open canals). According to real estate agents in the region, many people interested in purchasing property in the area are willing to pay more for properties that have a view of a canal. On the other hand, some property owners or potential property owners may not want to have a canal adjacent to their property because of the safety hazard an open canal poses, potentially limiting the effect on property values. Some OID patrons and community members have expressed concerns regarding the safety risk posed by open canals (Scanlon, 2020).

The potential aesthetic cost to residential landowners is not quantified due to a lack of available data. Interviewed real estate agents were not able to quantify the potential effect of a view of the canal. Furthermore, quantification is difficult due to scarce information in the economic literature. While the economic value of many natural views has been studied (such as for ocean front property, or other scenic natural areas), the value of irrigation canals has been studied little, if at all. As such, while this effect is recognized as a likely cost, this analysis does not quantify the potential change in aesthetic values of the proposed project. Regarding recreational effects, there are recreational opportunities in the area of Project Group 3 (but not the other project groups). As piping the District canal in Project Group 3 would increase access to these recreational opportunities from residential areas (the lack of bridges over the open canal currently increases the distance that residents have to travel to access the recreation areas), we expect that Project Group 3 would increase recreational values, although the effect is not quantified due to the lack of quantitative information on recreational usage in or adjacent to the project area.

3. Benefits of the Modernization Alternative

Table D-5 compares the project benefits (over the No Action Alternative) to the annual average project costs presented in Table D-2. The remainder of this section provides details on these project benefits. Table D-5 presents on-site damage reduction benefits that would accrue to agriculture and the local rural community, including increased agricultural yields and associated net income; reduced pumping costs; and reduced operations, maintenance, and replacement (OMR) costs. It also presents off-site quantified benefits, which consist of the value of enhanced fish and wildlife habitat, reduced carbon emissions (where there are emission reductions), savings on transportation infrastructure, and increased land values. Another benefit not included

in the analysis, but which may result indirectly from the Modernization Alternative, is the potential for increased on-farm investments in irrigation efficiency (as patrons have more funds due to increased yields and reduced pumping costs).

The analysis recognizes that instream flows may affect recreation, both in-river and adjacent land-based recreation. However, aside from potential positive impacts to fish and wildlife-related recreation (both fishing and wildlife viewing) from improved species populations and improved access to recreation areas in Project Group 3 as noted above, it is not clear how recreation may be affected. As such, this analysis assumes no net impact to recreation.

Table D-5. Comparison of Average Annual NEE Benefits and Costs of the Modernization Alternative Compared to No Action Alternative, Deschutes Watershed, Oregon, 2020$.[1]

Works of Improvement	Agriculture-Related			Non-Agricultural				Average Annual Benefits	Average Annual Cost [2]	Benefit–Cost Ratio
	Damage Reduction	Reduced OMR	Pumping Cost Savings	Carbon Emissions	Instream Flow Value	Transportation Infrastructure Savings	Increased Land Values			
Project Group 1	$207,000	$153,000	$21,000	$0	$144,000	$0	$0	$525,000	$484,000	1.1
Project Group 2	$4,000	$185,000	$25,000	$2,000	$115,000	$0	$0	$331,000	$316,000	1.0
Project Group 3	$0	$65,000	$4,000	$0	$32,000	$166,000	$8,000	$275,000	$157,000	1.8
Total	**$211,000**	**$403,000**	**$50,000**	**$2,000**	**$291,000**	**$166,000**	**$8,000**	**$1,131,000**	**$957,000**	**1.2**

Notes: Prepared August 2020

1/Price Base: 2020 dollars amortized over 100 years at a discount rate of 2.75 percent.

2/From Table D-2.

3/Values may not sum due to rounding.

3.1 Benefits Included in Analysis

3.1.1 Agricultural Damage Reduction Benefit

The Modernization Alternative would reduce agricultural damage in two ways: 1) it would provide a more reliable source of water to irrigators on McKay Creek, increasing their yields by avoiding damages from water shortages, and 2) it could avoid the loss of agricultural production that would occur if one of the District's current pump stations were to fail, causing a water shortage to agriculture in the District. We examine both potential benefits of agricultural reduction in this section, beginning with those to McKay growers.

The Modernization Alternative (Project Group 1) would implement the McKay Switch Project, which would increase water supply reliability and reduce agricultural damages to irrigators on McKay Creek. Currently, irrigators on McKay Creek begin drawing water from the creek in early April. Around mid-July, the creek runs dry and the irrigators have no other means of watering their crops for the rest of the season. This allows hay growers in the area to get only one cutting of alfalfa, on average, while a full irrigation season would allow growers to get up to three cuttings per year (Scanlon, 2020).

The McKay Switch Project (under the Modernization Alternative) would add District infrastructure that would deliver an alternative source of water to McKay Creek irrigators. This new infrastructure would allow these growers, who manage 686 acres of irrigated lands, to switch their source of water from McKay Creek to Prineville Reservoir storage. The stored water would provide water for the full growing season and allow the growers to avoid the agricultural damage associated with water shortages (Scanlon, 2020).

Almost all irrigators in the McKay Creek area grow hay crops (Scanlon, 2020). Accordingly, to estimate the benefits of these avoided damages, we adjusted an existing crop enterprise budget for alfalfa developed by Washington State University in 2012 (Norberg & Neibergs, 2012). We developed one budget for alfalfa under full irrigation (yield of 5.5 tons per acre) and one budget for alfalfa under a water shortage scenario with only one hay cutting (yield of 2.5 tons per acre). These budgets are shown in detail in Appendix 1. Using these crop budgets, we estimate that alfalfa provides average net returns of $231 per acre under full irrigation and -$82 per acre under deficit irrigation.[7] As such, the avoided damage (i.e., net benefit) of having full irrigation is approximately $313 per acre.

To estimate the reduction in agricultural damages in the McKay Creek area, we apply the net reduced agricultural damage benefit per acre ($313) to all 686 acres on McKay Creek that would receive water under the Modernization Alternative. In total, the McKay Switch Project is expected to yield net benefits of $214,000 per year (before discounting). These benefits all accrue to Project Group 1, which includes the McKay Creek Switch Project.

The other way the Modernization Alternative could avoid agricultural damages is by preventing a pump failure that results in water shortages. As described in the next section (0), the District's pumps are well past their useful life and are at significant risk of failing prior to their projected replacement in Year 10 under the No Action Alternative. District engineers and managers estimate that each year prior to replacement there is a

[7] The net returns under deficit irrigation are negative, implying that growers would not grow alfalfa under these economic conditions. However, despite using the best available information, this may be because fixed costs to growers are lower than modeled. For example, land costs are modeled at the average rental rate for irrigated cropland in Oregon, which is likely to be higher than the rate for hay acres in the McKay Creek area because the average includes acres that grow high-value crops. The fixed costs do not affect the benefits of the Project, as this is based on the difference between deficit irrigation of hay and full irrigation of hay (and fixed costs are nearly the same in both scenarios).

10 percent chance a pump will fail (Crew, 2020; Scanlon, 2020). If a pump were to fail, it would reduce water deliveries to Project Groups 1 and 2 by 40 cubic feet per second (cfs) until replacement parts could be procured. Because the parts would have to be custom manufactured, the failed pump would be in inoperable for the remainder of the irrigation season as a complete repair would likely take up to a year (Crew, 2020; Scanlon, 2020). We assume that it is equally likely for a pump to fail at any point during the irrigation season; as such, we assume that it fails at the mid-point of the 26-week irrigation season and that there are 13 weeks of the irrigation season when the pump is inoperable.

During the outage, the District would likely convert to a different water source and draw additional stored water from the Ochoco Reservoir in order to replace the Crooked River water that would have been available from the pump (Scanlon, 2020). At 40 cfs over 13 weeks, the volume of stored water needed to make up for the shortage would be 7,220 acre-feet. As long as the Ochoco Reservoir contained this amount of water during the pump outage, there would be no water shortage for growers in the season when the pump failed (which we assume is the case in this analysis). However, drawing down the Ochoco Reservoir would significantly increase the risk of a water shortage in the year following the pump failure. The Ochoco Reservoir only fills to capacity 50 to 60 percent of years; the remainder of years leave the District short of their full allocation of water (Scanlon, 2020). Accordingly, we assume, on average, there is a 45 percent chance a pump failure would result in a water shortage in the District equal to the amount lost during the pump outage (7,220 acre-feet) in the year following a pump failure.

A 7,220-acre-foot shortage would represent an approximate 13 percent reduction in the District's total water use.[8] Since most of the District grows hay, the consequence of the water shortage is likely to be reduced hay yields. Since the relationship between water applications and hay is roughly linear (Bohle, 2020), we assume the shortage would cause a 13 percent reduction in hay yields. To estimate the value of this reduction, we created a crop budget (detailed in NEE Appendix 1) that models the net returns to hay with a yield that is 13 percent lower than with full irrigation. This method indicates that a 13 percent yield reduction would lower the net returns per hay acre from $231 to $187, a loss of $44 per acre. When applied to the roughly 90 percent of the District's acres that grow hay and considering the annual risk of pump failure (10 percent) and the Ochoco Reservoir not filling (45 percent), the annual risk of pump failure to hay net revenues is around $43,000. As described in Section 0, we apportion these benefit of avoiding this risk to Project Group 1 and 2 according to the amount of water served by the pumps (47 percent to Project Group 1 and 53 percent to Project Group 2). Since the District anticipates replacing the pumps in Year 10 under the No Action Alternative, we assume these benefits accrue through Year 10.

Table D-6 summarizes the benefits of avoiding agricultural damage under the Modernization Alternative, including the benefits to McKay Creek growers (Project Group 1) and the benefits of avoiding a pump failure (Project Groups 1 and 2). When discounted and annualized, the avoided damage to agriculture is expected to bring average annual benefits of $211,000 under the Modernization Alternative (as shown below).

[8] Assuming the District's 20,062 irrigated acres use, on average, 2.8 acre-feet per acre each year.

Table D-6. Reduced Agricultural Damages Under the Modernization Alternative by Project Group, Deschutes Watershed, Oregon, 2020$.[1]

Works of Improvement	Acres Benefitting from Increased Yield	Undiscounted Annual Benefit of Increased Yield in McKay Creek	Undiscounted Annual Benefit of Reduced Yield Losses Due to Pump Failure	Annualized Average Net Benefits of Modernization Alternative
Project Group 1	686	$214,000	$20,000	$207,000
Project Group 2	0	$0	$23,000	$4,000
Project Group 3	0	$0	$0	$0
Total	**686**	**$214,000**	**$43,000**	**$211,000**

Prepared August 2020

1/Price Base: 2020 dollars amortized over 100 years at a discount rate of 2.75 percent.

3.1.2 District OMR Cost Savings Benefit

Under the Modernization Alternative, the District would experience OMR savings from two primary sources: Avoided canal maintenance costs and avoided pump OMR. This section explores these two benefits separately, beginning with the avoided canal O&M costs.

The District's canal O&M costs arise from transportation and labor costs to inspect the canals, conduct weed treatments, and excavate the canals. These costs occur in Project Groups 2 and 3, but not Project Group 1 since McKay Creek (which comprises Project Group 1) is not currently part of the District. There may be canal O&M costs to McKay Creek growers, and to the extent that there are, this analysis would underestimate the benefits of the Modernization Alternative. In Project Group 2, inspecting the canals require about 45 minutes of labor and 8 miles of driving every day during the irrigation season (which averages 190 days per year) (Scanlon, 2020). Project Group 3 requires about 1 hour of labor and 3 miles of driving each day for inspections every day of the irrigation season (Scanlon, 2020). With labor costing the District $20 per hour (including payroll taxes and wages), and valuing the vehicular costs at $0.575 per mile,[9] the annual cost of inspecting the canals totals approximately $3,700 for Project Group 2 and $4,300 for Project Group 3.

Regarding weed control costs, the District estimates it would save roughly $10,000 per year in Project Group 2 and $30,000 per year in Project Group 3 as a result of the Modernization Alternative. In addition, both project groups require 8 hours of excavation about every 3 years to maintain the canals, and renting the excavator costs $150 per hour (Scanlon, 2020). At these rates, the annual average cost of excavating the canals is roughly $1,200 per project group.

Additionally, under the No Action Alternative, Project Group 3 would require a fence be built for public safety. The project group is located in a suburban area where housing developments are expanding, and the canal in this project group runs adjacent to an elementary school. The associated public safety concerns are expected to result in the District installing fencing along the canal, which it expects would occur around Year 5 at a quoted cost of $50 per foot (Scanlon, 2020). Project Group 3 is approximately 1.2 miles long, which would result in total fencing costs of $312,500. After discounting and annualizing, the cost to install fencing is roughly $7,500 per year in present-value terms.

[9] This is the 2020 Internal Revenue Service standard mileage rate for travel (Internal Revenue Service, 2020).

As shown in Table D-7, the annualized avoided costs of canal O&M under the Modernization Alternative would be roughly $14,000 for Project Group 2 and $43,000 for Project Group 3, for a total annualized O&M savings of $57,000 per year.

Table D-7. Annual Reduced Canal O&M Costs to OID of Modernization Alternative, Deschutes Watershed, Oregon, 2020$.[1]

Works of Improvement	Undiscounted Annual O&M Savings	Undiscounted Avoided Cost of Fencing [2]	Discounted Annualized O&M Cost-Saving Benefit
Project Group 1	$0	$0	$0
Project Group 2	$15,000	$0	$14,000
Project Group 3	$36,000	$312,500	$43,000
Total	**$51,000**	**$312,500**	**$57,000**

Prepared August 2020

1/ Price Base: 2020 dollars amortized over 100 years at a discount rate of 2.75 percent.
2/ A one-time cost assumed to occur in Year 5.

Under the No Action Alternative, the District would need to replace three existing pump stations (CRPS No.1, CRPS No.2, and CRPS No.3, as previously discussed in Section 0). These pumps lift water from the Crooked River to Project Groups 1 and 2, a function that would continue under both the Modernization and No Action Alternatives. The District's pump stations CRPS No.1 and No.2 are at least 55 years old and well past their expected useful life (Crew, 2020). Currently, the District lacks the available funding to replace the pumps and is only able to conduct the minimum level of maintenance to keeping the pumps functioning (Crew, 2020; Scanlon, 2020). This situation makes it very possible the pumps could fail prior to replacement under the No Action scenario, which is expected to occur around Year 10 as long as the pumps do not fail prior to that (Scanlon, 2020). The cost of replacing the pump stations is assumed to be the same under both scenarios: $11,950,000 (2020 dollars), as the type of pump and use of the pump (to pump water from the Crooked River) is the same under all Alternatives.

The pumps have a useful life of about 50 years given proper maintenance, which means they would need to be replaced more than once during the project life (Crew, 2020). In this way, the Modernization and No Action Alternatives would incur the same replacement costs at different times, which, due to discounting, would cause the costs to have different present values. Similarly, the O&M costs, which tend to increase during the life of the pumps (as further explained below), would be similar between the two alternatives but occur at different times, which would also have different present values. The avoided pump OMR costs of the No Action Alternative (in present value terms) are benefits of the Modernization Alternative.

Under the Modernization Alternative, the cost of replacing the pumps is included in the project installation costs, and additional costs are incurred associated with project administration, technical assistance, and permitting costs, as described above, and are included in Table and Table D-2. These additional costs are assumed to not be incurred under the No Action Alternative.[10] This analysis assumes installation costs of

[10] Permitting costs in the case of the Modernization Alternative are associated with permitting cost above general construction costs, such as potentially special in-water work that would need to occur with the Crooked River Diversion weir raise. Because this work would not occur under the No Action Alternative, special permitting costs are not applicable.

pumps under No Action Alternative would occur in Year 10 and in Year 61, while, under the Modernization Alternative, replacement would occur in Year 51 and Year 102 (assuming replacement after 50 operating years).

The lifetime O&M costs of the pump are estimated to total 30 to 40 percent of the costs of initial installation (Crew, 2020). Given the initial installation costs of the pumps is estimated to be $11.9 million, the lifetime O&M costs are projected to be $3.59 - $4.78 million. We assume the average of this range: $4.18 million. In the years immediately following replacement, O&M costs are expected to be at least $3,500 per year and rise in approximately an exponential pattern afterwards, with the total over the 50-year period summing to $4.18 million (Crew, 2020). Accordingly, we model the O&M costs using the timeline in Figure D-1 below, with the highest costs being incurred near the end of the pumps' life. The total costs over the pumps' life ($4.18 million) is represented by the area below the curve.

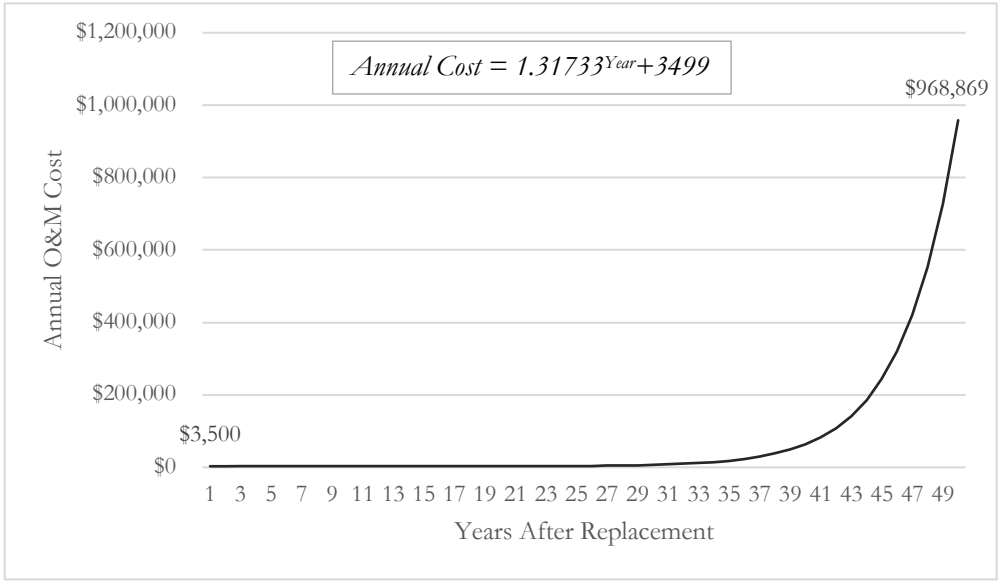


Figure D-1: Annual pump O&M costs for Crooked River Pump Stations 1, 2, and 3.

As the pumps are assumed to be the same, we assume the same costs for each year of pump life in all Alternatives. However, because pump replacement would occur in different years under the No Action Alternative and Modernization Alternative, the cost curve above would occur at different times. Specifically, the cost curve under the No Action Alternative would be 7 years behind the Modernization Alternative (since the pumps would be replaced in Year 3 under the Modernization Alternative and Year 10 under the No Action Alternative). The OMR savings resulting from the Modernization Alternative is represented by the difference between the costs under the two scenarios for any given year. For example, in Year 3, the pump OMR costs under the Modernization Alternative would be $3,500 and $188,226 under the No Action Alternative, resulting in a savings of $184,726 for that year. In total, including both the replacement cost of the pumps under No Action and the lifetime reduced O&M costs of replacing the pumps earlier under the Modernization Alternative, the undiscounted savings during the life of the project is a net benefit of $11,807,000.[11] As described in Section 0, we apportion the benefit of avoided OMR costs according to the proportion of water served to each project group: 47 percent to Project Group 1 and 53 percent to Project

[11] This includes some years where the OMR costs under the Modernization Alternative exceed the OMR costs under the No Action Alternative (i.e., a net cost of the proposed project for those years).

Group 2. As Table D-8 shows, after discounting and amortizing, the estimated benefits of reducing the lifetime OMR costs of the pumps (through replacing the costly-to-maintain existing, old pumps more rapidly) are roughly $324,000 annualized.

Table D-8. Annual Reduced Pump OMR Costs to OID of Modernization Alternative by Project Group, Deschutes Watershed, Oregon, 2020$[1]

Works of Improvement	Apportioned Undiscounted Total OMR Cost Savings (Relative to No Action)	Total Annualized Pump OMR Savings
Project Group 1	$5,575,000	$153,000
Project Group 2	$6,232,000	$171,000
Project Group 3	$0	$0
Total	**$11,807,000**	**$324,000**

Prepared August 2020

1/Price Base: 2020 dollars amortized over 100 years at a discount rate of 2.75 percent.

3.1.3 Patron Irrigation Pumping Cost Savings

OID patrons in Project Groups 1, 2, and 3 currently use an estimated 1,377,814 kWh annually to power irrigation pumps (Farmers Conservation Alliance, 2020). System improvements associated with the Modernization Alternative would result in an estimated net energy savings of 520,751 kWh per year, since it is much more efficient for patrons to receive pressurized water than to pressurize it themselves.[12] This energy cost savings is evaluated using Pacific Power's Schedule 41 rate for irrigation pumping: $0.0913 per kWh (Black Rock Consulting, 2017). Table D-9 presents the energy use and cost savings to OID patrons under the Modernization Alternative. After the project is complete, the average annual NEE savings to OID patrons would be approximately $45,000 each year.

Table D-9. Annual Average Energy Cost Savings to OID Patrons of Modernization Alternative by Project Group, Deschutes Watershed, Oregon, 2020$.[1]

Works of Improvement	Annual Energy Use Under No Action Alternative (kWh)	Annual Energy Use Under Modernization Alternative (kWh)	Reduced Annual Energy Use (kWh)[2]	Undiscounted Annual Energy Cost Savings	Average Annual Discounted NEE Benefits (Avoided Energy Costs)
Project Group 1	212,466	21,197	191,269	$17,000	$17,000
Project Group 2	842,906	563,974	278,932	$25,000	$24,000
Project Group 3	322,442	271,892	50,550	$5,000	$4,000
Total	**1,377,814**	**857,063**	**520,751**	**$47,000**	**$45,000**

Prepared August 2020

1/Price Base: 2020 dollars amortized over 100 years at a discount rate of 2.75 percent.
2/As estimated by FCA (Farmers Conservation Alliance, 2020).

[12] This is a based on an FCA analysis of OID data on energy savings.

The Modernization Alternative would provide pressurization to some irrigators on McKay Creek (Project Group 1), which would eliminate the need for these patrons to maintain irrigation pumps. Of the estimated 15 pumps being used by McKay Creek irrigators, eight are projected to be eliminated as a result of the Modernization Alternative. Pumps incur annual maintenance costs, service charges from power providers, and require replacement at the end of their useful life. Avoiding these costs would represent a benefit to District patrons.

Under Schedule 41, Pacific Power charges $90 to supply an electrical connection for a three-phase pump (Pacific Power, 2014). We use an average pump size of 10 horsepower (hp), requiring a 7.5-kW power connection. A 10-hp pump typically costs roughly $550 in repairs every four years, for an average annual maintenance cost of $138 (Mark, 2019; Scarborough, 2019). A 10-hp pump typically has a 10-year useful life and costs approximately $3,000 (Haun, 2019; Fey, 2019). Amortizing these replacement costs results in an annualized replacement cost of $347. Summing the service charges, maintenance costs, and annualized replacement costs results in a total estimated annual cost of $575 to own and operate an irrigation pump. This analysis uses $575 as the annual benefit of each pump eliminated in the study area as a result of the Modernization Alternative. Table D-10 outlines these cost-saving benefits. When discounted and amortized, District patrons would save roughly $4,000 per year on pump OMR costs (excluding energy, which is separately estimated in Table D-9).

Table D-10. Annual Pump OMR Cost Savings to OID Patrons of Modernization Alternative by Project Group, Deschutes Watershed, Oregon, 2020$.[1]

Works of Improvement	Patrons Pumps Eliminated through Piping	Undiscounted Annual Patron Pump OMR Savings	Average Annual Benefit of OMR Cost Savings
Project Group 1	8	$5,000	$4,000
Project Group 2	0	$0	$0
Project Group 3	0	$0	$0
Total	**8**	**$5,000**	**$4,000**

Prepared August 2020

1/Price Base: 2020 dollars amortized over 100 years at a discount rate of 2.75 percent.

3.1.4 Avoided Transportation Infrastructure Costs

The Modernization Alternative Project Group 3 allows the City of Prineville to avoid transportation infrastructure costs. Under the No Action Alternative, the City of Prineville would have to build multiple bridges over the District's canal in Project Group 3 in order to connect expanding suburban development (Brooks Resources Development, 2017). The City would likely build two bridges around Year 3 and at least three more bridges around Year 7, with each bridge costing approximately $1.3 million (Hannas, 2020). At this rate, the total (undiscounted) cost for the five bridges would be approximately $6.5 million.

Under the Modernization Alternative, the canal in Project Group 3 would be piped, eliminating the need to build these bridges and avoiding the additional cost to the City. As shown in Table D-11, when discounted and annualized, the benefit of avoiding the transportation infrastructure costs is estimated at $166,000 annually.

Table D-11. Transportation Infrastructure Savings of Modernization Alternative by Project Group, Deschutes Watershed, Oregon, 2020$.[1]

Works of Improvement	Number of Bridges Built in Each Project Group	Undiscounted Transportation Infrastructure Costs	Total Annualized Transportation Infrastructure Savings
Project Group 1	0	$0	$0
Project Group 2	0	$0	$0
Project Group 3	5	$6,500,000	$166,000
Total	**5**	**$6,500,000**	**$166,000**

Prepared August 2020

1/ Price Base: 2020 dollars amortized over 100 years at a discount rate of 2.75 percent.

3.1.5 Avoided Cost of Canal Failure

The District experiences canal failures in roughly one out of every three years in areas with fine sand soils (Scanlon, 2020). Earthen canals lined by fine sand are especially vulnerable to failure, and comprise about 17.2 miles of the District's canals, which includes the 1.1 miles of canal in Project Group 3 (Farmers Conservation Alliance, 2020). Assuming the probability of canal failure is equal across all 17.2 high-risk miles of canal, Project Group 3 has a 2.3 percent chance of a canal failure in any given year.[13] The economic consequences of a canal failure include the costs to clean up and repair the breach, and the associated property damage that results from flooding the area surrounding the breach. In Project Group 3, the Modernization Alternative would avoid the economic losses associated with canal failure by piping the canals, and thereby provide an economic benefit.

The costs to clean up and repair a canal breach vary widely but a conservative estimate is $10,000 per incident (Scanlon, 2020). The costs of property damage also vary widely but are generally higher when failures occur near more developed areas with built infrastructure, such as housing developments, which is the situation surrounding the canal in Project Group 3. A canal breach in this area could cause flood damage to homes and/or public buildings, including the adjacent elementary school.

To estimate the value of these potential damages, we assume they are the same as the costs of a canal breach in Central Oregon Irrigation District (COID), which occurred in similar circumstances to those in Project Group 3 (i.e., canal flow levels, proximity to development, type of development, and likely timing of response are all similar). The breach occurred on COID's Pilot Butte Canal in November 2005 during a time when the flow in the canal was comparable to the typical flow in Project Group 3 (roughly 140 cfs) (Scanlon, 2020). The subsequent flooding damaged five homes and resulted in a liability claim of $650,000 (2005 dollars) against COID (Scanlon, 2020). Adjusting these costs for inflation to 2020 dollars, similar damages in 2020 would cost around $972,000 to repair.[14] Because of the similarity of the situation to Project Group 3, we adopt this value as the potential damage to property from a canal failure in Project Group 3. Adding in the approximately $10,000 per incident costs to clean up and repair the canal itself (described above), total costs are estimated at approximately $982,000 per incident. To adjust this to an annual risk value, we multiply it by the estimated likelihood a canal failure would happen in Project Group 3 (2.3 percent), resulting in a value of

[13] This is calculated as 1.2 miles divided by 17.2 miles, multiplied by a 33% annual chance of failure.

[14] These costs were adjusted using the U.S. Bureau of Reclamation's Construction Cost Trends index (Bureau of Reclamation, 2020).

about $21,000. In total, the annual risk of clean up and property damage costs due to a canal failure are about $23,000. When discounted and annualized, the benefit of avoiding these costs under the Modernization Alternative is estimated at $22,000 annually (Table D-12).

