

Tulelake Irrigation District Infrastructure Modernization Project

Draft Watershed Plan-Environmental Assessment



*Klamath County, Oregon, Modoc and Siskiyou Counties, California
Tule Lake, Mills Creek – Lost River, and Copic Bay Watersheds
September 2026*

Prepared by

United States Department of Agriculture, Natural Resources Conservation Service—Lead Federal
Agency in cooperation with Tulelake Irrigation District

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Watershed Plan-Environmental Assessment for the Tulelake Irrigation District—Infrastructure Modernization Project

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

Sponsoring Local Organization (SLO): Tulelake Irrigation District (TID)

Cooperating Agencies: Bureau of Reclamation, U.S. Fish and Wildlife

Authority: This Watershed Plan-Environmental Assessment (Plan-EA) has been prepared under the Authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law [PL] 83-566). The Plan-EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, PL 91-190, as amended (42 United States Code [U.S.C.] 43221 et seq.) and USDA regulations under 7 CFR 1b.

Certifying Statement for EA Page Limit and Deadline

The Responsible Official certifies that this EA:

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

Abstract: This document is intended to fulfill requirements of the NEPA and to be considered for authorization of PL 83-566 funding of the Tulelake Irrigation District Infrastructure Modernization Project (project). The project seeks to improve water conservation, water delivery reliability, and public safety for irrigation infrastructure in Oregon and California's Klamath Basin. The project would include pump upgrades and smart data acquisition in the form of supervisory control and data acquisition (SCADA) technology. Total estimated project costs are \$16,302,000 of which \$3,769,000 would be paid by the sponsors and other non-federal funding sources. The estimated amount to be paid through NRCS PL 83-566 funds is \$12,533,000.

Comments: Comments must be submitted during the allotted Draft Public Review Period (within 30 days of the public release of the Draft Plan-EA) and become part of the Administrative Record. Submit comments and inquiries to: Natural Resources Conservation Service, Attn: Small Watershed Program, Tulelake Irrigation District-Infrastructure Modernization Project Plan-EA, 430 G Street, Davis, CA 95616, or email comments.to.CAwatersheds@usda.gov.

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Ancestral Land Acknowledgment

The Tulelake Irrigation District – Infrastructure Modernization Project area lies within the Klamath Basin of south-central Oregon and northeastern California, in Klamath County, Oregon, and Modoc and Siskiyou Counties, California, encompassing lands within and adjacent to the Tule Lake, Mills Creek–Lost River, and Copic Bay watersheds. The USDA Natural Resources Conservation Service (NRCS) respectfully acknowledges that these lands are the ancestral homelands of Native American peoples who have lived in, stewarded, and maintained cultural, spiritual, and subsistence connections to this landscape since time immemorial and who continue to do so today.

- The Klamath Tribes (the Klamath, Modoc, and Yahooskin peoples);
- The Modoc Nation (formerly the Modoc Tribe of Oklahoma);

NRCS is committed to meaningful, government-to-government consultation with these Tribes throughout the planning, design, and implementation of the project, and to the identification, protection, and respectful treatment of cultural resources and traditional cultural properties within the project area.

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Office of Management and Budget (OMB) Fact Sheet

Summary Preliminary Draft Watershed Plan-Environmental Assessment Document

for

Tulelake Irrigation District Infrastructure Modernization Project

Unique Identification Number: EAXX-005-53-006-1033536933

Siskiyou and Modoc Counties, California--Klamath County, Oregon

Oregon 2nd and California 1st Congressional Districts

Authorization

The watershed study was carried out and the plan prepared under the authority of PL 83-566 Stat. 666 as amended (16 U.S.C. Section 1001 et seq.) 1954. The works of improvement would be installed under the PL 83-566 authorized purpose of Agricultural Water Management.

Sponsor

Tulelake Irrigation District

Proposed Action

The Tulelake Irrigation District (TID or the District) Infrastructure Modernization Project is an agricultural water conveyance efficiency project. The proposed action would support and maintain existing agriculture in the area through a series of pump upgrades and SCADA installations intended to improve water management; reduce water loss in the District's conveyance system; reduce the operations and maintenance involved in delivering irrigation water to Project irrigators; and provide flexibility for parties to utilize the available water to meet high-priority needs year-to-year throughout the Klamath Basin.

Implementation of the proposed action would meet PL 83-566 Authorized Project Purpose (v), Agricultural Water Management, by improving District irrigation water availability and delivery operations, improving water quality, and improving TID's capacity to manage drain water and deliver water to the Lower Klamath National Wildlife Refuge (LKNWR) and patrons.

Federal assistance through PL 83-566 would support the District in addressing the following watershed problems and resource concerns: water shortages for agriculture, water shortages for wildlife refuges, and water delivery and operations inefficiencies in District infrastructure.

Implementation of the proposed action would address the sponsor's objectives and goals to reduce energy consumption and associated costs and optimize water resources management.

Purpose and Need for Action

The purpose of this project is to improve agricultural water management and energy efficiency of District-managed infrastructure.

The proposed project is needed to improve water conveyance efficiency and operation of District infrastructure to deliver water more reliably to irrigators within the District, TLNWR, and LKNWR.

Description of the Preferred Alternative

Under the Preferred Alternative, the District would install pump modifications and Supervisory Control and Data Acquisition (SCADA) installation at gate and check valves. These projects would include upgrading pumps at 28 locations throughout the District. The upgrades would include various improvements such as replacement of the pump and motor, Variable Frequency Drive (VFD) installation, SCADA upgrades for individual pumps, and traveling screen installations. The Preferred Alternative would also include the installation of SCADA and automation equipment at 74 sites throughout the District. SCADA installation would allow the District to more effectively measure and control water within the District.

Project Measures

Under the Preferred Alternative, project measures would include installing SCADA and automation at 74 sites as well as upgrading pumps at 28 locations.

Watershed Total Size

234,233 acres.

Tulelake Irrigation District Boundary Size

96,000 acres.

Climate and Topography

The project is in northeastern California, on the east side of the Cascade Mountain Range. The average elevation in TID is approximately 4,030 feet. Typically, the growing season is 100 days long, beginning in mid-April and ending in early October. Summer temperatures average about 60°F with some highs above 90°F. Average winter temperatures are in the low 30s Fahrenheit, with occasional lows below -10°F. The topography of TID is flat except for the northeast portion. Most of the lands within the District are within the original historical bed of Tule Lake.

Land Use (Planning Area)

Use	Acres
Irrigated Land	83,856
Non-irrigated Land	150,377

Land Ownership (Planning Area)

Owner	Percentage
Private	45.2%
State-Local	0.1%
Federal	51.2%

Owner	Percentage
Tribal	0.2%
Unknown	3.3%

Population and Demographics

The Preferred Alternative would occur in Siskiyou and Modoc Counties, CA, and Klamath County, OR. Siskiyou and Modoc Counties have a population of 44,076 and 8,700, respectively. The population growth rate of Siskiyou and Modoc Counties between 2011 and 2020 was -1.5 percent and -9 percent, respectively. The population of the State of California grew by 5 percent over the same period. Klamath County has a population of 69,413. The population growth rate of Klamath County between 2011 and 2020 was 4.8 percent. The population of the State of Oregon grew by 5 percent over the same period.

In 2020, roughly 19.6 percent of the Klamath County population lived below the poverty level (U.S. Census Bureau 2020). The County's proportion of low-income population (43 percent) is higher than the state average (29 percent) (EPA 2020). In 2020, 74.8 percent of the population was white alone, not Hispanic or Latino, 12.6 percent was Hispanic or Latino, and 3.6 percent was American Indian alone (U.S. Census Bureau 2020).

In 2020, roughly 16.9 percent of the Siskiyou County population lived below the poverty level (U.S. Census Bureau 2020). The County's proportion of low-income population (40 percent) is higher than the state average (29 percent) (EPA 2020). In 2020, 72.7 percent of the population was white alone, not Hispanic or Latino, 12.5 percent was Hispanic or Latino, and 4 percent was American Indian alone (U.S. Census Bureau 2020).

Population and Demographics – Klamath County and Oregon

	Klamath County	Oregon
Population 2021	69,413	4,237,256
Employment Rate	44.6%	57.6%
Median Household Income	\$46,721	\$71,562

Population and Demographics – Siskiyou and Modoc Counties and California

	Siskiyou County	Modoc County	California
Population 2020	44,076	8,700	39,538,223
Employment Rate	45.8%	41.5%	57.6%

	Siskiyou County	Modoc County	California
Median Household Income	\$49,857	\$51,090	\$84,907

Relevant Resource Concerns

Resource concerns identified through scoping include cultural resources; water conservation; surface water quality and quantity; groundwater quantity; aquatic and fish resources; wetland and riparian resources; soils; and terrestrial wildlife.

Alternatives

Alternatives Considered

Four action alternatives were initially considered; three were eliminated from full analysis because they did not address the purpose and need for action, did not achieve the Federal Objective and Guiding Principles, or because they became unreasonable due to cost, logistics, existing technology, social, or environmental reasons. The No Action Alternative and Modernization Alternative were analyzed in full.

No Action Alternative (Future without Federal Investment)

Under the No Action Alternative, construction activities associated with the project would not occur and TID would continue to operate and maintain its existing conveyance system in its current condition.

Proposed Action (Modernization Alternative)

Under the Modernization Alternative, TID would:

- Upgrade pumps throughout the District at approximately 28 locations. These pump upgrades would include various improvements such as replacement of the pump and motor, variable frequency drive installation, SCADA upgrades for individual pumps, and traveling screen installations.
- Install SCADA and automation equipment throughout the District at approximately 74 locations. SCADA installation would allow the District to more effectively measure and control water within the District.

The Modernization Alternative has been identified as the National Economic Development (NED) Alternative and is also the Preferred Alternative.

Mitigation, Minimization, and Avoidance Measures

Consultation under Section 106 of the National Historic Preservation Act (NHPA) is currently in progress between NRCS, as the lead federal agency, and consulting parties, including the California State Historic Preservation Officer (SHPO) and affiliated Tribes/Tribal Historic Preservation Officers (THPOs). No minimization, mitigation, or avoidance (MMA) measures have been identified to date. Section 106 review will be completed prior to project authorization. Ground disturbances would be limited to only those areas necessary to minimize effects on soil, vegetation, and land use. Where possible, construction activities would avoid or minimize effects on agricultural

lands by confining construction activities to the existing right-of-way (ROW) and easements. Sedimentation best management practices (BMPs) would be employed during and after construction, and construction schedules would minimize disturbance to wildlife and the public. After construction, disturbed areas would be returned to pre-construction contours and replanted with a mix of native or non-invasive desirable non-native grasses and forbs to reduce the risks of erosion and spread of noxious weeds.

Prior to construction, the District would complete pre-clearance surveys to verify the presence or absence of golden eagle in the area and all United States Fish and Wildlife Service (USFWS) guidelines would be followed to ensure minimal to no disturbance to bald or golden eagles nesting near the project area. Surface-disturbing activities would typically not occur during the migratory bird or raptor nesting season, generally from March 1 to August 31. If surface-disturbing activities must occur during this period, qualified avian biologists would conduct pre-construction avian surveys in appropriate habitats not fewer than 3 days and not more than 7 days before surface-disturbing activities begin. The specific area to be surveyed would be based on the scope of the activities. If ground-disturbing activities do not take place within 7 days of the surveys, the work areas would be resurveyed. If nesting migratory birds or raptors are detected during surveys, appropriate buffers would be applied. Buffers would remain in effect until the qualified biologist confirms that either the young have fledged, or the nest has failed.

Project Costs

	PL 83-566 Funds	PL 83-566 Funds Percentage	Other Funds	Other Funds Percentage	Total	Total Percentage
Construction	\$9,988,000	75%	\$3,329,000	25%	\$13,317,000	100%
Engineering	\$356,000	75%	\$119,000	25%	\$475,000	100%
SUBTOTAL COSTS	\$10,344,000	75%	\$3,448,000	25%	\$13,792,000	100%
Technical Assistance	\$1,467,000	100%	\$0	0%	\$1,467,000	100%
Real Property Rights	\$0	0%	\$0	0%	\$0	0%
Permitting	\$0	0%	\$32,000	100%	\$32,000	100%
Project Administration	\$722,000	71%	\$289,000	29%	\$1,011,000	100%
Annual O&M ¹	NA	NA	NA	NA	NA	NA

	PL 83-566 Funds	PL 83-566 Funds Percentage	Other Funds	Other Funds Percentage	Total	Total Percentage
TOTAL COSTS	\$12,533,000	77%	\$3,769,000	23%	\$16,302,000	100%

¹ Under the Preferred Alternative, there would be no additional O&M costs. Thus, O&M was included as a benefit and annual O&M costs are shown here as \$0.

Project Benefits

Project Benefits

Implementation of the Preferred Alternative would support Agricultural Water Management through pump upgrades and smart data acquisition in the form of SCADA. This would improve water delivery efficiency within the District and to wildlife refuges while reducing District operations and maintenance (O&M) costs.

Number of Direct Beneficiaries

924 patrons would directly benefit from this project.

Other Beneficial Effects-Physical Terms

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

Damage Reduction Benefits	Proposed Project
Reduced OMR	\$231,000
Avoided Pump Failure	\$140,000
Agricultural Yield Enhancement	\$2,084,000
Total Quantified Benefits	\$2,455,000
Benefit to Cost Ratio	3.7
Discount Rate	3.25%

Period of Analysis

Installation Period

Five years.

Project Life

Fifty years.

Funding Schedule

Year	PL 83-566	Other Funds	Total
0	\$1,892,800	\$570,800	\$2,463,600
1	\$4,961,800	\$1,485,800	\$6,447,600
2	\$1,892,800	\$570,800	\$2,463,600
3	\$1,892,800	\$570,800	\$2,463,600
4	\$1,892,800	\$570,800	\$2,463,600

Note: Totals may not sum due to rounding.

Environmental Effects

The Preferred Alternative would be planned, designed, and installed to have long-term net-beneficial effects on agricultural production, water quality, surface water hydrology, fish and aquatic species, wetland functions, fish and wildlife habitat, and ecosystem services within the planning area.

Implementation of the Preferred Alternative would result in minor, unavoidable temporary or short-term adverse effects such as impacts to land use, soils, vegetation, and wildlife habitat within the project area. Most temporary or short-term adverse effects would result from construction activities in the project area. Project sponsors would work closely with partners, contractors, and affected landowners to incorporate measures and BMPs to avoid and minimize short-term adverse effects.

Construction would disturb vegetation at or near proposed improvement sites, resulting in short-term minor adverse effects to aquatic and terrestrial vegetation. There is only one project site that has wetlands that may be jurisdictional and regulated under Section 404 of the Clean Water Act. If any regulated wetlands are identified, they would be avoided to the extent practicable, and necessary delineations and authorizations would be secured before work begins. Following construction, disturbed areas would be restored to previous contours and elevations and replanted with an NRCS-approved mix.

The Preferred Alternative would not permanently modify ground surface elevations at any proposed project sites, so floodwater storage and transport in the study area would not be affected by implementation of the Preferred Alternative. Any long-term effects on wildlife from the Modernization Alternative would be expected to be minimal. Construction would occur outside the primary nesting period for migratory birds of concern. Should an active nest be found, construction would be paused and coordination with a local U.S. Fish and Wildlife Service (USFWS) biologist would occur. Project activities would be discussed with USACE and California DSL to determine permit requirements.

Although TID's overall water supply would not be modified, increasing efficiency and improving the District's ability to manage water may help maintain water levels in the Tule Lake sumps, particularly in years of shortage. If so, the Modernization Alternative could have an indirect benefit in the Tule Lake sumps on fish and aquatic species, wetland and riparian areas, and surface water hydrology.

Major Conclusions

The Preferred Alternative would improve water delivery reliability for TID's patrons; reduce water lost to seepage from District-operated infrastructure; and improve District operational efficiencies in a manner that would reduce TID's operations and maintenance costs.

Areas of Controversy

There have been no areas of controversy identified.

Issues to be Resolved

None.

Evidence of Unusual Congressional or Local Interest

None.

Compliance

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

1 Introduction

Across the Western United States, aging infrastructure, growing populations, shifting rural economies, and changing climate conditions have contributed to increased pressure on water resources.

In recent years, the Klamath Basin has faced severe droughts that have significantly limited or even stopped the supply of water from Upper Klamath Lake (UKL) to the Bureau of Reclamation's (Reclamation) Klamath Project and two national wildlife refuges: the Lower Klamath National Wildlife Refuge (LKNWR) and Tule Lake National Wildlife Refuge (TLNWR). Tulelake Irrigation District (herein referred to as TID or the District), located in the Tule Lake, Mills Creek – Lost River, and Copic Bay Watersheds of the Lost Subbasin (see Figure 1-1), is proposing to modernize District infrastructure in order to address watershed problems. Water shortages and delivery and operational inefficiencies have resulted in farmers being forced to fallow thousands of acres of high-value farmland, endangering local agricultural economies. These water shortages experienced by the Klamath Project have also limited or even stopped water deliveries to the LKNWR, the nation's first waterfowl refuge and a critical component of the Pacific Flyway. The dry conditions in both Refuges have led to a reduction of critical habitat for upland and migratory birds as well as the endangered Lost River (C'waam) and shortnose (Koptu) suckers. Both species of sucker were traditionally used by the Klamath and Modoc Tribes as a food source and in cultural and spiritual practices and remain important resources for local Tribes today. Water shortages have also reduced wetland management capabilities on both LKNWR and TLNWR and resulted in the extirpation of endemic fish species in 2022.

Improved management of agricultural water could address these complex water supply demands and habitat protection objectives in the Klamath Basin. It also gives the District the ability to coordinate with USFWS Refuge managers to address water shortages for wildlife refuges. The District seeks federal funding through the USDA NRCS Watershed Protection and Flood Prevention Act, Public Law [PL] 83-566, to implement the proposed irrigation infrastructure modernization project (herein referred to as the project) to address the key watershed problems.

Approximately 70 percent of TID's water is tailwater from upstream flows from Klamath Project irrigation districts and can enter the District at several locations. TID is only able to control a single diversion several miles upstream from these locations, and incoming water volume can fluctuate greatly hour to hour. This variability in inflows creates significant challenges for the District and can result in more water than is needed by TID being present in District conveyances. TID must still move all of the water present through its system, resulting in high pumping and O&M costs, instances of excess water that can overwhelm the system, and excess unintentional spills. District pumps are far past their working life and the risk of catastrophic failure increases year by year. The flat topography also makes managing water in the District difficult and the resulting excess pumping required has become unviable for the District due to energy rate increases.

Improving irrigation infrastructure by modernizing the District's water distribution system would address regional agriculture instability, support local economies, and decrease energy use. These improvements would also reduce uncontrolled operational spills in TID, which could then be managed as needed to meet the extensive and diverse water supply needs of the Klamath Basin.

1.1 Planning Area

The District is located in Northeastern California, on the east side of the Cascade Mountain Range, in Siskiyou and Modoc Counties. A small portion of TID is in Klamath County in southwestern Oregon. TID falls within the Klamath Basin and is part of the Klamath Project.

Within the Planning Area is the Area of Potential Effect (APE). The APE was defined to address potential impacts to archaeological resources from ground disturbance and direct and indirect effects to the historic built environment from modernization activities. The APE is limited to the vertical and horizontal footprint of the areas and/or structures where the proposed project activities will occur plus a 100-foot buffer to account for potential minor changes to project element locations. It includes areas where ground-disturbing work would occur under the proposed action, adjacent areas, and construction staging and access areas.

1.2 Project Area

The project area is the portion of the planning area where the TID Infrastructure Modernization Project would occur (Figure 1-1). The project area, making up only a small proportion of the District's total system, consists of the District infrastructure to be modernized and areas where new infrastructure would be constructed, and associated rights-of-way where construction would take place, otherwise known as Works of Improvement.

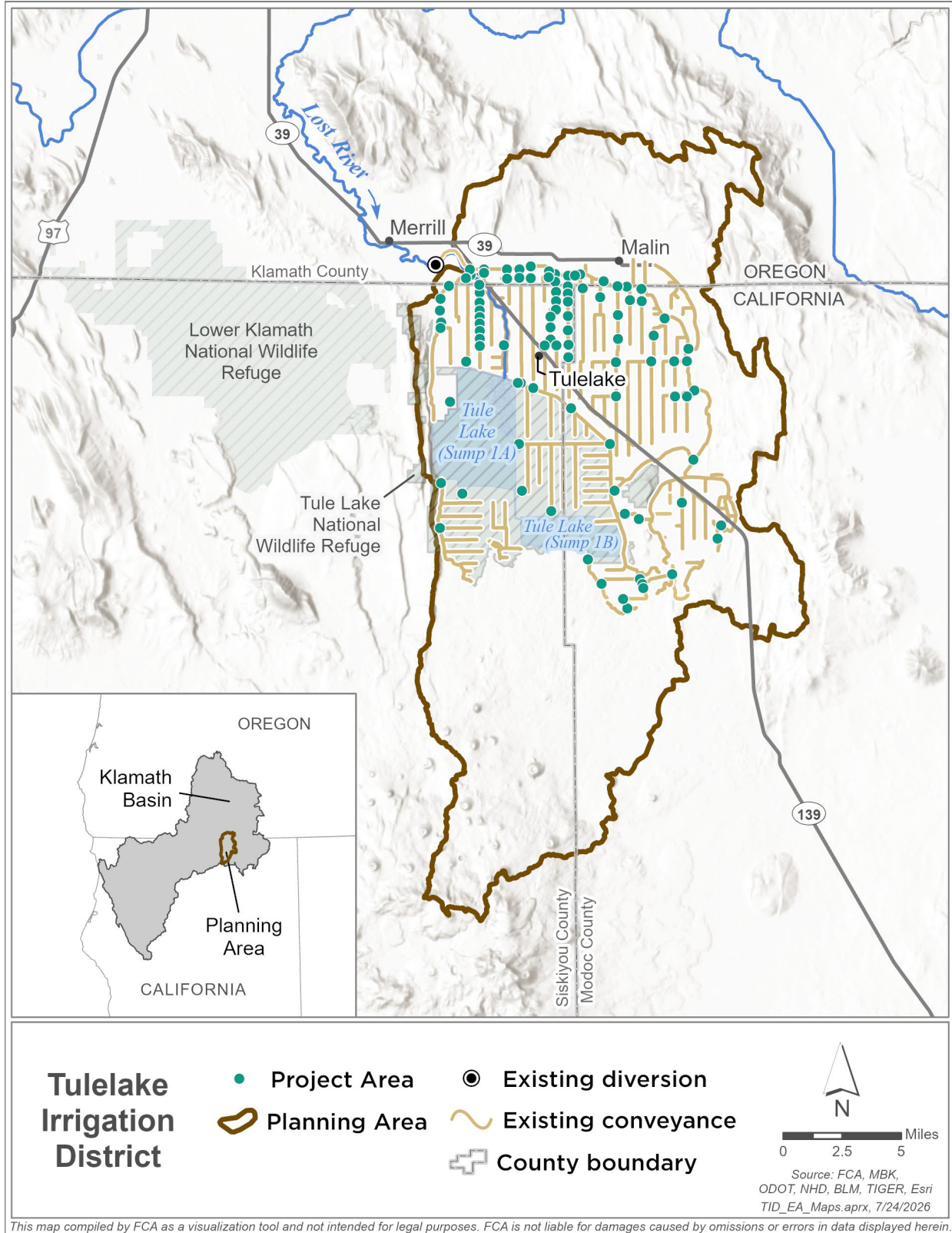


Figure 1-1. Tulelake Irrigation District planning area and project area.

1.3 Current Infrastructure

The District serves 63,000 acres of irrigated land through 243 miles of canals and pipelines, and 334 miles of drains (TID 2017). The majority of TID's water supply originates in Upper Klamath Lake. The remainder of available surface water is Lost River live flow, return flows from other irrigation districts, and diversion of stored water from Upper Klamath Lake (UKL) and Lake Ewauna (TID 2017).

Water is directed to TID through the Lost River Diversion Channel at Station 48 and the No. 1 Drain. Water diverted from the Klamath River, via the Lost River Diversion Channel at Station 48, is conveyed down the Lost River and diverted at the Anderson-Rose Dam to serve TID. The dam is operated to deliver surface water into the J-Canal, which distributes water to more than half of the District's irrigated lands. Additional points of inflow into the District from upstream Project districts include the D-Canal/J-Canal Drop, and drains 9, 10, 11, 46-C, 46-N-1-a, and 46-S. Additionally, TID drilled 10 wells in 2010 to supplement surface water during drought years.

The remaining water not diverted by TID at the Anderson-Rose Dam flows through the Lost River and into the Tule Lake sumps. The Tule Lake sumps are effectively what remains of the former Tule Lake, which had been a large lake prior to being drained for development. Sumps 1A and 1B serve as both habitat for fish and waterfowl and regulating reservoirs for TID. Sumps 2 and 3 have been reclaimed and are farmed as lease¹ and co-op lands² (TID, 2017). Currently, pumps and most laterals must be adjusted manually, which reduces precision, efficiency, and increases District O&M costs.

Due to its flat topography, the District relies on 36 lift pump stations to convey or reuse water throughout the system. TID also has seven automated trash screens at pumps within the system to minimize damage to pump facilities and improve the system's efficiency. Operational spills and tailwater from the District are conveyed through TID's extensive drainage system. Water stored within the Tule Lake sumps may be reused for irrigation within TID or discharged by TID's D-Pumping Plant through the Tule Lake Tunnel to provide water to land served by the P-Canal, including the eastern units of LKNWR. Water not used by the P-Canal users or the LKNWR enters the Klamath Straits Drain and is pumped back to the Klamath River.

In previous years, the District installed Supervisory Control and Data Acquisition (SCADA) on numerous checks throughout the District. The installation of SCADA increased the District's ability to more accurately match supply with demand and reduce unintentional operational spills. However, lack of SCADA control on a large portion of District infrastructure still results in extensive, avoidable spill.

1.4 Decision Framework

This Watershed Plan Environmental Assessment (Plan-EA) has been prepared to assess and disclose the potential effects of the proposed action, document the planning decisions made by NRCS and Sponsors, and document needed technical and financial assistance. Through PL 83-566, NRCS provides technical and financial assistance to project sponsors such as states, local governments, and

¹ Lease lands are administered by Reclamation and farmers completely harvest crops grown on these lands.

² Co-op lands are administered by USFWS, seasonally farmed by individuals, and typically are planted with cereal grains. Co-op farmers must leave a portion of the crop unharvested, which supplies migratory birds with feed during the fall and spring migrations.

Tribes to plan and implement authorized watershed project plans for watershed protection; flood mitigation; water quality improvements; soil erosion reduction; rural, municipal, and industrial water supply; irrigation; water management; sediment control; fish and wildlife enhancement; and hydropower.

NRCS is the lead federal agency for this Plan-EA and is responsible for issuance of a decision in accordance with NEPA. Reclamation and USFWS are also cooperating agencies, who must comply with NEPA and additional regulations. NEPA requires that projects using federal funds be evaluated for potential effects to the quality of the human and natural environment (individually or cumulatively).

Additionally, the continued feasibility of a project is monitored and documented in the project files every 5 years in accordance with NEPA requirements in the Title 190, General Manual, Part 410. Factors to be considered in determining the continued feasibility are economic, environmental, and social defensibility and the SLO commitment to continue the project. Modifications to the Plan-EA and project are prepared as necessary (NRCS, 2022).

The Plan-EA has been prepared as required by section 102(2)(C) of the National Environmental Policy Act of 1969 (NEPA), USDA's NEPA regulations (7 CFR Part 1b, finalized in April 2026), NRCS Title 190 General Manual Part 410, and NRCS's National Environmental Compliance Handbook Title 190 Part 610. The Plan-EA also meets the NRCS program policy of the 2015 NRCS National Watershed Program Manual (NWPM) (NRCS 2015) and guidance of the 2014 NRCS National Watershed Program Handbook (NWPH) (NRCS 2014). This Plan-EA serves to fulfill the NEPA and NRCS environmental review requirements for the proposed action.

In addition to the requirements and policies under NEPA listed above, the USDA has also conducted its analysis of this Plan-EA following the federal Principles and Requirements for Federal Investments in Water Resources³ as well as the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G). The USDA has issued guidance for analysis comprised of DM 9500-13 and DR 9500-13, and NRCS utilizes this guidance as the framework for evaluating water resources investments (USDA 2017).

³ Principles and Requirements are established pursuant to the Water Resources Planning Act of 1965 (PL 89-8), as amended (42 United States Code [U.S.C.] 1962a-2) and consistent with Section 2031 of the Water Resources Development Act of 2007 (PL 110-114).

2 Purpose and Need for Action

The purpose of this project is to improve agricultural water management and energy efficiency of District-managed infrastructure.

Federal assistance is needed to support TID in improving water conveyance efficiency and operation of District infrastructure to reduce water delivery and operational challenges. In recent years, TID has faced droughts that have severely limited water supply to irrigators within the District, TLNWR, and LKNWR. These water shortages and limited water deliveries are exacerbated due to constraints on the District's ability to efficiently deliver irrigation water to patrons and manage water within its system. Local agricultural economic sustainability depends on irrigation water, and implementation of this project would improve water management operations, increase efficiency of water delivery, and improve water management flexibility both within and outside the District. Improved water management could also benefit habitat at TLNWR, in which case recreation jobs and income could be beneficially impacted. When considering how to improve water management the District is constrained to existing water rights and agreements as well as working within its District boundaries and infrastructure.

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

Water resources investments shall reflect national priorities, encourage economic development, and protect the environment by: a. seeking to maximize sustainable economic development; b. seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and c. protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems. The project should seek to achieve the Guiding Principles as identified by the Federal Government. Additionally, in accordance with NRCS planning procedures the project seeks to solve problems, achieving study objectives while avoiding study constraints. The proposed project would be eligible for funding under Pub. Law No. 83-566 requirements under "Authorized Project Purpose (v), Agricultural Water Management," due to the proposed project's focus on irrigation water conservation, improved system operation efficiencies, and more reliable agricultural water supply delivery.

2.1 Watershed Problems and Resource Concerns

Federal assistance is needed to support the District in addressing the following watershed problems and resource concerns: water shortages for agriculture, water shortages for wildlife refuges, and water delivery and operation inefficiencies. The subsections below describe the watershed problems that federal assistance is needed to address.

2.1.1 Water Shortages for Agriculture

In recent years, prolonged drought conditions and variations in water allocations for the Klamath Project have impacted TID's operations, resulting in a less reliable water supply for District patrons. TID patrons contribute to the economy of the Klamath Basin through agricultural production of high-value crops such as alfalfa, wheat, irrigated pasture, potatoes, and onions. Decreased water allocations to the Klamath Project have led to decreased water supplies for TID, resulting in District producers fallowing more acres of productive agricultural land than they otherwise would choose.

This results in a decrease in crop production and a subsequent loss of revenue, threatening the local agricultural economies of the region.

2.1.2 Water Shortages for Wildlife Refuges

Unprecedented drought and reduced water allocations to TID have led to extensive habitat reductions in both TLNWR and LKNWR.

LKNWR wetland acres have declined by about 47 percent since 2012 (Donnelly et al. 2020). Drought and limited water supplies affect the ability of the TLNWR and LKNWR to provide and manage important habitat for aquatic life, including the federally listed shortnose and Lost River suckers. The Refuges also host the largest concentration of migratory waterfowl in North America and are critical stopping points on the Pacific Flyway (USFWS 2016). In 2022, the Refuges saw the lowest bird population numbers ever recorded (USFWS 2022).

2.1.3 Water Delivery and Operations Inefficiencies

The effects of water shortages at TID are exacerbated due to the old, inefficient lift pumps and lack of ability to manage flows throughout the system. This can result in the District inadvertently putting more water into the system than is needed. This additional water enters the District's drains and must be pumped, in some cases, multiple times.

The District's current system relies on the reuse of irrigation water, which requires operation of various pumping plants throughout the District. As a result, TID incurs high energy and O&M costs. The inefficiencies associated with pumping are largely due to antiquated pump units. An analysis in 2012 found that baseline pump efficiencies at nine District pump stations were between 47 and 75 percent. Upgraded pump efficiencies range from 75 to 80 percent with an average of roughly 80 percent (MBK Engineers, 2024). Also, many pump stations are operated manually and at a single speed, which limits the District's ability to match water demand with supply, and inevitably causes over-pumping and increases energy use.

2.1.4 Endemic Fish Recovery

Historically, Tule Lake provided suitable habitat for large populations of the Lost River and shortnose suckers. Only a small remnant of each population remains, due to poor water quality during summer and the loss of lake habitat with suitable water depth. There is hope, however, that these populations can be restored and Tule Lake is identified as a critical site for recovery. It is the goal of USFWS to facilitate successful spawning for suckers in Tule Lake (USFWS 2013), specifically by maintaining the water elevation in Sump 1A at least 4,034 feet or higher throughout the year to protect endangered sucker species (USFWS 2019).

2.2 Watershed and Resource Opportunities

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

- Improve irrigation water management and irrigation water delivery to irrigators within TID's system through better monitoring and control systems (i.e., SCADA) - *Healthy and Resilient Ecosystems; Sustainable Economic Development*
- Support and maintain existing agriculture through improved water management within the District's system. - *Healthy and Resilient Ecosystems; Sustainable Economic Development*

- Reduce the District's energy costs and O&M burden required to deliver irrigation water to TID patrons. - *Sustainable Economic Development*
- Improve water management flexibility for TID's operational spills. - *Healthy and Resilient Ecosystems, Sustainable Economic Development*
- Support Pacific flyway, fish recovery, and related ecosystem services. - *Healthy and Resilient Ecosystems*

3 Scope of the Plan-EA

3.1 Agency, Tribal, and Public Outreach

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

In accordance with regulations implementing the National Historic Preservation Act of 1966 as amended, and its subparts, NRCS must consult with the appropriate State Historic Preservation Officer(s) (SHPO), federally recognized Tribes/THPOs, and interested consulting parties. Consultation with interested Tribes/THPOs was initiated by the NRCS-CA on January 30, 2024. Consultation with the Oregon SHPO was initiated by NRCS-OR on September 21, 2023, and by NRCS-CA on February 7, 2024. As of July 7, 2026, a finding of "no adverse effect to historic properties" was submitted to the California and Oregon SHPOs and consulting Tribes. On August 3, 2026, Oregon SHPO indicated that they would not comment on the project but "it may continue as described" and on August 11, 2026, California SHPO agreed with the finding of no adverse effect to historic properties (see Appendix A.2.2).

In accordance with Section 7 of the Endangered Species Act, NRCS-CA entered into consultation with the USFWS for impacts to ESA-listed species on April 1, 2026.

3.2 Scoping Meeting

A public scoping meeting was held on February 8, 2023. Presenters at the meeting included Brad Kirby (TID) and Raija Bushnell, Farmers Conservation Alliance (FCA). Allison West attended and was the NRCS-CA representative. The presentations covered the financial assistance available through PL 83-566, the project purpose and need, the Plan-EA process, and ways in which the public could get involved. After the presentations, attendees asked questions and provided comments for the public record. A total of 27 people attended the meeting, excluding staff from TID, NRCS, and FCA.

3.3 Scoping Comments

Scoping comments were accepted from January 24 to March 8, 2023. Comments were received at the public meeting, through the District's WP website (<https://www.tulelakewatershedplan.com>) and via email (tulelakewatershed@gmail.com). See Table 3-1 for further information.

Table 3-1. Public Scoping Comment Summary.