Table D-12. Avoided Costs of Canal Failure Under the Modernization Alternative by Project Group, Deschutes Watershed, Oregon, 2020$ [1]

Works of Improvement	Undiscounted Annual Canal Failure Savings	Discounted Annualized Canal Failure Cost-Saving Benefit
Project Group 1	$0	$0
Project Group 2	$0	$0
Project Group 3	$23,000	$22,000
Total	**$23,000**	**$22,000**

Prepared August 2020

1/ Price Base: 2020 dollars amortized over 100 years at a discount rate of 2.75 percent.

3.1.6 Increased Land Value

Piping under the Modernization Alternative would allow currently undevelopable lands immediately proximate to the canal to be developed, thereby increasing the land's value. Currently in Project Group 3, the District's canal prevents roughly 35.7 acres from being developed (Hannas, 2020). This is in a suburban area with active residential development occurring nearby. Under the Modernization Alternative, the canal in Project Group 3 would be piped, which would allow the 35.7 acres to be developed into approximately 143 single family home lots (Hannas, 2020).

To estimate the economic value of making this development possible, we take the approximate sale value of each lot and subtract the costs to make it developable, to estimate the net value of the raw land. The estimated cost to develop each lot is approximately $53,100, which includes utility hook-ups, fees, permits, and other miscellaneous costs (Hannas, 2020). The market value of the lots would be roughly $55,000 (Scanlon, 2020; Peddicord, 2020). This means that the value of the raw land for development may be approximately $1,900, which totals $272,000 for all 143 lots that would become developable under the Modernization Alternative. We assume this value would be generated the year after Project Group 3 is completed (Year 2). As shown in Table D-13, when discounted and annualized, the benefit of the increased land value under the Modernization Alternative is worth $8,000 annually.

Table D-13. Increased Land Value of the Modernization Alternative by Project Group, Deschutes Watershed, Oregon, 2020$.[1]

Works of Improvement	Undiscounted Value of Land Improvement	Discounted Annualized Land Improvement Benefit
Project Group 1	$0	$0
Project Group 2	$0	$0
Project Group 3	$272,000	$8,000
Total	**$272,000**	**$8,000**

Prepared August 2020

1/ Price Base: 2020 dollars amortized over 100 years at a discount rate of 2.75 percent.

3.1.7 Value of Conserved Water

The value of the conserved irrigation water can be looked at in two ways: the value of increased water instream or the value of maintaining irrigated agricultural production. This analysis focuses on the value of instream flow, as the conserved water from the Modernization Alternative would be used to augment instream flows. However, this analysis also presents the value of water to agriculture as the Modernization Alternative also enhances water supply reliability to irrigators.

This section provides several types of information on the value of instream flow. First, this analysis examines the value that environmental groups, federal agencies, and other funders of conservation have been willing to pay for water conservation projects that restore flow in the Deschutes Basin. While these values are in fact costs, rather than a measurement of benefit, the amounts paid in the past for water conservation projects to enhance instream flow represent the minimum value to the funding entities of conserved water projects (benefits as perceived by funding entities are expected to at least equal costs or funding would not be provided). Similarly, there is some limited water market data available for what environmental or governmental groups have paid to directly purchase water rights and dedicate the water to instream flow. These values also represent the cost of increasing instream flow, similar to the data on costs of water conservation projects and may significantly underestimate the full value of instream flow augmentation. Data on water right transactions in the Deschutes Basin were not available for this study. However, prices of water rights are often based on the value of water to agriculture (as agriculture is the most common seller of water rights for environmental or other water uses). We therefore present market information on the value of water rights to irrigators in OID, as this indicates the potential cost of purchasing water rights from these irrigators.

Based on the following discussion, we assume that the economic benefit of instream flow augmentation would be at least $75 per acre-feet per year, such that this enhanced instream flow is estimated to have a value of approximately $305,000 per year once all project groups are complete under the Modernization Alternative (because of the timing, on an average annualized basis the NEE benefit is roughly $291,000 as presented in Table D-15). As most water right transactions for environmental purchases are to enhance fish habitat, this value is expected to be a conservative proxy for the value to the public of enhanced fish habitat and fish populations. The full measure of the economic benefit of enhanced instream flow is the benefit to the public of enhanced fish and wildlife populations, water quality, ecosystem function, etc.

Values published in the economic literature are often quite high for enhancements to trout and other fish and wildlife populations (see Table D-14), like those that would benefit from the instream flows provided by the Modernization Alternative. As quantitative information on how instream flows would improve fish and wildlife populations is not available, the analysis is not able to directly measure the economic benefit of enhanced instream flow. As such, the value of conserved water is estimated in this section using the prices of water from transactions in the Western United States. Transaction values from the Deschutes Basin itself are not used, as there are regulatory limitations on the amount paid for leased water and much of the water is temporarily leased and donated to instream flows, not reflecting the true instream flow value of the water. Table D-15 shows the estimated average annual benefits of enhanced instream flow for the Modernization Alternative.

Table D-14. Studies and Values Used to Estimate the Value of Fish Enhancement.

Author(s)	Study Year	Original Value Per Household (Dollar Year)	Value Per Household Adjusted to 2019 dollars	Restoration Location	Fish Enhancement	Survey Respondents
Bell, Huppert, & Johnson	2003	$24 - $122 (2000$)	$36 - $179	Coastal WA and OR	Annual willingness to pay (WTP) per household to increase local Coho salmon populations by 100%	Households in Grays Harbor, WA; Willapa Bay, WA; Coos Bay, OR; Tillamook Bay, OR; Yaquina Bay, OR
Olsen, Richards, & Scott	1991	$43 (2006$)	$54	Columbia River Basin	Annual WTP per household to increase salmon and steelhead population by 100%	Pacific Northwest households that never fish
Loomis	1996	$59 - $73 (1994$)	$101 - $125	Elwha River, Olympic Peninsula, WA	Annual WTP per household to restore a salmon and steelhead population in its historic habitat on the Elwha River	Households in Clallam County, WA; WA state; U.S.
Layton, Brown, & Plummer	1999	$119 - $250 (1998$)	$185 - $388	Eastern WA and Columbia River; Western WA and Puget Sound	Annual WTP per household to increase migratory fish populations by 50%	Households in WA state

Prepared August 2020

Sources: (Bell, Huppert, & Johnson, 2003); (Loomis, 1996); (Layton, Brown, & Plummer, 2001); (Olsen, Richards, & Scott, 1991) as cited in (Richardson & Loomis, 2009).

Table D-15. Annual Estimated Instream Flow Value of Modernization Alternative by Project Group, Deschutes Watershed, Oregon, 2020$.[1]

Project Group	Water Conservation Under Modernization Alternative (acre-foot/year)	Undiscounted Annual Benefits of Additional Instream Flow	Annualized Average Net Benefits of Modernization Alternative
Project Group 1	2,021	$152,000	$144,000
Project Group 2	1,613	$121,000	$115,000
Project Group 3	432	$32,000	$32,000
Total	**4,066**	**$305,000**	**$291,000**

Prepared August 2020

1/Price Base: 2020 dollars amortized over 100 years at a discount rate of 2.75 percent.

This value of $75 per acre-foot per year is based on the following information (see Table D-16):

1. Prices paid for water by environmental buyers throughout the Western United States: In the period 2000 to 2009, the purchase price of environmental water varied from just over $0 to nearly $1,676 per acre-foot per year, with an average permanent sale transaction price of $166 per acre-foot per year. Among the 51 permanent water right purchases with the sales price and volume recorded in the database, the permanent sales price value in 27 transactions (53 percent) was above $75 per acre-foot per year. As discussed at length below, these values paid are expected to provide a low range estimate of instream flow value to society.
2. Value of water to irrigators in OID: Using crop budget approach, we estimate that each acre-foot of water generates approximately $60 to $120 for hay growers in the District, depending on yields. This value is important, as the value of water to local agriculture is a key factor determining water sales and lease prices to environmental buyers in the project area (i.e., the marginal value of water to agriculture would determine agricultural sellers' willingness to accept a price for water), and because conserved water avoids potential future reductions in OID's deliveries.

Table D-16. Value per Acre-Foot per Year of Water (Market Prices and Value to Agriculture), Deschutes Watershed, Oregon, 2020$.

Type of Value	Low Value	High Value	Median Value	Average Value
Permanent water right transactions in Western U.S., 2000 to 2009 (*Converted to Annual Values*)	~$0	$1,676	~$75	$166
Value of water to OID irrigators (*Income Capitalization Approach and Sales Price of Water in Ag to Ag Transfers, Converted to Annual Values*)	$60	$120	N/A	$80

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3.1.7.1 Past Costs Paid as a Proxy for Value

Past piping projects in the Deschutes Basin highlight the willingness of funding entities to pay for instream flow augmentation. These values are evidence of the *minimum* benefit of the instream flows purchased, as perceived and experienced by these entities. Project costs paid are indicative of the *minimum* perceived benefit

as (barring very unusual circumstances) entities only pay for projects for which they believe benefits exceed costs. The perceived value may be higher than the price paid in cases where the funding organization was willing to pay more than the actual price paid by one organization for instream benefits. Furthermore, because instream benefits can be valued and enjoyed by people other than the funding organization, society's value of instream benefits is likely higher than the price paid for instream flow. Only if all people who value instream flows were to contribute their maximum willingness to pay for instream flow restoration would the value paid equal the benefits received. Finally, it is important to recognize that these values fundamentally represent *costs* and not benefits; the values paid are based on the cost to conserve water or for agriculture to reduce their use of water (as evident through water right transactions from agriculture to environmental flows).

In the Deschutes Basin, around 90 projects have restored approximately 80,000 acre-feet of water instream (Central Oregon Irrigation District, 2016). Based on data from the Deschutes River Conservancy, costs of instream flow augmentation from piping projects have ranged from approximately $105,000 to approximately $344,000 per cubic foot per second (cfs) conserved; this may equate to roughly $300 to $1,000 per acre-foot conserved.

Water rights can be purchased or leased in Oregon. It is important to note that the value paid per acre-foot depends on many variables, including the value of water to the seller, funding available to the buyer, characteristics of the affected stream/river (including current flow levels, flow targets, and presence of threatened or endangered species), characteristics of the water right (seniority, time of use, point of diversion, etc.), and the size of the water right.

Water right leases and purchases for environmental purposes across the Western United States were analyzed in a 2003 paper (Loomis, Quattlebaum, Brown, & Alexander, 2003). During the period between 1995 and 1999, six transactions of water right purchases averaged $362 per acre-foot in Oregon, while five water right leases averaged $115 per acre-foot per year. The paper also shows lease and purchase price by environmental use, including for riparian areas, wetlands, recreation, and instream flow. For instream flows, the average purchase price across 18 transactions per acre-foot was $1,121, while across 35 lease transactions the annual price was $68 per acre-foot.

The Bren School of Environmental Science and Management at the University of California, Santa Barbara, maintains a database of water transfers in the Western United States, and distinguishes between the terms of the transaction (i.e., sale or lease) and the sector of the buyer and seller (e.g., agricultural or environmental) (Bren School of Environmental Science & Management, University of California, Santa Barbara, 2017). The two graphs shown below in Figure D-2 and Figure D-3 show more recent (from 2000 to 2009) sales and leases of water rights by environmental buyers on a price per acre-foot per year basis. The figures show how water right transaction values vary widely, but sale prices (amortized to an annual price) typically are less than $200 per year while 1-year leases typically fall below $800 per acre-foot per year (with several transactions showing prices rising over a $1,000 per acre-foot per year). Among the 51 permanent water right purchases with the sales price and volume recorded in the database, the sales price value in 27 transactions (53 percent) was above $75 per acre-foot per year. However, it is also important to note that the amount paid per acre-foot tends to decline with an increase in water volume traded; weighing the purchase price by the water volume sold decreases the average permanent sale transaction price to $20 per acre-foot per year.

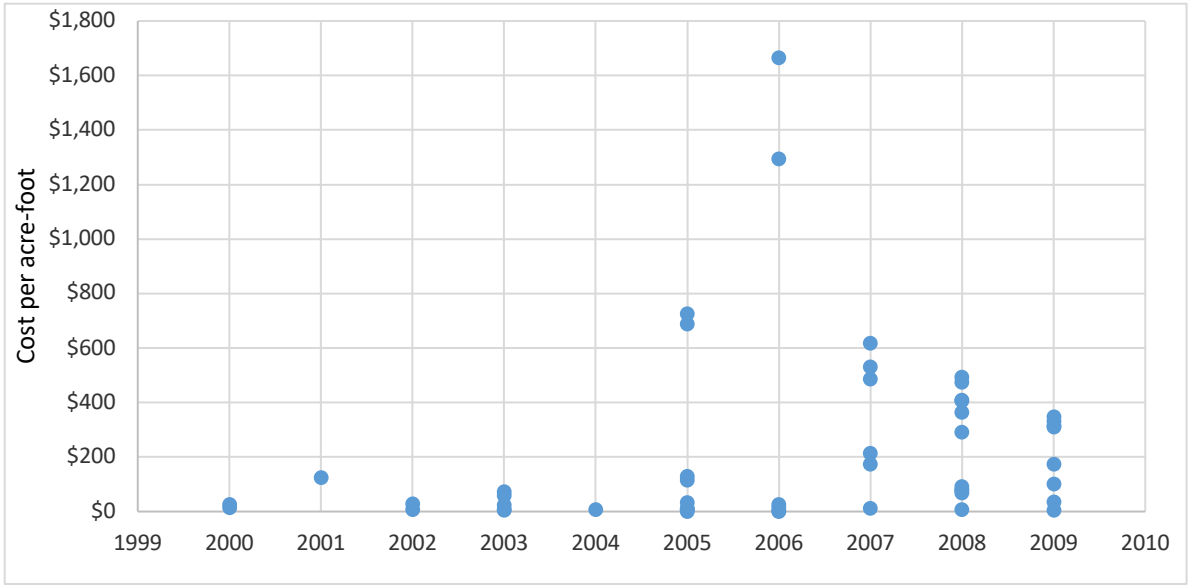

Figure D-2: Western Water Right Purchases for Environmental Purposes, 2000 to 2009, Price Paid per Acre-Foot per Year.[15]

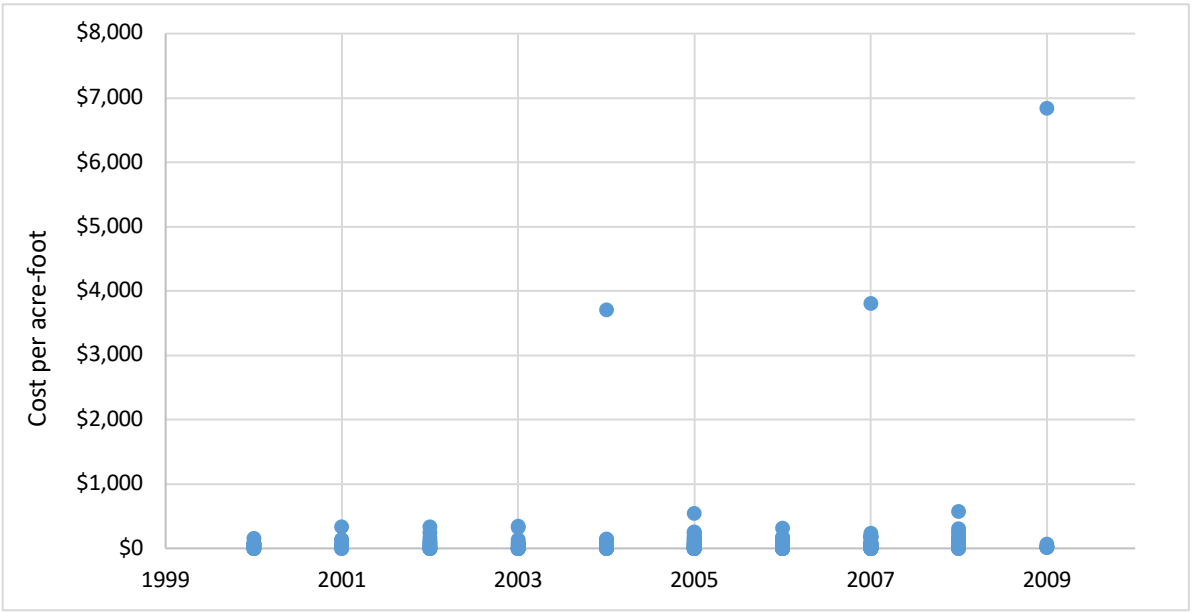

Figure D-3: One-Year Water Leases for Environmental Purposes, Price Paid Per Acre-Foot in Western United States.

3.1.7.2 Current and Potential Future Water Right Purchase Values in the Surrounding Area

Water sales in the District are not common and there is very little information available regarding transaction prices. However, to provide a reference for the value of water based on purchases in neighboring districts, water rights sold from one irrigator to another within Tumalo Irrigation District (which is also located in

[15] Note that dollar per acre-foot purchase prices were amortized using a 2.75 percent interest rate and a 100-year period to derive dollar per acre-foot per year values.

Central Oregon and has a similar crop mixture of predominantly forage crops) have typically had a purchase price between $5,080 to $7,620 per acre (Rieck, 2017).[16] These values are very similar to values provided by real estate agents in the region regarding the increased value of property with irrigation water rights, with all else equal. Assuming the certificated rate of 5.45 acre-feet per year delivered on average to acreage in Tumalo Irrigation District, this equates to approximately $941 to $1,399 per acre-foot ($5,080 to $7,620 per acre divided by 5.45 acre-feet per acre delivery), or a value of approximately $30 to $40 per acre-foot per year.

Prices paid for the limited number of agricultural water right sales may not reflect the average value of water to irrigators in OID and the cost of acquiring water in the future. The value of water to irrigators in OID (i.e., the increased farm income from having access to water) is important as it is a key determinant of the price at which irrigators would be willing to sell water rights (and the price at which environmental water buyers could obtain water from agricultural water right holders, which are the primary water right holders that could sell water rights to augment instream flows). The price paid per acre-foot in the limited Tumalo Irrigation District water transactions cited above is lower than the value derived from the effect on on-farm income from changes in access to irrigation water (income capitalization approach). The change in on-farm income from changes in access to irrigation water may be $80 per acre-foot per year.[17]

The fact that current water right transactions trade for a lower value than derived through the income capitalization approach may be because some farms in the region are not commercial farms or are not farming all their lands, and so derive less income from some of their water rights than commercial farms producing grass hay or other crops. This indicates that while some water may trade for the lower value, if instream flow buyers were to purchase water rights, then as more water rights were acquired, the cost per acre-foot would likely rise to the level as derived through the income capitalization approach.

3.2 Benefits Considered but Not Included in Analysis

3.2.1 Public Safety Avoided Costs

Piping irrigation water removes the hazard of drownings in canals and also eliminates the potential for earthen canals to fail, which could potentially cause a live-threatening situation. As discussed in Section 0, canal failures occur approximately once every three years in OID, and the fine sand canals in Project Group 3 are especially vulnerable to failure (Scanlon, 2020). In that section, we estimated the likely damage to property given a canal failure, but we did not estimate the potential threat to lives. This threat is relevant given the fact that the canal in Project Group 3 runs adjacent to an elementary school and a growing suburban neighborhood.

A history of recent drownings in Central Oregon irrigation canals provides evidence that fast-moving water in irrigation canals, often with steep and slippery banks, can be a threat to public safety. In 2004, a toddler drowned in a Central Oregon Irrigation District canal, and in 1996 and 1997, respectively, a 12-year old boy and a 28-year old man drowned in North Unit Irrigation District canals (Flowers, 2004). Other drownings may have occurred in the past, as a comprehensive list of drownings in Central Oregon irrigation canals was not available from the Bureau of Reclamation or other sources. However, the data indicate at least three drownings over the last 21 years (1996 through 2016), or 0.143 deaths per year during this period. As the population in Central Oregon continues to grow and areas surrounding irrigation canals continue to urbanize,

[16] These values have been adjusted for inflation to 2020 dollars using the Consumer Price Index.

[17] We based this estimate on an analysis of the net returns of water for alfalfa hay. Alfalfa makes up about 90 percent of farmed cropland in OID (Scanlon, 2020). We estimate that in an average year, alfalfa hay may provide a net return of about $231 per acre and requires approximately 2.9 acre-feet of water per acre. This results in an average net returns per acre-foot of water of approximately $80.

including Prineville, the risk to public safety would increase. The Modernization Alternative would pipe or fill 10.1 miles of open canals in OID's current system and an additional 6.6 miles of canals that are not currently part of OID.[18] This piping is expected to increase public safety.

4. Incremental Analysis

The Modernization Alternative is evaluated using an incremental analysis, which identifies how total costs and benefits change as project groups are added (Table D-17). In the incremental analysis, project group pipe size and costs remain the same for each project group assessed. The engineering pipeline design (pipe diameters, pressure ratings, etc.) is independent of the number of project groups and the order that the project groups are installed. In engineering the design of the system, the District and Black Rock Consulting mapped and collected digital elevation data to create a hydraulic model that determined pipe sizes for each pipeline (canal or lateral to be piped) in the system.

Table D-17. Incremental Analysis of Annual NEE Costs and Benefits Under the Modernization Alternative for Ochoco Irrigation District, Deschutes Watershed, Oregon, 2020$.[1]

Project Groups	Total Costs	Incremental Costs	Total Benefits	Incremental Benefits	Net Benefits
1	$484,000	--	$525,000	--	$41,000
1, 2	$800,000	$316,000	$856,000	$331,000	$56,000
1,2,3	$957,000	$157,000	$1,131,000	$275,000	$174,000

Prepared August 2020

1/Price Base: 2020 dollars amortized over 100 years at a discount rate of 2.75 percent.

[18] McKay Creek is not currently part of OID but would become part of the District under the Modernization Alternative.

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6. NEE Appendix Crop Enterprise Budgets

This appendix presents the crop enterprise budgets used in estimating agricultural NEE benefits under the Modernization Alternative resulting from reduced damages associated with water shortages. The agricultural production benefits are estimated using enterprise budgets that represent typical costs and returns of producing crops in the Deschutes Watershed of Central Oregon. Enterprise budgets aim to reflect common practices and relevant costs for production in the region, but do not necessarily represent the conditions of any particular farm.

6.1 Alfalfa Enterprise Budgets

We used a crop budget for alfalfa hay developed by Washington State University, and then adjusted values in the budget to account for changes in prices through time and local conditions in OID. A more recent published alfalfa hay budget for Central Oregon was not available from Oregon State or Washington State University. Due to the need to model conditions with different water availability, we developed three crop budgets. One budget models the net returns under full irrigation, a second models the net returns under a water deficit that results in only a single cutting, and the third models a 13 percent water shortage. We use the budgets to estimate the net benefits of piping to agricultural production in the NEE. The following section outlines the data and assumptions used in adjusting the Washington State alfalfa hay budget.

The alfalfa hay enterprise budgets were based on a 2012 budget developed by Washington State University (WSU) for establishing and producing alfalfa hay in the Washington Columbia Basin (Norberg & Neibergs, 2012). We selected these budgets as the basis for OID crop production costs because they are the most recent crop budgets developed for producing alfalfa hay in an area that is relatively close and similar to Central Oregon.

We updated the costs presented in the original budgets to account for changing values over time and to reflect conditions specific to OID. Returns to alfalfa were based on locally reported hay yields and five-year normalized average hay prices in Oregon. We developed three hay budgets: one budget to model production under full irrigation (Table D-18), and one for hay under deficit irrigation that results in a single cutting for the season (Table D-19), and one for hay under a 13 percent water shortage (Table D-20).

6.2 Modeled Farm

The modeled farm is 120 acres. The hay field is seeded in the fall following a grain crop such as wheat or barley and is harvested using one-ton bales. Other than labor for irrigation, all labor is provided by hiring custom work (includes harvest, fertilizer application, and herbicide application). Irrigation is delivered by a center pivot.

6.2.1 Input Costs

For fertilizers, we adjust the amount used proportionally according to differences in yield from the original budget. For example, the original budget calls for 92 pounds (lbs) of dry phosphate to produce 8 tons of hay per acre; under full irrigation, we model a yield of only 5.5 tons per acre (69 percent of the yield), so we reduce the amount of dry phosphate to 63 lbs (69 percent of 92 lbs). For sulfur, we input a specific amount based on local expert guidance, which suggests 30 lbs must be used for the soils in the study area (Bohle, 2020).

All costs are adjusted from the original values in the WSU budget. We used area-specific values for fuel prices, irrigation charges, and land costs. OID charges $7 per year for dam and construction fees and plans to charge new McKay patrons assessment fees of $170 per year for patrons with more than 10 acres. For the

average-sized plot in OID (22.3 acres), these fees average about $8 per acre. The original WSU budget did not include the costs of land; however, we added it to the budget used in this analysis. We used the average rental rate for irrigated cropland in Oregon: $150 per acre (NASS, 2017).

For costs that did not have area-specific values, we adjusted the value in the original budget using the national Producer Price Indices (PPI) produced by the National Agricultural Statistics Services (NASS), which are published for a variety of farm expenses (NASS, 2018). For example, there are prices indices for fertilizer, herbicides, supplies, tractors, custom work, as well as one for the farm sector in general. The PPI cost adjustments range from an 8 percent decrease in the price of fertilizer to a 16 percent increase in machinery costs. For a few costs, such as crop insurance and overhead expenses, we adjusted them by the Consumer Price Index (CPI), as we expect they would follow inflation patterns more closely than any of the PPI categories.

Establishment costs are derived from the same WSU budget and adjusted using the techniques described in this appendix. Establishment costs are amortized using a 2.75 percent interest rate and a 6-year payback period, which is roughly the average productive life of alfalfa stands in the area (Bohle, 2020).

6.2.2 Labor Costs

Because most of the labor is provided by custom work, the only direct labor costs are for an agricultural equipment operator to move the center pivots. For the cost of equipment operator labor, we use the median hourly wage rate for this occupation in Oregon in 2018, and adjust it to 2020 dollars using the CPI.[19] We further adjust this wage rate up by 20 percent to account for non-wage employment costs, such as health care and insurance.[20] This results in total labor costs of $21.65 per hour for equipment operators.

We adjusted the cost of custom work using the Custom Work PPI. For the hay budget under deficit irrigation (Table D-19), we adjust some labor costs (including custom bailing, hauling, staking, and tarping) proportionally to the change in yield (e.g., if yield falls by 10 percent, the amount of labor also falls by 10 percent). To the extent that labor costs fall less than this, our results would under-estimate benefits (and vice versa). Management labor costs are estimated at 5 percent of total costs. Other custom labor, including swathing and raking, are adjusted based on the number of hay cuttings. Under the single-cutting scenario, we reduce irrigation labor and repair costs by two-thirds to account for reduced irrigation, and by 13 percent under the 13 percent water shortage budget.

6.2.3 Revenues

To estimate the gross revenues of alfalfa hay under full irrigation (Table D-18), we use the average alfalfa yield in the McKay Creek area as reported by an Oregon State University (OSU) Extension Agent expert on forage crops in Central Oregon: 5.5 tons per acre (Bohle, 2020). We estimate the yield under the single-cutting scenario by assuming the first hay cutting (which is typically the only cutting McKay growers currently get) is roughly 45 percent of the total annual yield, or 2.5 tons per acre (Table D-19). Because the water-yield relationship for hay is roughly linear, we assume the 13 percent water shortage in the third scenario will lead to a 13 percent reduction in yield, for a total yield of 4.8 tons per acre under this scenario (Table D-20).

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[19] This is the average wage for the Agricultural Equipment Operators (occupation code 45-2091) in the Central Oregon non-metropolitan area according the Bureau of Labor Statistics' Occupational Employment and Wage Estimates data in May 2018 (Bureau of Labor Statistics, 2017).

[20] This is roughly the average proportion of non-wage labor costs for all private, part-time workers in the United States in December 2012 (Bureau of Labor Statistics, 2018).