Comment Topic	Section Where Topic is Discussed
Is there ongoing collaboration with the Yurok and other Tribes regarding restoring fish habitats?	Section 3.1, Agency, Tribal, and Public Outreach Section 4.7.4, Ecosystem Services Section 6.7.1.3, Ecosystem Services

Comment Topic	Section Where Topic is Discussed
What caused the water losses in Copic Bay and were these remedied?	Section 5.2.1, Canal Piping
How will this project impact how the District uses groundwater resources?	Section 4.6, Water Resources Section 4.6.1, Water Rights and Operations Section 4.6.4, Groundwater Section 5.2.1, Canal Piping Section 6.6.1.4, Groundwater Section 6.6.2.4, Groundwater
Will soil stability be impacted by the project?	Section 4.4, Soils Section 4.6.5, Ecosystem Services Section 6.4, Soils
Has the District considered storing water in Clear Lake for Irrigation use?	Section 4.6, Water Resources
Is the District considering implementing pressurized pipes or in-conduit hydropower?	Section 5.2, Alternatives Eliminated from Detailed Study
Do wildlife and migratory birds access irrigation canals and how would modernizing infrastructure impact the species either positively or negatively?	Section 4.6.2.3, Tule Lake Sumps Section 4.6.5, Ecosystem Services Section 6.9, Wildlife Resources
Is the project maintaining compliance of the 20% benefit to agricultural and rural communities?	Section 4.2.2, Land Use Section 6.3, Socioeconomic Resources
How will a modernization project be able to revitalize the Tulelake economy, which has suffered from water shortages?	Section 6.3, Socioeconomic Resources
Which parties are involved in the NEPA preparation and compliance process? Will multiple agencies be involved?	Section 1.4, Decision Framework Section 3.1, Agency, Tribal, and Public Outreach Section 4.1, Cultural Resources Section 5.1, Formulation Process Section 8.7.3, Responsibilities

Comment Topic	Section Where Topic is Discussed
Will the project guarantee improved water allocation?	Section 1.3, Current Infrastructure Section 2.1.3, Water Delivery and Operations Inefficiencies Section 6.6, Water Resources

3.4 Identification of Resource Concerns

Table 3-2 provides a summary of resource concerns identified through scoping and their relevancy to the proposed action. Resources determined not relevant were eliminated from detailed study; resources determined to be relevant have been carried forward for analysis.

Table 3-2. Summary of Resource Concerns for the Tulelake Irrigation District Infrastructure Modernization Project.

Resource	Relevant to the Proposed Action	Justification
Air Quality	No	No resource concerns have been identified nor will the project contribute to regional haze issues or to visibility degradation pollutants. Emissions from equipment associated with construction activities would occur; however, such emissions are considered negligible when compared to background levels and the application of best management practices (BMPs).
Coastal Zones	No	None present.
Coral Reefs	No	None present.
Cultural and Historic Resources	Yes	Cultural and Historic resources may be present in the project area.
Ecologically Critical Areas	Yes	The Tulelake and Lower Klamath National Wildlife Refuges are within the planning area.
Endangered and threatened species: Animals	Yes	Two ESA-listed endangered animal species occur in the project area or its vicinity.
Endangered and threatened species: Plants	No	No ESA-listed endangered or threatened plant species, plant species of concern, candidate plant species, or their designated critical habitats are known to occur within the project area.

Resource	Relevant to the Proposed Action	Justification
Essential Fish Habitat (EFH)	No	Since the project would not adversely affect EFH, consultation under the Magnuson-Stevens Act is not expected to be required.
Fish and Fish Habitat	Yes	The proposed action could affect fish habitat within waterbodies associated with District operations.
Floodplain Management	Yes	Construction and operation of the project could occur in the 100-year floodplain.
General Wildlife and Wildlife Habitat	Yes	Construction and operation of project components could affect wildlife near District operations.
Invasive Species/Noxious Weeds	Yes	Noxious weeds are known to occur within the project area.
Invasive Animal Species	Yes	Invasive animal species are known to occur within the project area.
Land Use	Yes	Land use could be affected by the proposed action.
Migratory Birds and Eagles	Yes	Migratory birds and eagles are known to occur within the project area.
Natural Areas	Yes	The project area crosses Natural Areas.
National Parks, Monuments, and Parklands	Yes	The Tulelake National Wildlife Refuge and Tule Lake National Monument are within the planning area.
Noise	No	No relevant effect to noise.
Prime Farmlands	Yes	Prime farmlands occur in the project area and could be affected by the project.
Public Safety	No	The proposed action would not affect public safety.
Recreation	Yes	The proposed action could beneficially affect recreation.
Regional Water Resource Plans	Yes	The proposed action considers altering the management of regional water resources.
Riparian Areas and Wetlands	Yes	Wetlands and riparian areas could temporarily be affected by project construction activities.

Resource	Relevant to the Proposed Action	Justification
Scenic Beauty and Visual Resources	No	Visual resources in the project area would not be affected by the project.
Scientific Resources	No	Scientific resources would not be affected by the project.
Soils	Yes	Construction of the project could affect soils.
Socioeconomics	Yes	The proposed action involves an expenditure of public funds that could affect the local and regional economy. An evaluation of the effects of providing NRCS funding is included.
Sole Source Aquifers	No	No sole source aquifers are present in or near the project area (EPA 2020).
Water: Groundwater Quantity, Aquifer Recharge	Yes	Construction and operation of the project could affect aquifer recharge.
Water: Surface Water Quality	Yes	Operation of the project could improve surface water quality.
Water: Surface Water Quantity	Yes	Operation of the project could improve surface water quantity.
Wild and Scenic River	No	No Wild and Scenic Rivers occur within the proposed project area.
Provisioning Services	Yes	Provisioning services have the potential to be affected by the proposed action.
Regulating Services	Yes	Regulating services have the potential to be affected by the proposed action.
Cultural Services	Yes	Cultural services have the potential to be affected by the proposed action.

4 Affected Environment

The following subsections describe the existing ecological, physical, biological, economic, and social resources of the project area and areas that could be affected by the operation of the TID system. The project area is defined in Section 1.2, Project Area. The nine subsections in this chapter describe the existing condition of resources that could be affected by the alternatives. Each subsection begins with an identification of the study area for the environmental resource at hand. The study area encompasses the spatial extent of the area where the effects may occur. The study area for any given resource may be limited to a relatively small area around individual sites associated with the proposed action, or it may extend to the boundaries of larger areas (e.g., watersheds, counties) that encompass the project area. Descriptions of the regulatory framework pertinent to the various resources are provided in Appendix E.

Per requirements of the PR&Gs, where applicable, this Plan-EA describes the ecosystem services associated with each resource. Ecosystem services refer to the benefits that people and their communities derive from the natural environment in which they live. Availability of water for consumption, buffering against crop failure through pollination, and providing places in which people value living are all examples of benefits that flow from nature to people. An assessment of links between ecological function and social well-being helps to ensure that beneficial and detrimental ecological impacts of a project are recognized and that detrimental impacts are minimized to the extent possible (EEA 2019).

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

1. Provisioning services: tangible goods provided for direct human use and consumption, such as food, fiber, water, timber or biomass;
2. Regulating services: services that maintain a world in which it is possible for people to live, providing critical benefits that buffer against environmental catastrophe—examples include flood and disease control, water filtration, climate stabilization, or crop pollination;
3. Cultural services: services that make the world a place in which people want to live—examples include spiritual, aesthetic viewsheds, or tribal values; and
4. Supporting services: services that refer to the underlying processes maintaining conditions for life on Earth, including nutrient cycling, soil formation, and primary production.

See Appendix E.10 for a diagram that links an action that would modernize District infrastructure with potentially impacted ecosystem features. Supporting services are not evaluated in this Plan-EA because they give rise to and support the final ecosystem services (Provisioning, Regulating, and Cultural) (EEA 2019; USDA 2017).

4.1 Cultural Resources

NEPA requires federal agencies to consider the effects of federally funded projects on cultural resources. For the purposes of NEPA, the term cultural resources encompasses “historic properties” as defined by Section 106 of the National Historic Preservation Act (NHPA), as well as sacred sites, archaeological sites not eligible for the National Register of Historic Places (NRHP), the historical built environment, and archaeological collections (CEQ Executive Office of the President and Advisory Council on Historic Preservation 2013). Under Section 106 of the NHPA, historic properties are defined as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the NRHP, including artifacts, records, and material remains related to such a property or resource” (36 CFR 800.16(l)(1)).

The study area for cultural resources consists of the APE, as well as the broader area considered during background research and records searches used to inform the identification of the APE and affected environment and to support consultation with regulatory agencies. The APE was defined to address potential impacts to archaeological resources from ground disturbance and direct and indirect effects to the historic built environment from modernization activities, and includes areas where ground-disturbing work would occur under the proposed action, adjacent areas, and construction staging and access areas. The cultural resources within the APE constitute the affected environment. See Appendix E.1 for detailed information about the ethnographic and historic context of the District, along with information about cultural resources investigations that have been conducted in and near the study area.

The study area includes portions of the traditional territory of the Modoc peoples, who established permanent camps around Tule Lake, Lower Klamath Lake, and Clear Lake. The broader Klamath Basin outside the study area also includes the traditional territories of two other Native American peoples: the Klamath and Yahooskin.

During the 19th century, the influx of European Americans and the subsequent claiming and use of Native lands without permission led to conflicts between the European Americans and Native Americans. In the 1850s, the Modoc leader, Keintpoos (also known as Captain Jack), proposed the development of a treaty to govern land use by both parties. The U.S. Congress drafted a different treaty (the Treaty of 1864), under which the Modoc ceded their traditional territories in southern Oregon and northeastern California and were confined, along with the Klamath and Yahooskin Band of Northern Paiutes, to the newly established Klamath Indian Reservation in Oregon. The treaty also promised money and supplies, but those ultimately were not distributed fully or fairly among the signatory Tribes. In response to unkept promises and conditions on the reservation, Keintpoos and a band of Modocs abandoned the reservation. The U.S. Army pursued the band, leading to the Modoc War from 1872 to 1873. Several places associated with the war, including a site known as Captain Jack’s Camp, are present in the District. Captain Jack’s Camp is one of many culturally important places in the area.

Following this period of conflict and displacement, and as Euro-American settlement intensified, the Tule Lake landscape was fundamentally transformed, overlaying earlier Indigenous cultural use areas with a system of reclamation and agricultural development. Reclamation and irrigation development in the western United States evolved from small, privately constructed systems in the mid-19th century to larger, corporate and privately financed irrigation enterprises in the late 19th century, before transitioning to large-scale, federally managed projects by the early 20th century. In the Klamath Basin, this transition culminated in the Klamath Project, authorized in 1905 under the Newlands Reclamation Act of 1902, and constructed primarily between 1906 and the 1920s. The

project introduced an extensive system of dams, canals, and drainage features designed to store and convey water from Upper Klamath Lake and its associated waterways to arid lands in southern Oregon and northern California. Implementation required the acquisition of existing water rights and the substantial modification of Lower Klamath and Tule Lakes.

In the Tule Lake area, reclamation began in 1909 with drainage works at the south end of the lake. The construction of Clear Lake and Lost River Dams (1910–1912) reduced flow into Tule Lake, exposing thousands of acres of former lakebed that were opened to homesteading beginning in 1917. Continued development through the 1920s–1940s—including the Lower Lost River Diversion Dam, J-Canal, pumping plants, dikes, and additional canal systems—enabled the expansion of irrigated agriculture and the drainage of low-lying sump areas. By the mid-20th century, much of the former lakebed and wetland margins had been converted to managed farmland. The TID was established in 1952, and since 1962 the irrigation network has remained largely in its current configuration, with ongoing operation and maintenance of existing infrastructure.

Analysts reviewed data from the State of California Northeast Information Center, which maintains records of the California Historical Resource Information System, as well as the California Office of Historic Preservation, the Oregon Historic Sites Database, and the Oregon Archaeological Records Remote Access system, to identify previously conducted cultural resource surveys and records of cultural resources in and within 0.5 miles of the APE. This records search was done to characterize the types of resources that might be found in the APE, to determine what previously documented resources are present within the APE, and to determine what previous cultural resources studies overlapped the APE. This background search identified no archaeological resources in the APE but one historic district in the APE. During the field survey, one previously unrecorded archaeological site (Temporary Site PMX_TID_1), one previously unrecorded archaeological isolate (PMX_TID_ISO_1), and 11 historic built environment resources were identified in the APE (Appendix E.1).

NRCS treated one archaeological resource in the APE as NRHP-eligible (Temporary Site PMX_TID_1) for the purposes of the project, as its boundary is well-defined and project avoidance was confirmed. PMX_TID_ISO_1 is not NRHP-eligible because it consists of one flake and has no potential to yield important information. PMX_TID_ISO_1 will also be avoided by the project.

There are 12 historic built environment resources located in the APE, including one historic district (Klamath Project Historic District) and 10 irrigation system structures of the Tulelake Irrigation District identified during field survey, as well as a second historic district (the Tule Lake Historic District) identified by NRCS following field survey. The two historic districts are treated as NRHP-eligible, eight of the individual resources are recommended NRHP-eligible as contributing resources of the historic district, and two of the individual resources are recommended as noncontributing resources of the historic district. None of the 10 irrigation system structures of the Tulelake Irrigation District below are recommended individually NRHP-eligible historic built environment resources (Appendix E.1). Historic built environment resources in the APE are:

- The Klamath Project Historic District, which is routinely treated by federal agencies and the California and Oregon SHPOs as eligible for listing in the NRHP. The Klamath Project Historic District includes historic built environment resources both within and outside of the APE.

- The Tule Lake Historic District is a multi-component, multi-state district representing the deep and complex history of former Tule Lake and vicinity, and includes the following archaeological and historic contributing resources: Petroglyph Point Archaeological District; Modoc Lava Beds Archaeological District; Tule Lake National Monument; Lava Beds National Monument; Lower Klamath National Wildlife Refuge; Klamath Project Historic District; and a possible Traditional Cultural Property important to Native Americans. For the purposes of this undertaking, NRCS is treating the Tule Lake Historic District as NRHP-eligible under Criterion A.
- Eight individual historic built environment resources that are components of the TID infrastructure that NRCS determined eligible for listing in the NRHP as contributors to the Klamath Project Historic District:
 - Three whole canals: J-Canal, M-Canal, and N-Canal;
 - Two whole canal lateral systems: J-Canal Lateral System and N-Canal Lateral System;
 - One structure: Pumping Plant D; and
 - Two whole reservoirs: Sump 1A and Sump 1B.
- Two individual resources that NRCS has determined to be noncontributing resources to the Klamath Project Historic District:
 - One whole canal: Q-Canal; and
 - One whole drain: D-Canal Drain.

4.2 Land Use

The study area for the evaluation of potential impacts on land uses consists of the lands within the District boundary, including the project area (i.e., the locations of District infrastructure that would be modernized under the proposed action) and sites that may be used for construction staging and access under the proposed action.

4.2.1 Land Ownership

Land ownership within the District varies, with ownership divided among private landowners, TID, and the federal government (USFWS and Reclamation) (Figure 4-1).

The District is approximately 63,000 acres in size and contains 924 farm accounts, of which 713 are privately owned lands, 159 are for publicly leased lands, and 52 are for surplus water through District sumps (MBK Engineers 2011).

Canals and laterals within the District are owned by Reclamation. Reclamation-owned rights-of-way surrounding the canals vary and are measured from the center line of the canal. Infrastructure within the canals, including well pumps, pumping plants, and trash screens, is owned by the District.

The TLNWR falls within District boundaries, and several proposed sites for infrastructure improvement are within the refuge. The TLNWR is owned by USFWS and is approximately 40,000 acres in size. Of this, approximately 17,300 acres are leased to farmers or are farmed by refuge permit holders (MBK Engineers 2021).

4.2.2 Land Use

Land uses within the District consist primarily of agricultural uses and associated infrastructure; land uses in the project area are wholly related to irrigation conveyance for agriculture. Portions of the project area in Klamath County, Oregon, are zoned as Exclusive Farm Use - Cropland (EFU-C), which is intended to protect and maintain agricultural lands for farm use, consistent with existing and future needs for agricultural products (Klamath County 2023). Portions of the project area in Siskiyou County, California, are zoned primarily as Prime Agricultural District (AG-1), intended for areas that are used or suitable for use for intensive agricultural production. The location of proposed improvement site N-1 is zoned as Rural Residential Agricultural (R-R-B-40), which is intended for areas where rural residential uses can be compatibly mixed with commercial agricultural activities with a minimum parcel size of 40 acres (Siskiyou County 2022). Portions of the project area in Modoc County, California, are zoned primarily as Agricultural Exclusive (AE), intended to protect agriculture by limiting incompatible land uses and reserving lands that are suited to agriculture, and Agricultural General, intended to be applied to lands that are used or appropriate for non-intensive agricultural and accessory uses (Modoc County 2023).

In 2019, crops grown within TID included alfalfa, wheat, barley, potatoes, pasture, and other crops (Appendix E.2 Table F-4).

In addition to agriculture, the TLNWR supports wildlife habitat and many recreational uses including hunting, photography, birdwatching, and educational programs (USFWS 2023a).

Rural-scale residential and agricultural-industrial uses are scattered throughout the District. A number of proposed project locations are adjacent to parcels with residential uses.

The town of Tulelake is located within the District boundary. Land uses in this urbanized area include residential, small-scale commercial, and public facilities such as schools, emergency service providers, and fairgrounds.

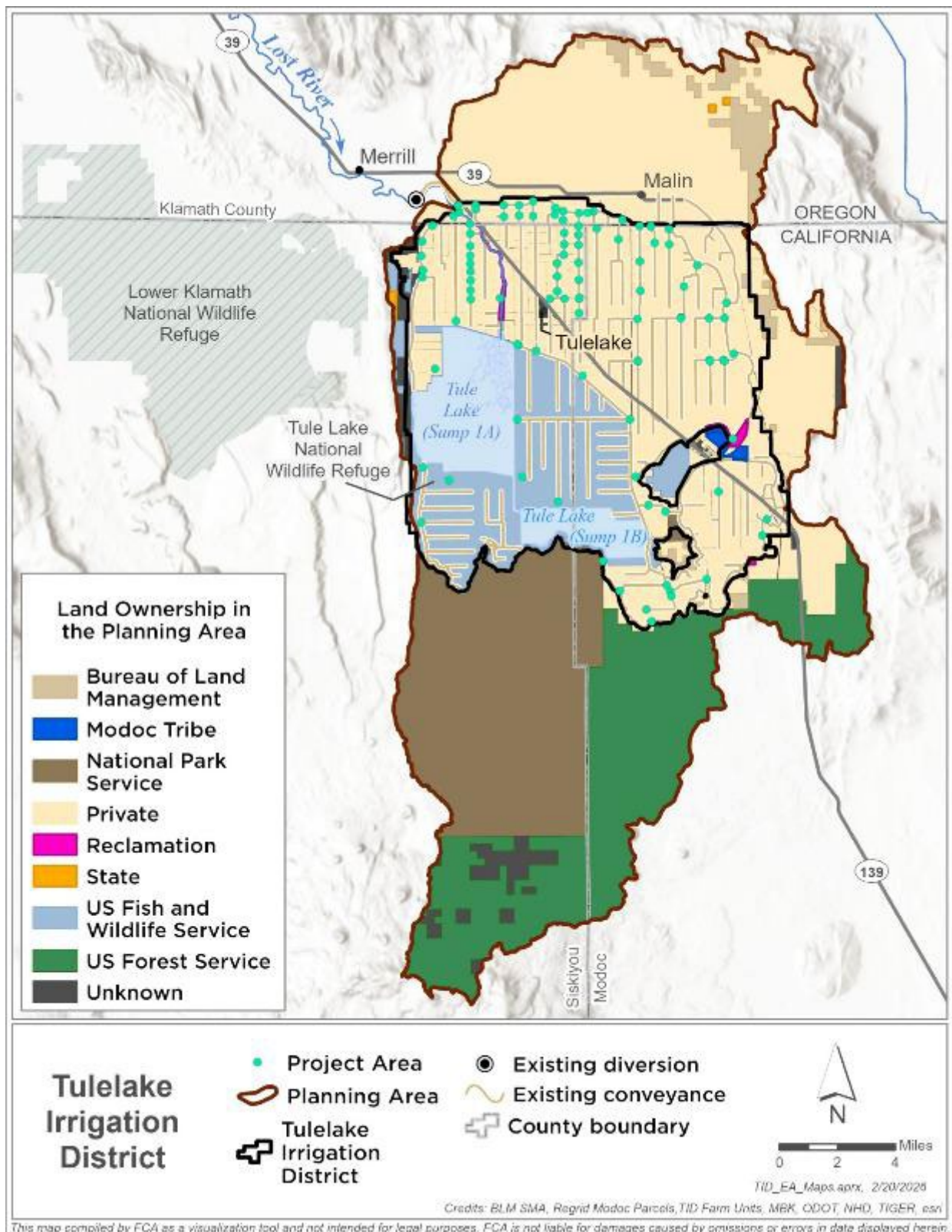


Figure 4-1. Tulelake Irrigation District land ownership.

4.2.3 Ecosystem Services

Provisioning service: Water available for irrigation: Water is diverted from the Klamath River and, to a lesser extent, the Lost River, and is delivered to the District and its patrons to provide for agricultural land uses, including cultivation of crops and livestock forage. This water allows for the cultivation of crops for human consumption and forage that supports livestock production, ultimately benefiting direct human use and consumption.

Cultural service, Culturally important natural areas: The delivery of water from District infrastructure to TLNWR and LKNWR provides cultural ecosystem services. The refuges host the largest concentration of migratory waterfowl in North America and are critical stopping points on the Pacific Flyway (USFWS 2016). This is an important cultural resource for wildlife observation, education, and research providing culturally important services. Unprecedented drought and reduced water allocations to TID have led to extensive habitat reductions in both TLNWR and LKNWR. In 2022, the refuges saw the lowest bird population numbers ever recorded (USFWS 2022).

4.3 Socioeconomic Resources

The project area lies within Klamath County in Oregon and Siskiyou and Modoc counties in California. These counties comprise the study area for the analysis of potential impacts on socioeconomic resources. The town of Tulelake is located within the District boundary.

4.3.1 Population

Table 4-1 shows the population characteristics for Klamath County, Siskiyou County, and Modoc County. Between 2016 and 2021, the populations of Klamath County and Siskiyou County increased, while the population of Modoc County decreased. In 2020, the population of Tulelake was 902 (U.S. Census Bureau 2020).

Table 4-1. Population Characteristics.

Area	2016 Population	2021 Population	Percentage Change, 2016 to 2021
Klamath County, OR	65,946	68,899	+4.5%
Siskiyou County, CA	43,668	44,151	+1.1%
Modoc County, CA	9,033	8,723	-3.4%

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

Race and ethnicity in Klamath County, Siskiyou County, Modoc County, and the states of Oregon and California are summarized in Table 4-2. Approximately 25 percent of the population of Klamath County identifies as a minority, similar to the statewide proportion in Oregon (approximately 28 percent). In both Siskiyou County and Modoc County, the proportions of the population that identify as a minority are substantially lower than the statewide proportion in California: approximately 27 percent in Siskiyou County and approximately 23 percent in Modoc County, compared to approximately 65 percent statewide.

Table 4-2. Race and Ethnicity.

Indicator	Klamath County	Siskiyou County	Modoc County	Oregon	California
Total Population in 2020	69,413	44,076	8,853	4,237,256	39,538,223
Two or More Races	6.5%	7%	2.3%	6.1%	4.1%
One Race					
• White alone	74.8%	72.7%	77.1%	71.7%	34.7%
• Black or African American alone	0.7%	1.1%	1.4%	1.9%	5.4%
• American Indian or Alaska Native alone	3.6%	4%	3.5%	1%	0.4%
• Asian alone	1.1%	2%	1.9%	4.5%	15.1%
• Native Hawaiian and Other Pacific Islander alone	0.1%	0.1%	0.1%	0.4%	0.3%
Hispanic or Latino (of any race)	12.6%	12.5%	14.9%	13.9%	39.4%
Not Hispanic or Latino	87.4%	87.5%	85.1%	86.1%	60.6%

Source: U.S. Environmental Protection Agency (EPA) 2020.

4.3.2 Area Employment and Income

Klamath, Siskiyou, and Modoc counties all have lower labor force participation rates and employment rates than their respective states (Table 4-3). Klamath County and Modoc County have higher unemployment rates than Oregon and California, respectively. Siskiyou County has a slightly lower unemployment rate than California as a whole.

Agriculture, forestry, fishing and hunting, and mining workers make up 2.6 percent of Klamath County's labor force, 9.5 percent of Siskiyou County's labor force, and 20.7 percent of Modoc County's labor force (U.S. Census Bureau 2021).

Table 4-3. Labor Force Characteristics.

Indicator	Klamath County	Siskiyou County	Modoc County	Oregon	California
Labor Force Participation Rate	51.9%	49.7%	46.3%	62.6%	63.9%
Employed	44.6%	45.8%	41.5%	59.0%	59.3%
Unemployment Rate	5.6%	3.9%	4.5%	3.5%	4.1%

Source: U.S. Census Bureau American Community Survey 5-year Estimates (2017–2021).

Median household income and the poverty rate are summarized in Table 4-4. Median incomes in all three counties are below the medians for their respective states, and poverty rates are higher.

Table 4-4. Income and Poverty.

Indicator	Klamath County	Siskiyou County	Modoc County	Oregon	California
Median Household Income	\$46,721	\$49,857	\$51,090	\$70,084	\$84,097
Poverty Rate	20.5%	16.7%	19.6%	12.1%	12.3%

Source: U.S. Census Bureau American Community Survey 5-year Estimates (2017–2021).

4.4 Soils

The study area for soils is the project area. Soils in the project area are generally silt loams with volcanic ash properties due to the geological influence of the eruption of Mt. Mazama (Crater Lake). As discussed in Appendix E.2., soils in the project area range from very poorly drained soils that formed in lacustrine deposits to excessively drained soils that formed in alluvium or lacustrine deposits derived from volcanic rocks. The potential for water-based erosion on most of these soil types is low because they all occur on slopes of 0 to 2 percent. Most soil loss in the area is due to aeolian erosion. Soils in the project area have been previously disturbed with the construction of the existing irrigation conveyance.

NRCS has developed technical soil groups that are associated with a particular soil type and a soil's rating for agricultural commodity production (NRCS 2023). NRCS soil groupings in the general vicinity of the project area are approximately 27 percent farmland of statewide importance, 18 percent prime farmland if irrigated, 13 percent prime farmland if irrigated and drained, and 41 percent not prime farmland. No unique farmland (land used to produce high-value crops) is present in the project area.

4.5 Vegetation

4.5.1 General Vegetation

The study area for vegetation consists of the project area plus areas within approximately 50 feet, where people and equipment engaged in construction activities could potentially affect existing vegetation. Vegetation is typically limited to a 5-foot-wide strip densely vegetated with reed canarygrass (*Phalaris arundinacea*), broad-leaf cattail (*Typha latifolia*), and hard-stem club-rush (*Schoenoplectus acutus*). Upslope of the canal, vegetation is dominated by 3-foot-tall Mexican fireweed (*Bassia scoparia*), stinging nettle (*Urtica dioica*), and tumble mustard (*Sisymbrium altissimum*).

Vegetation types in the TID boundaries consist predominantly of agricultural crops, with wetlands, pasture, developed land, and shrublands comprising the remainder of the District's land area (USGS 2019; TID 2017). Major agricultural crops are identified in Section 4.2, Land Use. Riparian areas within the District are limited to areas adjacent to the Lower Lost River Improved Channel, although hydrophytic vegetation can also be found along canals and ditches (NRCS 2022). Dominant wetland species present in the TLNWR include tule (*Schoenoplectus acutus*) and cattail (*Typha* sp.) (NRCS 2022).

No special-status species (i.e., threatened, endangered, candidate, and other sensitive plant species protected under the federal Endangered Species Act [ESA] or by the States of California or Oregon) are known or expected to occur in TID and the project area (CNDDB 2023a, Oregon Biodiversity Information Center [ORBIC] 2023, USFWS 2026). See Appendix E.3 for additional information.

Excessive biomass accumulation along the District's canals causes major operational issues. The District performs daily maintenance of aquatic vegetation to reduce serious damage to pump facilities. Additionally, the District has installed automated trash screens at some of its facilities to minimize damage from vegetation and to improve system efficiency. Vegetation in the project area is managed by mowing.

4.5.2 Common and Noxious Weeds

Common weed species that are abundant in TID and its surrounding vicinity include cheatgrass (*Bromus tectorum*), Scotch broom (*Cytisus scoparius*), and common teasel (*Dipsacus fullonum*). Various invasive and noxious weed species are also present. Noxious weeds are defined under the Oregon Administrative Rules (OAR) 603-052-1200 as those that have been declared a menace to the public welfare because of the environmental and economic degradation that occurs when they become established. California Food and Agriculture Code (FAC) 5004 (2021) defines noxious weeds as “any species of plant that is, or is liable to be, troublesome, aggressive, intrusive, detrimental, or destructive to agriculture, silviculture, or important native species, and difficult to control or eradicate, which the director, by regulation, designates to be a noxious weed.”

The spread of noxious weeds is regulated at the county and state levels. Siskiyou County operates one of the largest noxious weed programs in the state of California, and together with Modoc County, regulates noxious weeds in the California portion of the District. Klamath County performs the County's required duties under ORS 569.355 to control noxious weeds in the Oregon portion of the District.

Both California and Oregon use action-oriented weed classification systems to serve as official guidelines for prioritizing responses by state and county weed management programs and implementing noxious weed control projects (ODA 2022; CDFA 2023). Appendix E.3 lists the

noxious weeds known to occur within the District and vicinity, along with their corresponding classifications by Oregon and California.

4.6 Water Resources

The following subsections provide information about water used for District operations, surface water hydrology, surface water quality, and groundwater. The study area for water resources consists of the upper Klamath River watershed, including Upper Klamath Lake, the Link River, and Lake Ewauna, as well as the Lost River watershed, which includes Gerber Reservoir, Miller Creek, Clear Lake, and other waterbodies associated with TID operations, such as Tule Lake and the LKNWR downstream. The study area also includes the District's conveyance system of canals, laterals, ditches, and drains.

In addition to providing irrigation water, the District also delivers water to Tule Lake in the TLNWR and Lower Klamath Lake in the LKNWR. Water not used at the LKNWR enters the Klamath Straits Drain and discharges back to the Klamath River. Therefore, the District collects and distributes water across the landscape via an interconnected network of diversions, pumps, canals, laterals, ditches, sumps, etc. Because of this interconnectedness, changes in management and operations have the potential to affect water resources inside and outside of the TID project area.

4.6.1 Water Rights and Operations

TID's water supply comes from three primary sources: the Klamath River, the Lost River, and groundwater wells. Water is also sourced from the tailwater of other irrigation districts that divert surface water from those sources. See Appendix E.4 for a schematic diagram of water supply, distribution, and drainage systems in the Klamath Project, including TID. The relative proportion of the total water supply that comes from each of these sources varies from year to year based on availability and obligations to other users. As discussed in Section 2.1.1, Water Shortages for Agriculture, recent drought conditions and ESA-driven requirements have reduced water availability and forced TID to adjust its sourcing and delivery of irrigation water.

Oregon State water rights for the Klamath Project are part of an ongoing adjudication process. The state issued a Findings of Fact and Order of Determination in 2013, with certain amendments and corrections applied since that time. TID was associated with the consolidated claim (Claim Nos. 321-17, 293, 323-3) and Claims 312 and 317. The claim numbers, description, and associated acreages are summarized in Table 4-5.

Table 4-5. Claims Associated with the Final Order of Determination of the Klamath Adjudication.

Claim #	Description/Acres
293	215,559.4 acres agriculture and refuge lands plus 15,659.0 acres of inchoate lands.
312	35,000 acre-feet of water per year for irrigation of up to a maximum of 10,000 acres per year within a place of use totaling 25,381.7 acres within the Lower Klamath National Wildlife Refuge.
317	49,902.3 acre-feet of water per year for irrigation of up to a maximum of 16,000 acres per year within a place of use totaling 17,967.3 acres within the Tule Lake National Wildlife Refuge.

Claim #	Description/Acres
321-17	178,857.81 acres, 3,280 cfs from Upper Klamath Lake, Lake Ewauna, the Link River, and the Klamath River, including the Lost River Diversion Channel and all tributaries to the Klamath River.
323-3	735,500 acre-feet of storage in Upper Klamath Lake, Agency Lake, and Lake Ewauna 13,500 acre-feet.

Under the Final Order of Determination, the amount of water that can be diverted by the combined KID and TID irrigation system was determined based on the history of water use by these districts between 1961 and 2000. The total quantity of water includes water to be delivered to federal lands, namely TLNWR, under Claim 317. Water quantity estimates are broken down into two seasons: the March 1 through October 31 season and the February 15 through November 15 season. During these time periods, the District's water is controlled by operations at Station 48 and the No. 1 Drain Gate.

The majority of TID's surface water supply is from the Klamath River and is directed to TID via the Lost River Diversion Channel and the No. 1 Drain. Water diverted from the Klamath River is conveyed into the Lost River Diversion Channel and diverted at Station 48, which feeds into the Lost River and is then diverted downstream at the Anderson-Rose Dam to serve TID. The dam is operated to deliver surface water into TID's J-Canal, which distributes water to more than half of TID's irrigated lands (MBK Engineers 2011).

A substantial portion of TID's water supply is tailwater from other Klamath Project water users located north of the California-Oregon border, including lands in the Klamath Irrigation District (KID). Reuse of water from other Klamath Project areas can account for as much as 70 percent of TID's water supply. Additional points of inflow into the District from KID include the D-Canal, and drains 9, 10, 11, 46-C, 46-N-1-a, and 46-S.

The remaining water not diverted by TID at the Anderson-Rose Dam continues down the Lost River and into the Tule Lake sumps. The Tule Lake sumps are effectively what remains of the former Tule Lake, and the sumps compose the TLNWR. Sumps 1A and 1B act as regulating reservoirs for TID, while Sumps 2 and 3 have been reclaimed and are farmed as lease and co-op lands. Currently, TID must remove excessive water in its sumps to prevent flood damage to the surrounding areas. To do this, TID pumps the sump water through D Plant into the LKNWR at the end of the growing season (late fall/early winter), after the primary fall migration of birds.

In addition to managing 243 miles of canals and laterals, the District also has 334 miles of drains, 10 wells, and 36 pumping plants with a total of 65 individual lift pumps. Operational spills and tailwater from the District are conveyed through TID's extensive drainage system. Water regulated and stored in the Tule Lake sumps may be rediverted for irrigation within the District or discharged into the eastern units of the LKNWR through the Tule Lake Tunnel (through Sheepy Ridge). Water not used by the P-Canal users or the LKNWR enters the Klamath Straits Drain and is pumped back to the Klamath River.

Water is present in the District's canals and laterals and in the project area throughout the irrigation season (mid-April through early October) and occasionally during the non-irrigation season due to a

seasonally high-water table (Brad Kirby, personal communication, 8/2/2023). It is likely that water is permanently present in portions of the project area, such as pumps adjacent to the Tule Lake sumps.

Descriptions of surface water routing and infrastructure in the District are provided in Section 1.3, Current Infrastructure. Groundwater sources are described in Section 4.6.4, Groundwater.

4.6.2 Surface Water Hydrology

The following subsections describe the hydrology of waterbodies associated with District operations.

4.6.2.1 Lost River

The Lost River originates from the Clear Lake Reservoir east of TID. It flows north into Oregon, then west and south, terminating in the Tule Lake sumps. Along the way, Lost River water is used by other irrigation districts in the Klamath Project. Water from the river is diverted into the Lost River Diversion Channel, where it combines with flows from the Klamath River. Station 48 on the Lost River Diversion Channel supplies water back into the Lost River's natural channel, which then conveys TID's allocation to the Anderson-Rose Diversion Dam. The dam diverts water for TID into the J-Canal, and the remainder of the flow continues south to Tule Lake Sump 1A in the TLNWR. The supply of surface water from the Lost River to TID has become infrequent and unreliable for irrigation needs (MBK Engineers 2021).

4.6.2.2 Klamath River

The Klamath River originates from Lake Ewauna, just downstream of Upper Klamath Lake and the Link River. The river flows southwest for 257 miles through Oregon and northern California before discharging into the Pacific Ocean. By average discharge, the Klamath is the second-largest river in California after the Sacramento River; it has a drainage basin of almost 16,000 square miles. Snowmelt contributions from the Klamath Mountains (Marble Mountains, Salmon Mountains, Scott Bar Mountains, Siskiyou Mountains, and Trinity Alps) support year-round flow in the Klamath River.

The Klamath Project A-Canal begins with diversions at the Link River Dam. The A-Canal bifurcates several times, providing water to other Klamath Project users and eventually becoming the D-Canal that is identified as a source of tailwater feeding into TID's J-Canal. Downstream of Lake Ewauna, the Klamath River is connected to the Lost River Diversion Channel. The Klamath River provides supplemental water to be diverted at Station 48 and again at the Anderson-Rose Diversion Dam (described above). The annual amount of Klamath River water allocated to TID is based solely on the upstream beneficial uses. Therefore, water availability for irrigation varies substantially from year to year.