To estimate the gross revenues per ton, we use the normalized average price per ton for hay in Oregon reported by the Economic Research Service of the USDA in 2019: $193.20 (Economic Research Service, 2018). Because the average price of alfalfa tends to be higher than the average price of other hay in Oregon, by using the normalized average price for all hay, we may be understating the net benefits to alfalfa hay acres.[21]

6.3 Alfalfa Enterprise Budget Tables

The tables below present the three alfalfa hay enterprise budgets used to estimate the net returns to under different irrigation scenarios: one budget under full irrigation (Table D-18), one budget modeling returns under a single cutting (Table D-19), and one budget under a 13 percent water deficit scenario (Table D-20).

[21] From 2013 to 2017, the average price for alfalfa ($194 per ton) was seven percent higher than the average price for other kinds of hay ($180 per ton) (NASS, 2017).

Table D-18. Alfalfa Net Returns Under Full Irrigation.

Item	Quantity	Unit	$/Unit	Total
REVENUE				
Alfalfa Hay	5.5	ton	$193.20	$1,062.60
VARIABLE COSTS				
Dry Nitrogen	0.0	lb	$0.34	$0.00
Dry Phosphate	63.3	lb	$0.58	$36.59
Dry Potash	96.3	lb	$0.41	$39.60
Dry Sulfur	30.0	lb	$0.20	$5.87
Zinc	3.4	lb	$1.98	$6.82
Boron	1.4	lb	$4.47	$6.14
Custom Application	1.0	ac	$9.90	$9.90
Soil Test	1.0	ac	$0.33	$0.33
Herbicide	2.0	lb	$19.14	$38.28
Custom Application	1.0	ac	$9.90	$9.90
Custom - Swath	3.0	ac	$22.00	$66.00
Custom - Rake	3.0	ac	$11.00	$33.00
Custom - Bail	5.5	ton	$18.70	$102.85
Custom - Haul & Stack	5.5	ton	$9.90	$54.45
Custom - Tarping	5.5	ton	$5.50	$30.25
Irrigation - water charge	1.0	ac	$53.60	$53.60
Irrigation - service charge	1.0	ac	$7.92	$7.92
Irrigation - repairs	1.0	ac	$16.53	$16.53
Irrigation - labor	0.5	ac	$22.10	$11.05
Haystack insurance	5.5	ton	$2.25	$12.37
Gopher control	1.0	ac	$5.58	$5.58
Fuel	2.3	gal	$2.69	$6.13
Lubricants	1.0	ac	$0.89	$0.89
Machinery repairs	1.0	ac	$1.98	$1.98
Overhead	1.0	ac	$43.23	$43.23
Operating interest	1.0	ac	$16.48	$16.48
Total variable costs				$615.74
FIXED COSTS				
Machinery depreciation	1.0	ac	$6.31	$6.31
Machinery interest	1.0	ac	$3.68	$3.68
Machinery insurance, taxes, housing, license	1.0	ac	$2.62	$2.62
Management (5% of total cost)	1.0	ac	$39.61	$39.61
Amortized establishment cost	1.0	ac	$13.85	$13.85
Land cost	1.0	ac	$150.00	$150.00
Total fixed costs				$216.07
Total costs				$831.81
NET RETURNS PER ACRE				**$230.79**

Prepared August 2020

Table D-19 Alfalfa Net Returns with a Single Cutting.

Item	Quantity	Unit	$/Unit	Total
REVENUE				
Alfalfa Hay	2.5	ton	$193.20	$478.17
VARIABLE COSTS				
Dry Nitrogen	0.0	lb	$0.34	$0.00
Dry Phosphate	28.5	lb	$0.58	$16.47
Dry Potash	43.3	lb	$0.41	$17.82
Dry Sulfur	30.0	lb	$0.20	$5.87
Zinc	1.5	lb	$1.98	$3.07
Boron	0.6	lb	$4.47	$2.76
Custom Application	1.0	ac	$9.90	$9.90
Soil Test	1.0	ac	$0.33	$0.33
Herbicide	2.0	lb	$19.14	$38.28
Custom Application	1.0	ac	$9.90	$9.90
Custom - Swath	1.0	ac	$22.00	$22.00
Custom - Rake	1.0	ac	$11.00	$11.00
Custom - Bail	2.5	ton	$18.70	$46.28
Custom - Haul & Stack	2.5	ton	$9.90	$24.50
Custom - Tarping	2.5	ton	$5.50	$13.61
Irrigation - water charge	1.0	ac	$0.00	$0.00
Irrigation - service charge	1.0	ac	$0.00	$0.00
Irrigation - repairs	0.7	ac	$16.53	$11.02
Irrigation - labor	0.3	ac	$22.10	$7.37
Haystack insurance	2.5	ton	$2.25	$5.56
Gopher control	1.0	ac	$5.58	$5.58
Fuel	2.3	gal	$2.69	$6.13
Lubricants	1.0	ac	$0.89	$0.89
Machinery repairs	1.0	ac	$1.98	$1.98
Overhead	1.0	ac	$43.23	$43.23
Operating interest	1.0	ac	$8.35	$8.35
Total variable costs				$311.90
FIXED COSTS				
Machinery depreciation	1.0	ac	$6.31	$6.31
Machinery interest	1.0	ac	$3.68	$3.68
Machinery insurance, taxes, housing, license	1.0	ac	$2.62	$2.62
Management (5% of total cost)	1.0	ac	$26.67	$26.67
Amortized establishment cost	1.0	ac	$58.88	$58.88
Land cost	1.0	ac	$150.00	$150.00
Total fixed costs				$248.16
Total costs				$560.06
NET RETURNS PER ACRE				**-$81.89**

Prepared August 2020

Table D-20. Alfalfa Net Returns Under 13-Percent Deficit Irrigation.

Item	Quantity	Unit	$/Unit	Total
REVENUE				
Alfalfa Hay	4.8	ton	$193.20	$926.03
VARIABLE COSTS				
Dry Nitrogen	0.0	lb	$0.34	$0.00
Dry Phosphate	63.3	lb	$0.58	$36.59
Dry Potash	96.3	lb	$0.41	$39.60
Dry Sulfur	30.0	lb	$0.20	$5.87
Zinc	3.4	lb	$1.98	$6.82
Boron	1.4	lb	$4.47	$6.14
Custom Application	1.0	ac	$9.90	$9.90
Soil Test	1.0	ac	$0.33	$0.33
Herbicide	2.0	lb	$19.14	$38.28
Custom Application	1.0	ac	$9.90	$9.90
Custom - Swath	3.0	ac	$22.00	$66.00
Custom - Rake	3.0	ac	$11.00	$33.00
Custom - Bail	4.8	ton	$18.70	$89.63
Custom - Haul & Stack	4.8	ton	$9.90	$47.45
Custom - Tarping	4.8	ton	$5.50	$26.36
Irrigation - water charge	1.0	ac	$0.00	$0.00
Irrigation - service charge	1.0	ac	$0.00	$0.00
Irrigation - repairs	0.9	ac	$16.53	$14.40
Irrigation - labor	0.4	ac	$22.10	$9.63
Haystack insurance	4.8	ton	$2.25	$10.78
Gopher control	1.0	ac	$5.58	$5.58
Fuel	2.3	gal	$2.69	$6.13
Lubricants	1.0	ac	$0.89	$0.89
Machinery repairs	1.0	ac	$1.98	$1.98
Overhead	1.0	ac	$43.23	$43.23
Operating interest	1.0	ac	$13.98	$13.98
Total variable costs				$522.48
FIXED COSTS				
Machinery depreciation	1.0	ac	$6.31	$6.31
Machinery interest	1.0	ac	$3.68	$3.68
Machinery insurance, taxes, housing, license	1.0	ac	$2.62	$2.62
Management (5% of total cost)	1.0	ac	$39.61	$39.61
Amortized establishment cost	1.0	ac	$13.85	$13.85
Land cost	1.0	ac	$150.00	$150.00
Total fixed costs				$216.07
Total costs				$738.55
NET RETURNS PER ACRE				**$187.48**

D.2 Alternatives Considered During Formulation

This appendix section presents the alternatives considered in the formulation phase.

During the formulation phase, alternatives were evaluated based on meeting both NEPA and environmental review requirements specific to NRCS federal investments in water resources projects (Table D-21). According to NEPA, "agencies shall rigorously explore and objectively evaluate all reasonable alternatives" (40 CFR 1502.14). According to the PR&G DM 9500-013, alternatives should reflect a range of scales and management measures and be evaluated against the Federal Objective and Guiding Principles; against the extent to which they address the problems and opportunities identified in the purpose and need; and against the criteria of completeness, effectiveness, efficiency, and acceptability:

1. Completeness is the extent to which an alternative provides and accounts for all features, investments, and/or other actions necessary to realize the planned effects, including any necessary actions by others. It does not necessarily mean that alternative actions need to be large in scope or scale.
2. Effectiveness is the extent to which an alternative alleviates the specified problems and achieves the specified opportunities.
3. Efficiency is the extent to which an alternative alleviates the specified problems and realizes the specified opportunities at the least cost.
4. Acceptability is the viability and appropriateness of an alternative from the perspective of the Nation's general public and consistency with existing Federal laws, authorities, and public policies. It does not include local or regional preferences for particular solutions or political expediency.

Alternatives eliminated during formulation are discussed below the table. Alternatives selected for further evaluation are discussed in the Plan-EA.

Table D-21. Alternatives Considered During the Formulation Phase.

Alternative	Which criteria in the PR&G does the alternative achieve?				Selected for Further Evaluation
	Completeness	Effectiveness	Efficiency	Acceptability	
Conversion to Dryland Farming			X		
Fallowing Farm Fields			X		
Market Based Approaches to include Voluntary Duty Reduction					
Partial Use of Groundwater					
On-Farm Efficiency Upgrades				X	

Impoundment Pump Storage Dam					
Canal Lining	X	X		X	X
No Action (Future without Federal Investment)			X		X
Modernization Alternative	X	X	X	X	X

Conversion to Dryland Farming

Dryland farming is a non-structural alternative. This method of farming uses no irrigation and drought-resistant crops and practices to conserve moisture. The lack of rainfall throughout the growing season (approximately 12 inches per year) coupled with hot temperatures, desiccating winds, and generally shallow and well- to excessively drained soils with low storage potential, makes dryland farming infeasible within the District (Daly et al. 1994; Gannett et al. 2001). In the District, agricultural production would substantially decrease if dryland farming were implemented. With decreased production and income, farmers could potentially sell their land due to the development pressure; however, dryland farming would be inconsistent with ensuring agricultural production is maintained in an area undergoing urbanization.

Conversion to dryland farming would not meet any of the purposes of the project. If water saved from conversion to dryland farming was put instream, it could meet the need of improving instream flow for fish and aquatic habitat, but this is not certain to occur because conversion to dryland farming would be voluntary, and any water saved would not necessarily be put in stream by the patrons. Conversion to dryland farming would not meet any of the other identified project needs.

Conversion to dryland farming was eliminated from further evaluation because it would not meet the project's purpose and need; its effectiveness would be uncertain since conversion to dryland farming would be voluntary; it would not be acceptable because it is inconsistent with public policy supporting and maintaining existing agricultural land use; and because it would not achieve the Federal Objective and Guiding Principles.

Fallowing Farm Fields

Fallowing farm fields is a non-structural alternative that includes permanently transferring or temporarily leasing water rights from irrigated lands or otherwise not using water rights appurtenant to irrigated lands. Fallowing farm fields would use less irrigation water within the District and would therefore allow more water to remain instream for fish, wildlife, and habitat.

Fallowing farm fields would not meet any of the project purposes. If water saved from fallowing was put instream, it could meet the need of improving instream flow for fish and aquatic habitat, but this is not certain to occur because fallowing would be voluntary, and any water saved would not necessarily be put instream by the patrons. Fallowing farm fields would not meet any of the other identified needs of the project.

Fallowing farm fields was eliminated from further evaluation because it would not meet the project's purpose and need; its effectiveness would be uncertain since fallowing fields would be voluntary; it would not be acceptable because it is inconsistent with public policy supporting and maintaining existing agricultural land use; and because it would not achieve the Federal Objective and Guiding Principles.

Market-Based Approaches to include Voluntary Duty Reduction

For the purpose of this analysis, Market-Based Approaches refers to patrons' voluntarily accepting less than their full water delivery rate from the District, or to patrons' temporarily or permanently moving water or water rights from their lands to the river. Although permanently dedicating water for instream use is part of the proposed action, it utilizes established authorities and is not a part of the following discussion.

Market-based approaches as a stand-alone alternative would not meet any of the purposes of the project. If water saved from voluntary reductions as a result of market-based approaches was put instream it could meet the need of improving instream flow for fish and aquatic habitat, but this is not certain to occur because participation would be voluntary, and any water saved would not necessarily be put in stream by the irrigators. Incorporating market-based solutions would not meet any of the other identified needs of the project.

Incorporating market-based solutions into the proposed action without corresponding regulatory and policy changes, which would be required to provide the District with the authority to carry out the transfer of patron water instream, is not ripe for consideration as an alternative at this time. Without a change in the framework of current lawful authorities on the part of the District, incorporating market-based incentives into the proposed action is not within the District's ability or capacity to undertake, nor is it logistically or technically feasible.

For example, a reduction in duty by a patron could mean the District diverts less water, which would leave more water instream. Because the District is obligated to provide a certain amount of water to patrons to meet associated rights, this alternative would be voluntary and at the discretion of individual landowners. For this reason, there would be no certainty that water would be saved, and that streamflow would be restored. Furthermore, OID lacks the statutory authority or responsibility to carry out, operate and maintain voluntary duty reduction by its patrons, creating a logistically complex situation for OID to implement. Further, because the system has open canals, subject to certain operating inefficiencies, the District would still have to divert enough water, accounting seepage, to ensure those deliveries. Therefore, carrying out this alternative would be logistically complex and technically infeasible

Market-based incentives were eliminated from further evaluation because they would not meet the project purpose; its effectiveness would be uncertain since reducing one's duty would be voluntary; the District lacks the ability to carry out patron duty reductions; it would not achieve the Federal Objective and Guiding Principles; and given current water delivery technology it is technically infeasible by the District to accommodate.

Exclusive or Partial Use of Groundwater

The exclusive or partial conversion from surface-water-sourced to groundwater-sourced irrigation was also initially considered as possible alternatives. To use groundwater in the Deschutes Basin, the District would have to apply for groundwater rights under OWRD's Deschutes Basin Groundwater Mitigation (DBGM) program pursuant to OAR 690-505-0500. The DBGM program is part of OWRD's goal to limit groundwater use by imposing restrictions to new users obtaining groundwater rights. Under the DBGM program, only 32.98 cfs is available for the whole Deschutes Basin, and it is unlikely the District could obtain rights to all the remaining water (S. Henderson, personal communication, August 14, 2017). Given only 32.98 cfs is available

under this program, the District's exclusive use of groundwater to entirely replace their use of surface water is not feasible.

The partial use of groundwater for irrigation would have logistical and legal constraints. The District and patrons could use their surface water rights for groundwater mitigation credits[22] required by the DBGM program; however, the District would need the authority from each patron to convert surface water rights to groundwater rights; there would be no guarantee of gaining this approval from patrons. Converting from surface water rights to groundwater rights would also affect the seniority and, therefore, the reliability of the District's water rights. The District currently has senior surface water rights that minimize the chance of being impacted during drought years; however, new groundwater rights would be junior (dated the year of the application and construction) and could be subject to curtailment.

Exclusive and partial use of groundwater would not meet any of the purposes of the project. If water saved from conversion to groundwater was put instream it could meet the need of improving instream flow for fish and aquatic habitat, but this is not certain to occur because switching to groundwater would be voluntary, and any water saved would not necessarily be put instream by the patrons. Partially or exclusively switching to groundwater would not meet any of the other identified needs of the project. Additionally, the District lacks the statutory authority or responsibility to carry out, operate and maintain groundwater wells on private lands owned by OID patrons. Therefore, carrying out this alternative would be logistically complex. The exclusive and partial use of groundwater was eliminated from further evaluation because it would not meet the project's purpose and need; its effectiveness would be uncertain since conversion to groundwater would be voluntary; of inefficiencies associated with logistical and legal constraints obtaining groundwater rights; of low acceptability since converting to groundwater rights would result in junior water rights; and because it would not achieve the Federal Objective and Guiding Principles.

On-farm Efficiency Upgrades and Piping Private Laterals

On-farm efficiency upgrades refer to OID service area patrons upgrading their on-farm infrastructure to use irrigation technologies that provide a more precise application of water. Piping private laterals refers to piping ditches or laterals that are owned by private patrons and bring the water from the District's infrastructure to the patron's farm fields. On-farm infrastructure and private laterals are distinct from District canals and laterals because they are owned and operated by patrons. Once delivered by the District the water may have to be carried substantially further to fields, so the patron may have a long extent of private laterals and ditches they own and operate. Once arriving on-farm, water can either be released to flow over the land for flood irrigation or stored in a holding pond and later pumped out for sprinkler irrigation systems. Typical on-farm irrigation systems include center-pivots, wheel-lines, hand-lines, K-lines, drip systems, and flood irrigation. Each irrigation system has a different application efficiency (i.e., its ability to deliver the irrigation water to the crop root system across the full field being irrigated).

On-farm efficiency upgrades and piping private laterals would not meet any of the purposes of the project. If water saved from upgrades and piping of private laterals was put instream it could meet the need of improving instream flow for fish and aquatic habitat, but this is not certain to occur because upgrading on-farm systems would be voluntary, and any water saved would not necessarily be put instream by the patrons.

[22] OID will not create groundwater mitigation credits under either the No Action or the Modernization Alternative analyzed in this Plan-EA.

On-farm efficiency upgrades and piping private laterals would not meet any of the other identified needs of the project.

On-farm upgrades and piping private laterals are not within the scope of actions that OID can entertain as the project sponsor under PL-85-566 because OID lacks the authority or responsibility to carry out, operate and maintain on-farm infrastructure owned and operated by OID patrons. Similarly, as part of this project the District would not be able to pursue other mitigation or incentive actions related to patron water use and farming.

In addition, if PL 83-566 funds were used to develop and implement on-farm efficiency upgrades and piping private laterals, the use of these funds would require the District to complete a State Historic Preservation Office/National Historic Preservation Office analysis on a private tax lot-by-tax lot basis[23], as well as receive permission to then operate and maintain the system, including acquiring easements to do so. This approach is logistically complex and would increase the costs of the project.

On-farm efficiency upgrades and piping private laterals were eliminated from further evaluation because it would not meet the project's purpose and need; its effectiveness would be uncertain since any water saved would not necessarily be put in stream by patrons; and because it did not achieve the Federal Objective and Guiding Principles.

Impoundment Pump Storage Dam

An impoundment pump storage dam is a structural alternative that would specifically be built to serve the McKay Creek irrigators. This alternative would consist of a dam, and small reservoir built in a nearby valley. Associated pumps, as needed, to pump water in or out of the reservoir would also be installed. The reservoir would then be filled by winter precipitation or by pumping water from local creeks such as McKay Creek during periods of high run-off. Water stored behind the dam would be gravity-fed to the McKay Creek irrigators.

To build an impoundment pump storage dam alternative, the District would have to pay market price for the purchase of land and easements and negotiate with landowners, which would be a complex, expensive, and time-consuming process. Additionally, new water rights for the stored water in this impoundment reservoir would have to be applied for, which would similarly be a complex, expensive, and time-consuming process. Application for new water rights would potentially not be possible; Oregon Water Resource Department's Water Availability Analysis for McKay Creek above Allen Creek suggests that there would be no water available for new water rights in this watershed. An impoundment pump storage dam was eliminated from further evaluation because it would not meet the purpose and need of the project, would not be effective, would not be efficient arising from high legal costs, and would not achieve the Federal Objective and Guiding Principles.

D.3 Capital Costs for the Canal Lining Alternative

The capital cost of the Canal Lining Alternative (Table D-22) was estimated by calculating the length of geotextile membrane in existing open canals, assuming an anchor of membrane extending 7 feet on either side. The membrane would be covered by a 1-inch layer of shotcrete (fine-aggregate concrete sprayed in place). This estimate also includes fencing along both sides of the canal, and safety ladders every 750 feet in channels deeper than 2.5 feet. Costs related to earthwork and labor are estimated by a construction cost

[23] This could require OID to mitigate cultural resources on private property, potentially resulting in the District having to develop long-term maintenance or preservation agreements on lands not subject to District control.

multiplier of 2. Turnouts were estimated using the same assumptions as the Preferred Alternative. The cross-section dimensions for lining the canals was calculated for each corresponding pipe diameter size using transects on a digital elevation model, estimated from an irrigation district in Central Oregon. The McKay Switch alignment was not included for canal lining as no open canal currently exists. Other costs such as junctions, pumps, weirs, and siphon upgrades are the same as the Preferred Alternative (for cost details see Table D-24).

Table D-22. Canal Lining Alternative Costs.

Feature	Diameter (in)	Length (ft)	Cross section to be lined (ft)	Channel depth (ft)	Geomembrane total ($)	Shotcrete total ($)	Fencing total ($)	Ladder total ($)	Subtotal
Lining	4	944	10.7	1.0	$18,211	$55,546	$12,948	$0	$173,411
Lining	8	1,847	12.3	2.0	$38,152	$124,949	$25,344	$0	$376,892
Lining	12	5,118	12.7	2.4	$107,628	$358,599	$70,225	$0	$1,072,903
Lining	16	7,796	14.8	2.3	$177,441	$633,630	$106,957	$0	$1,836,056
Lining	18	163	14.5	2.8	$3,674	$13,014	$2,236	$109	$38,065
Lining	20	5,070	22.2	3.2	$147,225	$618,040	$69,555	$3,380	$1,676,401
Lining	24	18,130	23.8	3.1	$551,245	$2,370,326	$248,738	$12,086	$6,364,791
Lining	26	4,098	23.6	3.0	$124,051	$532,208	$56,226	$2,732	$1,430,434
Lining	72-90	53,210	33.7	4.3	$2,155,129	$9,847,783	$730,041	$35,473	$25,536,854
								Subtotal	**$38,506,000**
								Engineering, Construction Management, Survey (6%)	$2,310,000
								Construction Management / General Contractor (12%)	$4,621,000
								Contingency (30%)	$13,631,000
								Cost of non-lining features – same as Preferred Alternative	$14,868,000
								TOTAL	**$73,936,000**

Totals are rounded to nearest $1,000. Prepared August 2020

D.4 Modernization Alternative/Preferred Alternative Costs

This section presents capital costs for the Modernization Alternative, which is identified as the Preferred Alternative (Table D-23). The Modernization Alternative was priced using HDPE pipe, which was, at the time of this analysis, considered to be the most cost-effective material (Table D-24). The cost estimates also include fittings and other necessary appurtenances. This section also includes a discussion of other piping materials that were considered.

Table D-23. Proposed Features for the Preferred Alternative within Ochoco Irrigation District.

Type	Project Feature	Quantity	Total
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 Drum Screen	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[3]	$1,776,000
		Construction Contractor Markup[3]	$887,000
		Contingency[3]	$3,111,000
		TOTAL	**$29,556,000**

Totals are rounded to the nearest $1,000. Prepared August 2020

[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.

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

Table D-24. HDPE Pipe Diameters and Lengths.

Area	Feature	Diameter (in)	Length (feet)	Length (miles)
Grimes Flat	Pipe	4	944	0.18
Grimes Flat	Pipe	8	1,847	0.35
Grimes Flat	Pipe	12	5,118	0.97
Grimes Flat	Pipe	16	7,796	1.48
Grimes Flat	Pipe	18	163	0.03
Grimes Flat	Pipe	20	5,070	0.96
Grimes Flat	Pipe	24	18,130	3.43
Grimes Flat	Pipe	26	4,098	0.78
McKay Pipeline	Pipe	4	1,159	0.22
McKay Pipeline	Pipe	6	6,697	1.27
McKay Pipeline	Pipe	8	4,432	0.84
McKay Pipeline	Pipe	12	2,342	0.44
McKay Pipeline	Pipe	16	5,415	1.03
McKay Pipeline	Pipe	20	7,925	1.50
McKay Pipeline	Pipe	24	6,948	1.32
IronHorse	Pipe	78	6,250	1.2
		Total	**84,334**	**16.00**

Prepared August 2020

Other Piping Materials Considered

In addition to HDPE, using steel or polyvinyl chloride (PVC) was also explored. A cost analysis was completed for each material. The costs of junctions, pumps, and other non-pipe costs are the same as the Preferred Alternative. The lengths and diameters, and range of pressure ratings used for these piping alternatives were estimated based on the engineering analysis completed in the District's System Improvement Plan (SIP). Annual operating costs and material design life were also taken into consideration. Annual operating costs (equipment, maintenance, and labor costs) were assumed to decrease 15 percent because a fully piped system would reduce the need to inspect, repair, remove obstructions, and make manual adjustments to the system. See the tables below for steel and PVC cost details and pipe specifications.

Steel Piping Alternative

The lengths, diameters, and range of pressure ratings used for this alternative were estimated based on the engineering analysis completed in the District's SIP. Spiral-welded steel was selected that conforms to requirements of the American Water Works Association C200 standard. This pipe was selected because it is considered an industry consensus standard and is a prominent guide for the manufacture of steel pipe for water and wastewater applications in North America (Bambie and Keil 2013). Steel pipe typically has a design life of 50 years under irrigation water delivery applications (Table D-25).

Unlike HDPE, which typically does not need fittings to conform to most canal alignments, steel pipe cannot be shaped to conform into canal alignments; therefore, elbows would be required. The cost of elbow fittings was estimated by assuming one elbow every 100 feet at a cost of $100 per 1 inch of pipe diameter. The same construction multipliers for labor and installation were used as the Preferred Alternative.

Table D-25. Steel Piping Alternative Costs.

Feature	Diameter (in)	Quantity	Units	Unit Cost	Elbow Qty	Subtotal
Steel Pipe	4	2,103	Ft	$16.56	21	$130,000
Steel Pipe	6	6,697	Ft	$25.39	67	$631,000
Steel Pipe	8	6,279	Ft	$34.23	63	$795,000
Steel Pipe	12	7,460	Ft	$51.89	75	$1,430,000
Steel Pipe	16	13,211	Ft	$69.55	132	$3,391,000
Steel Pipe	18	163	Ft	$78.39	2	$47,000
Steel Pipe	20	12,995	Ft	$87.22	130	$4,180,000
Steel Pipe	24	25,078	Ft	$104.88	251	$9,696,000
Steel Pipe	26	4,098	Ft	$113.72	41	$1,431,000
Steel Pipe	72	8,030	Ft	$316.86	80	$7,806,000
Steel Pipe	78	6,250	Ft	$343.36	63	$6,584,000
Steel Pipe	90	38,930	Ft	$396.35	390	$47,334,000
Subtotal		**131,293**	**Ft**	**N/A**	**1,315**	**$83,455,000**
Engineering, Construction Management, Survey (6%)						$5,003,000
Construction Management / General Contractor (12%)						$10,006,000
Contingency (30%)						$29,518,000
Cost of non-pipe features – same as Preferred Alternative						$14,868,000
TOTAL						**$142,850,000**

Totals are rounded to the nearest $1,000. Prepared August 2020

PVC Piping Alternative

The lengths, diameters, and range of pressure ratings used for this alternative were estimated based on the engineering analysis completed in the District's SIP. PVC would be used for all pipe up to 26-inch diameter, and steel would be used for 72-inch diameter and greater. PVC is not manufactured in diameters larger than 48 inches.

The lifespan of a piping system depends on many different factors. Proper installation and operation of the piping system are key to achieving a long service life. Assuming a piping system is ideally installed and operated, the main factor affecting the pipe's service life is the number and magnitude of surge/water hammer events the system experiences. Surge/water hammer events are caused by valve operations, changing irrigation demand in the system, pump startup and shutdown, quick hydropower turbine shutdowns due to

power failures, and any other factors causing fast changes in the piping system flow rate (B. Cronin P.E., personal communication, July 27, 2018).