4.6.2.3 Tule Lake Sumps

The Tule Lake sumps represent the remainder of historic Tule Lake, which was largely drained for agriculture. The Tule Lake sumps are managed by USFWS as the TLNWR, one of six refuges that make up the Klamath Basin National Wildlife Refuge Complex. The Tule Lake sumps are divided into four areas: Sumps 1A and 1B act as regulating reservoirs for TID, while Sumps 2 and 3 have been reclaimed and are farmed as lease and co-op lands. Sump 1A receives flows directly from the terminus of the Lost River, which includes all water not diverted by TID at the Anderson-Rose Dam, as well as tailwater from many of the TID drains. Management goals for the Tule Lake sumps are codified in the Kuchel Act of 1964 (Public Law 88-567, 16 U.S.C. 695k-r), which emphasizes

proper waterfowl management on both conservation and lease lands within the TLNWR and LKNWR.

Water stored within the Tule Lake sumps may be rediverted for irrigation within TID or discharged by TID's D-Pumping Plant. The D-Pumping Plant controls water levels in the Tule Lake sumps. District tailwater and sump water that is discharged through the D-Pumping Plant is then conveyed through the Tule Lake Tunnel (drilled through Sheepy Ridge) to provide water to P-Canal lands including the LKNWR. Water not used by the P-Canal users or the LKNWR enters the Klamath Straits Drain and is pumped back to the Klamath River.

4.6.2.4 Lower Klamath Lake

Lower Klamath Lake, which was once directly connected with the Klamath River, has largely been drained, and the remaining marsh and lake areas are now managed as LKNWR. Maintained primarily for waterfowl and water-dependent species, this 53,600-acre refuge contains 12 wetland units that are supplied with water on either a seasonal or a permanent basis. While the Comprehensive Conservation Plan calls for a mix of perennial wetland, seasonal wetland, and floodable grain, drought conditions and limited water supply over the past 5 years have made it difficult to achieve these goals. Private agricultural lands are within the boundary of the former lake as well.

TID controls water levels within Tule Lake sumps and pumps water through the Tule Lake Tunnel in Sheepy Ridge to the P-Canal water users, as well as to the LKNWR.

4.6.3 Surface Water Quality

Irrigation water quality within TID canals and ditches is generally considered poor, although it is not frequently monitored. A significant proportion of TID's water supply comes from tailwater from other Klamath Project users that is originally sourced from waterbodies listed as impaired under Section 303(d) of the Clean Water Act (CWA), such as the Klamath River, the Lost River, and the Lost River Diversion Channel. Within TID, water quality is further degraded as water travels from the headworks to TLNWR and LKNWR (EPA 2008). During the non-irrigation season, canals are generally dewatered. The remainder of this section discusses water quality in waterbodies associated with District operations.

The Lost River in Oregon is a 303(d)-listed waterbody for temperature, dissolved oxygen, ammonia toxicity, and chlorophyll-a. Total Maximum Daily Loads (TMDLs) have been established for the Lost River in Oregon based on the most sensitive beneficial use: fish and aquatic life. In California, the Lost River was removed from the Section 303(d) list for temperature in 2006; however, it is still subject to temperature targets (NCRWQCB 2018). The Lower Lost River, TLNWR, and LKNWR, all in California, have TMDLs established by EPA Region 9 for pH, dissolved oxygen, and dissolved inorganic nitrogen.

The Klamath River from Upper Klamath Lake to the Keno Dam, also known as Lake Ewauna and the partial source of the Lost River Diversion Channel, is on Oregon's Section 303(d) list for temperature, dissolved oxygen, pH, chlorophyll-a, and ammonia. The Klamath Straits Drain, which conveys water from LKNWR back to the Klamath River, is also a Section 303(d) waterbody for the same parameters (DEQ 2019).

The Tule Lake Sumps 1A and 1B are part of a larger grouping of waterbodies listed and have a TMDL established for high pH. High mercury levels and temperature have also been identified as potentially problematic in these waterbodies but have not been added to the Section 303(d) list

(NCRWQCB 2018). The lower Lost River and TID canals and drains are also part of a grouping of surface waterbodies that are listed for pH, dissolved oxygen, nutrients, mercury, and arsenic; however, TMDLs have only been established for the latter three (NCRWQCB 2018).

With increasing re-use of tailwater for irrigation, there is concern about the potential to concentrate salts in the soil profile (Mateos et al. 2000). While this is not currently observed within TID, it is expected to begin happening with more frequent drought-year operations.

Finally, toxins from cyanobacteria blooms have become more common in the Tule Lake sumps as a result of less system flushing and extensive water recycling. Ongoing drought exacerbated by climate variability has led to reduced project allocations and subsequent reduced return flows resulting from increased irrigation efficiency throughout the Klamath Project.

4.6.4 Groundwater

TID has the ability to supplement its surface water supply with 10 high-capacity irrigation wells that were drilled in 2010. Each well can supply between 6,000 and 10,000 gallons per minute, but the wells alone do not have the capacity to supply more than 15 to 20 percent of TID's water needs. Historically, groundwater was not a significant source for irrigation in the District. However, groundwater supplementation has become more frequent in the last two decades. The driving forces behind this change are increased frequency and severity of drought conditions, combined with reduced surface water deliveries due to ESA-driven water requirements in Upper Klamath Lake and the Klamath River. Groundwater is only used in necessity during dry years when the surface water supply is curtailed. The use of well water also benefits irrigators outside TID, as it frees up surface water for other Klamath Project users. It should be noted that the use of groundwater is considered "junior" to the "senior" surface water rights in this region; therefore, increased reliance on groundwater over the long term is unlikely if a demonstrated potential for groundwater extraction to harm surface water availability is demonstrated during the adjudication process.

The Tule Lake Subbasin was identified as a medium-priority basin by the California Department of Water Resources, meaning the subbasin is not in a state of overdraft. As required by California's Sustainable Groundwater Management Act, TID worked with Modoc County, Siskiyou County, and the City of Tulelake to develop and implement a Groundwater Sustainability Plan that was adopted in early 2022. The purpose of the plan is to bring the basin into sustainable groundwater management by 2042 (MBK Engineers 2021).

4.6.5 Ecosystem Services

Provisioning service: Water available for irrigation: Water from the Klamath River and Lost River systems is diverted into the District's irrigation system and delivered to its patrons' properties to provide for agricultural purposes, including cultivation of crops and livestock forage. This water allows for the cultivation of crops for human consumption and forage that supports livestock production, ultimately benefiting direct human use and consumption.

Regulating service: Water quality: Water quality within TID is generally considered poor, although it is not frequently monitored. A significant proportion of TID's water supply comes from tailwater from other Klamath Project users that is originally sourced from waterbodies listed as impaired under Section 303(d) of the CWA, such as the Klamath River, the Lost River, and the Lost River Diversion Channel. With increasing re-use of tailwater for irrigation, there is concern about the potential to concentrate salts in the soil profile. Ongoing drought exacerbated by climate variability has led to reduced project allocations and subsequent reduced return flows resulting from increased irrigation efficiency throughout the Klamath Project.

Cultural service: Culturally important species: People's values for species conservation may arise from personal use (i.e., enjoying seeing the species and/or its habitat), personal beliefs and moral ethics (i.e., believe protecting a species and its habitat is the right thing to do), altruism (i.e., believing a resource should be protected so that others can use it or benefit from it), and/or a desire to bequest the resource (i.e., believing a resource should be protected for future generations). TID works closely with USFWS to manage water levels in TLNWR and provide water for LKNWR downstream. These refuges provide important wetland habitat and food resources for myriad migratory waterfowl. In addition, TID's open canals and drains can provide habitat, a water supply, and a dispersal corridor for mammals and amphibians throughout the District. Where vegetation has not been cleared, it can provide food, cover, and breeding sites for a variety of wildlife species throughout the year.

Cultural service, Culturally important natural areas: The delivery of water from District infrastructure to TLNWR and LKNWR provides support to the refuges as culturally important natural areas that provide cultural ecosystem services. Surface water management and the water provided to TLNWR and LKNWR support refuge operations and therefore the cultural value of the refuges themselves. Recent water shortages have limited water deliveries to the refuges.

4.7 Fish and Aquatic Resources

The study area for fish and aquatic resources consists of the waterbodies associated with TID operations (see Section 4.6.1, Water Rights and Operations), as well as the TID conveyance system of canals, laterals, and drains. Appendix E.5 provides additional supporting information about fish and aquatic resources.

4.7.1 General Fish and Aquatic Species

The isolated nature of historical habitat in the upper Klamath River and Lost River watersheds has resulted in a limited native fish species assemblage, comprising only five families: *Petromyzontidae* (lampreys), *Cyprinidae* (minnows), *Catostomidae* (suckers), *Salmonidae* (salmon and trout), and *Cottidae* (sculpins). Native fish species have evolved to thrive in a landscape characterized by shallow lakes, low-gradient streams, and climatic extremes (NRC 2004).

Chinook salmon and steelhead once migrated to tributaries upstream of Upper Klamath Lake, and coho salmon and Pacific lamprey may have migrated upstream as far as the Spencer River (a tributary that enters the mainstem Klamath River above Iron Gate Dam, but below Keno Dam) (Hamilton *et al.* 2011). These anadromous runs have been eliminated from the upper Klamath River Basin due to the inability to migrate past Iron Gate Dam. Non-native fish species that have been introduced include fathead minnow in Upper Klamath Lake, Sacramento perch in Clear Lake, and brown bullhead, green sunfish, bluegill, pumpkinseed, largemouth bass, white crappie, black crappie, and yellow perch throughout the study area. In addition, non-native bullfrog (*Lithobates catesbeianus*) populations have been increasing in the region, which represents a potential risk to populations of native fish and amphibians.

Based on the hydrologic connectivity between TID's canals, laterals, and drains and waterbodies in the surrounding watersheds, the species identified above have access to the project area. In some cases, barriers to migration posed by pumps and screened diversions may limit distribution, and degraded water quality in the District's conveyance system may be unsuitable for many of these species. Nonetheless, at the end of each irrigation season in conjunction with dewatering, Reclamation conducts fish salvage at several locations along the TID's J-Canal. Juvenile suckers are encountered on a regular basis and these efforts are documented in annual monitoring reports (e.g.,

Reclamation 2023). The take of ESA-listed species due to entrainment within Klamath Project infrastructure was addressed in the biological opinions for Klamath Project Operations (USFWS 2019, 2023e).

4.7.2 Federally Listed Fish Species

Two ESA-listed fish species have been documented in the study area. These are the shortnose sucker (*Chasmistes brevirostris*) and the Lost River sucker (*Deltistes luxatus*), both of which are listed as endangered. No critical habitat for either species has been designated in the canals, laterals, ditches, or drains that make up the District's conveyance system (USFWS 2026). Study area waterbodies in which critical habitat has been designated are Clear Lake Reservoir, Gerber Reservoir, Upper Klamath Lake, Lake Ewauna, and the Klamath River. None of these waterbodies are within 10 miles of TID.

Lost River suckers are large (up to 3.3 feet long) and long-lived (up to 55 years old). They are native to the Lost River and upper Klamath River systems, where they have adapted to living in lakes (Moyle 2002). Shortnose suckers can grow up to almost 2 feet long, but growth is variable among individuals. They also are relatively long-lived; some fish have been aged at 33 years old. Both species live in lakes and reservoirs but spawn primarily in streams. Spawning occurs from February through May in riffles or runs with gravel and cobble substrate, moderate flows, and depths of less than 4 feet. After hatching, larvae emerge from the gravel and drift downstream to the preferred lake habitat, rearing along the shoreline in areas of shallow water and emergent vegetation. As they grow larger in the first year, they move to deeper water, and adults typically inhabit areas at least three feet deep.

Historically, Tule Lake provided suitable habitat for large populations of both species of suckers. In fact, Tule Lake likely hosted the largest Lost River sucker population prior to damming (Bendire 1889). Only a small remnant of each population remains, due to poor water quality during summer and the loss of lake habitat with suitable water depth. Sampling efforts in 2007 found adult suckers but no juveniles, indicating recruitment was severely limited. Adult suckers in the Tule Lake sumps currently lack access to suitable spawning habitat in the Lost River, and USFWS concluded that the two sucker populations are not self-sustaining under the existing conditions (USFWS 2019). There is hope, however, that these populations can be restored and Tule Lake is identified as a critical site for recovery. It is the goal of USFWS to facilitate successful spawning for suckers in Tule Lake (USFWS 2013), specifically by maintaining the water elevation in Sump 1A at least 4,034 feet or higher throughout the year to protect endangered sucker species (USFWS 2019). Unfortunately, ongoing drought conditions have resulted in the sumps completely drying out at times, beginning in 2021 (USFWS 2023d).

Entrainment of suckers into conveyance infrastructure (including within TID) is accounted for in the USFWS Incidental Take Statement for the Klamath Project Operations (USFWS 2023d). Each year at the end of the irrigation season, Reclamation conducts fish salvage in TID's J-Canal to limit mortality associated with dewatering and stranding (Reclamation 2023). Salvage efforts may occur within the project area. Salvage is also performed periodically in areas that must be temporarily dewatered for maintenance.

Additional species with federal conservation status in the Klamath Basin include:

- Coho salmon (*Oncorhynchus kisutch*) are listed as threatened under the ESA. This species is not expected to occur in the project area because there are no known observations in the

TLNWR or the LKNWR, there is no suitable habitat, and there are no migratory pathways that would allow access to the area (USFWS 2016).

- Bull trout (*Salvelinus confluentus*) are listed as threatened under the ESA. For the same reasons as coho salmon, this species is not expected to occur in the project area.
- Oregon spotted frogs (*Rana pretiosa*) are listed as threatened under the ESA. This species is not expected to occur in the TLNWR or LKNWR because there are no known observations and there is no suitable habitat (USFWS 2016). The nearest extant populations of this species are more than 30 miles from TID (USFWS 2022).

No critical habitat for coho salmon, bull trout, or Oregon spotted frogs has been designated or proposed for designation in the study area. In addition, no waterbodies in the study area have been designated as essential fish habitat by the National Marine Fisheries Service (NMFS 2023).

4.7.3 State-Listed Aquatic Species

A list of aquatic species that are protected by the State of Oregon (OAR 635-100-0105) and that may be present in the project area was compiled using the ORBIC data report (ORBIC 2023). Species protected by the State of California (CA Fish and Game Code § 2050–2115.5) were identified using the state’s most current inventory of listed endangered and threatened animals (CNDDB 2023b).

Both the Lost River sucker and the shortnose sucker are listed as endangered by the State of Oregon and the State of California. Coho salmon are listed as endangered by the State of Oregon and as threatened by the State of California. No other state-listed threatened, endangered, or candidate fish or aquatic species are known or expected to occur in the study area.

4.7.4 Ecosystem Services

Provisioning service: Fish populations: Waterbodies associated with District operations support populations of native Lost River sucker and shortnose sucker, both of which are federally listed and state-listed as endangered. Other species potentially present in waterbodies associated with District operations include lamprey (i.e., Pacific lamprey and Pit-Klamath brook lamprey), minnows (i.e., tui chub and blue chub), sculpin (i.e., Klamath Lake sculpin, marbled sculpin, and slender sculpin), and Klamath redband trout. Introduced species include fathead minnow in Upper Klamath Lake, Sacramento perch in Clear Lake, brown bullhead, green sunfish, bluegill, pumpkinseed, largemouth bass, white crappie, black crappie, and yellow perch, and other fish species.

Cultural Service: Culturally important species: People’s values for species conservation may arise from personal use (i.e., enjoying seeing the species and/or its habitat), personal beliefs and moral ethics (i.e., believe protecting a species and its habitat is the right thing to do), altruism (i.e., believing a resource should be protected so that others can use it or benefit from it), and/or a desire to bequest the resource (i.e., believing a resource should be protected for future generations). Some fish species have cultural significance to the Klamath Tribes. These include the Lost River sucker and shortnose sucker, which were a primary food source for the Tribes before the sucker populations collapsed in the 1980s.

4.8 Wetland and Riparian Areas

The study area for wetlands and riparian areas consists of the project area and lands served by the District.

Wetlands and riparian areas perform a number of valuable functions, including water storage, water filtration, and biological productivity. They can also support complex food chains that provide sources of nutrients to plants and animals and provide specialized habitat for a wide variety of aquatic and terrestrial species.

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

Based on an analysis of aerial imagery and data from the National Wetlands Inventory (NWI), wetlands and riparian areas are located primarily along the perimeter of Tule Lake Sumps 1A and 1B, the Lost River, and along irrigation canals, laterals, and drains. These areas are found mostly within floodplains and drainages in the TLNWR. Soils in most of the District are classified by NRCS (2023) as hydric soils, suggesting the potential to support wetland vegetation.

Using NWI, approximately 5.71 acres of wetlands were identified within the project area. NWI has identified 5.57 acres as “riverine” and 0.14 acres as “riverine, freshwater emergent.” Although these 0.14 acres have been identified differently under NWI, they have similar features to the other 5.71 acres. A wetland scientist conducted a reconnaissance site visit of the District in August 2023 and observed hydrophytic vegetation (i.e., species that usually or almost always grow in wetlands) along the edges of TID’s canals and laterals. The vegetation along the canals and laterals generally consists of a herbaceous cover of non-native grasses and forbs (or graminoids).

While these areas may have some riverine features, such as hydrophytic vegetation, and qualify as riparian habitat, they don’t have trees, shrubs, or other features that you may typically see in riparian habitats. Additionally, these areas do not provide the services associated with riparian habitat such as improving water quality by filtering pollutants, reducing erosion, and stabilizing banks. Water typically flows through the District’s canals and laterals during the irrigation season between mid-April and early October, creating favorable growing conditions for the vegetation during a portion of the year. However, the vegetation in the project area is regularly disturbed during operation and maintenance of the canals and laterals.

Wetlands in irrigation ditches are generally not regulated under Section 404 of the Clean Water Act (see Appendix E.8). Based on NWI analysis, almost all wetlands associated with the project area are within the excavated irrigation ditches and would not be regulated under Section 404. At two sites within the project area there are NWI-mapped wetlands that may be jurisdictional and occur outside of the excavated canal. See Appendix E.7 for a summary and quantification of the potential wetland areas within the project area as well as photos showing typical vegetation at these sites.

According to the current FEMA Flood Insurance Rate Maps for Siskiyou, Modoc, and Klamath Counties, portions of the District along the lower Lost River and Tule Lake Sumps 1A and 1B are within the 100-year floodplain (see Appendix E for a map). These areas have been farmed for several decades.

4.9 Wildlife Resources

The study area for wildlife includes the project area plus adjoining areas where construction-related noise and human activity could disturb sensitive species. Appendix E.6 provides additional information about wildlife species, including special-status species, known or expected to be present in or near the project area.