USDA-NRCS's practice standard lifespan for irrigation pipeline is 20 years (NRCS n.d.). This lifespan is based on long-term experience with primarily PVC pipe irrigation system installations (B. Cronin P.E., personal communication, July 27, 2018). The Plastics Pipe Institute's online software indicates that with the average number of surge/water hammer events expected in a pipeline network, the lifespan of a typical 24-inch, 125-psi-pressure-rated PVC pipe would 14 years with a safety factor of two (Plastics Pipe Institute 2015). PVC is also more prone to failure under freezing conditions and the Ochoco system is used to deliver water several times during the winter. During these periods, a PVC pipe system would be more likely to freeze and potentially rupture and fail. PVC piping has been installed in irrigation districts in the Deschutes Basin and experienced premature failure, especially in Districts where water is delivered during the winter. Considering the information above, a PVC design life of 33 years was assumed for this analysis.

Unlike HDPE, PVC pipe cannot be shaped to conform into canal alignments; therefore, elbows would be required. The cost of elbow fittings was estimated by assuming one elbow every 100 feet at a cost of $100 per 1 inch of pipe diameter. To account for additional PVC costs, an additional 5 percent cost was added (Table D-26). The same construction multipliers for labor and installation were used as the Preferred Alternative.

Table D-26. PVC Piping Alternative Costs.

Feature	Diameter (in)	Quantity	Units	Unit Cost	Elbow Qty	Subtotal
PVC Pipe	4	2,103	Ft	$1.90	21	$38,000
PVC Pipe	6	6,697	Ft	$3.90	67	$205,000
PVC Pipe	8	6,279	Ft	$6.70	63	$284,000
PVC Pipe	12	7,460	Ft	$14.40	75	$604,000
PVC Pipe	16	13,211	Ft	$16.77	132	$1,350,000
PVC Pipe	18	163	Ft	$19.72	2	$19,000
PVC Pipe	20	12,995	Ft	$30.40	130	$2,049,000
PVC Pipe	24	25,078	Ft	$40.04	251	$5,155,000
PVC Pipe	26	4,098	Ft	$44.08	41	$718,000
PVC Subtotal		**78,083**	**Ft**	**N/A**	**782**	**$10,422,000**
Steel Pipe	72	8,030	Ft	$316.86	80	$7,806,000
Steel Pipe	78	6,250	Ft	$343.36	63	$6,584,000
Steel Pipe	90	38,930	Ft	$396.35	390	$47,334,000
Steel Subtotal		**53,210**	**Ft**	**N/A**	**533**	**$61,724,000**
Steel + PVC Subtotal		**131,293**	**Ft**	**N/A**	**1,315**	**$72,146,000**
Engineering, Construction Management, Survey (6%)						$4,329,000
Construction Management / General Contractor (12%)						$8,658,000
Contingency (30%)						$25,540,000
Cost of non-pipe features – same as Preferred Alternative						$14,868,000
TOTAL						**$125,541,000**

Totals are rounded to the nearest $1,000. Prepared August 2020

D.5 Net Present Value of the Preferred Alternative and Other Piping Materials Considered

This section presents the estimated net present value of the Preferred Alternative, eliminated alternatives, and other piping materials considered. This analysis compares installation and operation of pipes and canals only. The following features are not included in this analysis: 10.5 miles of canal bank raises, pump stations, and general infrastructure improvement such as weirs and siphons. The Preferred Alternative is HDPE pipe for McKay, Grimes Flat, and IronHorse, which is shown in green.

Discount Rate: 2.75%

Period of Analysis: 100 years

Table D-27. Net Present Value of the Preferred Alternative and the Eliminated Alternatives.

	HDPE Piping Alternative	PVC Piping Alternative	Steel Piping Alternative	Canal Lining Alternative
Design Life (years)	100	33	50	33
Capital Costs				
McKay	$4,212,000	$6,816,000	$12,790,000	N/A
Grimes Flat	$4,170,000	$9,173,000	$20,545,000	$19,894,000
Crooked River Canal	$29,009,000	N/A	$57,633,000	$23,133,000
IronHorse	$5,177,000	N/A	$10,099,000	$5,235,000
Ochoco Main Canal – Upper Middle	$12,860,000	N/A	$26,952,000	$12,971,000
Net Present Value of Replacement Costs[1]				
McKay	N/A	$2,101,000	$2,597,000	N/A
Grimes Flat	N/A	$2,828,000	$4,172,000	$14,308,000
Crooked River Canal	N/A	N/A	$11,702,000	$16,638,000
IronHorse	N/A	N/A	$2,051,000	$3,765,000
Ochoco Main Canal – Upper Middle	N/A	N/A	$5,473,000	$9,329,000
Annual O&M Costs				
McKay	$19,000	$19,000	$19,000	N/A
Grimes Flat	$23,000	$23,000	$23,000	$34,000
Crooked River Canal	$17,000	N/A	$17,000	$25,000
IronHorse	$3,000	N/A	$3,000	$5,000

	HDPE Piping Alternative	PVC Piping Alternative	Steel Piping Alternative	Canal Lining Alternative
Ochoco Main Canal – Upper Middle	$9,000	N/A	$9,000	$13,000
Percent Change in O&M from current system	-15%	-15%	-15%	25%
Net Present Value of O&M Costs				
McKay	$645,000	$645,000	$645,000	N/A
Grimes Flat	$781,000	$781,000	$781,000	$1,154,000
Crooked River Canal	$577,000	N/A	$577,000	$849,000
IronHorse	$102,000	N/A	$102,000	$170,000
Ochoco Main Canal – Upper Middle	$306,000	N/A	$306,000	$441,000
Total Net Present Value				
McKay	$4,857,000	$9,562,000	$16,032,000	N/A
Grimes Flat	$4,951,000	$12,782,000	$25,498,000	$35,356,000
Crooked River Canal	$29,586,000	N/A	$69,912,000	$40,622,000
IronHorse	$5,279,000	N/A	$12,252,000	$9,170,000
Ochoco Main Canal – Upper Middle	$13,166,000	N/A	$32,731,000	$22,739,000

Totals are rounded to the nearest $1,000. Prepared August 2020

Note:

[1] For PVC pipe, 33 percent of the pipe was replaced at 33 years and 67 percent replaced at 66 years. For steel pipe, 25 percent was replaced at 50 years and 75 percent replaced at 75 years. For canal lining, 100 percent was replaced at both 33 years and 66 years.

References

Ballantyne, Donald. 2013. Development of Seismic Design Guidelines for Distribution Piping. Website: https://www.pnws-awwa.org/uploads/PDFs/conferences/2013/Engr%20Precon%20Session%207%20Don%20Ballantyne.pdf. Accessed May 22, 2018.

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Watershed Protection and Flood Prevention Act of 1954, Pub. L. No. 83-566, 68 Stat. 666.

Appendix E

Other Supporting Information

E.1 Intensity Threshold Table

This section presents the intensity threshold table used to quantify effects on resources of concern because of the proposed action.

Table E-1. Intensity Threshold Table for the Ochoco Irrigation District Irrigation Modernization Project.

Negligible	Changes in the resource or resource related values would be below or at the level of detection. If detected, the effects on the resource or environment would be considered slight with no perceptible impacts.
Minor	Changes in resource or resource related values would be measurable but small. The effects on the resource or the environment would be localized.
Moderate	Changes in the resource or resource related values would be measurable and apparent. The effects on the resource or the environment would be relatively local.
Major	Changes in resource or resource related values would be measurable and substantial. The effects on the resource or the environment would be regional.
Impact Duration Definitions	
Temporary	Transitory effects which only occur over a period of days or months
Short-term effect	Resource or resource related values recover in fewer than five years
Long-term effect	Resource or resource related values take greater than five years to recover

E.2 Supporting Calculations for Soils

Table E-2. Project Area Length Crossing Farmland.

NRCS Farmland Class	Project Area (percent)	Project Area (miles)
Prime farmland if irrigated	41.4%	13.2
No digital data available[1]	33.9%	10.8
Farmland of statewide importance	13.4%	4.3
Not prime farmland	10.8%	3.5
Prime farmland if irrigated and drained	0.4%	0.1
Total	**100%[2]**	**31.9**

Source: NRCS gSSURGO FY2018 data.

[1] The area for which data are not available consists mostly of the area along McKay Creek and the Grimes Flat laterals.

[2] May not sum due to rounding.

References

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2018. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at the following link: https://websoilsurvey.sc.egov.usda.gov/. Accessed August 28, 2020.

E.3 Supporting Calculations for Land Use

Table E-3. Project Area Length Crossing Land Use Classes.

Land Use	Percent of the Project Area Length	Project Area Length Crossing each Land Use Class (miles)
Agriculture[1]	19%	6.1
Developed Use[2]	36%	11.3
Non-cultivated Use[3]	45%	14.5
Total	**100%**	**31.9**

Source: USGS 2016.
[1] Hay/Pasture, Cultivated Crops.
[2] High, medium, low intensity development, developed open space.
[3] Shrub/scrub, barren land, evergreen forest, woody wetlands.

Table E-4. Project Area Length Crossing Land Ownership.

Land Ownership	Percent of the Project Area Length	Project Area Length Crossing each Land Use Class (miles)
City	4%	1.5
County	0%	0.1
Private	91%	28.8
Tax lot gap[1]	4%	1.4
Reclamation	0%	0.2
Total	**100%[2]**	**32**

Source: Crook County GIS
[1] The majority of tax lot gaps consist of roadways.
[2] May not sum due to rounding.

References

U.S. Geological Survey (USGS). 2016. National Land Cover Database (2016 Edition). U.S. Geological Survey, Sioux Falls, SD. Website: https://www.mrlc.gov/data. Accessed January 13, 2019.

Crook County GIS. 2017. Crook County GIS Open Data Portal: Taxlots. Prineville, OR. Website: https://data-crookcounty.opendata.arcgis.com/. Accessed December 2019.

E.4 Supporting Information for Vegetation Resources

This appendix section presents supporting data used to evaluate effects of the Preferred Alternative with respect to vegetation resources.

The Deschutes Basin Board of Control determines a weed to be noxious if it is "injurious to public health, agriculture, recreation, wildlife, or any public or private property," and "impacts and displaces desirable vegetation." Furthermore, it is recognized that certain noxious weeds are so pervasive that they have been classified by ORS 569.350 to be a menace to public welfare. The Crook County Noxious Weed Policy and Classification System designates three weed categories. "A" designated weeds are of highest priority for control and are subject to intensive eradication, containment, or control measures using county resources. "B" designated weeds have a limited distribution; intensive containment control and monitoring by landowners is required, and support from the County is provided when resources allow. "C" designated weeds are the lowest priority for control and have a widespread distribution; landowner control and monitoring is recommended (Deschutes County 2020; Crook County 2018).

Table E-5. Weeds Known to Occur within the Ochoco Irrigation District Infrastructure Modernization Project Area.

Vegetation Species	Scientific Name	Crook County Noxious Weed Rating (Crook 2018)
Bull thistle	*Cirsium vulgare*	C
Canada thistle	*Cirsium arvense*	B
Canary reed grass	*Phalaris arundinacea* L.	B†
Cheat grass	*Brachypodium sylvaticum*	B†
Dalmatian toadflax	*Linaria dalmatica*	A
Diffuse knapweed	*Centaurea diffusa*	B
Gorse	*Ulex europaeus* L.	B†
Kochia	*Kochia scoparia*	B†
Leafy spurge	*Euphorbia esula*	A
Medusahead rye	*Taeniatherum caput-medusae*	B
Perennial pepper weed	*Lepidium latifolium*	B
Poison hemlock	*Conium maculatum*	B
Puncture vine	*Tribulus terrestris*	B
Russian knapweed	*Acroptilon repens*	B

Vegetation Species	Scientific Name	Crook County Noxious Weed Rating (Crook 2018)
Scotch thistle	*Onopordum acanthium*	A
Spotted knapweed	*Centaurea stoebe*	B
Whitetop-hoary cress	*Lepidium draba*	B
Yellow starthistle	*Centaurea solstitialis*	A
Sago pond weed*	*Stuckenia pectinate* L.	Nuisance weed or noxious weed in irrigation canals‡
Horned pond weed*	*Zannichellia palustris* L.	Nuisance weed in irrigation canals
Finamentous algae*	Various species	Nuisance weed in irrigation canals

Source: D. Wood, personal communication, October 30, 2019
Noxious Weed Rating [Source: Crook County Noxious Weed List 2018 (Crook County 2018)]
A: Highest priority noxious weed designated by the Board
B: Distribution is limited in the county, region, or state. Intensive control to limit or eliminate reproduction and spread will occur at the county level as resources and situation allow.
C: Distribution is widespread in the county, region, or state, therefore eradication is unlikely and treatment is a lower priority.
Not applicable because pond weed is not classified as a noxious weed. However, it is present throughout the project area.
† Noxious weed according to Oregon Department of Agriculture
‡ USDA Plant Guide https://plants.sc.egov.usda.gov
*Found in District canals and laterals (FCA 2018)

References

Crook County. 2018. Crook County Noxious Weed List. List provided by Debbie Wood Crooked River Weed Management Area Coordinator. October 30, 2019.

Deschutes County. 2020. Deschutes County Weed List. Website: https://www.deschutes.org/sites/default/files/fileattachments/road/page/567/20170123_deschutes_county_weed_list.pdf. Accessed: August 27, 2020.

Farmers Conservation Alliance (FCA). 2018. Preliminary Investigative Report Questionnaire for Ochoco Irrigation District.

Wood, Debbie (Crooked River Weed Management Area Coordinator). 2019. Personal communication (email) with Kristin Alligood (FCA) October 30, 2019.

E.5 Supporting Information for Fish and Aquatic Resources

This appendix section presents supporting information associated with Primary Constituent Elements for critical habitat of federally listed species.

Table E-6. Primary Constituent Elements for Bull Trout.

Primary Constituent Element Number	Habitat Description and Characteristics
PCE 1	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.
PCE 2	Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.
PCE 3	An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.
PCE 4	Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.
PCE 5	Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.
PCE 6	In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.
PCE 7	A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.
PCE 8	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.
PCE 9	Sufficiently low levels of occurrence of nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

Table E-7. Fish and Aquatic Species within the Area of Potential Effect for the Ochoco Irrigation District Infrastructure Modernization Project.

Species Common Name	Scientific Name	Crooked River	Prineville Reservoir	McKay Creek	Lower Deschutes
Bull trout	*Salvelinus confluentus*	X		X	X
Steelhead trout	*Oncorhynchus mykiss*	X		X	X
Spring Chinook salmon	*Oncorhynchus tshawytscha*	X			X
Sockeye salmon	*Oncorhynchus nerka*	X			X
Redband trout	*Oncorhynchus mykiss gairdnerii*	X	X	X	X
Summer/ Fall Chinook Salmon	*Oncorhynchus tshawytscha*				X
Mountain whitefish	*Prosopium williamsoni*	X	X	X	X
Pacific lamprey	*Entosphenus tridentatus*				X
Largescale sucker	*Catostomus marcocheilus*	X	X	X	X
Bridgelip sucker	*Catostomus columbianus*	X	X	X	X
Chiselmouth	*Acrocheilus alutaceus*	X	X	X	X
Dace species	*Rhinichthys* (spp.)	X	X	X	X
Northern pikeminnow	*Ptychocheilus oregonensis*	X	X		X
Sculpin species	Family Cottidae	X	X	X	X
Brook trout	*Salvelinus fontinalis*	X	X	X	X
Brown trout	*Salmo trutta*	X	X	X	X
Floater species mussels	*Anodonta* (spp.)	X			
Western pearlshell mussel	*Margaritifera falcata*	X		X	X
Western ridged mussel	*Gonidea angulata*	X	X		

Source: Adapted from AID et al. 2019

References

Arnold Irrigation District (AID), Central Oregon Irrigation District (COID), Lone Pine Irrigation District (LPID), North Unit Irrigation District (NUID), Ochoco Irrigation District (OID), Swalley Irrigation District (SID), Three Sisters Irrigation District (TSID), Tumalo Irrigation District (TID), City of Prineville. 2019. Draft Deschutes Basin Habitat Conservation Plan.

E.6 Supporting Information for Water Resources

This appendix section presents the methodology and data included in the Ochoco Irrigation District (OID) System Improvement Plan (Black Rock 2018). The findings presented in Black Rock (2018) were used to evaluate the potential effects of the Preferred Alternative on water resources.

Black Rock Consulting worked with the District to coordinate a seepage loss study performed by Farmers Conservation Alliance staff under direction from Black Rock Consulting/Kevin L. Crew, P.E and David C. Prull, P.E.. During the summer of 2016, the Seepage Loss Assessment Program (LAP), supported by Oregon State University and the Oregon Water Resources Department, was implemented in 7 of the 8 Central Oregon irrigation districts, including OID, to inform the districts of current system losses. The program included the use of newly purchased and calibrated Sontek Flowtracker II and Doppler-Boat technology, manual, and office and field training, all in accordance with the United States Geological Survey and United States Bureau of Reclamation (USGS 2010). The program was managed by Oregon Registered Professional Engineers, Kevin L. Crew, P.E. and David C. Prull, P.E.

The primary purpose of the LAP was to perform a one-time measurement program in each District. The program provided the approximate seepage losses in elements of each system. The measurements were performed at different times of the irrigation season within each District. Therefore, the percentage of peak flow at the time of measurement varied by District as the LAP team entered, measured, and exited each District. The results were used to provide a strong indication of losses. The results were interpolated or extrapolated based upon the maximal expected loss within each District. The final loss information was used to identify losses by project phase or lateral.

Flow diversion data for the District over the last seven years of operation were also evaluated to determine a historical peak diversion rate of approximately 350 cfs (approximately 350 cfs peak from Ochoco Reservoir and the Crooked River Diversion including 20 cfs supply to the Breese Lateral and 4 cfs supply to the Rye Grass Canal). The District identified a desired delivery rate of up to 7.5 GPM/Acre, its peak certificate rate. The total acreages assessed for the OID system were used to estimate that a 309 cfs peak diversion rate would allow the District to deliver 7.5 GPM/Acre with a fully piped system (including all laterals and private laterals down to the individual patron turnouts). A fully piped conveyance system would typically no longer lose any water to seepage, evaporation, and end spills. With no water loss to due to seepage, evaporation, or end spills, the District could reduce its peak diversion by 41 cfs, reducing it from 350 cfs to 309 cfs, and still deliver up to 7.5 GPM/Acre.

For OID, the LAP was implemented throughout the District's primary canal and system laterals. Direct measurements identified a total seepage loss of approximately 53 cfs in the District's system. The District could allocate 41 cfs, or 77 percent, of the water saved through modernization instream and still maintain its ability to deliver its desired rate of 7.5 GPM/Acre. The District could retain 23 percent of the water saved through modernization to maintain its ability to deliver its desired rate under its existing water rights.

To determine water savings for the Grimes Flat Laterals, the direct loss measurements were used for greater precision (see Table E-7). 4.9 cfs of loss were identified in the Grimes Flat laterals by the LAP. This loss due to seepage and evaporation would be eliminated under the Preferred Alternative. All of the loss and associated savings would be water from the Crooked River: 77 percent of the water saved through the Preferred Alternative, or 3.8 cfs, would be allocated for instream use; 23 percent of the water saved through the Preferred Alternative, or 1.1 cfs, would be retained by the District to maintain its ability to deliver its desired rate under its existing water rights.

To determine water savings for the IronHorse section, the direct loss measurements of the Crooked River Distribution Canal were used for greater precision. The loss of the entire Crooked River Distribution Canal section was then prorated based on the linear feet of the proposed project (8,800 LF) resulting in an estimated 1.02 cfs of loss. This loss due to seepage and evaporation would be eliminated under the Preferred Alternative. All of the loss and associated savings would be water from the Crooked River. The District has agreed to allocate 100 percent of the water saved in this Section through the Preferred Alternative.

Table E-8. Ochoco Irrigation District Water Loss and Conservation in the Project Area.

Canal/Lateral	Seepage Loss Measured (cfs)	Water Conserved for Instream Use (cfs) [1]	Water Conserved for Instream Use (acre-feet)	Water Savings Retained by the District (cfs) [1]	Water Savings Retained by the District (acre-feet)
Grimes Flat Laterals	4.9	3.8	1,613	1.1	467
IronHorse section of the Crooked River Distribution Canal	1.02	1.02	433	0.0	0
Total	**5.92**	**4.82**	**2,046**	**1.1**	**467**

[1] While water loss must be initially calculated in cfs, the total volume of water lost through the season is calculated to be 2,046 acre-feet. It may be that upon further discussion with ODFW, OWRD, and other stakeholders, the rate protected instream may change, but the volume would remain the same.

Crooked River Reach

This section presents supporting calculations used when evaluating effects of the proposed action with respect to water resources. See Figure C-3 in Appendix C for location of gauges.

Crooked River Below Prineville Reservoir

This subsection presents supporting calculations used when evaluating the effects of the Preferred Alternative with respect to water resources in the Crooked River below Prineville Reservoir at OWRD Gauge No. 14080500.

Table E-9. Streamflow metrics for the Crooked River below Prineville Reservoir at OWRD Gauge No. 14080500.

Month	Pre-Project Median Daily Average Streamflow (cfs)[1]	Streamflow Protected Instream Through Project (cfs)[2,3]	Streamflow Released from Prineville Reservoir for the McKay Switch Project (cfs)[4]	Post-Project Median Daily Average Streamflow (cfs)[2,3,4]	Post-Project Percentage Increase in Median Daily Average Streamflow
Oct	103.0	4.82	16	119.0	15.5%
Nov	72.0	0	0	72.0	0.0%
Dec	69.0	0	0	69.0	0.0%
Jan	75.0	0	0	75.0	0.0%
Feb	79.0	0	0	79.0	0.0%
Mar	109.0	0	0	109.0	0.0%
Apr	340.0	4.82	16	356.0	4.7%
May	261.0	4.82	16	277.0	6.1%
Jun	231.0	4.82	16	247.0	6.9%
Jul	228.0	4.82	16	244.0	7.0%
Aug	229.0	4.82	16	245.0	7.0%
Sep	213.0	4.82	16	229.0	7.5%

[1] Streamflow statistics represent data collected during water years 1988 through 2018.
[2] These data include 3.8 cfs protected instream through the Grimes Flat Lateral improvements and 1.02 cfs protected instream through the IronHorse section improvements.
[3] The distribution of conserved water over the year is for illustrative purposes. While water loss must be initially calculated as a rate (cfs), the total volume of water lost through the season is calculated to be 2,046 acre-feet. It may be that, upon further discussion with ODFW, OWRD, and other stakeholders, the rate protected instream each month may change. The total volume protected instream would remain the same.
[4] The conserved water protected instream through the project, which appears as "Streamflow Protected Through Project" would have been released for diversion by the District prior to the completion of the project and would not contribute to increased streamflow in this reach.

Crooked River at Prineville, Oregon

This subsection presents supporting calculations used when evaluating the effects of the Preferred Alternative with respect to water resources in the Crooked River at Prineville, Oregon at OWRD Gauge No. 14081500.

Table E-10. Streamflow metrics for the Crooked River at Prineville, Oregon at OWRD Gauge No. 14081500.

Month	Pre-Project Median Daily Average Streamflow (cfs)[1]	Streamflow Protected Through Project (cfs)[2,3]	Post-Project Median Daily Average Streamflow (cfs)[1,2,3]	Post-Project Percentage Increase in Median Daily Average Streamflow
Oct	80.0	4.82	84.82	6.0%
Nov	84.0	0	84.0	0.0%
Dec	88.0	0	88.0	0.0%
Jan	90.0	0	90.0	0.0%
Feb	101.0	0	101.0	0.0%
Mar	536.0	0	536.0	0.0%
Apr	187.5	4.82	192.32	2.6%
May	78.0	4.82	82.82	6.2%
Jun	65.5	4.82	70.32	7.4%
Jul	75.0	4.82	79.82	6.4%
Aug	84.5	4.82	89.32	5.7%
Sep	77.0	4.82	81.82	6.3%

[1] Streamflow statistics represent data collected during water years 2015 through 2018.
[2] These data include 3.8 cfs protected instream through the Grimes Flat Lateral improvements and 1.02 cfs protected instream through the IronHorse section improvements.
[3] The distribution of conserved water over the year is for illustrative purposes. While water loss must be initially calculated as a rate (cfs), the total volume of water lost through the season is calculated to be 2,046 acre-feet. It may be that, upon further discussion with ODFW, OWRD, and other stakeholders, the rate protected instream each month may change. The total volume protected instream would remain the same.

Crooked River near Terrebonne, Oregon

This subsection presents supporting calculations used when evaluating the effects of the Preferred Alternative with respect to water resources in the Crooked River near Terrebonne, Oregon at OWRD Gauge No. 14087300.

Table E-11. Streamflow metrics for the Crooked River near Terrebonne, Oregon at OWRD Gauge No. 14087300.

Month	Pre-Project Median Daily Average Streamflow (cfs)1	Streamflow Protected Downstream from Prineville Reservoir through Project (cfs)2,3	Minimum Streamflow Protected Through McKay Switch Project (cfs)4	Post-Project Median Daily Average Streamflow (cfs)1,2,3	Post-Project Percentage Increase in Median Daily Average Streamflow
Oct	174.0	4.82	0.18	179.00	2.9%
Nov	142.0	0	0	142.0	0.0%
Dec	135.0	0	0	135.0	0.0%
Jan	160.0	0	0	160.0	0.0%
Feb	202.5	0	0	202.5	0.0%
Mar	253.0	0	0	253.0	0.0%
Apr	420.5	4.82	11.2	436.52	3.8%
May	185.0	4.82	7.0	196.82	6.4%
Jun	118.5	4.82	1.7	125.02	5.5%
Jul	70.0	4.82	0.23	75.05	7.2%
Aug	81.0	4.82	0	85.82	6.0%
Sep	146.5	4.82	0	151.32	3.3%

[1] Streamflow statistics represent data collected during water years 1993 through 2018.
[2] These data include 3.8 cfs protected instream through the Grimes Flat Lateral improvements and 1.02 cfs protected instream through the IronHorse section improvements.
[3] The distribution of conserved water over the year is for illustrative purposes. While water loss must be initially calculated as a rate (cfs), the total volume of water lost through the season is calculated to be 2,046 acre-feet. It may be that, upon further discussion with ODFW, OWRD, and other stakeholders, the rate protected instream each month may change. The total volume protected instream would remain the same.
[4] These live flow water rights created through the McKay Switch Project would protect up to 11.2 cfs instream, with streamflow benefits varying based on water availability in McKay Creek. Using data from Gauge No. 14085700, a minimum post-project streamflow was determined and is used for analyses on minimum protected inflows to the Crooked River at the mouth of McKay Creek.

McKay Creek Reach

This subsection presents supporting calculations used when evaluating the effects of the proposed action on water resources in McKay Creek. OWRD Gauge No. 14085700 is located on McKay Creek at Poppy Creek, just upstream of the upstream extent of the project area at River Mile (RM) 12.0. Streamflow at this gauge approximates streamflow entering the project area. Several tributaries enter McKay Creek downstream of this gauge and provide additional streamflow between the gauge and RM 6.0, the downstream extent of the irrigation diversions included in the McKay Creek Switch. It is assumed that McKay Creek irrigators have diverted up to 11.2 cfs from the creek between RM 12.0 and RM 6.0 whenever that water is available. It is also assumed that pre-project streamflow statistics at Gauge No. 14085700 approximate minimum (i.e., without any additional tributary inputs) post-project streamflow statistics between RM 12.0 and RM 0.0.

Table E-12. Streamflow Metrics for McKay Creek.

Month	Pre-Project Median Daily Average Streamflow (cfs) Upstream from the Project Reach[1]	Water Rights Protected Instream Through Project (cfs)[2]	Minimum Post-Project Median Daily Average Streamflow Through the Project Reach (cfs)[3]	Oregon Department of Fish and Wildlife Instream Water Right on the Lower Reach of McKay Creek [3,4]
Oct	0.18	11.20	0.18	0.51
Nov	0.61	0	0.61	1.59
Dec	1.90	0	1.90	6.16
Jan	6.20	0	6.20	11.00
Feb	13.00	0	13.00	26.0 / 28.4
Mar	21.00	0	21.00	33.70
Apr	25.50	11.20	25.50	34.40
May	7.00	11.20	7.00	21.20
Jun	1.70	11.20	1.70	6.37
Jul	0.20	11.20	0.20	1.16
Aug	0	11.20	0	0.36
Sep	0	11.20	0	0.36

[1] Streamflow statistics represent median daily average streamflow by month in McKay Creek above Poppy Creek near Prineville, Oregon at OWRD Gauge No. 14085700. Data were collected during water years 2009 through 2018.
[2] Theses live flow water rights would protect up to 11.2 cfs instream, with streamflow benefits varying based on water availability in McKay Creek
[3] ODFW Certificate 73200
[4] Instream flow numbers for February 1-14 are 26 cfs; for February 15-28, flow numbers are 28.4 cfs.

Allocation of Conserved Water Program

This section presents information on the State of Oregon's Allocation of Conserved Water Program.

The Oregon Water Resources Department manages the Allocation of Conserved Water Program. The Allocation of Conserved Water Program allows a water user who conserves water to use a portion of the conserved water on additional lands, lease or sell the water, or dedicate the water to instream use. Use of this program is voluntary and provides benefits to both water right holders and instream values.

The statutes authorizing the program were originally passed by the Legislative Assembly in 1987. The primary intent of the law is to promote the efficient use of water to satisfy current and future needs—both out-of-stream and instream. The statute defines conservation as "the reduction of the amount of water diverted to satisfy an existing beneficial use achieved either by improving the technology or method for diverting, transporting, applying or recovering the water or by implementing other approved conservation measures."

In the absence of Department approval of an allocation of conserved water, water users who make the necessary investments to improve their water use efficiency are not allowed to use the conserved water to meet new needs; instead, any unused water remains in the stream where it is available for the next appropriator. In exchange for granting the user the right to "spread" a portion of the conserved water to new uses, the law requires allocation of a portion to the state for instream use.

After mitigating the effects on any other water rights, a new water right certificate is issued with the original priority date reflecting the reduced quantity of water being used with the improved technology. A certificate is issued for the state's instream water right, and, if requested, a certificate is issued for the applicant´s portion of the conserved water. The priority dates for the state's instream certificate and the applicant's portion of conserved water must be the same date and is be either the same date as the original water right or 1-minute junior to the original right.

Estimated Change to Streamflow Following Project Implementation

Figure E.1 depicts the Project Area (purple) and the portions of waterbodies that would be affected by changes in District operations (blue) due to the proposed action. The project area only shows District conveyance infrastructure that would be modified or constructed by the proposed action. District infrastructure that is not modified by the project is not shown. The rate change (cfs) in the figure table reflects the cumulative change in streamflow in a reach. For example, on average, the streamflow in LC1 would be reduced by 1.0 cfs (2.0 cfs maximum), which would result in 1.0 cfs (2.0 cfs maximum) less streamflow in CR5. Therefore, CR5 is expected to have a total increase in streamflow of 15.02 (14.02 cfs maximum).

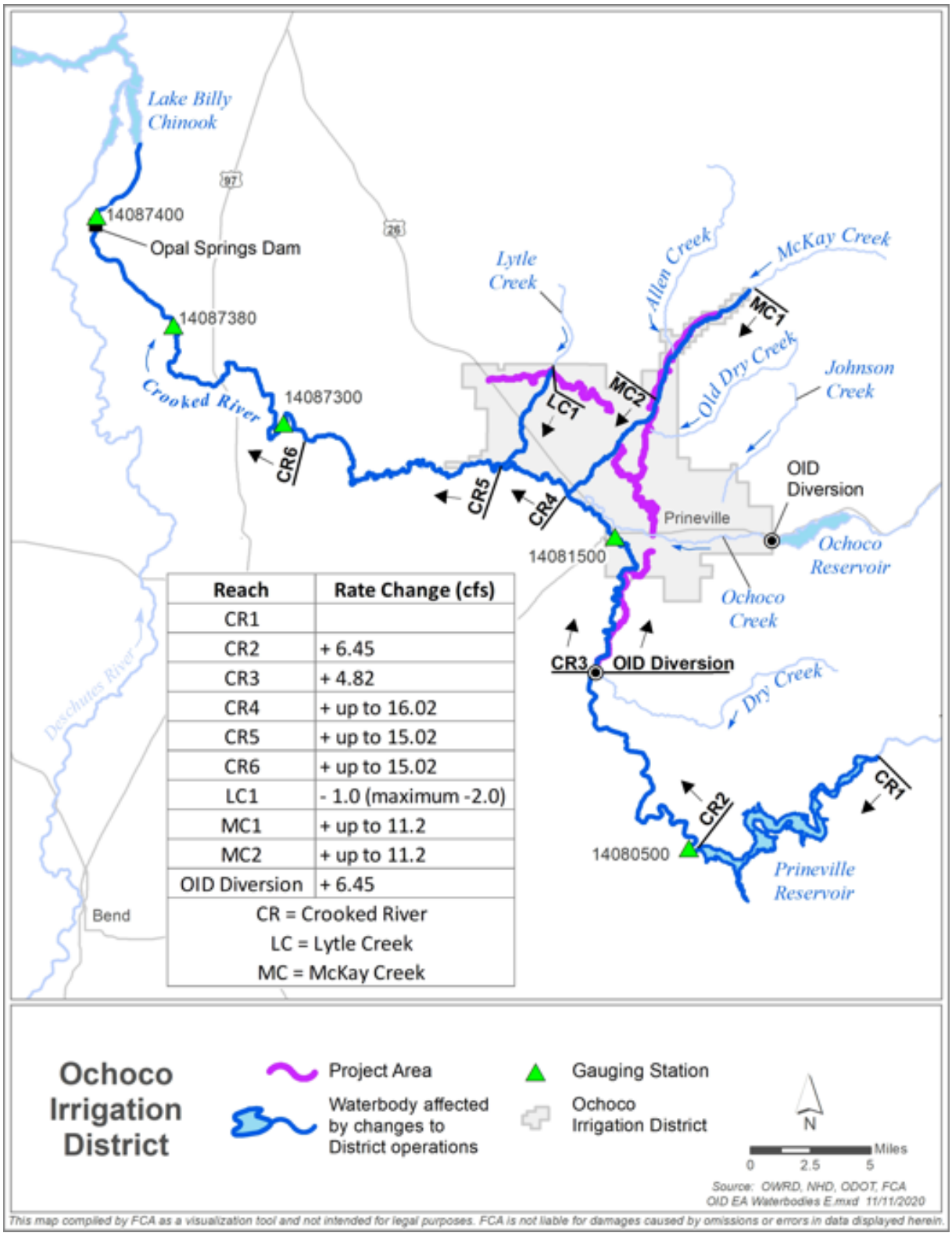


Figure E-1. Waterbodies and associated change in streamflow as a result of the Ochoco Irrigation District Irrigation Modernization proposed action.

Crooked River Reach 1 (CR1): RM 83.0 to RM 70.0

Prineville Reservoir has 148,640 acre-feet of active capacity. The District holds 60,639 acre-feet of stored water rights in the Prineville 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).

Water conserved allocated instream following piping Grimes Flat laterals and the IronHorse section would be released from Prineville Reservoir but would not affect Prineville Reservoir levels. Prior to the proposed action, the District would have released this water from the reservoir for irrigation use.

Following the completion of the McKay Creek Water Rights Switch, the District 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 for the McKay Creek Water Rights Switch would have a negligible effect on Prineville Reservoir levels.

Crooked River Reach 2 (CR2): RM 70.0 to RM 54.9

During the District's practical irrigation season (April 1 through Oct. 31), the median daily average streamflow at OWRD Gauge No. 14080500 below Prineville Reservoir is 103 cfs in October,[24] the lowest streamflow month of the irrigation season. Release of an additional 2,740 acre-feet of water allocated to McKay Creek irrigators as a flat rate would increase streamflow in this reach by approximately 6.45 cfs (totaling up to 109.65 cfs [or up to 6.2 percent]). This action would have a negligible to minor effect on streamflow.

Following the completion of piping Grimes Flat laterals (Project Group 2) and IronHorse section (Project Group 3), the District is to release the 2,046 acre-feet of the total saved 2,512 acre-feet of water. The water allocated instream for conservation is assumed to be released as a flat rate of 4.82 cfs over the irrigation season. Because this water would have been released into CR2 for Grimes Flat and IronHorse irrigators, there would be no effect to streamflow in this reach when the District releases conserved water.

Crooked River Reach 3 (CR3): RM 54.9 to RM 44.4

The District would divert the water released from CR1 into CR2 for McKay Creek irrigators (approximately 6.45 cfs) at its diversion on the Crooked River, the start of CR3. This water would, therefore, not affect CR3 reach or any downstream reaches.

Following the proposed action, the District would reduce its water right by 2,046 acre-feet through Oregon's Allocation of Conserved Water Program. This conserved water would be protected instream by a new water right through the program, and would, therefore, pass the District's diversion as it flows downstream. If released as a flat rate, the conserved water would add approximately 4.82 cfs to the streamflow in the CR3 reach.

As compared with CR2, flow in CR3 is reduced due to multiple diversions, including the District's. OWRD Gauge No. 14081500, located at the Highway 126 Bridge near Prineville, Oregon, measures streamflow downstream from the District's diversion as well as several other upstream diversions. The median daily average streamflow recorded at this gauge in June, the lowest streamflow month of the irrigation season, across the four years of provisional data available (2015 through 2018) is 65.5 cfs. Following completion of

[24] Streamflow statistics represent data collected during water years 1988 through 2018. Data were averaged across the District's practical irrigation season (April 1 through October 31).

the proposed action, this low flow would increase by approximately 4.82 cfs (or 7.4 percent) during the irrigation season. This increase in streamflow would have a negligible to minor effect on streamflow.

Streamflow in the remaining portion of CR3 may increase due to input from Ochoco Creek, which enters the Crooked River downstream of the OWRD Gauge No. 14081500, as well as various groundwater inputs, thus making the effect of the increased streamflow from the proposed action less discernable.

Crooked River Reach 3 (CR4): RM 44.4 to RM 41.3

CR4 includes the portion of the Crooked River from the confluence with McKay Creek to the confluence with Lytle Creek. Streamflow in this reach is made up of water moving downstream from CR3 (see above), groundwater inputs, and streamflow from McKay Creek. At least one private diversion (Crooked River Central Canal) diverts water in this reach.

Implementation of the proposed action would contribute water released from Bowman Dam (CR1-CR3) and live flow available from McKay Creek (MC1-2), which would confluence in CR4 and increase streamflow in the CR4 reach. Approximately 4.82 cfs of protected water would travel through this reach across the irrigation season (see CR2-CR3). Up to 11.2 cfs of water would confluence in CR4 from McKay Creek (see MC1 and MC2), when available, increasing streamflow in this reach by up to 16.02 cfs.

The contribution of live flow from McKay Creek into CR4 would vary across the irrigation season. McKay Creek is fed by snowmelt, spring discharge, and tributary inflow (see MC1 and MC2). Due to this natural hydrology, up to approximately 16.02 cfs, could be contributed to CR4 during the spring months (April through May) of the District's practical irrigation season (April 1 through October 31). As the irrigation season progresses and spring snowmelt contributes less to McKay Creek, the streamflow contributed to CR4 as a result of the proposed action would decrease. In the later summer and early fall months, contributions to CR4 streamflow from the McKay Switch could be as little as 0 cfs, resulting in a minimum increase in streamflow of approximately 4.82 cfs allocated instream and protected from CR1.

No active OWRD gauges exist on the Crooked River in the CR4 reach. Providing quantitative information about the median daily average streamflow in this reach is therefore not possible. However, based on the natural hydrology of the Lower Crooked River Watershed, which sees higher streamflow in the early spring months during spring snowmelt than in later months when live flow has diminished, streamflow contributed as a result of the proposed project is expected to be higher in the early spring months than it would be in the later irrigation season months.

Given that streamflow contributions would be expected to decrease from a high of up to 16.02 cfs to a low of 4.82 cfs over the irrigation season, which would generally follow the natural hydrology of the system, the increased streamflow is expected to have an overall negligible to minor effect on CR4.

Crooked River Reach 5 (CR5): RM 41.3 to RM 27.3

CR5 is defined as the confluence of the Crooked River and Lytle Creek (RM 40) downstream to North Unit Irrigation District's pumps (RM 27.3). As described in CR4, up to 16.02 cfs would flow into CR5 above base streamflow in the early spring months of the irrigation season and would decrease to a minimum of 4.82 cfs into summer and fall.

On average, approximately 1 to 2 cfs less water would enter CR5 from Lytle Creek (LC1) due to the elimination of the operational spill following the piping of the Grimes Flat laterals. Therefore, following project implementation, the streamflow in CR5 would be increased by up to 15.02 to 14.02 cfs on average, which accounts for the 1 to 2 cfs reduction of streamflow entering CR5 from LC1 on average.

Quantifying streamflow in CR5 is challenging because no active gauges exist in this reach. Qualitatively, CR5 generally has greater base streamflow than CR4 because of contributions from groundwater, tributaries, and springs. Although multiple diversions exist along CR5, groundwater and tributary inputs generally increase streamflow until RM 27, where North Unit Irrigation District pumps water from the Crooked River.

Overall, increased streamflow as a result of the proposed action is expected to have a negligible to minor effect to streamflow in CR5.

Crooked River Reach 6 (CR6): RM 27.3 to RM 0.0

CR6 is defined as beginning at North Unit Irrigation District's (NUID) pumps (RM 27.3), where NUID pumps water out of the Crooked River and into the NUID main canal, and ending at the mouth of Lake Billy Chinook (RM 3). Streamflow declines due to this pumping, but again increases with inputs from springs and groundwater downstream. OWRD Gauge No. 14087300 near Terrebonne measures streamflow downstream from North Unit Irrigation District's pumps.

As described in CR4 and CR5, up to an additional 15.02 cfs would flow into CR6 in the early spring months of the irrigation season and would decrease to a minimum of 4.82 cfs into summer and fall. NUID has entered into an agreement with the Deschutes River Conservancy regarding pumping volumes and minimum streamflow in the Crooked River, and this agreement has been incrementally incorporated into conserved water projects completed by NUID. The agreement requires NUID to meet a portion of its demand from the Crooked River, and it also requires that NUID's pumping not draw streamflow in the Crooked River below specified rates following the completion of those conserved water projects. Streamflow is measured below NUID's pumps at OWRD Gauge No. 14087300 near Terrebonne. The Final Order for Conserved Water Application CW-75, the most recent of those projects, identifies this streamflow by month and by type of year (i.e., dry or non-dry).

The agreement identifies a minimum streamflow that ranges from 56.8 cfs (July) to 180.5 cfs (April) in non-dry years and 40.8 cfs (May) to 121.3 cfs (October) in dry years. In the spring months, when McKay Creek streamflow is relatively high, McKay Creek water protected instream through the project would carry through CR5 to CR6. In the summer and fall months, when McKay Creek streamflow has diminished (see MC1 and MC2, below), little to no McKay Creek water would carry through CR5 to CR6. The 4.82 cfs of stored water protected in the Crooked River would carry through CR5 to CR6 during all months (see CR 1 and CR2).

When streamflow entering CR6 exceeds the sum of NUID's pumping demands and minimum flow requirements, the water protected instream through the proposed project would contribute to increased streamflow in CR6. These conditions would most likely occur during the spring months, when pumping demand has been relatively low and streamflow relatively high. When streamflow entering CR6 does not exceed the sum of NUID's pumping demands and minimum flow requirements, the water protected instream through the proposed project would not contribute to increased streamflow in CR6. These conditions would most likely occur in the summer and fall months, when streamflow declines and pumping demand increases.

McKay Creek 1 (MC1): RM 6.0 to RM 12.0

McKay Creek originates in the Ochoco Mountains and is fed by snowmelt, spring discharge, and tributary inflow. 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. Over the past 100 years, flows in MC1 (RM 6.0 to RM 12.0) have been altered due to private irrigation withdrawals in this reach. The streamflow restored in MC1 following the proposed action would approximate the natural hydrograph of McKay Creek. In a typical year, the proposed action would restore a full 11.2 cfs to MC1 early in the irrigation season (April through June) as McKay Creek experiences peak runoff. This rate would decrease as the irrigation season progresses and streamflow upstream from the project naturally declines.

McKay Creek 2 (MC2): RM 0.0 to RM 6.0

Following the proposed action, the District would allow any water restored instream in MC1 (up to 11.2 cfs) to pass its Jones Dam diversion (RM 5.9) into MC2 (RM 0.0 to RM 6.0). This water would also pass other diversions along MC2 and would join the Crooked River. This would restore a more natural hydrograph in MC2.

Lytle Creek 1 (LC1)

Lytle Creek is a tributary to Crooked River that enters the Crooked River at RM 41.8. Similar to McKay Creek, Lytle Creek follows a seasonal runoff pattern which peaks in the early spring. 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).

Following piping the Grimes Flat laterals, the District would no longer operationally spill into Lytle Creek at RM 5.7. This would reduce streamflow in LC1 by approximately 1 to 2 cfs on average but would return LC1 to a more natural hydrology.

The proposed action would have a negligible effect on LC1.

References

Black Rock Consulting and Farmers Conservation Alliance (Black Rock). 2018, Ochoco Irrigation District System Improvement Plan.

Oregon Water Resources Department (OWRD). 2017. Allocation of Conserved Water. Retrieved from: http://www.oregon.gov/owrd/pages/mgmt_conserved_water.aspx. Accessed November 10, 2017.

U.S. Geological Survey (USGS). 2010. Discharge Measurements at Gaging Stations – Chapter 8 of Book 3, Section A. Retrieved from: https://pubs.usgs.gov/tm/tm3-a8/tm3a8.pdf. Accessed January 31, 2020,

E.7 Supporting Information for Wildlife Resources

Table E-11. Migratory Bird Treaty Act/Bald and Golden Eagle Protection Act Species Potentially Occurring within the Project Area.

Migratory Bird Treaty Act/Bald and Golden Eagle Protection Act Species	Scientific Name
Bald eagle	*Haliaeetus leucocephalus*
Brewer's sparrow	*Spizella breweri*
Calliope hummingbird	*Stellula calliope*
Cassin's finch	*Carpodacus cassinii*
Eared grebe	*Podiceps nigricollis*
Flammulated owl	*Otus flammeolus*
Fox sparrow	*Passerella iliaca*
Golden eagle	*Aquila chrysaetos*
Green-tailed towhee	*Pipilo chlorurus*
Lewis's woodpecker	*Melanerpes lewis*
Loggerhead shrike	*Lanius ludovicianus*
Long-billed curlew	*Numenius americanus*
Olive-sided flycatcher	*Cantopus cooperi*
Peregrine falcon	*Falco peregrinus*
Pinyon jay	*Gymnorhinus cyanocephalus*
Rufous hummingbird	*Selasphorus rufus*
Sage thrasher	*Oreoscoptes montanus*
Short-eared owl	*Asio flammeus*
Swainson's hawk	*Buteo swainsoni*
Western grebe	*Aechmophorus occidentalis*
White-headed woodpecker	*Picoides albolavatus*
Williamson's sapsucker	*Sphyrapicus thyroidus*
Willow flycatcher	*Empidonax traillii*

Source: USFWS 2017

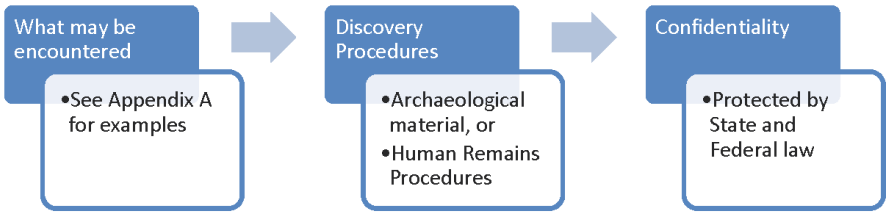
E.8 Supporting Information for Cultural Resources

ARCHAEOLOGICAL INADVERTENT DISCOVERY PLAN (IDP)

PROJECT NAME: OCHOCO IRRIGATION DISTRICT INFRASTRUCTURE MODERNIZATION PROJECT

PROJECT MANAGER, Bruce Scanlon July 1, 2020

HOW TO USE THIS DOCUMENT



Archaeology consists of the physical remains of the activities of people in the past. This IDP should be followed should any archaeological sites, objects, or human remains are found. These are protected under Federal and State laws and their disturbance can result in criminal penalties.

This document pertains to the work of the Contractor, including any and all individuals, organizations, or companies associated with Ochoco Irrigation District (OID) Infrastructure Modernization Project.

WHAT MAY BE ENCOUNTERED

Archaeology can be found during any ground-disturbing activity. If encountered all excavation and work in the area MUST STOP. Archaeological objects vary and can include evidence or remnants of historic-era and precontact activities by humans. Archaeological objects can include but are not limited to:

- **Stone flakes, arrowheads, stone tools, bone or wooden tools, baskets, beads.**
- Historic building materials such as **nails, glass, metal** such as cans, barrel rings, farm implements, **ceramics, bottles, marbles, beads.**
- Layers of **discolored earth** resulting from hearth fire
- Structural remains such as **foundations**
- **Shell** Middens
- **Human skeletal remains** and/or **bone fragments** which may be whole or fragmented.

For photographic examples of artifacts, please see Appendix A. (Human remains not included)

If there is an inadvertent discovery of any archaeological objects see procedures below.

If in doubt call it in.

DISCOVERY PROCEDURES: WHAT TO DO IF YOU FIND SOMETHING

1. Stop ALL work in the vicinity of the find

2. Secure and protect area of inadvertent discovery with 30 meter/100 foot buffer—work may continue outside of this buffer
3. Notify Project Manager and Agency Official
4. Project Manager will need to contact a professional archaeologist to assess the find.
5. If archaeologist determines the find is an archaeological site or object, contact SHPO. If it is determined to *not* be archaeological, you may continue work.

HUMAN REMAINS PROCEDURES

1. If it is believed the find may be human remains, stop ALL work.
2. Secure and protect area of inadvertent discovery with 30 meter/100 foot buffer, then work may continue outside of this buffer with caution.
3. Cover remains from view and protect them from damage or exposure, restrict access, and leave in place until directed otherwise. **Do not take photographs. Do not speak to the media.**
4. Notify:
    - Project Manager
    - Agency Official
    - Oregon State Police **DO NOT CALL 911**
    - SHPO
    - LCIS
    - Appropriate Native American Tribes
5. If the site is determined not to be a crime scene by the Oregon State Police, do not move anything! The remains will continue to be *secured in place* along with any associated funerary objects, and protected from weather, water runoff, and shielded from view.
6. Do not resume any work in the buffered area until a plan is developed and carried out between the State Police, SHPO, LCIS, and appropriate Native American Tribes and you are directed that work may proceed.

CONTACT INFORMATION

- Project Manager, Bruce Scanlon: (541) 447-6449
- NRCS Agency Official, Ron Alvarado: (503) 414-3201
- Reclamation Agency Official: Leah Meeks (208) 378-5025
- NRCS Archaeologist, Michael Petrozza: (503) 414-3212
- Reclamation Archaeologist, Chris Horting-Jones (503) 389-6541 ext. 236
- Oregon State Police, Sgt. Chris Allori: (503) 731-4717 Cell: (503) 708-6461
- Oregon State Historic Preservation Office (SHPO),
    - Jason Allen: (503) 986-0579
    - State Archaeologist, Dennis Griffin: (503) 986-0674
    - Asst. State Archaeologist, John Pouley: (503) 986-0675
- LCIS, Mitch Sparks: (503) 986-1086
- Appropriate Tribes
    - Confederated Tribes of the Warm Springs Reservation of Oregon
      Tribal Historic Preservation Officer, Robert Brunoe: (541) 553-2015

CONFIDENTIALITY

The OID Infrastructure Modernization Project and employees shall make their best efforts, in accordance with federal and state law, to ensure that its personnel and contractors keep the discovery confidential. The media, or any third-party member or members of the public are not to be contacted or have information regarding the discovery, and any public or media inquiry is to be reported to the Natural Resources Conservation Service (NRCS). Prior to any release, the responsible agencies and Tribes shall concur on the amount of information, if any, to be released to the public.

To protect fragile, vulnerable, or threatened sites, the National Historic Preservation Act, as amended (Section 304 [16 U.S.C. 470s-3]), and Oregon State law (ORS 192.501(11)) establishes that the location of archaeological sites, both on land and underwater, shall be confidential.

APPENDICES AND SUPPLEMENTARY MATERIALS

B. Visual reference and examples of archaeology

APPENDIX A

VISUAL REFERENCE GUIDE TO ENCOUNTERING ARCHAEOLOGY

Figure 1: Stone flakes

Figure 2: Stone tool fragments

Figure 3: Cordage

Figure 4: Shell midden

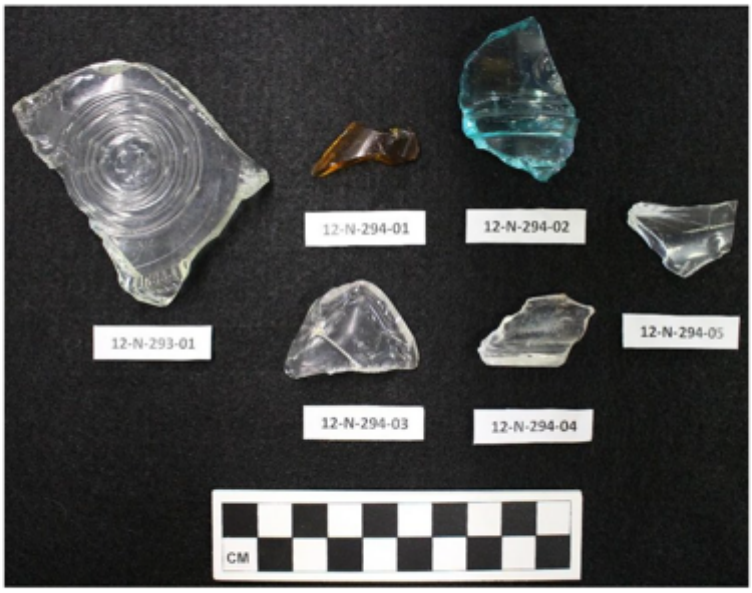


Figure 5: Historic glass artifacts

Figure 6: Historic metal artifacts

Figure 7: Historic building foundations

Figure 8: 18th Century ship

E.9 Guiding Principles

Guiding Principles (USDA 2017) The Guiding Principles identified in the PR&G are considered when developing and evaluating alternatives, as described below	
Healthy and Resilient Ecosystems	A primary objective of the PR&G analysis is the identification of alternatives that will protect and restore the functions of ecosystems. Alternatives should first avoid adverse impact. When environmental consequences occur, alternatives should minimize the impact and mitigate unavoidable damage. If damage occurs, mitigation to offset environmental damage must be included in the alternative's design and costs.
Sustainable Economic Development	Alternatives for resolving water resources problems should improve the economic well-being of the Nation for present and future generations. The PR&G analysis will consider the effects of alternatives on both water availability and water quality to evaluate the sustainability of economic activity and ecosystem services. Water use or management factors that provide improved sustainability or reduced uncertainty should be identified in alternatives.
Floodplains	The PR&G seek to avoid unwise use of floodplains and flood prone areas. Alternatives should avoid investments that adversely affect floodplain function, such that the floodplain is no longer self-sustaining. If an alternative impacts floodplain function, then the alternative should describe efforts to minimize and mitigate the impact and the residual loss of floodplain function. The PR&G investment evaluation of alternatives must be consistent with Executive Order 11988 of May 24, 1977 (Floodplain Management), as modified by Executive Order 13690 of January 30, 2015 (Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input), and the Federal Flood Risk Management Standard, which require executive departments and agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. The PR&G investment evaluation is informed by the processes to evaluate the impacts of Federal actions affecting floodplains consistent with Executive Order 11988, as amended.
Public Safety	An objective of the PR&G is to reduce risks to people, including life, injury, property, essential public services, and environmental threats concerning air and water quality. These risks to public health and safety must be evaluated and documented for all alternatives, including those using nonstructural approaches. The residual risks to public health and safety associated with each of the water investment alternatives should be described, quantified if possible, and documented.
Environmental Justice	An objective of the PR&G investment evaluation process is the fair treatment of all people including meaningful involvement in the public comment process. Any disproportionate impact to minority, Tribal, and low-income populations should be avoided. In implementing the PR&G, agencies should seek solutions that would eliminate or avoid disproportionate adverse effects on these communities. For watershed investments, particular attention should be focused to downstream areas. The study area may need to be reexamined to include the concerns of affected communities downstream of the immediate investment area. The PR&G process should document efforts to include the above-mentioned populations in the planning process. The PR&G process must be in compliance with Executive Order 12898 of February 11, 1994 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations). Applications of the PR&G process in USDA agencies must be in compliance with USDA DR 5600-002 (Environmental Justice).