4.9.1 General Wildlife

Most wildlife species that may use habitats in TID and the project area are habitat generalists and other species that are able to adapt to or exploit the agricultural environment. Mammals characteristic of such areas include shrews, moles, squirrels, gophers, rabbits, mice, bats, American badger, striped skunk, and coyote. Larger mammals such as deer, pronghorn, and elk are commonly seen grazing in the fields within the District's irrigated lands (NRCS 2022). Amphibian species that may occur in the District include long-toed salamanders, rough-skinned newts, Great Basin spadefoot, Cascades frog, western toad, Pacific treefrogs, and bullfrogs (USFWS 2016). Animals in the area commonly use the District's canals and drains within the project area as habitat and water sources.

4.9.2 Migratory Bird Treaty Act / Bald and Golden Eagle Protection Act Protected Species

Much of the TLNWR lies within the boundaries of TID. The TLNWR is an important stop on the Pacific Flyway, which connects waterfowl breeding grounds in the north with major wintering grounds in California and Mexico. Approximately 80 percent of migratory waterfowl on the Pacific Flyway pass through the District and surrounding region during spring and fall migrations. Waterfowl migration begins in early September; up to a million ducks, geese, and swans are typically present by early November (NRCS 2022).

Migratory birds use various habitats in TID including agricultural habitats, interspersed undeveloped uplands, and wetland and aquatic habitats. Aquatic habitats associated with District canals, drains, and the Tule Lake sumps are used by various species of ducks, geese, swans, and other migratory waterfowl (eBird 2023). Crops in reclaimed areas administered by USFWS and leased for farming within the District must be left approximately 25 to 33 percent unharvested to provide forage for migratory birds during the fall and spring migrations (TID 2017).

Nearly all bird species in TID are protected under the Migratory Bird Treaty Act (MBTA). The Act (16 U.S.C. § 703–712) implements various treaties and conventions between the United States and other countries for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds, or taking, destroying, or possessing their eggs or nests, is unlawful. The Act classifies most species of birds as migratory except for upland and non-native birds such as pheasant, chukar, gray partridge, house sparrow, European starling, and rock dove.

Bald eagles may also be found foraging within the District in spring and summer months (USFWS 2016). Eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668–668d), which prohibits the taking or possessing of and commerce in bald and golden eagles, with limited exceptions. The Act covers intentional acts or acts in disregard of the safety of bald or golden eagles.

4.9.3 Federally Listed Species

Analysts reviewed data from USFWS (2026), ORBIC (2023), and CNDDDB (2023b) to identify ESA-listed wildlife species potentially present in or near TID. ESA-listed aquatic species are discussed in Section 4.7.2, Federally Listed Fish Species.

The ranges of two ESA-listed wildlife species overlap with the District. They are the gray wolf (*Canis lupus*) and the yellow-billed cuckoo (*Coccyzus americanus occidentalis*). There are no known observations of either species in or near the District, and no areas within the District boundaries have been designated or proposed for designation as critical habitat for either species. Due to a lack of suitable habitat, neither of these species is expected to be present in the study area. USFWS (2026) also identified monarch butterfly (*Danaus plexippus*) and Suckley's cuckoo bumble bee, proposed to be listed as threatened and endangered (respectively) under the ESA, as potentially present in the study area. Suckley's cuckoo bumble bee is not anticipated to be present in the study area but monarch butterfly is known to be present throughout the Klamath Basin (USFWS 2023c) and is therefore assumed to be present from June 1 to September 30, which is the breeding season for the species within the region (Xerces Society 2018).

Northwestern pond turtles are known to occur within the Tulelake Irrigation District Watershed Area (USFWS 2023b) and within Tule Lake (USFWS 2016). This species is proposed as threatened under the ESA and is state-listed by Oregon as a sensitive-critical species. Based on the presence of potentially suitable habitat (CDFW 2016; USGS GAP 2018) and observations of NWPTs in Klamath Project irrigation canals (K. Adkins, ODFW, personal communication, January 12, 2024), the species could be present in the District's conveyance system.

4.9.4 State-Listed Species

A list of wildlife species that are protected by the State of Oregon (OAR 635-100-0105) and that may be present in the project area was compiled using the ORBIC data report (ORBIC 2023). Species protected by the State of California (CA Fish and Game Code § 2050–2115.5) were identified using the state's most current inventory of listed endangered and threatened animals (CNDDDB 2023b). These species are identified in Table 4-6. State-listed aquatic species are discussed in Section 4.7.3, State-Listed Aquatic Species.

Table 4-6. State-Listed Wildlife Species Potentially Present in the Project Area.

Common Name	Scientific Name	Oregon State Status	California State Status
Gray wolf	<i>Canis lupus</i>	Endangered	Endangered
Tricolored blackbird	<i>Agelaius tricolor</i>	Not Listed	Threatened
Northern goshawk	<i>Accipiter gentilis</i>	Sensitive	Not Listed
Swainson's hawk	<i>Buteo swainsoni</i>	Sensitive	Threatened
Bank swallow	<i>Riparia riparia</i>	Not Listed	Threatened
Greater sandhill crane	<i>Grus canadensis tabida</i>	Not Listed	Threatened

Sources: ORBIC 2023; CNDDDB 2023b.

5 Alternatives

5.1 Formulation Process

The formulation of alternatives followed the requirements for NEPA (including USDA Department regulations 7 CFR 1b) as well as the PR&G. During the formulation stage, multiple alternatives were considered, including: piping sections of the District, lining sections of the District, SCADA and pump upgrades, and more comprehensive SCADA.

These alternatives were analyzed to determine if they met the purpose and need and PR&G formulation criteria⁴ (see Appendix D.5 for a table presenting this analysis). After this consideration, the canal lining alternative was eliminated from further analysis. More information on this alternative and why it was eliminated during the formulation stage can be found in Appendix D.1.3.

5.2 Alternatives Eliminated from Detailed Study

The following describes two alternatives that met the formulation criteria, but after consideration were not moved forward to be analyzed in detail as viable alternatives. Alternatives were removed from consideration if they did not address the purpose and need for action, did not achieve the Federal Objective and Guiding Principles, or became unreasonable because of exorbitant cost, logistics, existing technology, or environmental reasons (National Watershed Program Manual 501.37; PR&G 6.5b).

5.2.1 Canal Piping

The District would convert open laterals to fully pressurized pipe in the J-1 and Copic Bay Systems. The following actions would be included in a Canal Piping Alternative:

- The proposed action in the J-1 System would convert 26.2 miles of open laterals to a fully pressurized pipeline system. Additional actions would include installing one new centralized pump station and tying in existing drain and groundwater pump stations to the piped system. The J-1 Lateral is separated from the rest of TID's delivery system by the Lower Lost River Improved Channel and is the first lateral on the J-Canal. The capital costs for this project are estimated at \$65,206,200.
- The proposed action in the Copic Bay System would convert approximately 23.5 miles of open laterals to a fully pressurized pipeline system along the Copic Bay Lateral. The fully pressurized pipeline system would be operated by one new centralized pump station with the supplemental pump augmenting the flows. Up to 17 private groundwater pumping stations would be tied in to augment the flows in the Copic Bay system. The capital costs for this project are estimated at \$81,957,400.

Piping the J-1 and Copic Bay Systems would meet the project purpose of Agricultural Water Management by improving water management operations, increasing energy efficiency, and conserving water along district infrastructure.

⁴ These alternatives were analyzed for four criteria: completeness, effectiveness, efficiency, and acceptability (USDA 2017). Some of the initial alternatives considered did not meet these formulation criteria and were eliminated from further analysis; see Appendix D.1.3.

However, the exorbitant costs of implementing these piping projects eliminated the alternative from further study. Additional discussion of alternative costs can be found in Appendix D.3. Based on these costs, canal piping was eliminated from further study. This alternative does not achieve the Federal Objective and Guiding Principles.

5.2.2 Additional SCADA Locations

Under this alternative the District would install SCADA on seven additional drains into the Lost River upstream of TID. These sites would allow the District to better understand inflow from upstream Klamath Project users into the District's system. Currently, inflows to the Lost River and return flows from KID are not well understood nor measured.

Implementation of these upgrades would meet the project purpose of Agricultural Water Management by improving water management operations within the District. However, it was determined that the installation of SCADA into the Lost River did not meet the efficiency criteria for the PR&Gs. Based on costs and logistics associated with permitting and implementation of SCADA in the Lost River, the project would not be efficient.

5.3 Alternatives Description

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

5.3.1 No Action Alternative (Future without Federal Investment)

Under the No Action Alternative, federal funding through PL 83-566 would not be available to implement the project. The District would continue to operate and maintain its existing system in its current condition. This alternative assumes that modernization of the District's system to meet the purpose and need of the project would not be reasonably certain to occur. For the purpose of this Plan-EA, the No Action Alternative is a near-term continuation of the standard operating procedures. Under the No Action Alternative, TID would replace pump units as they are needed (i.e., after a failure requires it) and as the District's budget allows. The total (undiscounted) replacement cost of the No Action Alternative is therefore estimated at \$2,750,000. More information on the No Action Alternative costs can be found in Appendix D.2.

The No Action Alternative would not meet the purpose and need of the project. There would be no improvement to Agricultural Water Management or to District water management operations, water and energy efficiency would not be increased, and the District's O&M costs would remain high. Water delivery and operational inefficiencies would remain the same and could potentially worsen over time as equipment and infrastructure continue to age, and replacement parts become more difficult to procure. This is especially true of the pumping infrastructure that the District relies on to move water to its patrons. Under the No Action Alternative, the effects of future water shortages and limited water deliveries to District patrons and the TLNWR and LKNWR could be exacerbated.

5.3.2 Modernization Alternative (Future with Federal Investment)

Under this alternative, federal funding through PL 83-566 would be available. The District would perform the following actions (see Figure 5-1):

- Upgrade pumps throughout the District at approximately 28 locations. These pump upgrades would include various improvements such as replacement of the pump and motor, variable frequency drive installation, SCADA upgrades for individual pumps, and traveling screen installations.

- Install SCADA and automation equipment throughout the District at approximately 74 locations. SCADA installation would allow the District to more effectively measure and control water within the District.

The District has determined that this alternative is technically feasible and addresses the project's purpose and need. When developing the Modernization Alternative, risk and uncertainty were considered. The Modernization Alternative would provide resiliency in the face of future climate variability. The project would support existing land use.

The Modernization Alternative contributes to the sponsors' resource opportunities, as follows:

- Improving water management operations. The Modernization Alternative would improve water management operations on a daily basis and enhance water delivery reliability for all patrons, the TLNWR, and LKNWR.
- Supporting existing agriculture. The Modernization Alternative would support and maintain existing agriculture by improving water management within the District's system, sustaining reliable irrigation deliveries to TID patrons.
- Increasing energy efficiency. All proposed actions within the Modernization Alternative would reduce the energy demands associated with pumping water throughout the District.
- Lower operating costs. Installing variable frequency drives and other pumping upgrades would decrease annual operating expenses throughout the District.
- Conserving water along District infrastructure. The Modernization Alternative would allow the District to understand inflows more accurately and more effectively manage diverted water. Please see Section 6.6.2.5 and Appendix D.1 for more information on how the management of water would affect crop yields.
- Supporting the Pacific Flyway and fish recovery. The Modernization Alternative would support the Pacific Flyway, fish recovery, and related ecosystem services through improved water management and greater flexibility in managing operational spills, including deliveries that benefit the TLNWR and LKNWR.

The estimated project cost for the Modernization Alternative including NRCS Technical Assistance, Program Administration, and permitting would be \$16,302,000 (2025 dollars). Additional information regarding the costs and the present value of the costs of the Modernization Alternative can be found in Appendices D.3 and D.4.

Construction of the Modernization Alternative would occur in two project groups over the course of 5 years. Construction would occur during the non-irrigation season (October to April), with construction beginning as early as the 2026-2027 non-irrigation season. See Section 8.7.2, Planned Sequence of Installation, for a project timeline. Patron deliveries would not be affected during construction. The following subsections describe in more detail both the SCADA installation and pump upgrades.

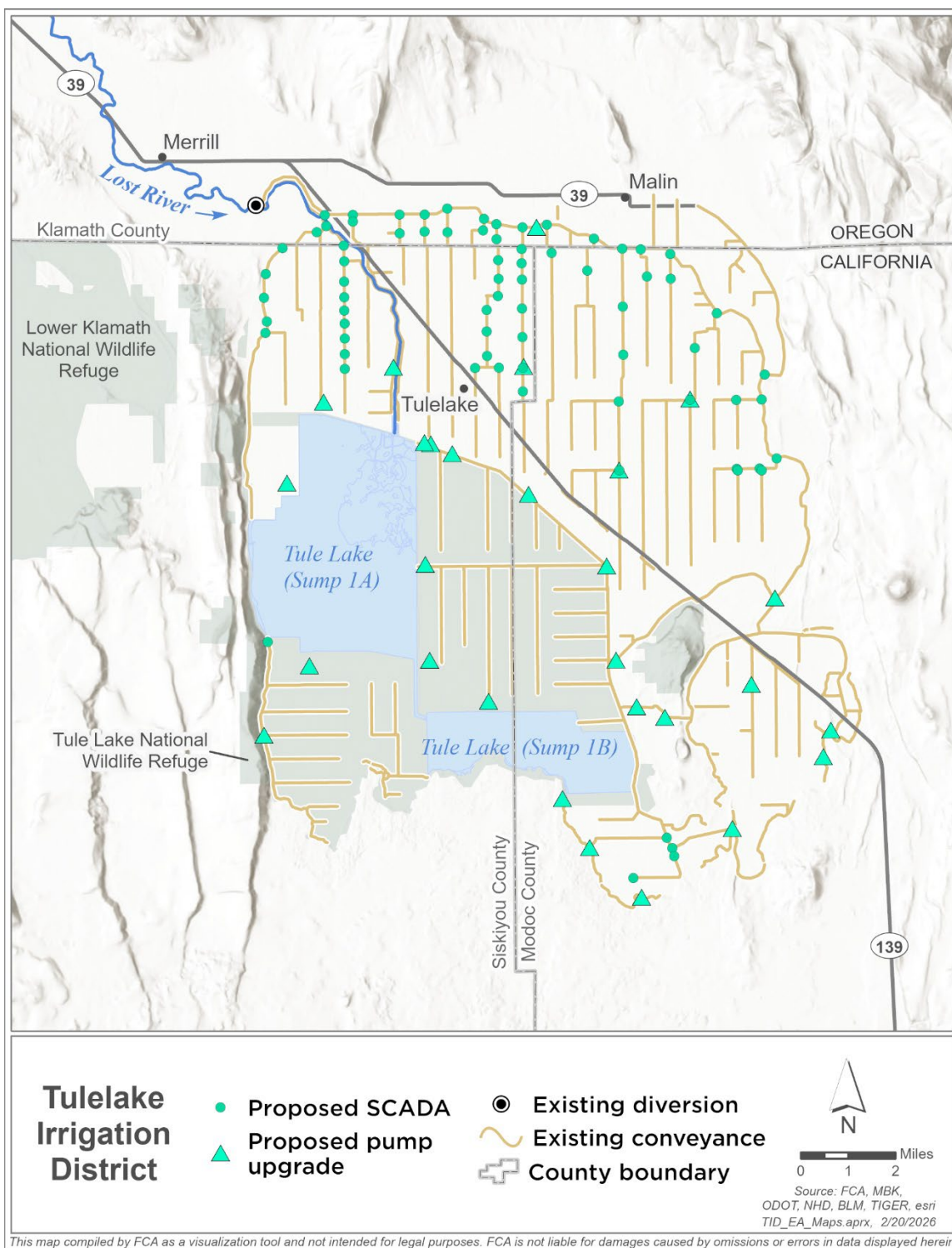


Figure 5-1. Overview of the Potential Modernization Alternative for Tulelake Irrigation District Infrastructure Modernization Project.

5.3.2.1 SCADA Installation

Under the Modernization Alternative, SCADA sites would be installed throughout the District. Sites would be located on existing drains and canals within the District. Installing SCADA would enhance water management within the District.

The proposed SCADA activities include installing SCADA infrastructure and automation equipment at 74 locations throughout the District. Depending on the existing conditions of each site, the installation of some or all the following components is proposed. Descriptions of these actions are provided below:

- One-half horsepower motor and an actuator at checks that are not automated (Figure 5-2)
- A field-installable controller (Figure 5-3),
- A non-contact level monitor with radar sensor housed inside a vertical corrugated standpipe (Figure 5-5),
- Radio communication equipment (Figure 5-4).

Construction to install the SCADA and automation would include mobilization and staging of appropriately sized construction equipment, delivery of equipment to construction areas, placement of equipment, and excavation and backfilling in the canal for the 36" HDPE standpipe/radar sensor assemblies. The field-installable unit would be installed on a mounting frame (see Section 5.3.2.1.2) at all sites and connected to the radar sensors/still well assemblies (see Section 5.3.2.1.4) and the automated gate at all sites. SCADA equipment would be assembled prior to being delivered to the site. All SCADA installation would be limited to installing SCADA and automation equipment at existing manually operated check structures. The installation of SCADA equipment would take approximately two days per site.

For both SCADA installation and pump upgrades, when necessary, vegetation clearing before construction, vegetation and weed management during construction, and reseeding after construction would be completed according to NRCS guidelines. During construction, to the extent practicable, vegetation clearing would be minimized and locations for vehicle and equipment staging would occur in previously disturbed areas. At each SCADA installation site, the area temporarily affected by vegetation clearing and ground-disturbing work is expected to extend approximately 50 feet around the location of the project site (i.e., an area of approximately 7,850 square feet). All project areas would be accessed from existing maintenance roads or public roads. Best management practices that minimize effects to vegetation and avoid the spread of invasive plants and noxious weeds would be followed before, during, and after construction, as outlined further in Section 6.5.2 of this plan.

5.3.2.1.1 Motor and Actuator

At check structures with gates that are operated by hand wheel, a one-half horsepower motor and actuator would be retrofitted (see Figure 5-2). This allows the gate to be adjusted automatically.



Figure 5-2. A motor control and actuator would be installed on the canal headgate.