Watershed Approach	A watershed approach must be used when completing a PR&G analysis. This approach recognizes that there may be upstream and downstream impacts of a water resources activity that may be outside of the applicable political or administrative boundaries. A watershed approach is not necessarily limited to analyzing impacts within a specific hydrologic unit. Rather, it is broad, systems- based framework that explicitly recognizes the interconnectedness within and among physical, ecological, economic, and social/cultural systems. A watershed approach enables examination of multiple objectives, facilitates the framing of water resources problems, incorporates a broad range of stakeholders, and allows for identification of interdependence of problems and potential solutions. In many instances, a specific hydrologic unit may be the appropriate scale to examine alternatives to address water resources problems and opportunities. In this case, the watershed would become the study area. In other cases, environmental, economic, or social conditions may merit a study area that is combination of various hydrologic units or other geographic groupings. Ideally, the area of analysis should represent a geographical area large enough to ensure plans address cause and effect relationships among affected resources, stakeholders, and investment options, both upstream and downstream of an investment site. The watershed approach also establishes the framework to examine cumulative effects and the interaction of a potential Federal investment with other water resources projects and programs. When considering the impact of Federal investments against some economic and ecological measures, the analysis may need to be expanded to include regional markets and habitat considerations beyond the initial study area (e.g., beyond the immediate hydrologic unit).

E.10 Consultation Letters

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Bend Field Office
63095 Deschutes Market Road
Bend, Oregon 97701
Phone: (541) 383-7146 FAX: (541) 383-7638

Reply To: 01EOFW00-2020-CPA-0005
File Name: 2019_OchocoID_scoping_FWS_comments.pdf
TS Number: 20-16
TAILS: 01EOFW00-2020-CPA-0005
Doc Type: Final

October 18, 2019

Attn: Ochoco Watershed Plan
Farmers Conservation Alliance
102 State Street
Hood River, Oregon 97031

Subject: Comments on the National Environmental Policy Act scoping process for the Ochoco Irrigation District Infrastructure Modernization Project

Dear Ms. Hoffman,

Thank you for the opportunity to provide recommendations and input during your National Environmental Policy Act (NEPA) scoping process for the Ochoco Irrigation Modernization Project (Project). The US Fish and Wildlife Service (Service) supports piping the canals and laterals and is eager to see the resulting conserved water returned to Ochoco and McKay creeks and the Crooked River.

The Service has been leading a large-scale conservation planning effort for water management that benefits threatened and endangered species in the Deschutes River Basin in Central Oregon. The goal of this planning effort is to develop an Endangered Species Act (ESA) Habitat Conservation Plan (HCP) under section 10(a)(1)(B) of the ESA that provides non-Federal parties the opportunity to conserve the ecosystems upon which listed species depend, ultimately contributing to their recovery. The Deschutes Basin HCP (DBHCP) has been in development for several years and includes eight Central Oregon irrigation districts (constituting the Deschutes Basin Board of Control) and the City of Prineville (collectively the Applicants). The Applicants' goal is to complete the planning process in 2020. Currently, a Draft HCP and a Draft Environmental Impact Statement (EIS) are out for public review.

The goal of the DBHCP is to manage water in the Deschutes River Basin in a manner that addresses the long-term certainty for water users but provides the necessary water for species covered by the plan. Species covered by the DBHCP include Oregon spotted frog (*Rana pretiosa*), bull trout (*Salvelinus confluentus*), and steelhead (*Oncorhynchus mykiss*), sockeye salmon (*Oncorhynchus nerka*) and spring Chinook salmon (*Oncorhynchus tshawytscha*). One of the various tools available for the Applicants' conservation approach is to modernize their existing irrigation infrastructure and return the conserved water instream to support the

conservation of the covered species. The Deschutes Basin HCP does not prescribe which conservation tool the Applicants must use; instead, it is designed to set a series of flow milestones in the future that the Applicants must meet using all available tools.

Currently, low flows in the Deschutes River Basin result in myriad impacts on fish and wildlife resources. Water management that alters water levels has reduced habitat suitability, and increased flows are necessary to meet the life history demands of the covered species and other species of conservation concern such as the inland Columbia Basin redband trout (*Oncorhynchus mykiss gairdneri*). Further, low flows impact water quality by increasing temperature and decreasing dissolved oxygen. Less than optimal water quality often contributes to the spread and extent of invasive aquatic species (plants and wildlife), and these problems interact synergistically to degrade wildlife habitat within and around the Ochoco and McKay creeks and the Crooked River. Higher flows and subsequent cooler water temperatures enable optimal growth for young salmonid fry. Restoring hydrographs in these systems helps address limiting factors for the covered species, including low flow, altered hydrology, high water temperature, and impaired fish passage. The Service is providing you with the following comments in the context and spirit of our mutual ongoing efforts and responsibilities to conserve listed and unlisted species.

The proposed plan aligns with the DBHCP and the Crooked River Collaborative Water Security and Jobs Act of 2014 (HR 2640), and the Service supports the Districts and NRCS' efforts to reduce losses via water conveyance and returning those flows instream to benefit fish, wildlife, and their habitats. Since the conservation need is high, the Service supports the use of all tools available for conservation. We recommended considering an approach that allows for the greatest flexibility over time to conserve water and return it to Ochoco and McKay creeks and the Crooked River. Given the long-term nature of the Project and the high conservation need, we suggest using a more integrated approach. While the Service wants to see the piping commence, the funding opportunity that PL 83-566 provides may also be used to achieve conservation through the use of other tools. If needed, the Service is happy to provide more substantive feedback about specific conservation tools that would complement the Project.

Again, the Service is supportive of piping canals and laterals and appreciates NRCS' endeavors to facilitate those efforts through PL 83-566. We want to ensure that all tools remain available to achieve the significant conservation gains we need to see in Ochoco and McKay creeks and the Crooked River.

We look forward to coordinating with you throughout the scoping process and during the development of the EA. We will provide input as needed during the formulation of your final document. If you have any questions or if we can be of any assistance, please contact Emily Weidner or me at 541-383-7146.

Sincerely,

Bridget Moran
Field Supervisor

Oregon
Kate Brown, Governor

Department of Fish and Wildlife
Prineville Field Office
High Desert Region
2042 SE Paulina Hwy.
Prineville, OR 97754
(541) 447-5111
FAX (541) 447-8065
www.dfw.state.or.us

October 18, 2019

Ochoco Irrigation District (OID)
1001 NW Deer St.
Prineville, OR 97754

Re: Scoping comment letter for OID Infrastructure Modernization Project

Dear Ochoco Irrigation District,

The Oregon Department of Fish and Wildlife (ODFW) appreciates the opportunity to comment on the proposed infrastructure modernization project. ODFW supports OID in this opportunity to improve water conservation, water delivery reliability, and public safety; there will be benefits to fish and wildlife habitat by restoring streamflow and improving water quality. ODFW offers the following suggestions for consideration during the project's NEPA review.

Conserved water from federal or state financed projects not subject to repayment can be converted to an in-stream water right under Oregon Revised Statute 537.470 (3). Flows can be converted in a percentage equal to the percentage of public funds used to finance the conservation measures if more than 25 percent of the funds come from public sources. ODFW recommends the maximum amount of conserved water allowable be converted instream to the uncontracted storage account in Prineville Reservoir. Conserved flows will support the conservation of native and reintroduced anadromous fishes below Bowman Dam.

Infrastructure improvements such as piping canals and installing measurement devices will allow OID to deliver water more efficiently and accurately, reducing the amount of tailwater and returning flows to public waterbodies. This will lead to improved water quality in public waterbodies and improved habitat for aquatic species. ODFW would also encourage OID to coordinate with ODFW and a restoration partner to develop wetlands to treat tailwater and returning flows to public waterbodies. There should not be any additional financial cost to OID as this project should serve as the required match for grant funding.

ODFW also reminds OID that changes to in-stream infrastructure may trigger state fish passage and screening requirements. This project may also provide an opportunity to identify and address currently unscreened diversions. Our staff are available to help assess these needs.

ODFW supports OID's infrastructure modernization project and appreciates their willingness to implement projects that restore streamflow and improve aquatic habitat in public waterbodies. We look forward to working with them on the successful implementation of this project.

Sincerely,

Tim Porter
Assistant District Fish Biologist

CC: Mike Harrington and Brett Hodgson

USDA
United States Department of Agriculture

Natural Resources Conservation Service

1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

Dennis Teitzel, District manager
Bureau of Land Management
Prineville District Office
3050 NE 3rd Street
Prineville, OR 97754

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Mr. Teitzel,

Embedded in this letter is a website link to the copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

The purpose of this project is to improve irrigation water management and delivery, reduce district operations and maintenance costs, improve public safety, and enhance streamflow in portions of McKay Creek and the Crooked River by replacing 10.1 miles of District-operated canals with 9.2 miles of buried pipelines, installing a new pipeline along McKay Creek, and completing associated improvements such as pump station installations and canal bank raises.

We are requesting that you review this project in accordance with section 102(2)(C) of the National Environmental Protection Policy Act of 1969 (Public Law 91-190). We request that comments be received by this office on or before September 30, 2020. If your comments are not received by the due date, we will assume you do not wish to comment.

The Draft Plan-EA is available for public review and comment. Copies may be obtained by contacting Gary Diridoni, Assistant State Conservationist-Watershed Resource Planning, USDA, NRCS, 1201 NE Lloyd Blvd, Suite 900, Portland, Oregon, 97232, phone 503-414-3092 or gary.diridoni@usda.gov. An electronic version has been made available for viewing and downloading at Oregon Watershed Plans web page, found at https://oregonwatershedplans.org. NRCS

will consider all comments received and will respond to those received by September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 16, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS

USDA
United States Department of Agriculture

Natural Resources Conservation Service

1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

Christine Curran
Deputy State Historic Preservation Officer
Parks and Recreation Department
State Historic Preservation Office
725 Summer Street, NE, Suite C
Salem, Oregon 97301-1226

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Ms. Curran,

A copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR has been provided for your review, utilizing the Go Digital submittal process. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

The purpose of this project is to improve irrigation water management and delivery, reduce district operations and maintenance costs, improve public safety, and enhance streamflow in portions of McKay Creek and the Crooked River by replacing 10.1 miles of District-operated canals with 9.2 miles of buried pipelines, installing a new pipeline along McKay Creek, and completing associated improvements such as pump station installations and canal bank raises.

The Draft Watershed Plan does not address the agency's responsibilities for Section 106 of the National Historic Preservation Act (NHPA). As funding for project groups is allocated, consultation on the canals, laterals, pump stations, and all associated structures will be addressed, in fulfillment of Section 106 of the NHPA.

We are requesting that you review this project in accordance with section 102(2)(C) of the National Environmental Protection Policy Act of 1969 (Public Law 91-190). We request that comments be received by this office on or before September 30, 2020. If your comments are not received by the due date, we will assume you do not wish to comment.

2

The Draft Plan-EA is available for public review and comment. Copies may be obtained by contacting Gary Diridoni, Assistant State Conservationist-Watershed Resource Planning, USDA, NRCS, 1201 NE Lloyd Blvd, Suite 900, Portland, Oregon, 97232, phone 503-414-3092 or gary.diridoni@usda.gov. An electronic version has been made available for viewing and downloading at Oregon Watershed Plans web page, found at https://oregonwatershedplans.org. NRCS will consider all comments received and will respond to those received by September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 16, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Ecc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS
Rachael Gebauer, Cultural Resources Specialist/ Archaeologist, NRCS
Michael Petrozza, Archaeologist, NRCS
Dr. Dennis Griffin, State Archaeologist, OR State Historic Preservation Office
John Pouley, Assistant State Archaeologist, OR State Historic Preservation Office
Ian Johnson, Associate Deputy State Historic Preservation Officer OR State Historic Preservation Office

USDA
United States Department of Agriculture

Natural Resources Conservation Service

1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

Mr. Eric King, City Manager
City of Bend
710 NW Wall St.
Bend, OR 97703

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Mr. King,

Embedded in this letter is a website link to the copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

The purpose of this project is to improve irrigation water management and delivery, reduce district operations and maintenance costs, improve public safety, and enhance streamflow in portions of McKay Creek and the Crooked River by replacing 10.1 miles of District-operated canals with 9.2 miles of buried pipelines, installing a new pipeline along McKay Creek, and completing associated improvements such as pump station installations and canal bank raises.

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will consider all comments received and will respond to those received by September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 30, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS

USDA
United States Department of Agriculture

Natural Resources Conservation Service

1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

Mr. Steve Forrester, City Manager
City of Prineville
387 NE Third St.
Prineville, OR 97754

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Mr. Forrester,

Embedded in this letter is a website link to the copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

The purpose of this project is to improve irrigation water management and delivery, reduce district operations and maintenance costs, improve public safety, and enhance streamflow in portions of McKay Creek and the Crooked River by replacing 10.1 miles of District-operated canals with 9.2 miles of buried pipelines, installing a new pipeline along McKay Creek, and completing associated improvements such as pump station installations and canal bank raises.

We are requesting that you review this project in accordance with section 102(2)(C) of the National Environmental Protection Policy Act of 1969 (Public Law 91-190). We request that comments be received by this office on or before September 30, 2020. If your comments are not received by the due date, we will assume you do not wish to comment.

The Draft Plan-EA is available for public review and comment. Copies may be obtained by contacting Gary Diridoni, Assistant State Conservationist-Watershed Resource Planning, USDA, NRCS, 1201 NE Lloyd Blvd, Suite 900,Portland, Oregon, 97232, phone 503-414-3092 or gary.diridoni@usda.gov. An electronic version has been made available for viewing and downloading at Oregon Watershed Plans web page, found at https://oregonwatershedplans.org. NRCS will consider all comments received and will respond to those received by

September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 16, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS

USDA
United States Department of Agriculture

Natural Resources Conservation Service

1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

Mr. Keith Witcosky, City Manager
City of Redmond
411 SW 9th St.
Redmond, OR 97756

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Mr. Witcosky,

Embedded in this letter is a website link to the copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

The purpose of this project is to improve irrigation water management and delivery, reduce district operations and maintenance costs, improve public safety, and enhance streamflow in portions of McKay Creek and the Crooked River by replacing 10.1 miles of District-operated canals with 9.2 miles of buried pipelines, installing a new pipeline along McKay Creek, and completing associated improvements such as pump station installations and canal bank raises.

We are requesting that you review this project in accordance with section 102(2)(C) of the National Environmental Protection Policy Act of 1969 (Public Law 91-190). We request that comments be received by this office on or before September 30, 2020. If your comments are not received by the due date, we will assume you do not wish to comment.

The Draft Plan-EA is available for public review and comment. Copies may be obtained by contacting Gary Diridoni, Assistant State Conservationist-Watershed Resource Planning, USDA, NRCS, 1201 NE Lloyd Blvd, Suite 900, Portland, Oregon, 97232, phone 503-414-3092 or gary.diridoni@usda.gov. An electronic version has been made available for viewing and downloading at Oregon Watershed Plans web page, found at https://oregonwatershedplans.org. NRCS will consider all comments received and will respond to those received by

September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 30, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS

USDA
United States Department of Agriculture

Natural Resources Conservation Service
1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

The Honorable Jeff Merkley
United States Senator
131 NW Hawthorne Avenue, Suite 208
Bend, OR 97703

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Senator Merkley,

Embedded in this letter is a website link to the copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

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We are requesting that you review this project in accordance with section 102(2)(C) of the National Environmental Protection Policy Act of 1969 (Public Law 91-190). We request that comments be received by this office on or before September 30, 2020. If your comments are not received by the due date, we will assume you do not wish to comment.

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consider all comments received and will respond to those received by September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 16, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS
BJ Westlund, Central Oregon Field Representative, Office of US Senator Jeff Merkley (D-OR)

USDA
United States Department of Agriculture

Natural Resources Conservation Service
1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

The Honorable Ron Wyden
United States Senator
911 NE 11th Avenue, Suite 630
Portland, OR 97232

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Senator Wyden,

Embedded in this letter is a website link to the copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

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consider all comments received and will respond to those received by September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 16, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS
Jacob Egler, Special Projects Coordinator, Office of US Senator Ron Wyden (D-OR)

USDA
United States Department of Agriculture

Natural Resources Conservation Service

1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

Mr. Jerry Brummer, County Commissioner
Crook County Courthouse
300 NE 3rd St, Rm. 10
Prineville, OR 97754

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Mr. Brummer,

Embedded in this letter is a website link to the copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

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September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 16, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS

USDA
United States Department of Agriculture

Natural Resources Conservation Service

1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

Robert Brunoe
General Manager Branch of Natural Resources
The Confederated Tribes of the Warm Springs Reservation
P.O. Box C
Warm Springs, OR 97761

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Mr. Brunoe,

Embedded in this letter is a website link to the copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

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September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 16, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS

USDA
United States Department of Agriculture

Natural Resources Conservation Service

1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

Mr. Phil Henderson, County Commissioner Chair
Board of County Commissioners
1300 NW Wall, Suite 200
Bend, OR 97703

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Mr. Henderson,

Embedded in this letter is a website link to the copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

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We are requesting that you review this project in accordance with section 102(2)(C) of the National Environmental Protection Policy Act of 1969 (Public Law 91-190). We request that comments be received by this office on or before September 30, 2020. If your comments are not received by the due date, we will assume you do not wish to comment.

The Draft Plan-EA is available for public review and comment. Copies may be obtained by contacting Gary Diridoni, Assistant State Conservationist-Watershed Resource Planning, USDA, NRCS, 1201 NE Lloyd Blvd, Suite 900, Portland, Oregon, 97232, phone 503-414-3092 or gary.diridoni@usda.gov. An electronic version has been made available for viewing and downloading at Oregon Watershed Plans web page, found at https://oregonwatershedplans.org. NRCS will consider all comments received and will respond to those received by

September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 16, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS

USDA
United States Department of Agriculture

Natural Resources Conservation Service

1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

Paul Henson, PhD
State Supervisor, Oregon Fish and Wildlife Office
U.S. Fish and Wildlife Service
2600 SE 98th Avenue
Portland, OR 97266

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Mr. Henson,

Embedded in this letter is a website link to the copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

The purpose of this project is to improve irrigation water management and delivery, reduce district operations and maintenance costs, improve public safety, and enhance streamflow in portions of McKay Creek and the Crooked River by replacing 10.1 miles of District-operated canals with 9.2 miles of buried pipelines, installing a new pipeline along McKay Creek, and completing associated improvements such as pump station installations and canal bank raises.

This project is not covered by the consultation provisions of the Fish and Wildlife Coordination Act of 1934, as amended (FWCA). However, consultation is required under Section 12 of P.L.83-566, which was added to P.L.83-566 by the 1958 amendments to the FWCA. Section 12 was added in recognition of the need for evaluation of fish and wildlife resources impacts and opportunities at P.L.83-566 projects in a manner similar to that required for other construction projects under the FWCA.

Section 12 provides that, in preparing project plans, the Department of Agriculture must consult with the Fish and Wildlife Service (FWS) regarding the conservation and development of fish and wildlife resources and provide the FWS with the opportunity to participate in project planning. The FWS is to be afforded the opportunity to make surveys and investigations and prepare reports with recommendations on the conservation and development of fish and wildlife. The Department of Agriculture must give full consideration to the recommendations contained in FWS reports and include features that are determined to be feasible and that are acceptable to the Department and the local project sponsor. FWS reports are to be included in project reports prepared by the Department of Agriculture. No funds are provided by the Department of

Agriculture for FWS involvement in P.L.83-566 projects; funds for such work must come from those appropriated for FWS work in project planning.

This letter is being submitted to request consultation under the provisions of Section 12 of P.L.83-566 which provides for consultation similar to that required under the FWCA. This letter also is being submitted to request that you review this project in accordance with section 102(2)(C) of the National Environmental Protection Policy Act of 1969 (Public Law 91-190). We request that comments be received by this office on or before September 30, 2020. If your comments are not received by the due date, we will assume you do not wish to comment.

The Draft Plan-EA is available for public review and comment. Copies may be obtained by contacting Gary Diridoni, Assistant State Conservationist-Watershed Resource Planning, USDA, NRCS, 1201 NE Lloyd Blvd, Suite 900, Portland, Oregon, 97232, phone 503-414-3092 or gary.diridoni@usda.gov. An electronic version has been made available for viewing and downloading at Oregon Watershed Plans web page, found at https://oregonwatershedplans.org. NRCS will consider all comments received and will respond to those received by September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 16, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS

USDA
United States Department of Agriculture

Natural Resources Conservation Service

1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

Leah Horner
Regional Solutions Director
State of Oregon
Office of the Governor Katherine Brown
900 Court Street NE, Suite 254
Salem, OR 97301-4047

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Ms. Horner,

In accordance with Section 2 of Executive Order 10913, and our responsibility as assigned by the Secretary of Agriculture, we are transmitting for your review and comment the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, Crook County, OR.

Embedded in this letter is a website link to the copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190). The application for assistance in the preparation of the Draft Plan-EA was approved by NRCS on July 1, 2019.

The purpose of this project is to improve irrigation water management and delivery, reduce district operations and maintenance costs, improve public safety, and enhance streamflow in portions of McKay Creek and the Crooked River by replacing 10.1 miles of District-operated canals with 9.2 miles of buried pipelines, installing a new pipeline along McKay Creek, and completing associated improvements such as pump station installations and canal bank raises.

We are requesting that you review this project in accordance with section 102(2)(C) of the National Environmental Protection Policy Act of 1969 (Public Law 91-190). We request that comments be received by this office on or before September 30, 2020. If your comments are not received by the due date, we will assume you do not wish to comment.

The Draft Plan-EA is available for public review and comment. Copies may be obtained by contacting Gary Diridoni, Assistant State Conservationist-Watershed Resource Planning, USDA, NRCS, 1201 NE Lloyd Blvd, Suite 900 Portland, Oregon, 97232, phone 503-414-3092 or gary.diridoni@usda.gov. An electronic version has been made

available for viewing and downloading at Oregon Watershed Plans web page, found at https://oregonwatershedplans.org. NRCS will consider all comments received and will respond to those received by September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 16, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS
Lauri Aunan, Natural Resources Policy Advisor, Office of the Governor Katherine Brown
Jason Miner, Natural Resources Policy Advisor, Office of the Governor Katherine Brown
Chris Cummings, Interim Director, Business Oregon
Alexis Taylor, Director, Oregon Department of Agriculture (ODA)
Richard Whitman, Director, Oregon Department of Environmental Quality (ODEQ)
Curt Melcher, Director, Oregon Department of Fish and Wildlife (ODFW)
Vicki Walker, Director, Oregon Department of State Lands (ODSL)
Tom Byler, Director, Oregon Water Resources Department (OWRD)
Meta Loftsgaarden, Executive Director, Oregon Watershed Enhancement Board (OWEB)

USDA
United States Department of Agriculture

Natural Resources Conservation Service

1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

Ms. Mae Huston, County Commissioner Chair
Board of County Commissioners
66 SE D Street Suite A
Madras, Oregon 97741

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Ms. Huston,

Embedded in this letter is a website link to the copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

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We are requesting that you review this project in accordance with section 102(2)(C) of the National Environmental Protection Policy Act of 1969 (Public Law 91-190). We request that comments be received by this office on or before September 30, 2020. If your comments are not received by the due date, we will assume you do not wish to comment.

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September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 16, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS

USDA
United States Department of Agriculture

Natural Resources Conservation Service
1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

The Honorable Greg Walden
United States House of Representatives
1051 NW Bond Street, Suite 400
Bend, OR 97701

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Representative Walden,

Embedded in this letter is a website link to the copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

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We are requesting that you review this project in accordance with section 102(2)(C) of the National Environmental Protection Policy Act of 1969 (Public Law 91-190). We request that comments be received by this office on or before September 30, 2020. If your comments are not received by the due date, we will assume you do not wish to comment.

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consider all comments received and will respond to those received by September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 16, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS
Nick Strader, Legislative Assistant, Office of US Congressman Greg Walden (R-OR, Second District)

USDA
United States Department of Agriculture

Natural Resources Conservation Service

1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

Colonel Michael Helton
US Army Corps of Engineers Portland District
P.O. Box 2946
Portland, Oregon 97208-2946

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Colonel Helton,

A copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR has been uploaded to your FTP site (AMRDEC) located at https://safe.amrdec.army.mil/safe/ for review. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Central Oregon Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

The purpose of this project is to improve irrigation water management and delivery, reduce district operations and maintenance costs, improve public safety, and enhance streamflow in portions of McKay Creek and the Crooked River by replacing 10.1 miles of District-operated canals with 9.2 miles of buried pipelines, installing a new pipeline along McKay Creek, and completing associated improvements such as pump station installations and canal bank raises.

We are requesting that you review this project in accordance with section 102(2)(C) of the National Environmental Protection Policy Act of 1969 (Public Law 91-190). We request that comments be received by this office on or before September 30, 2020. If your comments are not received by the due date, we will assume you do not wish to comment.

The proposed action under consideration meets the irrigation exemption under USACE's Regulatory Guidance Letter No. 07-02, Exemption for Construction or Maintenance of Irrigation Ditches and Maintenance of Drainage under Section 404 Part 323.4(a)(3) of the CWA. Additional coordination and consultation with USACE, as applicable, will occur during the project group planning stage to ensure the applicability of CWA permitting requirements, exemption criteria, or to determine if additional CWA compliance and permitting is required.

The Draft Plan-EA is available for public review and comment. Copies may be obtained by contacting Gary Diridoni, Assistant State Conservationist-Watershed Resource Planning, USDA, NRCS, 1201 NE Lloyd Blvd, Suite 900, Portland, Oregon, 97232,

phone 503-414-3092 or gary.diridoni@usda.gov. An electronic version has been made available for viewing and downloading at Oregon Watershed Plans web page, found at https://oregonwatershedplans.org. NRCS will consider all comments received and will respond to those received by September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 16, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS
Andrea Wagner, Regulatory Project Manager/Biologist, USACE

USDA
United States Department of Agriculture

Natural Resources Conservation Service

1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

September 3, 2020

Gregg Garnett, Field Office Manager
U.S. Bureau of Reclamation
Bend Field Office
1375 SE Wilson Ave, Suite 100
Bend, OR 97702-1435

Subject: Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan–Environmental Assessment

Dear Mr. Garnett,

Embedded in this letter is a website link to the copy of the Draft Watershed Plan–Environmental Assessment (Draft Plan-EA) for the Ochoco Irrigation District Infrastructure Modernization Project, located in Crook County, OR. Farmers Conservation Alliance prepared this Draft Plan-EA for the United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Ochoco Irrigation District, as the project sponsor. This plan was prepared under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566) and in accordance with section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190).

The purpose of this project is to improve irrigation water management and delivery, reduce district operations and maintenance costs, improve public safety, and enhance streamflow in portions of McKay Creek and the Crooked River by replacing 10.1 miles of District-operated canals with 9.2 miles of buried pipelines, installing a new pipeline along McKay Creek, and completing associated improvements such as pump station installations and canal bank raises.

We are requesting that you review this project in accordance with section 102(2)(C) of the National Environmental Protection Policy Act of 1969 (Public Law 91-190). We request that comments be received by this office on or before September 30, 2020. If your comments are not received by the due date, we will assume you do not wish to comment.

The Draft Plan-EA is available for public review and comment. Copies may be obtained by contacting Gary Diridoni, Assistant State Conservationist-Watershed Resource Planning, USDA, NRCS, 1201 NE Lloyd Blvd, Suite 900, Portland, Oregon, 97232, phone 503-414-3092 or gary.diridoni@usda.gov. An electronic version has been made available for viewing and downloading at Oregon Watershed Plans web page, found at https://oregonwatershedplans.org. NRCS

will consider all comments received and will respond to those received by September 30, 2020. Comments received will be made available for public inspection.

Sincerely,

JASON JEANS
Acting State Conservationist

Enclosure:
Notice of Availability of Draft Watershed Plan-Environmental Assessment and Public Meeting on Wednesday, September 16, 2020 for Ochoco Irrigation District Infrastructure Modernization Project

Cc: Gary Diridoni, ASTC- Watershed Resources and Planning, NRCS

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT
P.O. BOX 2946
PORTLAND, OR 97208-2946

15 October 2020

Mr. Jason Jeans
Acting State Conservationist
U.S. Department of Agriculture
Natural Resources Conservation Service
1201 NE Lloyd Boulevard, Suite 900
Portland, Oregon 97232
jason.jeans@usda.gov

Dear Mr. Jeans:

The U.S. Army Corps of Engineers (Corps) has received your request to review and comment on the draft watershed plan environmental assessment (Draft Plan EA) for the Ochoco Irrigation District Infrastructure Modernization Project (Project) located in Crook County, Oregon. The Draft Plan-EA identifies multiple activities within several Lower Crooked River sub-watersheds proposed to be implemented in 2021 and completed over several years.

We have reviewed the Draft Plan EA pursuant to Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act (RHA). Under Section 404 of the CWA, the Corps regulates the discharge of dredge or fill material into waters of the United States. Under Section 10 of the RHA, the Corps regulates work in or affecting navigable or historically navigable waters of the United States.

The Crooked River and its tributaries are not regulated under Section 10 of the RHA; therefore, based on the maps included in the Draft Plan-EA, it appears a Section 10 Department of the Army (DA) permit would not be required for the Project.

Section 404 of the CWA, 33 U.S.C. § 1344, prohibits discharges of dredged or fill material into waters of the United States, including wetlands, unless the work has been authorized by a DA permit or has been determined by the Corps to be exempt from regulation under Section 404. The Navigable Waters Protection Rule (NWPR) defines the limits of jurisdictional waters. The NWPR became final on June 22, 2020. The Draft Plan EA states that coordination with the Corps would occur prior to implementation of each site-specific project to ensure the proper authorizations are obtained. However, to assist in project planning and to minimize impacts to jurisdictional water the following three paragraphs discuss NWPR elements and exemptions that may apply to the Project.

Corps regulations at 33 CFR 323.4(a)(3) define exempt activities, activities not requiring a permit, as the construction or maintenance of farm or stock ponds or irrigation ditches or the maintenance (but not the construction) of a drainage ditch. Discharges associated with siphons, pumps, headgates, wingwalls, weirs and diversion structures and other facilities appurtenant and functionally relating to irrigation ditches are included in this exemption. The enclosed Army & EPA Joint Memo - Exempt Construction or Maintenance of Irrigation Ditches and Exempt Maintenance of Drainage Ditches (Memo) dated July 24, 2020, supersedes RGL 07-02. The Memo provides a framework for determining the applicability of the ditch exemptions and the "recapture provision." In Section IV (e) Step 5, the Memo discusses the two parts which must be met to "recapture" an activity, which brings the activity into the scope of regulation under CWA Section 404, such that a permit would be required. The rule and subsequent guidance make clear piping of a jurisdictional water would generally require a permit under Section 404.

The NWPR defines a tributary as a naturally occurring surface water channel that contributes surface water flow to the territorial sea or to waters which currently are used, were used, or may be susceptible to use in interstate or foreign commerce (including waters subject to the ebb and flow of the tide). A tributary would not lose its jurisdictional status if it contributes surface water flow to downstream jurisdictional water in a typical year through a channelized, non-jurisdictional surface water feature, a culvert, dam, tunnel or similar artificial feature, a debris pile or boulder field or through any other excluded feature under paragraph b of the NWPR (33 CFR 328.3(b)).

The term "tributary " would also apply to any ditch that has either relocated a tributary, is constructed in a tributary or is constructed in an adjacent wetland as long as the ditch is perennial or intermittent and contributes surface water flow to a Traditional Navigable Water (TNW) or territorial seas in a typical year. A ditch may also be considered an adjacent wetland where a ditch was constructed in an adjacent wetland that contributes less than perennial or intermittent flow to a territorial sea or traditional navigable water in a typical year and meets the definition of wetlands and adjacent wetlands of the NWPR.

In addition to potential Corps' Regulatory review for impacts to waters of the United States, the Corps must consider potential impacts to federally authorized projects. Section 14 of the Rivers and Harbors Act of 1899, codified in 33 U.S.C. § 408 (referred to as "Section 408"), authorizes the Secretary of the Army, on the recommendation of the Chief of Engineers, to grant permission for the alteration or occupation or use of a Corps federally authorized project if the Secretary determines that the activity will not be injurious to the public interest and will not impair the usefulness of the project. An alteration is defined as any action that builds upon, alters, improves, moves, occupies, or otherwise affects the usefulness, or the structural or ecological integrity of a Corps

federally authorized project. This Draft Plan-EA does not include sufficient information to determine if any activities would require permission under Section 408.

The Draft Plan EA states that coordination with the Corps would occur prior to implementation of each site-specific project to ensure the proposed action either meets exemption criteria or that proper authorizations are obtained. Where permits would be required, the Corps will consider the need for compensatory mitigation based on the 2008 Mitigation Rule (33 CFR part 332).

I encourage coordination with my staff regarding the applicability of the Corps jurisdiction and authority over non-exempt activities associated with your Project. If you have any questions, please contact Ms. Anita Andazola at the letterhead address, by telephone at (541) 465-6894, or email anita.m.andazola@usace.army.mil.

Sincerely,

Digitally signed by HELTON.MICHAEL.DON.1131216021
Date: 2020.10.14 17:56:32 -07'00'

Michael D. Helton, PMP
Colonel, Corps of Engineers,
District Commander

Enclosure

cc:
Natural Resources Conservation Service (Gary Diridoni, gary.diridoni@usda.gov)
Farmers Conservation Alliance (Amanda Schroeder, amanda.schroeder@fcasolutions.org)
Farmers Conservation Alliance (Kristin Alligood, kristen.alligood@fcasolutions.org
Corps of Engineers, Section 408 (Sally Bird-Gauvin, sally.a.bird-gauvin@usace.army.mil)
Corps of Engineers, Real Estate (Amanda Dethman, amanda.j.dethman@usace.army.mil)

**JOINT MEMORANDUM TO THE FIELD BETWEEN
THE U.S. DEPARTMENT OF THE ARMY, CORPS OF ENGINEERS AND
THE U.S. ENVIRONMENTAL PROTECTION AGENCY CONCERNING
EXEMPT CONSTRUCTION OR MAINTENANCE OF IRRIGATION DITCHES AND
EXEMPT MAINTENANCE OF DRAINAGE DITCHES UNDER
SECTION 404 OF THE CLEAN WATER ACT**

I. INTRODUCTION

The U.S. Army Corps of Engineers ("Corps") and the U.S. Environmental Protection Agency ("EPA") (together, "the agencies"), implement Section 404 of the Clean Water Act ("CWA").[1] Section 404 of the CWA regulates the discharge of dredged or fill material into the navigable waters, which the CWA defines as "waters of the United States, including the territorial seas." 33 U.S.C. 1344 and 1362. The agencies are signing this memorandum to provide a clear, consistent approach regarding the application of the exemptions from regulation under Section 404(f)(1)(C) of the CWA for the construction or maintenance of irrigation ditches and for the maintenance of drainage ditches ("ditch exemptions").

This memorandum supersedes previous Corps Regulatory Guidance Letter ("RGL") 07-02, which superseded RGL 87-07. In an effort to provide greater clarity, this memorandum defines the following terms for purposes of implementing the ditch exemptions: "irrigation ditch," "drainage ditch," "construction," and "maintenance." This memorandum also provides a framework for determining the applicability of the ditch exemptions and the "recapture provision" in CWA Section 404(f)(2).

The contents of this document do not have the force and effect of law and are not meant to bind the public in any way. This document is intended only to provide clarity to the public regarding existing requirements under the law or agency policies.

II. BACKGROUND

a. Under Section 404(f)(1)(C) of the CWA (*see also* 33 CFR 323.4(a)(3) and 40 CFR 232.3(c)(3)), discharges of dredged or fill material for the purpose of construction or maintenance of jurisdictional irrigation ditches, or the maintenance (but not construction) of jurisdictional drainage ditches, are not prohibited by or otherwise subject to regulation under Section 404 of the CWA (*i.e.,* these activities are exempt from the need to obtain a Section 404 permit).

[1] In a 1979 opinion, the U.S. Attorney General Benjamin R. Civiletti determined that EPA has the ultimate responsibility for interpreting the CWA Section 404(f) exemptions. *See* 43 Op. Att'y Gen. 197 (Sept. 5, 1979), https://www.epa.gov/cwa-404/1979-civiletti-memorandum-under-cwa-section-404f. Attorney General Civiletti stated that it is the EPA Administrator who has general responsibility under the Act (33 U.S.C. 1251(d)), and who has general authority to prescribe regulations (33 U.S.C. 1361(a)).

b. Section 404(f)(2) of the CWA states that "[a]ny discharge of dredged or fill material into the navigable waters incidental to any activity having as its purpose bringing an area of navigable waters into a use to which it was not previously subject, where the flow or circulation of navigable waters may be impaired or the reach of such waters be reduced, shall be required to have a permit under this section." This is commonly referred to as the "recapture provision"; see paragraph c of this section for the regulations implementing this provision.

c. Under 33 CFR 323.4(c) and 40 CFR 232.3(b), exemptions under 33 CFR 323.4(a)(1)-(6) and 40 CFR 232.3(c)(1)-(6) do not apply if the discharge into a water of the United States "is part of an activity whose purpose is to convert an area of the waters of the United States into a use to which it was not previously subject, where the flow or circulation of waters of the United States may be impaired or the reach of such waters reduced. Where the proposed discharge will result in significant discernable alterations to flow or circulation, the presumption is that flow or circulation may be impaired by such alteration."

III. DEFINITIONS

a. On April 21, 2020, the agencies promulgated a definition of the term "ditch," to mean "a constructed or excavated channel used to convey water." 85 FR 22250. The agencies believe that a clear definition of this term is useful in the context of the ditch exemptions independent of the regulatory text defining "waters of the United States," and therefore this same definition is hereby adopted for the purpose of this memorandum. However, when referred to in this memorandum, the term "ditch" specifically refers to irrigation and drainage ditches.

b. The agencies' regulations define "discharge of dredged material" and "discharge of fill material." *See* 33 CFR 323.2(d) and (f), and 40 CFR 232.2.

c. The agencies' regulations define "waters of the United States." *See* 33 CFR 328.3 and 40 CFR 120.2. It has been the agencies' longstanding practice that certain ditches generally are not considered waters of the United States. However, certain ditches may be a water of the United States, such as certain ditches constructed in or through a jurisdictional water, including a jurisdictional wetland.

d. For the purposes of this memorandum, "irrigation ditch" is defined as a ditch (as defined in paragraph III.a above) that either conveys water to an ultimate irrigation use or place of use ("irrigation water"), or that moves and/or conveys irrigation water (*e.g.*, "run-off" from irrigation) away from irrigated lands ("irrigation return flows").

e. For the purposes of this memorandum, "drainage ditch" is defined as a ditch (as defined in paragraph III.a above) where increasing drainage of a particular land area or infrastructure is at least part of the designed purpose. This includes the following ditch use categories: agricultural, transportation (*e.g.*, roadside, railroad), mosquito abatement, and stormwater management.

f. For the purposes of this memorandum, "related structure" is defined as a structure which is appurtenant to, and functionally related to, an irrigation ditch. Examples of such related structures include, but are not limited to: siphons, pipes, pumps or pump systems, grade control structures, headgates, wingwalls, weirs, diversion structures, and such other facilities. The key to whether a structure is a "related structure" and potentially covered by the irrigation ditch exemption is whether the structure affects the ability (*e.g.*, capacity, design velocities) of the ditch to convey water as designed.

g. For the purposes of this memorandum, "maintenance" is defined as the activity undertaken to preserve or restore the original designed purpose and approximate capacity of the original, as-built configuration of a ditch. Maintenance includes a repair to an existing structure or feature to keep the ditch in its existing state or proper condition, or to preserve it from failure or decline.

h. For the purposes of this memorandum, "construction" is defined as new work, or work that results in a relocation, an extension, or an expansion of an existing ditch and/or related structure. In general, the construction of an irrigation ditch must be intended to primarily serve an irrigation purpose in order for the construction activity to be exempt.

IV. GUIDANCE FOR APPLYING THE DITCH EXEMPTIONS

General Guidance. To determine whether one of the ditch exemptions applies, the following steps should be analyzed:

a. Step 1 is to determine whether the proposed activity will occur in waters of the United States. The agencies' regulations and associated preamble language, guidance documents, and technical manuals may be used to make this determination. If the proposed activity will not occur in waters of the United States, the proposed activity is not prohibited by nor regulated under Section 404 of the CWA.

b. Step 2 is to determine whether the proposed activity involves a discharge of dredged and/or fill material. As noted in paragraph III.b above, the agencies' regulations define these terms. If no discharge of dredged and/or fill material will occur, the proposed activity is not prohibited by nor regulated under Section 404 of the CWA.

c. Step 3 is to determine whether the proposed activity involves an "irrigation ditch" or a "drainage ditch" according to the definitions in Section III of this memorandum. The following clarifications may assist in making this determination:

- Irrigation Ditches:
    - Related structures, as defined in paragraph III.f above, are included in the scope of the irrigation ditch exemption.
    - If a ditch carries only irrigation water, irrigation return flows, and/or overland flow (precipitation and/or snowmelt) to and/or from an irrigated area, that ditch would be considered an irrigation ditch, not a drainage ditch.
    - A ditch that diverts water from a waterbody (*e.g.*, stream, lake, or reservoir) for irrigation purposes is an irrigation ditch and does not become a drainage ditch even if a substantial portion of the flow into or volume of the waterbody is diverted by the irrigation ditch.
- Drainage Ditches:
    - Where a ditch would have the effect of draining wetlands (other than wetlands established due to the presence of irrigation water), the ditch would be considered a drainage ditch, not an irrigation ditch, even if used for irrigation.

d. Step 4 is to determine whether the proposed activity is "maintenance," which is exempt for irrigation and drainage ditches, or "construction," which is exempt for irrigation ditches only.[2] The following clarifications may assist in making this determination:

[2] In many cases, accurate historical records are not available to determine the "as-built" specifications of the original ditch and/or related structures. In these cases, agency staff should work closely with the project proponent to establish an appropriate maintenance depth and/or reference an appropriate structure design to restore the ditch's original designed

- Maintenance (for both irrigation and drainage ditches):
    - Removal of material, including vegetation, from an existing ditch such as by dredging or recontouring in accordance with the historical design and purpose of the ditch, qualifies as maintenance. However, the ditch must not be deepened such that it would drain additional areas compared to the original design.
    - Minor changes to the cross-section of the ditch to conform with current engineering standards (*e.g.*, where more graduated side-slopes result in greater stability) qualify as maintenance, so long as those modifications of the ditch will not result in the drainage, degradation, or destruction of additional jurisdictional waters.
    - Replacement or repair of existing related structure(s) qualify as maintenance as long as the original purpose of the structure is not changed and original approximate capacity of the irrigation ditch or related structures are not increased. Activities related to structures that were not designed to contribute to the original purpose and capacity of the ditch are not covered by the maintenance portion of the irrigation ditch exemption or the drainage ditch exemption. There may, however, be circumstances where a drainage ditch includes associated structures which may be evaluated on a case-by-case basis as to whether the maintenance of such structures is exempt.
- Construction (for irrigation ditches only):
    - Relocation of existing ditches or tributaries, and converting existing ditches into pipes, qualifies as construction. However, these actions should be analyzed in Step 5, below, to determine whether they would be subject to the recapture provision.
- Maintenance (for irrigation and drainage ditches) and/or Construction (for irrigation ditches only) Depending on the Site-specific Circumstances:
    - Sidecasting, for purposes of this memorandum, is the casting of dredged or excavated material to the side of or near the ditch being constructed or maintained. Sidecasting of any dredged material for the purpose of construction or maintenance of jurisdictional irrigation ditches, or the maintenance (but not construction) of jurisdictional drainage ditches, into jurisdictional wetlands or other waters of the United States is exempt. However, these actions should be analyzed in Step 5, below, to determine whether the sidecasting would be subject to the recapture provision.
    - Armoring, lining, and/or piping repair activities qualify as maintenance only where a previously armored, lined, or piped section is being repaired and all work occurs within the footprint of the previous work. All new lining of ditches, where the ditch had not previously been lined, is considered construction.
    - Temporary discharges of fill material in waters of the United States that would be used to facilitate the completion of the exempt ditch maintenance and ditch construction activities described above, such as the placement of temporary cofferdams for erosion and sediment control purposes, are also exempt under Section 404(f)(1)(C) of the CWA, provided the temporary fills are not recaptured under Step 5, below, and provided the temporary fills are removed from waters of the United States in their entirety upon completion of the ditch maintenance or ditch construction activity.

purpose and approximate capacity, while meeting the spirit of the exemption and ensuring adequate protection of aquatic resources. In situations where the potential applicability of the exemption under CWA Section 404(f)(1)(C) to a proposed activity has been raised to the District, and where the District cannot make a determination due to a lack of pertinent factual information, the District should request additional documentation or supporting evidence from the project proponent or inform the proponent that the activity may not qualify for the exemption.

e. Step 5 is to determine applicability of the "recapture provision." CWA Section 404(f)(2) sets forth a two-part test, and both parts must be met to "recapture" an activity (*i.e.*, to bring the activity within the scope of regulation under CWA Section 404, such that a permit would be required).

Part 1: Is the discharge incidental to a proposed activity where the purpose of the activity is to convert an area of the waters of the United States into a use to which it was not previously subject? This is also known as the "change in use" test. The following clarifications may assist in making this determination:

- Construction of an irrigation ditch that cuts through (or across) a jurisdictional waterbody, including wetlands, may be a change in use of the waterbody because the footprint of the ditch and any structure(s) within the jurisdictional water(s) may convert that portion of the waterbody from a non-irrigation use to an irrigation use.
- Conversion of a jurisdictional wetland to a non-wetland is a change in use. However, the development of wetland characteristics in a ditch does not establish a new use for the ditch. The recapture provision would not apply to the maintenance activities of ditches which have developed wetland characteristics even if sediment and vegetation removal occurs to eliminate obstructions to flow.[3]
- Construction of dikes, drainage ditches, or other works or structures used to effect conversion of a wetland from silvicultural to agricultural use (such as by draining the wetland) is a change in use (33 CFR 323.4(c) and 40 CFR 232.3(b)).
- The fill of the former area of existing jurisdictional ditches or tributaries associated with relocation of such waters or converting existing jurisdictional ditches into pipes, is a change in use (*i.e.*, from jurisdictional waters to dry land or to non-jurisdictional waters).

Part 2: If Part 1 of the test is met, will the proposed activity impair the flow or circulation of waters of the United States or reduce the reach of such waters? This determination should be made on a case-by-case basis,[4] and the following clarifications may assist in making this determination:

- The agencies' regulations implementing CWA Section 404(f) (*i.e.*, 33 CFR 323.4(c) and 40 CFR 232.3(b)) specify that "(w)here the proposed discharge will result in significant discernible alterations to flow or circulation, the presumption is that flow or circulation may be impaired by such alteration." The project proponent should provide information to the agencies regarding why this presumption is not met if they request an exemption determination by the agencies.
- A discharge which elevates the bottom of waters of the United States without converting it to dry land does not thereby reduce the reach of, but may alter the flow or circulation of, waters of the United States (33 CFR 323.4(c) and 40 CFR 232.3(b)). An example of this could be "thin-spreading" dredged material into jurisdictional wetlands. Case-specific information should be considered to determine if such alterations to flow or circulation would rise to the level of impairment.

[3] In certain circumstances, the accumulation of sediment over time may be so extensive that the ditch is no longer capable of being used to convey water, or the intended purpose of the ditch as a drainage resource has been abandoned. The removal of sediment and vegetation in such cases may be considered construction instead of maintenance, depending on the factual circumstances, and may require a permit, assuming the feature is, or the activity at issue is performed in, an otherwise jurisdictional water. When accumulation of sediment or debris occurs in response to a flood, storm, hurricane or similar event or series of events, the maintenance designed to restore such ditches to their original capacity should fall within the scope of the CWA Section 404(f) permit exemption. The maintenance activities performed to restore the ditch, however, must not expand the ditch beyond the contours of the ditch that existed before the event or events occurred.

[4] Because the CWA Section 404(f)(1) exemption for maintenance of irrigation or drainage ditches applies only to maintenance activities that would maintain existing capacity and functionality (not to construction activities), it is unlikely that the recapture provision in CWA Section 404(f)(2) would apply to ditch maintenance activities as defined above.

- A proposed activity for the purpose of construction or maintenance of a ditch that has the effect of substantially increasing or decreasing water levels in a nearby jurisdictional wetland or other jurisdictional water would be an alteration of the flow and circulation of said water(s), and should be analyzed to determine whether that alteration rises to the level of impairment.
- Construction of an irrigation ditch which converts a jurisdictional ditch into a pipe is a change in use of waters of the United States, and by definition also a reduction in their reach, within the meaning of CWA Section 404(f)(2).
- Certain construction or maintenance activities in a ditch have the potential to sever the hydrologic connection of waters of the United States and/or to sever adjacency between a jurisdictional wetland and another water of the United States. Ditch maintenance or construction activities having such an effect would reduce the reach of waters of the United States, and therefore may meet the second part of the recapture provision test. However, if a project proponent is able to demonstrate that hydrologic connectivity is maintained between the waters that would otherwise be severed, such as through the use of a culvert, flood or tide gate, pump, or similar artificial feature, or through the intentional breaches of levees or similar features, the reach of waters of the United States may not be reduced by the activity, although it may result in an impairment of flow or circulation.

V. CONCLUSION

When an activity has been determined in the first four steps of Section IV above to involve discharges of dredged or fill material into waters of the United States, the discharges are for the purpose of construction or maintenance of irrigation ditches or the maintenance (but not construction) of drainage ditches, and the elements of the recapture provision are not satisfied, then the activity is exempt from regulation under Section 404 of the CWA.

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R.D. JAMES
Assistant Secretary of the Army
(Civil Works)

DAVID ROSS
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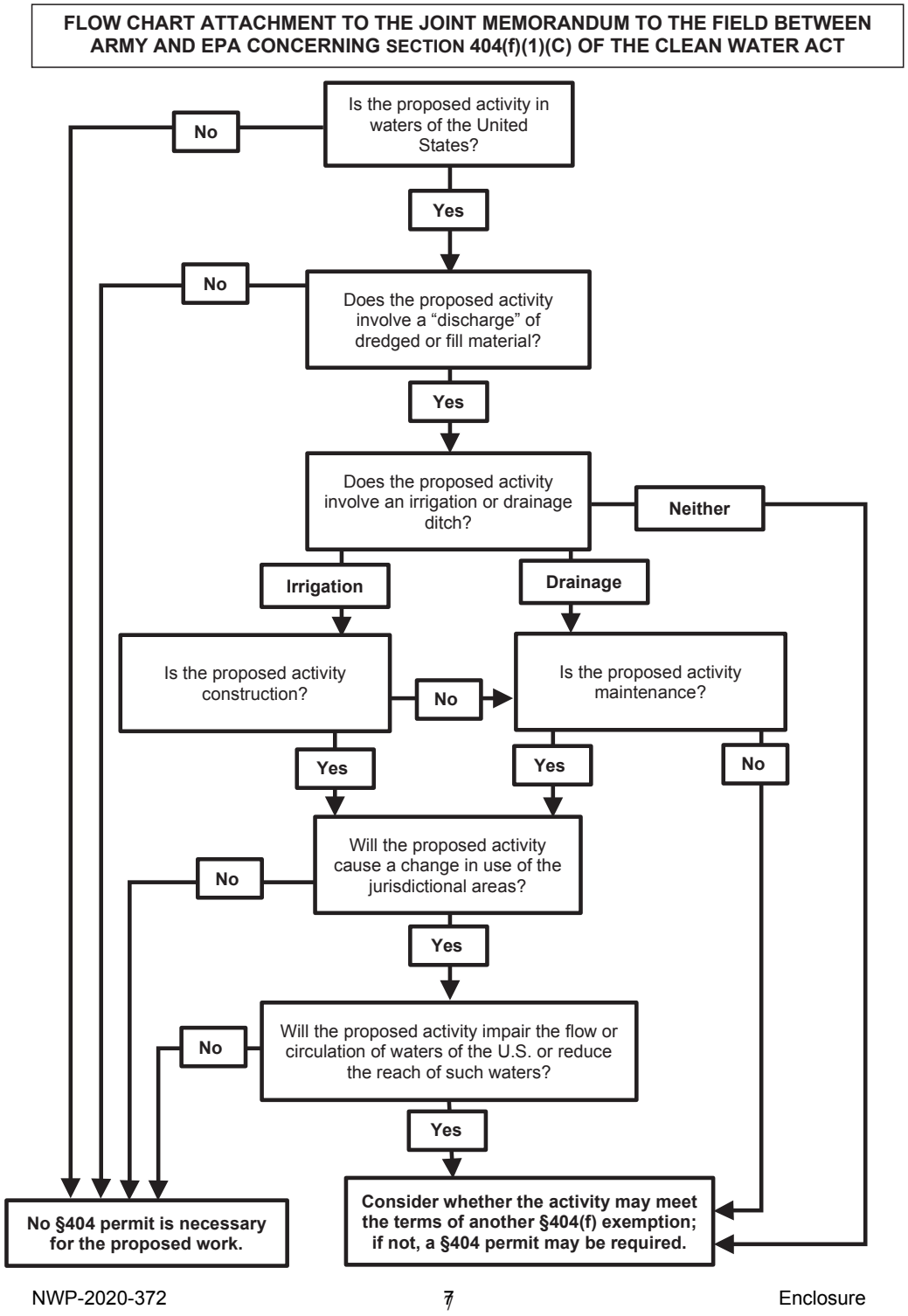
Date: 2020.07.24 16:39:41 -04'00'

DAVID P. ROSS
Assistant Administrator, Office of Water
Environmental Protection Agency


FLOW CHART ATTACHMENT TO THE JOINT MEMORANDUM TO THE FIELD BETWEEN ARMY AND EPA CONCERNING SECTION 404(f)(1)(C) OF THE CLEAN WATER ACT
Is the proposed activity in waters of the United States?
No
Yes
Does the proposed activity involve a "discharge" of dredged or fill material?
No
Yes
Does the proposed activity involve an irrigation or drainage ditch?
Neither
Irrigation
Drainage
Is the proposed activity construction?
No
Is the proposed activity maintenance?
Yes
Yes
No
Will the proposed activity cause a change in use of the jurisdictional areas?
No
Yes
Will the proposed activity impair the flow or circulation of waters of the U.S. or reduce the reach of such waters?
No
Yes
No §404 permit is necessary for the proposed work.
Consider whether the activity may meet the terms of another §404(f) exemption; if not, a §404 permit may be required.
NWP-2020-372
7
Enclosure

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Bend Field Office
63095 Deschutes Market Road
Bend, Oregon 97701

In Reply Refer to: 01EOFW00-2021-CPA-0001
FWS/R1

October 8, 2020

Attn: Ochoco Watershed Plan
Farmers Conservation Alliance
102 State Street
Hood River, Oregon 97031

Subject: Comments on the National Environmental Policy Act Draft Environmental Assessment for the Ochoco Irrigation District Infrastructure Modernization Project

Dear Ms. Hoffman,

Thank you for the opportunity to provide recommendations and input during your National Environmental Policy Act (NEPA) process for the Ochoco Irrigation Modernization Project (Project). The US Fish and Wildlife Service (Service) supports piping the canals and laterals and is eager to see the resulting conserved water returned to Ochoco and McKay creeks and the Crooked River.