5.3.2.1.2 Control Unit

A field-installable control unit (see Figure 5-3) would be installed at each proposed site. The control unit would be delivered to the site by a pickup truck. It would be mounted by hand to a frame that would be constructed at the site. The frame could be constructed by driving a post into the ground to limit ground disturbance (see Figure 5-4). The radar elevation sensors, radio communication equipment, and gate controller would be connected to the control unit. The control unit would be connected to a 120VAC electrical circuit or a solar panel/battery unit, depending on the proximity of the nearest power.



Figure 5-3. A field-installable control unit.



Figure 5-4. A SCADA-equipped check structure.

Note: The control unit is mounted to posts driven into the ground in the canal.

5.3.2.1.3 Electrical Power

The SCADA upgrades would require electrical power. At sites that do not have existing electrical service, the District would mount a small solar panel on the control unit frame and connect it to batteries that would be contained within the control unit.

5.3.2.1.4 Radar Sensors and Stilling Wells

A stilling well (vertical plastic culvert) with radar sensors (Figure 5-2) would be installed upstream and downstream of the check structure and would measure and communicate the elevation of the water level to the control unit. To ensure quality of measurement, the radar sensor would be placed in a stilling well that would prevent inaccuracies associated with turbulent water, moss, or foam. The stilling well would be constructed using a 10-foot-long, 36-inch-diameter section of corrugated pipe. A hole would be dug on the inside of the canal embankment after which the pipe would be placed inside. Once vertically aligned, fill would be placed around the pipe to support it. The radar sensor would be placed in the pipe and connected to the control unit. The 100-foot buffer accounts for the placement of upstream and downstream stilling wells, but the wells would not be placed outside of the canal. See location of the black pipe in Figure 5-2.

5.3.2.1.5 Radio Communication Equipment

The water elevation and gate position information would be transmitted to a user interface via radio communication. The radio antenna would be atop the frame the control unit was mounted on (see Figure 5-2).



Figure 5-5. A radar sensor that reads the elevation of the water level and communicates that to the control unit.

5.3.2.2 Pump Upgrades

Under the Modernization Alternative, 28 pumps would be upgraded. Pump upgrades would include replacing existing inefficient pump units with more efficient units, retrofitting existing pump drives with variable frequency drives, adding SCADA, and/or installing traveling belt screens. Pump and motor replacements would increase operability, reduce routine maintenance labor on old pumps, and minimize the likelihood of outages due to pump failure. Variable frequency drives allow for greater flexibility in variable flow output, improved flow control, increased efficiency, increased energy savings, reduced wear and maintenance on the pump, and allow for increased automation features. Traveling screens at pump intakes would reduce debris entering pumps, decreasing operation and maintenance and preventing pump failure. All pump upgrades would take place at existing pumps, and there would be approximately 7,850 square feet of temporary ground disturbance at all pumps. Each pump upgrade would take approximately one week to complete.

5.3.2.2.1 SCADA

Any SCADA installation on the pumps would be similar to the processes described in the proposed SCADA description. Stilling wells with water level sensors would be installed upstream and downstream of the pump and connected to a control unit. The control unit would be mounted to a frame with radio communication equipment near the pump. Due to existing electrical equipment, the control unit and radio equipment could be mounted to existing framing. All SCADA upgrades associated with pump upgrades would be installed on existing infrastructure.

5.3.2.2.2 Traveling Belt Screens

Traveling belt screens would be installed upstream of pump intake sumps to prevent moss and other detritus from entering the pump. A traveling belt screen and framing would be constructed at the

District office and shop yard and delivered to the site on a trailer via existing roadways. The traveling screen assembly would be set into the canal and mounted on an approximately 6'x6' concrete pad (see Figure 5-6). At the pump sump, a small amount of dirt and concrete work would be performed to enlarge the sump area. A second concrete pad would be poured at the tail of the screen to receive and store removed moss.



Figure 5-6. A traveling screen sits immediately upstream of the pump intake.

Note: The lower screen sits on a small concrete pad. The lower screen removes moss from the canal and drops it onto a second conveyor, which moves the moss to another concrete pad where it is stored for removal.

5.3.2.2.3 Pump Motor and Drive Upgrades

Existing pump motors and drives (see Figure 5-7) would be replaced with modern, more efficient units (see Figure 5-8). The new units would be stored at the District office and shop yard until installation. They would be delivered to the pump site by trailer and would be limited to existing roads. The existing discharge pipes would be excavated out and removed. The excavation would be backfilled, and the new discharge pipes would be installed at a higher elevation than the old pipes. The site would be backfilled and graded. The electrical improvements would be made to increase capacity at pump locations. Electrical power exists at all pump sites.



Figure 5-7. Pump site with old motors and drives.



Figure 5-8. Pump site with new motors and drives.

5.3.2.2.4 Additional Pump Upgrade Information

Other activities that would occur during the pump upgrades would include mobilization and staging of small construction equipment and delivery of equipment to construction areas via existing access roads. During construction, the construction sites would be accessed via existing access routes.

For both SCADA installation and pump upgrades, when necessary, vegetation clearing before construction, vegetation and weed management during construction, and reseeding after construction would be completed according to NRCS guidelines in the *Oregon and Washington Guide for Conservation Seedings and Plantings* (NRCS 2000). During construction, to the extent practicable, vegetation clearing would be minimized and locations for vehicle and equipment staging would occur in previously disturbed areas.

Construction that would occur during the pump upgrades would include mobilization and staging of appropriately sized construction equipment and delivery of equipment to construction areas. A bearing structure for the traveling belt screen would be constructed at the pump intake. Additionally, a small concrete pad would be constructed adjacent to the traveling screen used to stockpile detritus removed by the traveling screen. At the pump sump, a small amount of earthwork and concrete work would be performed to enlarge the sump area. Where needed, electrical improvements would be made to increase capacity at pumps. During construction, the construction sites would be accessed via existing access routes. All construction activities would take place within existing pump infrastructure and existing pump areas and access roads. If non-irrigation water (i.e., stormwater) is present, canals would be dewatered prior to any work within the canal.

For both SCADA installation and pump upgrades, vegetation clearing before construction, vegetation and weed management during construction, and reseeding after construction would be completed according to NRCS guidelines. During construction, vegetation clearing would be minimized to the extent practicable, and locations for vehicle and equipment access, staging, and storage would be selected to avoid trees.

All project areas would be accessed from existing maintenance roads or public roads.

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

5.4 Summary and Comparison of Alternatives

Table 5-1. Summary and Comparison of Alternatives.

Alternative Plans	No Action Alternative (Future without Federal Investment)	Modernization Alternative (Future with Federal Investment)
Locally Preferred	No	Yes
National Economic Development	No	Yes
Socially Preferred	No	Yes
Environmentally Preferred	No	Yes
Guiding Principles	No Action Alternative (Future without Federal Investment)	Modernization Alternative (Future with Federal Investment)
Healthy and Resilient Ecosystems	No	Yes
Sustainable Economic Development	No	Yes
Floodplains	No	Not Applicable
Public Safety	No	Not Applicable
Watershed Approach	No	Yes

Provisioning Services – Trade-Offs	No Action Alternative (Future without Federal Investment)	Modernization Alternative (Future with Federal Investment)
Irrigation water	No	Yes
Instream fish species	No	Yes
Regulating Services – Trade-Offs	No Action Alternative (Future without Federal Investment)	Modernization Alternative (Future with Federal Investment)
Water quality	No	Yes
Cultural Services – Trade-Offs	No Action Alternative (Future without Federal Investment)	Modernization Alternative (Future with Federal Investment)
Culturally important species	No	Yes
Installation Costs	No Action Alternative (Future without Federal Investment)	Modernization Alternative (Future with Federal Investment)
Federal Pub. Law No. 83-566	\$0	\$12,533,000
Local only or Matching Pub. Law No. 83-566	\$0	\$3,769,000
Total	\$0	\$16,302,000
Average Annual Cost		
Installation	\$0	\$628,000
OM&R	\$54,000	\$30,000
Total	\$54,000	\$658,000
Annual Benefits	\$0	\$2,293,000
Annual Costs	\$54,000	\$604,000
Annual Net Benefits	-\$54,000	\$1,851,000
Regional Economic Impacts	No Action Alternative (Future without Federal Investment)	Modernization Alternative (Future with Federal Investment)
Annual Jobs from Recreation	0	Enhanced water management may benefit habitat at LKNWR, in which case recreation jobs and income may be beneficially impacted.
Local jobs during construction (including direct/indirect/induced)	0	Minimal – not quantified as the vast majority of expenditure is for equipment and NRCS technical support not sourced locally.

Change in Annual Jobs from agriculture (including direct/indirect/induced)	0	30
Beneficial Effects Annualized (2026\$)	No Action Alternative (Future without Federal Investment)	Modernization Alternative (Future with Federal Investment)
Region <i>Construction</i>	Not Applicable	\$2,200,000
Region <i>Agriculture</i>	Not Applicable	\$2,200,000
Rest of Nation	Not Applicable	Some ripple income/employment effects expected but not estimated.
Adverse Effects Annualized (2026\$)	No Action Alternative (Future without Federal Investment)	Modernization Alternative (Future with Federal Investment)
Region	<\$0.0	-\$200,000 (cost savings)
Rest of Nation	\$0	\$600,000

6 Environmental Consequences

6.1 Cultural Resources

6.1.1 No Action (Future without Federal Investment)

Under the No Action alternative, water delivery and operational inefficiencies would remain the same for the TID facility and the facility may deteriorate over time. Failure of the TID facility's infrastructure could lead to abandonment or demolition which could affect the integrity of the Klamath Project Historic District through loss of one of its contributing resources. However, as the district is historically significant for its association with California's agricultural history, the loss of the TID would not likely be assessed as a significant impact to cultural/historic resources.

6.1.1.1 Built Environment Resources

The No Action Alternative would maintain existing conditions and activities in the APE. As such, there is no potential for impacts to historic built environment resources from the No Action Alternative.

6.1.1.2 Archaeological Resources

The No Action Alternative would maintain existing conditions and activities in the APE. As such, there is no potential for impacts to archaeological resources identified in the APE from the No Action Alternative. However, potential impacts to unknown archaeological resources that may be present in the APE are possible if ground disturbance from future operations/maintenance of the TID under the No Action Alternative inadvertently disturbs them. Applicable inadvertent discovery procedures and regulatory requirements would apply to such activities.

6.1.2 Modernization Alternative

6.1.2.1 Built Environment Resources

Eight of the 10 historic built environment resources of the TID that NRCS has determined to be contributing resources to the Klamath Project Historic District would be modified: J-Canal, M-Canal, N-Canal, J-Canal Lateral System, N-Canal Lateral System, Pumping Plant D, Sump 1A, and Sump 1B. None of the modifications would alter the characteristics or historical associations that make either the Klamath Project Historic District or the Tule Lake Historic District eligible for listing in the NRHP; therefore, NRCS has made a finding of no adverse effect to historic properties pursuant to 36 CFR 800 for the project (see Appendix A.2.2). The California SHPO agrees with the finding of no adverse effect to historic properties, and the Oregon SHPO chose not to comment and indicated the project “may continue as described” (see Appendix A.2.2). Selection of the Modernization Alternative would result in no significant impact to historical resources.

6.1.2.2 Archaeological Resources

NRCS treated one archaeological resource in the APE as NRHP-eligible (Temporary Site PMX_TID_1) and one not NRHP-eligible (PMX_TID_ISO_1). These two resources would be avoided during implementation of the Modernization Alternative. Potential impacts to unknown subsurface archaeological resources that may be present in the APE are possible if ground disturbance from future operations/maintenance of the TID under the Modernization Alternative

inadvertently disturbs them. Previously unidentified archaeological resources could be encountered during future operation, maintenance, repair, or other ground-disturbing activities associated with the project. Applicable inadvertent discovery procedures and regulatory requirements would apply to such activities.

6.2 Land Use

6.2.1 No Action (Future without Federal Investment)

6.2.1.1 Land Use and Ownership

The No Action Alternative would have no direct adverse effect on land use or land ownership within the project area or District.

6.2.1.2 Ecosystem Services

Provisioning service: Water available for irrigation: Under the No Action Alternative, existing District infrastructure would experience continued inefficiencies of operations, particularly during periods of water shortage, which would perpetuate current difficulties in delivering irrigation water to District patrons. As discussed below in Section 6.6.1.2, Surface Water Hydrology, the likelihood of drought conditions is expected to increase, exacerbating the issues associated with water shortages. Over the long term, the No Action Alternative would thus be expected to have an adverse effect on crops relying on District irrigation.

Cultural service: Culturally important natural areas: Under the No Action Alternative, water delivery to TLNWR and LKNWR from TID infrastructure would remain limited in water shortage years, which would cause continued loss of habitat for wildlife and associated recreation opportunities. The No Action Alternative would have a long-term adverse effect on culturally important natural areas.

6.2.2 Modernization Alternative

6.2.2.1 Land Ownership and Use

The Modernization Alternative would have no direct effect on land ownership in the project area or District. All construction and associated activities would occur in Reclamation's existing ROW and easements. Access would be via existing access roads used for irrigation infrastructure maintenance.

There would be temporary, negligible adverse effects on land uses in the project area. Construction activities would take place on land currently used for irrigation infrastructure. Construction would occur outside of the irrigation season, avoiding the potential for interference with irrigation operations. BMPs would be implemented during construction, including avoiding unnecessary ground disturbance, restricting construction activities to existing easements and rights-of-way, and minimizing ground disturbance where unavoidable. Following construction, disturbed areas would be re-contoured and planted and/or seeded with an NRCS-approved native plant mix (see Appendix E.7.7).

Noise, dust, and vibration generated by construction activities would be temporary, short-lived, and comparable to that generated by agricultural equipment frequently used in the District. As such, the effects of construction activities on surrounding residential land uses would be negligible. Landowners adjacent to areas of construction would be notified before construction activities begin.

Implementation of the Modernization Alternative would support existing zoning designations and land use in the District through more efficient and reliable delivery of water to agricultural land uses.

6.2.2.2 Ecosystem Services

Provisioning service: Water available for irrigation: Ecosystem services of water for irrigation would be supported through the improvement of water delivery through infrastructure improvements under the Modernization Alternative.

Cultural service: Culturally important natural areas: Ecosystem services of culturally important natural areas would be supported through gains in efficiency and reliability of water delivery to TLNWR and LKNWR, which would support habitat for wildlife and provide recreation opportunities. The Modernization Alternative would have an overall beneficial effect on culturally important natural areas.

6.3 Socioeconomic Resources

6.3.1 No Action (Future without Federal Investment)

6.3.1.1 Regional Economic Development Benefits (RED), Without Project (No Action Alternative)

There is an expected OMR expenditure of \$2.75 million in the No Action for pump replacement. As most of the expenditure is expected to be for pump equipment that would be sourced from outside the local area, there is expected to be minimal impact to local jobs and income. However, the replacement of this infrastructure would reduce the risk of pump failure and subbing of crops/loss of water supply reliability, thereby helping to maintain agricultural production in the District. With this benefit (reduced agricultural damages), the average annual total economic activity supported by TID agricultural production is estimated to increase above baseline by approximately \$0.1 million in average annualized income, as shown in Table 5-1.

6.3.2 Modernization Alternative

6.3.2.1 Regional Economic Development Benefits (RED), Modernization Alternative

There is an expected construction expenditure of approximately \$16.3 million in the Modernization Alternative for installation of pumps and SCADA. As the new pumps and SCADA equipment would be manufactured elsewhere and would be installed by current district personnel, installation of these project groups is expected to result in minor economic impacts in the local region, so project costs are not modeled for regional economic impacts.

The Modernization Alternative would result in greater water reliability enhancement and water management benefits than under the No Action Alternative. Avoiding pump failure and increasing water supply reliability would increase crop production and reduce agricultural crop damages. Water conservation benefits from reduced avoided spills in the District may be used to reduce agricultural crop damages or may be used to enhance habitat. This RED models the regional economic benefit assuming the water is used to enhance irrigation water supply reliability; to the extent that the water is used to enhance habitat, the economic impact would be different.⁵ Based on the estimated reduction in crop damages (both from avoided pump failure and conserved water), the average annual total economic activity supported by agricultural production is estimated to increase above

⁵ Economic impacts from recreation/tourism in the region could result if water is used to enhance habitat, but the effect is likely different than the effect of water used to enhance agricultural production.

baseline by approximately 30 jobs and \$2.2 million in average annualized income, as shown in Table 5-1.

The Modernization Alternative would also result in a slight reduction in Operations, Maintenance, and Repair (OM&R) expenses for TID and its patrons. However, there are no anticipated effects on District wages and employment. As such, there are expected to be limited RED effects of this reduced expenditure, so effects are not quantified in this RED analysis.

6.4 Soils

6.4.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the operation of the District's system would have no effects on soils in the project area beyond those associated with District operations under existing conditions.

6.4.2 Modernization Alternative

Under the Modernization Alternative, 18.4 acres may be minorly disturbed, and backfilling would occur as needed. Because soils in the project area have been previously disturbed with the construction of the existing irrigation conveyance, long-term effects on soil from the Modernization Alternative would be minor.

The proposed action would involve the installation of stilling wells into the canals or laterals on either the upstream and downstream side of the gate or check valves. The potential for water-based erosion is low because the proposed work would occur on slopes of 0 to 2 percent and would be performed outside of the active irrigation season, when the canals and laterals have been dewatered. BMPs would be implemented to minimize aeolian erosion and contain runoff on site and could include placing geotextile filters and applying water to disturbed soils to prevent wind erosion (see Appendix E.7.4).

Minor short-term effects on soils are anticipated because BMPs would be in place, effects would be localized to the project areas where construction occurs, and effects would only occur during construction.

No long-term or short-term effects on prime farmland or other federal or state-level farmland designations were identified due to all soils in the project areas being previously disturbed.

6.5 Vegetation

6.5.1 No Action (Future without Federal Investment)

Under the No Action Alternative, there would be no effect on vegetation associated with irrigation canals or adjacent upland vegetation. TID would continue its existing vegetation management practices, which consist of regular removal of moss from the system's irrigation canals and laterals to prevent moss establishment.

6.5.2 Modernization Alternative

6.5.1.1 General Vegetation

Overall, the Modernization Alternative would have minor, short-term effects on vegetation because changes to vegetation would be localized to the immediate vicinity of construction-related ground disturbance within the project area, which is a limited area and is regularly disturbed due to District operations and maintenance. Construction access and staging would prioritize the use of existing

public roads, existing canal maintenance access roads, and disturbed and/or graveled areas adjacent to existing pump station infrastructure in order to minimize temporary effects on vegetation.