The Service has been leading a large-scale conservation planning effort for water management that benefits threatened and endangered species in the Deschutes River Basin in Central Oregon. The goal of this planning effort is to develop an Endangered Species Act (ESA) Habitat Conservation Plan (HCP) under section 10(a)(1)(B) of the ESA that provides non-Federal parties the opportunity to conserve the ecosystems upon which listed species depend, ultimately contributing to their recovery. The Deschutes Basin HCP (DBHCP) has been in development for several years and includes eight Central Oregon irrigation districts (constituting the Deschutes Basin Board of Control) and the City of Prineville (collectively the Applicants). The Applicants' goal is to complete the planning process in 2020. Currently, a Draft HCP and a Draft Environmental Impact Statement (EIS) have undergone public review and the final documents are being prepared.

The goal of the DBHCP is to manage water in the Deschutes River Basin in a manner that addresses the long-term certainty for water users but provides the necessary water for species covered by the plan. Species covered by the DBHCP include Oregon spotted frog (*Rana pretiosa*), bull trout (*Salvelinus confluentus*), and steelhead (*Oncorhynchus mykiss*), sockeye

salmon (*Oncorhynchus nerka*) and spring Chinook salmon (*Oncorhynchus tshawytscha*). One of the various tools available for the Applicants' conservation approach is to modernize their existing irrigation infrastructure and return the conserved water instream to support the conservation of the covered species. The Deschutes Basin HCP does not prescribe which conservation tool the Applicants must use; instead, it is designed to set a series of flow milestones in the future that the Applicants must meet using all available tools.

Currently, low flows in the Deschutes River Basin result in myriad impacts on fish and wildlife resources. Water management that alters water levels has reduced habitat suitability, and increased flows are necessary to meet the life history demands of the covered species and other species of conservation concern such as the inland Columbia Basin redband trout (*Oncorhynchus mykiss gairdneri*). Further, low flows impact water quality by increasing temperature and decreasing dissolved oxygen. Less than optimal water quality often contributes to the spread and extent of invasive aquatic species (plants and wildlife), and these problems interact synergistically to degrade wildlife habitat within and around the Ochoco and McKay creeks and the Crooked River. Higher flows and subsequent cooler water temperatures enable optimal growth for young salmonid fry. Restoring hydrographs in these systems helps address limiting factors for the covered species, including low flow, altered hydrology, high water temperature, and impaired fish passage. The Service is providing you with the following comments in the context and spirit of our mutual ongoing efforts and responsibilities to conserve listed and unlisted species.

The proposed plan aligns with the DBHCP and the Crooked River Collaborative Water Security and Jobs Act of 2014 (HR 2640), and the Service supports the Districts and NRCS' efforts to reduce losses via water conveyance and returning those flows instream to benefit fish, wildlife, and their habitats. Since the conservation need is high, the Service supports the use of all tools available for conservation. We recommended considering an approach that allows for the greatest flexibility over time to conserve water and return it to Ochoco and McKay creeks and the Crooked River. Given the long-term nature of the Project and the high conservation need, we suggest using a more integrated approach.

While the Service wants to see the piping commence, the funding opportunity that PL 83-566 provides may also be used to achieve conservation through the use of other tools. If needed, the Service is happy to provide more substantive feedback about specific conservation tools that would complement the Project. Again, the Service is supportive of piping canals and laterals and appreciates NRCS' endeavors to facilitate those efforts through PL 83-566. We want to ensure that all tools remain available to achieve the significant conservation gains we need to see in Ochoco and McKay creeks and the Crooked River.

We appreciate the ongoing coordination related to migratory bird species and bald and golden eagles. The draft EA discusses the Bald and Golden Eagle Protection Act (BGEPA) and various measures intended to avoid any nest disturbance. The Service has a comment related to content on page 106. The draft EA states, "The Act only covers intentional acts or acts in "wanton disregard" of the safety of bald or golden eagles." This is not accurate and this language does not apply to the Bald and Golden Eagle Protection Act (BGEPA) nor bald and golden eagles. Non-

purposeful take is prohibited under BGEPA. As discussed in previous meetings, if seasonal and temporal restrictions cannot be adhered to then permits are available.

We look forward to coordinating with you throughout the development of the final EA. We will provide input and technical assistance as needed during the formulation of your final document. If you have any questions or if we can be of any assistance, please contact Emily Weidner or me at 541-383-7146.

Sincerely,

BRIDGET MORAN

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Date: 2020.10.08 14:45:14 -07'00'

Bridget Moran
Field Supervisor

Oregon
Kate Brown, Governor

Department of Fish and Wildlife
Prineville Field Office
Deschutes Watershed
2042 SE Paulina Hwy.
Prineville, OR 97754
(541) 447-5111
FAX (541) 447-8065
www.dfw.state.or.us

September 30, 2020

Farmers Conservation Alliance
102 State Street
Hood River, OR 97031

Re: Comment letter for Draft Watershed EA for OID Infrastructure Modernization Project

To Whom It May Concern,

The Oregon Department of Fish and Wildlife (ODFW) appreciates the opportunity to comment on the draft Watershed Plan-Environmental Assessment for the Ochoco Irrigation District infrastructure modernization project. ODFW continues to support OID in this opportunity to improve water conservation, water delivery reliability, public safety, and the resulting benefits to fish and wildlife habitat by restoring streamflow and improving water quality. After reviewing the EA, we have comments and questions that would help improve water restoration efforts.

In regards to the McKay Water Switch, the draft EA states there are approximately 15 irrigators with 11.2 cfs of water rights in McKay Creek and that most of them have signed Letters of Intent to participate in the switch. The amount of water to be transferred instream (up to 11.2 cfs) is contingent upon the number of irrigators that participate and the quantity of water available in their individual water rights. Expected benefits from conserved water in McKay Creek are speculative without knowing this information. ODFW requests more specificity in regards to the actual number of signed Letters of Intent and associated water quantity. We also have questions regarding the quantity of water being supplied to the irrigators. The draft EA states irrigators hold water rights for 11.2 cfs, yet 11.65 cfs will be provided. In order to account for loss, OID will add 4.35 cfs to the delivery system for a total of 16 cfs. Before project improvements, OID estimates loss of about 20% system-wide, yet they are accounting for 27% loss in the McKay Water Switch. ODFW requests clarification if the 4.35 cfs is needed to ensure delivery or if there is potential to save more water through the upgrades.

In addition, ODFW recognizes the benefit to fish and wildlife through OID's intention to transfer the water instream, however, we have concerns about the amount of water actually being protected instream and the distance it will be protected. As part of the Habitat Conservation Plan, OID would allow the water to pass the Jones Diversion, even though their water right is senior, but there is no mention of other senior water right holders downstream. Because the instream transfer is subject to prior appropriation, other senior water right holders, aside for OID, can consume the instream water before it reaches Lake Billy Chinook. In order to evaluate the species benefit of this project, information regarding the seniority of other water right holders in McKay Creek and the Crooked River is needed.

The McKay Water Switch has the potential to reestablish a more natural hydrograph in McKay Creek, dependent upon the number of irrigators and the seniority of those users that participate in the switch. However, it is unclear if the proposed use of the Conserved Water Statute for 4.82 cfs in the Crooked River will do the same. The EA is unclear on which water right OID will be using for the transfer- stored water right or live flow right. Given the current State limitations for transfers of stored water, which water right utilized for the transfer will dictate the season of benefit- either irrigation season or storage season. Our research indicates the most important time period of flow impacts on fish populations in the Crooked River occurs during winter, when flow is typically the lowest. ODFW recommends OID's stored water right be transferred instream as live flow and protected to Lake Billy Chinook so that sufficient winter flows are ensured. Additionally, one of the resource concerns and rationale identified in the EA are instream flows for fish and aquatic habitat. In order to fulfill this need, and consistent with

the spirit of mutually beneficial gains of this project, ODFW recommends OID support ODFW's instream water right application IS-70354 by lifting their protest.

ODFW appreciates OID's willingness to maintain fish passage and screening throughout the project. Two infrastructure improvements identified in the draft EA include raising the Crooked River diversion weir and a drum screen in the Crooked River diversion canal. The weir raise will most likely trigger ODFW's fish passage laws so we request more detailed information in order to assess if remedial action (ie. fish ladder) is needed, which may require additional costs to the project. It was unclear why a new drum screen is needed at the Crooked River diversion canal, but ODFW encourages OID to use this opportunity to identify and address other screening needs. Our staff are available to help assess these needs and we encourage coordination as early as possible.

Infrastructure improvements such as piping canals and installing measurement devices will allow OID to deliver water more efficiently and accurately, reducing the amount of tailwater and returning flows to public waterbodies. This will lead to improved water quality in public waterbodies and improved habitat for aquatic species. ODFW would also encourage OID to coordinate with ODFW and a restoration partner to develop wetlands to treat tailwater and returning flows to public waterbodies.

ODFW appreciates and supports OID's willingness to implement projects that restore streamflow and improve aquatic habitat in public waterbodies as these actions will support the conservation of native and reintroduced anadromous fishes. We look forward to working with them to identify ways to maximize benefits for all involved parties from the successful implementation of this project.

Sincerely,

Tim Porter
Assistant District Fish Biologist

CC: Mike Harrington
Brett Hodgson
Anna Pakenham Stevenson

United States Department of Agriculture

Natural Resources Conservation Service

1201 NE Lloyd Blvd.
Suite 900
Portland, OR 97232
503-414-3200

November 13, 2020

National Marine Fisheries Service, NOAA Fisheries
Mr. Kim Kratz, Assistant Regional Administrator,
Oregon and Washington Coastal Area
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232

Dr. Paul Henson, PhD
State Supervisor, Oregon Fish and Wildlife Office
U.S. Fish and Wildlife Service
2600 SE 98th Avenue
Portland, OR 97266

Subject: Ochoco Irrigation District Infrastructure Modernization Project Watershed Plan–Environmental Assessment, Section 7 consultation

Dear Mr. Kratz and Dr. Henson,

The Ochoco Irrigation District Infrastructure Modernization Project is a large agricultural water conveyance efficiency project. The purpose of the project is to improve water conservation, water delivery reliability, and public safety on along district-operated laterals and canals. The proposed action is located in and around the city of Prineville in Crook County within the Lower Crooked River Watershed of the Deschutes Basin.

The proposed project would install 16.8 miles of buried pipe, install four new pump stations and associated pipe, and conduct canal improvements (raising canal banks and installing geomembrane liners) along 15.2 miles of existing canal where needed. Additional general infrastructure improvements would also be conducted, including raising the Crooked River Diversion weir. Construction would occur within three project groups and over the course of four years. All work would occur within existing district-operated rights-of-way and/or easements. The district has determined that implementation of the proposed action would conserve 4.82 cubic feet per second (cfs) of water for instream uses, and would transfer up to 11.2 cfs of live flow McKay Creek water rights instream, while also improving water delivery reliability, reducing operations and maintenance costs, and improving public safety.

To complete this project, OID is seeking federal funds under the authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566), which is administered by the Natural Resources Conservation Service (NRCS). A draft watershed plan environmental assessment has been prepared by Farmers Conservation Alliance in accordance with the National Environmental Policy Act (NEPA) of 1969, Public Law 91-190, as amended (42 United States Code [U.S.C.] 43221 et seq.) and Public Law 83-566 planning processes to meet NRCS requirements. The *Ochoco Irrigation District Infrastructure Modernization Project Draft Watershed Plan-Environmental Assessment* (Plan-EA) document, dated September 2020, is enclosed for your reference. The US Bureau of Reclamation is a cooperating agency on this Plan-EA.

The purpose of this letter is to initiate Section 7 consultation with the National Marine Fisheries Service (NMFS) and US Fish and Wildlife Service (USFWS). NRCS requests that NMFS concur with our determination that the OID Irrigation Modernization Project, may affect, but is not likely to adversely affect, Middle Columbia River steelhead (*Oncorhynchus mykiss*), a non-essential experimental population (NEP), which will be listed as threatened in January 2025 when the NEP designation is removed.

NRCS further requests that USFWS concur with our determination that the OID Irrigation Modernization Project, may affect, but is not likely to adversely affect, federally threatened bull trout (*Salvelinus confluentus*) and their federally designated critical habitat.

If you have any questions, please contact Gary Diridoni at gary.diridoni@usda.gov or 503-414-3092.

Sincerely,

JASON JEANS
Acting State Conservationist

ECC:
Bridget Moran, U.S. Fish and Wildlife Service
Scott Carlon, National Marine Fisheries Service
Gregg Garnett, U.S. Bureau of Reclamation
Gary Diridoni, Natural Resource Conservation Service

References: https://oregonwatershedplans.org/ochoco-id

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Bend Field Office
63095 Deschutes Market Road
Bend, Oregon 97701

Reply To: 01EOFW00-2021-I-0091
FWS/R1

November 23, 2020

Jason Jeans, Acting State Conservationist
Natural Resources Conservation Service
1201 NE Lloyd Blvd., Suite 900
Portland, Oregon 97232

Subject: Informal consultation for the Natural Resources Conservation Service on the effects of the Ochoco Irrigation District Infrastructure Modernization Project on bull trout and its critical habitat

Dear Mr. Jeans:

This letter transmits the U.S. Fish and Wildlife Service's (Service) concurrence on effects of the proposed Ochoco Irrigation District Infrastructure Modernization Project (Project) to the Federally listed threatened bull trout (*Salvelinus confluentus*) and its critical habitat. This document was prepared in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.; [Act]). We received your request for concurrence and Biological Assessment (Assessment), dated November 13, 2020, regarding effects to bull trout and its critical habitat.

The Natural Resources Conservation Service (NRCS) determined, and the Service concurs, that the proposed activities ***may affect, but are not likely to adversely*** affect bull trout or its critical habitat. A complete administrative record for this consultation is on file at the Service's Bend Field Office in Bend, Oregon.

Summary of the Proposed Action
The Project seeks to improve water conservation, water delivery reliability, and public safety along irrigation infrastructure within the Lower Crooked River watershed of the Deschutes River Basin. Ochoco Irrigation District (OID) operates primarily within and around the city limits of Prineville, Oregon and supplies water to approximately 900 patrons on over 20,000 acres within their district. The Watershed Protection and Flood Prevention Act (PL-566) authorizes the NRCS to assist local organizations and units of government to plan and implement watershed projects. OID will be constructing and operating the Project, but Federal funding will facilitate the Project's successful completion. This funding is administered by NRCS; as such, NRCS is the lead Federal agency responsible for ensuring the Project meets Federal requirements.

The Project includes installing 14.8 miles of buried pipe, adding four new pumps, improving 18.4 miles of existing canal, and making improvements to existing irrigation infrastructure. The irrigation modernization activities have been split into three project groups that will be implemented over a period of four years. Project group 1 would commence fall 2021 and finish in 2024 and facilitate the McKay Creek Water Rights Switch (McKay Switch). The McKay Switch would enable private irrigators to switch from diverting live flow from McKay Creek to Prineville Reservoir storage and become patrons of OID. Construction in project group 1 includes new pipeline construction (6.6 miles), a new pump station, and installation of two variable frequency drive booster pumps required to carry water to McKay Creek irrigators. Project group 2 would commence fall 2023 and continue for one year. OID's open Grimes Flat laterals would be converted to buried pipe (8.2 miles) and a new pump station would be installed to facilitate delivery along the laterals. The third project group would start in 2022 and realign and bury approximately 1.2 miles of pipe in the IronHorse section of canals, and backfill and reseed another 1.9 miles of decommissioned open canal. Other activities associated with the Project include modification of OID's conveyance system to facilitate delivery to McKay Creek irrigators that would become OID patrons, 0.1-mile of pipe replacement, and 15.2 miles of canal bank raises.

The action area encompasses portions of waterbodies in Crook, Deschutes, and Jefferson counties in central Oregon and OID's rights-of-way and easements where project work will occur (Figure 2 and Figure 3 in Assessment). Waterbodies include the Crooked River, Lytle Creek, McKay Creek, and Prineville Reservoir (Table 1 in Assessment). The Assessment contains a detailed description of the proposed action and action area.

Background Bull Trout and Critical Habitat
OID's canals and rights-of-way do not provide habitat for bull trout, but the action area is within bull trout designated critical habitat (Unit 6). For the purposes of tracking and assessing recovery, bull trout are divided into Distinct Population Segments (DPS). Each DPS, one in the coterminous United States, are subdivided into biologically relevant recovery units that consist of occupied core areas or groups of core areas in close proximity. The Costal Recovery Unit encompasses Oregon and Washington and is comprised of 25 core areas. The proposed activities fall entirely within the Lower Deschutes River Core Area. Although various factors such as agriculture, water diversion, dam and reservoir construction, land drainage contributed to bull trout declines in the Lower Deschutes River Core Area, currently this core area functions as a bull trout population stronghold, and is considered one of the core areas with the most stable and abundant populations of bull trout within the Coastal Recovery Unit. Spawning and rearing for Lower Deschutes River Core Area populations occurs outside of the action area, primarily in the Metolius River Subbasin. The Crooked River provides important foraging, overwintering, and migration habitat for these populations of bull trout upstream of Pelton Round Butte Dam and Lake Billy Chinook (Figure 5 in Assessment). Current limitations for bull trout populations in the Crooked River include low streamflow, impaired water quality, and barriers to upstream passage. Since its construction in 1982, Opal Springs Dam was a passage barrier for bull trout on the Crooked River less than a mile upstream of Lake Billy Chinook. Upon completion of a fish ladder in November 2019, the passage now permits bull trout volitional access of the Crooked River up to Bowman Dam as well as its tributaries including McKay Creek.

Effects to the Species and Critical Habitat
Project implementation includes the construction of a modernized irrigation delivery system as well as transferring live flow water rights in McKay Creek to instream flows. Construction activities associated with the proposed action would not directly impact bull trout or its critical habitat since neither are contained within the network of irrigation infrastructure, but the improved system will result in conserved water over the long-term for fish use in the Crooked River and McKay Creek. Project group 1 will conserve up to 11.2 cubic feet per second (cfs) in McKay Creek and Crooked River, transferred instream and permanently protected in part as a result of the McKay Switch. Lateral piping in project group 2 would save up to 4.9 cfs and allocate up to 3.8 cfs instream in the Crooked River. Project group 3 would save up to 1.02 cfs and allocate 100-percent of that water instream in the Crooked River. These flow increases will indirectly affect bull trout and critical habitat by providing increased instream flows year-round for fish.

Conclusion
Based on information contained within the Assessment, meetings, and conversations with NRCS and OID staff, the Service concurs with the NRCS's determination that this project ***may effect but is not likely to adversely affect*** the bull trout or its critical habitat.

The Service provides the following rationale for our concurrence on bull trout and its critical habitat:

1. No direct effects are expected as a result of irrigation modernization construction for OID's canals and laterals.
2. Potential adverse indirect effects to water quality parameters such as temperature, dissolved oxygen, pH, and disease, are anticipated to be discountable from baseline conditions.
3. Indirect effects as a result of long-term flow increases will improve baseline conditions for the bull trout and its critical habitat resulting in a beneficial effect.

This concludes informal consultation on the actions outlined in your biological assessment. The requirements established under section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.), have been met, thereby concluding the consultation process. However, if future events result in the reassessment of the proposed action, the reinitiation of consultation may be warranted. Reinitiation of consultation of this action may be necessary if: (1) new information reveals effects of the agency action that may affect any listed species or critical habitat in a manner or to an extent not considered in the biological assessment; or (2) the agency action is subsequently modified in a manner that causes an effect to the listed species not considered in this analysis; or (3) a new species is listed or critical habitat designated that may be affected by the proposed action.

purposeful take is prohibited under BGEPA. As discussed in previous meetings, if seasonal and temporal restrictions cannot be adhered to then permits are available.

We look forward to coordinating with you throughout the development of the final EA. We will provide input and technical assistance as needed during the formulation of your final document. If you have any questions or if we can be of any assistance, please contact Emily Weidner or me at 541-383-7146.

Sincerely,

BRIDGET MORAN

Digitally signed by BRIDGET MORAN
Date: 2020.10.08 14:45:14 -07'00'

Bridget Moran
Field Supervisor

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
304 S. Water Street, Suite 201
Ellensburg, Washington 98926-3617

Refer to NMFS No: WCRO-2020-03187

December 7, 2020

Jason Jeans
Acting State Conservationist
National Resources Conservation Service
1201 NE Lloyd Blvd, Suite 900
Portland, Oregon 97232

Re: Endangered Species Act Section 7(a)(2) Concurrence Letter for the Ochoco Irrigation District Infrastructure Modernization Project

Dear Mr. Jeans:

On November 13, 2020, the National Marine Fisheries Service (NMFS) received the National Resources Conservation Service's (NRCS) request for a written concurrence that the Ochoco Irrigation District Infrastructure Modernization Project (Project) is not likely to adversely affect (NLAA) species listed as threatened or endangered or critical habitats designated under the Endangered Species Act (ESA). This response to your request was prepared by NMFS pursuant section 7(a)(2) of the ESA and implementing regulations at 50 CFR 402.

This letter is in compliance with section 515 of the Treasury and General Government Appropriations Act of 2001 (Data Quality Act) [44 U.S.C. 3504 (d) (1) and 3516], and underwent pre-dissemination review using standards for utility, integrity, and objectivity. This document will be available within 2 weeks at the Environmental Consultation Organizer (https://eco.fisheries.noaa.gov). A complete record of this consultation is on file at our Columbia Basin Branch office in Ellensburg, Washington.

Consultation History

NMFS received a review draft of your biological assessment (BA) on November 5, 2020. We provided feedback to the NRCS by email dated November 6, 2020. We received the final BA and request for consultation on November 13, 2020.

Proposed Action and Action Area

The 2014 Crooked River Collaborative Water Security and Jobs Act (2014 Act) provided for the storage of 2,740 acre-feet of water in Prineville Reservoir and expanded the Ochoco Irrigation District (OID) boundary to include irrigated lands in the McKay Creek drainage. The proposed action would facilitate the McKay Creek Water Rights Switch (McKay Switch) by improving existing infrastructure and installing new facilities to deliver stored water from Prineville

Reservoir to McKay Creek and Grimes Flat water users in lieu of diverting water directly from McKay Creek. Water users that participate in the McKay Switch would convert their live flow water rights to instream rights in McKay Creek.

The OID would implement the proposed action in three project groups. Construction would occur over the course of 4 years and would occur within existing OID-operated rights-of-way or easements. Project group one would commence fall 2021 and finish in 2024. Construction in project group one includes assembly of 6.6 miles of new pipeline, a new pump station, and installation of two variable frequency drive booster pumps required to carry water to McKay Creek irrigators. Project group two would commence fall 2023 and continue for 1 year. The OID's open Grimes Flat laterals would be converted to 8.2 miles of buried pipe, and a new pump station would be installed to facilitate delivery along the laterals. The third project group would start in 2022 and realign and bury approximately 1.2 miles of pipe in the IronHorse section of canals, and backfill and reseed another 1.9 miles of decommissioned open canal. Other activities associated with the Project include modification of the OID's conveyance system to facilitate delivery to McKay Creek irrigators, 0.1 miles of pipe replacement, and 15.2 miles of canal bank raises.

The action area includes Prineville Reservoir, the lower Crooked River [River Mile (RM) 70 to mouth)], McKay Creek and Lytle Creek. These waterbodies are located in Crook, Deschutes and Jefferson Counties in central Oregon.

Description of Species and Critical Habitat

Middle Columbia River (MCR) steelhead is listed under the ESA and occurs in the action area. This species was originally listed as threatened on March 25, 1999 (64 FR 14517) and includes all naturally-spawned steelhead populations originating below natural and manmade impassable barriers from the Columbia River and its tributaries upstream of the Wind and Hood Rivers (exclusive) to and including the Yakima River, excluding steelhead originating from the Snake River Basin. Seven artificial production programs were included in this listing on January 5, 2006 (71 FR 833).

All steelhead that occur above Round Butte Dam on the Deschutes River, including the action area, are designated as a nonessential experimental population (NEP) under section 10(j) of the ESA (78 FR 2896; January 15, 2013). For purposes of ESA section 7 consultation, this species is treated as a species proposed for listing for all actions occurring above, or upstream of, Round Butte Dam. However, the NEP designation will expire on January 15, 2025, at which time all steelhead occurring upstream of Round Butte Dam, including the action area, shall be treated as a listed species. While the likely effects from the proposed action are expected to be insignificant, thus not requiring a take statement from NMFS, any project delays could carry the proposed action into 2025 or after this species acquires full listing status. Therefore, the NRCS elected to consult to ensure that all their requirements under the ESA are fulfilled.

Middle Columbia River steelhead critical habitat was designated on September 2, 2005 (70 FR 52630). In the Deschutes Basin, critical habitat includes all occupied areas downstream, but not

upstream, of the Pelton Round Butte Hydroelectric Project on the Deschutes River. The proposed action area does not contain critical habitat for MCR steelhead.

Effects of the Action

Construction activities associated with the proposed project consist of converting open irrigation canals to buried pipeline. This would have no direct, indirect, or cumulative effects to MCR steelhead or its habitat. Canals within the project area do not contain salmonids or other fish species. Fish screens at OID diversion points prevent entrainment into its irrigation conveyance systems so there will be no opportunity for steelhead to interact with project construction activities.

The improved water delivery system would result in conserved water over the long-term for steelhead use in the Crooked River and McKay Creek. Project group one would conserve up to 11.2 cubic feet per second (cfs) in McKay Creek and the Crooked River downstream of the creek's confluence. The 11.2 cfs would be transferred instream and permanently protected under the McKay Switch. Lateral piping in project group two would save up to 4.9 cfs and allocate up to 3.8 cfs instream in the Crooked River. Project group 3 would save up to 1.02 cfs and allocate 100 percent of that water instream in the Crooked River. Because flow in Mckay Creek is largely driven by runoff from snowmelt, normal flows in the creek decrease significantly in the summer. However, the increase in flow from the elimination of water diversions from the middle reach of McKay Creek (RM 6 to RM 12) and instream protection would have beneficial effects for steelhead, allowing more flow to remain instream for steelhead migration and rearing during the spring and early summer months before the flow naturally diminishes. At no point will the action reduce flows compared to baseline conditions.

The beneficial effects described above are not used to offset adverse effects for this analysis. All construction-related effects of the project will be discountable, that is, effects to steelhead are extremely unlikely to occur.

We did not analyze effects to critical habitat because there is no designated or proposed critical habitat in the action area.

Conclusion

Based on this analysis, NMFS concurs with the NRCS that the proposed action is not likely to adversely affect MCR steelhead. No direct effects are expected from construction activities, no adverse effects to water quality are anticipated, and the resulting conservation and protection of additional instream flow would be beneficial for MCR steelhead.

Reinitiation of Consultation

Reinitiation of consultation is required and shall be requested by the NRCS or by NMFS, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) the proposed action causes take; (2) new information reveals effects of the action that

may affect listed species in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to the listed species that was not considered in the written concurrence; or (4) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16). This concludes the ESA consultation.

Please direct questions regarding this letter to Scott Carlon at (971) 322-7436 or scott.carlon@noaa.gov.

Sincerely,

F. Dale Bambrick, Chief
Columbia Basin Branch
Interior Columbia Basin Office

cc: Scarlett Vallaire, NRCS, Portland (scarlett.vallaire@usda.gov)
Kristin Aligood, Farmers Conservation Alliance (kristin.alligood@fcasolutions.org)