Approximately 5.71 acres of vegetation would be disturbed (per site: at minimum 0.01 acres, at maximum 0.15 acres, and on average 0.04 acres). Vegetation would be disturbed during construction activities such as clearing and ground disturbance at SCADA installation sites and in areas where disturbance is unavoidable due to construction equipment access or equipment and materials staging needs. Please see Sections 4.5 and 4.8 for more information on the types of vegetation that would be disturbed.

Following construction, disturbed areas would be re-contoured and planted and/or seeded with an NRCS-approved mix and maintained as needed based on applicable guidance from NRCS. Minimal to no long-term effects to vegetation would be anticipated, as the plant mix used to revegetate disturbed areas, which would consist of native and/or non-invasive habitat adapted species, may improve habitat conditions compared to the existing mix of non-native weedy species. See Appendix E.7.7 for a discussion of site revegetation measures to be used following completion of construction.

6.5.1.2 Noxious Weeds

During construction, exposed soils would be susceptible to weed invasion. The movement of construction vehicles could provide opportunities to spread weeds by transporting their seeds to new locations. During construction, the contractor would use BMPs such as avoiding unnecessary ground disturbance, minimizing ground disturbance where unavoidable, and ensuring that erosion control measures such as straw wattles or bales are free of weeds and weed seeds. See Appendix E.7.6 for a detailed list of invasive species control BMPs that would be implemented to avoid the spread of invasive plants and noxious weeds.

With the use of BMPs during construction, the Modernization Alternative would have a negligible short-term effect with respect to noxious weeds. Over the long term, noxious weed management would be expected to differ little from existing conditions, consisting of the continuation of current weed control and monitoring activities.

6.6 Water Resources

6.6.1 No Action (Future without Federal Investment)

The No Action Alternative would maintain existing operations using existing infrastructure. The District would continue managing water delivery under challenging drought conditions, there would be no changes to the efficiency of how water moves through the system, and gradual degradation of the conveyance system would continue. Potential effects on water resources within the study area are described below.

6.6.1.1 Water Rights

The No Action Alternative would have no effect on water rights established by the ongoing adjudication process. The amount and timing of water the District receives is determined by legal obligations and availability.

6.6.1.2 Surface Water Hydrology

The No Action Alternative would have no effect on waterbodies associated with District operations. Water entering TID is managed according to adjudicated water rights, contracts with Reclamation, ESA-driven requirements, and availability. Any ongoing climate-driven or land-use-related changes

to the upstream areas that provide water for TID (e.g., those in the Lost River watershed and the Klamath River watershed) would not be altered by the No Action Alternative.

The movement of water through the District would continue to be managed with the existing infrastructure and modified as needed based on inter-annual variability in supply. The challenges of current operations, particularly during periods of water shortage, would continue to exacerbate difficulties in delivering water to the Tule Lake sumps via TID drains, and to LKNWR. With an increasing likelihood of drought conditions in the region due to climate variability, the No Action Alternative would have a long-term adverse effect on water delivery within TID, as well as the hydrology of waterbodies downstream.

6.6.1.3 Surface Water Quality

The No Action Alternative would have no effect on surface water quality. The existing poor water quality conditions with respect to pH, dissolved oxygen, nutrients, mercury, arsenic, and cyanobacteria within the District would continue under status quo operations.

6.6.1.4 Groundwater

The No Action Alternative may lead to long-term adverse effects on groundwater resources. If TID continues to rely on inefficient water control structures to deliver surface water to irrigators and the supply is not adequate due to drought-induced water shortages, then TID may need to use supplemental groundwater from its wells on a more frequent basis. If pumping exceeds the recharge rate, the water table could drop, resulting in regionwide adverse effects on natural waterbodies and existing wells. A groundwater management plan is currently in development.

6.6.1.5 Ecosystem Services

Provisioning service: Water available for irrigation: The No Action Alternative would perpetuate operational inefficiencies in the District's system, resulting in long-term adverse effects on water delivery to properties within the District for agricultural purposes, including the production of crops for human consumption and livestock forage.

Regulating service: Water quality: The No Action Alternative would perpetuate operational inefficiencies in the District's system, resulting in continued difficulties delivering water to the Tule Lake sumps via the TID drains, and to LKNWR. With an increasing likelihood of drought conditions in the region accompanied by increased use of tailwater, the No Action Alternative would have a long-term adverse effect on surface water quality in downstream areas.

Cultural service: Culturally important species: Under the No Action Alternative, continued difficulties delivering water to the Tule Lake sumps via the TID drains and to LKNWR, accompanied by an increased likelihood of drought conditions in the region, would have a long-term adverse effect on wetland habitat and food resources for migratory waterfowl.

Cultural service: Culturally important natural areas: Under the No Action Alternative, continued difficulties delivering water to the Tule Lake sumps via the TID drains and to LKNWR, accompanied by an increased likelihood of drought conditions in the region, would cause continued loss of habitat for wildlife and associated recreation opportunities. The No Action Alternative would have a long-term adverse effect on culturally important natural areas.

6.6.2 Modernization Alternative

The Modernization Alternative would install SCADA and upgrade pumps at numerous locations throughout the District to allow more effective and efficient water delivery management. These

proposed improvements would increase the resiliency of the system as climatic conditions change and would improve the reliability of water delivery to irrigators and the downstream wildlife refuges. Potential effects on water resources in the study area are described below.

6.6.2.1 Water Rights and Operations

The Modernization Alternative would have no effect on water rights established by the ongoing adjudication process. The amount and timing of water diverted into TID is determined by legal obligations and availability. Increasing efficiency and improving the ability to manage water within the TID would not affect the amount withdrawn from primary sources.

6.6.2.2 Surface Water Hydrology

The Modernization Alternative would have no effect on surface water hydrology upstream of the District. Water entering TID is managed according to adjudicated water rights, contracts with Reclamation, ESA-driven requirements, and availability. Upstream areas that provide the source of water for TID, such as those in the Lost River watershed and the Klamath River watershed, would not be affected.

The movement of water through the District would be managed more efficiently. Installed SCADA and upgraded pumps would allow the District to deliver water more precisely and to adjust operations based on inter-annual fluctuations in supply. TID estimates, based on the past 20 years of data, that an average of 20,000 acre-feet per year of unintentional operational spill could be avoided under the Modernization Alternative. Avoiding uncontrolled spills would increase available water and would provide flexibility for parties to use the available water to meet high-priority needs year to year throughout the Klamath Basin, including agricultural production and habitat.

Therefore, the Modernization Alternative could have an indirect beneficial effect, depending on saved water use and management, on surface water hydrology of the Tule Lake sumps, Upper Klamath Lake, and downstream waterbodies (e.g., LKNWR).

6.6.2.3 Surface Water Quality

The Modernization Alternative would have no effect on the existing poor water quality conditions in the waterbodies described in Section 4.6.3, Surface Water Quality. Within the canals, construction-phase BMPs as detailed in Appendix E.9 would be implemented to avoid or minimize localized impacts to water quality. All of the construction work would occur when canals are dewatered and within the existing check or pump infrastructure. If there is water in the work area, the canal would be dewatered per BMPs as described in Appendix E.9.12.

The District would continue to source water from 303(d)-listed waterbodies (Lost River, Klamath River) and rely on tailwater from other irrigation districts. The possibility of salt accumulation in soils would continue, as would the existing problem with moss build-up in the canals. Water quality in the Tule Lake sumps and downstream in LKNWR would not be affected by the proposed operational improvements.

6.6.2.4 Groundwater

The upgraded pumps and SCADA facilities that would be installed under the Modernization Alternative would interact with surface water only and would have no direct effects on groundwater resources. Compared to the No Action Alternative, the operational improvements would allow TID to more efficiently deliver its allocated surface water to irrigators, potentially allowing the District and its patrons to rely less on supplemental groundwater. However, the need to pump groundwater

is determined by the availability of the surface water supply, and delivery would be determined by operational decisions made consistent with the Groundwater Sustainability Plan (MBK Engineers 2021).

6.6.2.5 Ecosystem Services

Provisioning service: Water available for irrigation: The Modernization Alternative would reduce operational inefficiencies in the District's system, resulting in benefits for water delivery to properties within the District for agricultural purposes, including the production of crops for human consumption and livestock forage.

Regulating service: Water quality: The Modernization Alternative would reduce operational inefficiencies in the District's system and would have no effect on the water quality of source or receiving waterbodies.

Cultural service: Culturally important species: It is not known whether the Modernization Alternative would result in more tailwater availability in the Tule Lake sumps and for downstream users. If tailwater availability increases, the Modernization Alternative could have an indirect, beneficial effect on wetland habitat and food resources for migratory waterfowl as a result of increased water delivery to the TLNWR.

Cultural service: Culturally important natural areas: It is not known whether the Modernization Alternative would result in more tailwater availability in the Tule Lake sumps and for downstream users, including LKNWR. If tailwater availability increases, the Modernization Alternative could have an indirect, beneficial effect on habitat for wildlife and cultural and recreation opportunities as a result of increased water delivery to the LKNWR and TLNWR.

6.7 Fish and Aquatic Resources

6.7.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the District would continue to operate with its current infrastructure. The existing operational impacts on fish and aquatic resources would continue and possibly become exacerbated by more frequent drought conditions resulting from climate variability. Discussion of the effects on specific resources is provided below.

6.7.1.1 General Fish and Aquatic Species

Currently, fish and aquatic species within the TID canal system and in TLNWR are subject to degraded habitat conditions and poor water quality. This would not change under the No Action Alternative. Species that are present in study area waterbodies (as well as those that might enter the TID canal system) are typically more tolerant of these degraded conditions; salmonids have already been extirpated, and the remaining native and non-native warmwater species are adapted to high water temperatures and low dissolved oxygen concentrations.

6.7.1.2 Federally Listed and State-Listed Fish and Aquatic Species

The No Action Alternative would have no direct effect on federally or state-listed fish species identified in Section 4.7.2, Federally Listed Fish Species and Section 4.7.3, State-Listed Aquatic Species but could lead to long-term indirect adverse effects to suckers if water shortages continue. Challenges to operating the TID system when water supplies are limited may hinder the ability to maintain ESA-mandated water levels in TLNWR and LKNWR and provide adequate instream flows. Certain water levels must be maintained in these lake areas to provide suitable habitat for

shortnose suckers and Lost River suckers. Incidental take due to entrainment and stranding would remain unchanged.

6.7.1.3 Ecosystem Services

Provisioning service: Fish populations: The No Action Alternative would result in no change to the existing water delivery system. In light of anticipated climatic changes and prolonged periods of drought, the No Action Alternative could result in a long-term indirect adverse effect on populations of native Lost River suckers and shortnose suckers, as well as lamprey (i.e., Pacific lamprey and Pit-Klamath brook lamprey), minnows (i.e., tui chub and blue chub), sculpin (i.e., Klamath Lake sculpin, marbled sculpin, and slender sculpin), and Klamath redband trout that may occur downstream of TID.

Cultural service: Culturally important species: The No Action Alternative may result in an adverse effect on culturally important species. If the District is not able to effectively manage water levels in TLNWR and supply water to LKNWR, then Lost River sucker and shortnose sucker populations—species that have cultural significance to the Klamath Tribes—may be adversely affected.

6.7.2 Modernization Alternative

Under the Modernization Alternative, the District would install SCADA and upgrade pumps to allow more efficient delivery of water to irrigators and to the TLNWR. Although the overall water supply would not be modified, increasing efficiency and improving the District's ability to more flexibly manage water may help maintain water levels in the Tule Lake sumps, particularly in years of shortage. Discussion of the effects on specific resources is provided below.

6.7.2.1 General Fish and Aquatic Species

The Modernization Alternative could have minor short-term effects on fish and other aquatic species present within the TID canal system. Construction would occur outside of the irrigation season, when the District's canals and laterals have been dewatered. If water is present at any sites when construction occurs, BMPs (Appendix E.8.12) would be implemented at those sites to minimize effects of turbidity and noise on any fish and aquatic species that may be present. Water levels within the canals would be managed to optimize delivery for agricultural purposes, and the existing degraded habitat and water quality levels would not change.

The proposed upgrades would allow TID to manage its allotted water more flexibly, but it is uncertain whether this would result in better ability to maintain certain water levels within the TLNWR during years of limited supply. If so, the Modernization Alternative could result in a long-term indirect benefit to fish and aquatic species in the Tule Lake sumps by maintaining available habitat; however, if not, there would be no long-term effect on fish and aquatic species.

6.7.2.2 Federally Listed and State-Listed Fish and Aquatic Species

Consultation with USFWS has been completed as required by the provision of Pub. L. No. 83-566. USFWS concurred with the “may affect, not likely to adversely affect” and a letter of concurrence was issued on July 20, 2026. See Appendix E.9.

The Modernization Alternative could have minor long-term beneficial effects on Lost River and shortnose suckers within TID's water conveyance system. Traveling belt screens installed at pump upgrade locations would act as barriers to fish passage, helping to block suckers from entering pump intakes and reducing entrainment-related mortality. Construction activities associated with pump upgrades and SCADA/automation installation could result in short-term, limited increases in

sedimentation and turbidity affecting water quality; however, avoidance and minimization measures (construction timing, staging, erosion control, and spill prevention) would reduce these risks. Prior to construction, canals would be dewatered on TID's normal seasonal schedule, and any entrained LRS and SNS would be salvaged and translocated by Reclamation.

The Modernization Alternative could also have minor effects on northwestern pond turtle. NWPT are expected to occur at low densities within TID's water conveyance system, with some presence likely in the Tule Lake sumps. Construction would occur between late October and late March, when NWPT may be overwintering in pond-bottom sediment or in natal nests in sparsely vegetated fill adjacent to permanently inundated drains. Ground-disturbing work for SCADA/automation installation is not expected to affect NWPT, as these areas are unsuitable for nesting or overwintering. Ground-disturbing work at pump upgrade sites, located near deeper permanently ponded water and sparsely vegetated fill that may support overwintering and nesting habitat, could cause short-term turbidity increases and temporary disturbance to nesting habitat; these effects would be minimized through erosion-control AMMs and pre-construction NWPT surveys with exclusionary fencing installed at nesting locations and removed after the nesting season. With these measures in place, effects to NWPT would be temporary and insignificant.

6.7.2.3 Ecosystem Services

Provisioning service: Fish populations: The Modernization Alternative would result in better management of TID operations and a more resilient, dependable supply both for irrigators and for the TLNWR and LKNWR. While the total quantity of water would not change, these operational improvements may allow for maintenance of water levels in the Tule Lake sumps and consequently may have an indirect beneficial effect on fish populations.

Cultural service: Culturally important species: The Modernization Alternative may improve the District's ability to maintain water levels in the Tule Lake sumps. Certain water levels are necessary for providing suitable habitat for sucker populations, species with cultural significance for the Klamath Tribes.

6.8 Wetland and Riparian Areas

6.8.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the proposed improvements would not be implemented, and the effects of the continued operation of the District's system on wetlands and riparian areas in the project area would not differ from the effects associated with current operations. Wetland and riparian vegetation associated with District infrastructure and operations would persist in addition to wetland and riparian features adjacent to District infrastructure that are supported by seepage.

6.8.2 Modernization Alternative

As discussed in Section 6.6, Water Resources, the Modernization Alternative would not affect the water supply entering the District. By installing SCADA and upgrading pumps throughout the District, the Modernization Alternative would allow TID to manage water delivery and water reuse more effectively and efficiently compared to the No Action Alternative. It is uncertain whether improved efficiency of water delivery to District irrigators could increase the amount of tailwater available in the Tule Lake sumps. If this occurs, the Modernization Alternative could increase the amount of water available to support wetlands and riparian areas within and downstream of TID, resulting in a long-term beneficial effect to these resources.

Within the project area, direct minor temporary and permanent effects would occur to wetland areas as identified through the NWI. For each SCADA and pump location, a 50-ft buffer for each site was looked at using the NWI mapper. Approximately 5.71 acres of wetlands across the 102 pump and SCADA sites were identified. During construction, approximately 5.43 acres (across over 102 individual sites) of seasonal opportunistic hydrophytic plant sites could be removed or buried during excavation, fill, and other construction activities. These 5.43 acres generally consist of non-native grasses and forbs (or graminoids) within or lining the excavated canals. The areas where this vegetation grows are degraded due to regular operation and maintenance by the District and do not provide high-quality habitat. After construction, disturbed areas would be recontoured and regraded as necessary and then be replanted with a mix of native or non-invasive desirable non-native grasses and forbs (or graminoids). Approximately 0.11 acres of land that similarly hosts herbaceous vegetation would be permanently impacted (due to the permanent installation of stilling wells), resulting in long-term minor adverse effects to hydrophytic vegetation. Because these impacts are localized and relatively small compared to the overall presence of wetlands and riparian areas in the area, they have been identified as minor.

Wetlands in irrigation ditches are generally not regulated under Section 404 of the Clean Water Act (see Appendix E.8). Based on NWI analysis, almost all wetlands associated with the project area are within the excavated irrigation ditches and would not be regulated under Section 404. At two SCADA sites (Q-1 and J-22-1) there are NWI-mapped wetlands that occur outside of the excavated canal. Per NWI, at site J-22-1 there is a 0.004-acre wetland site that is located on the opposite side of the maintenance road from where SCADA would be installed. This site would not be disturbed during construction (see Appendix E.8 for a figure). Site Q-1 potentially has wetlands that would fall under Section 404. Prior to construction, if any jurisdictional wetlands that fall under Section 404 regulation would be identified, they would be avoided to the extent practicable, and necessary authorizations would be secured before work begins (see Appendix E.8.10).

Compliance requirements for local, state, and federal permits that may be triggered by the proposed action are identified in Appendix E.9. Some sites where SCADA and/or pump upgrades would occur are within the mapped 100-year floodplain. However, construction would not modify ground surface elevations at any proposed project sites; as such, the Modernization Alternative would not affect floodwater storage or transport in the study area.

6.9 Wildlife Resources

6.9.1 No Action (Future without Federal Investment)

Under the No Action Alternative, the operation of the District's system would have no effects on wildlife resources in the project area, beyond those associated with District operations under existing conditions. Wildlife use of habitats in the project area, including the District's irrigation canals and drains, would continue to be as described in Section 4.9.1.

6.9.2 Modernization Alternative

6.9.2.1 General Wildlife

Temporary, localized effects on wildlife could result from construction noise, human activity, and ground-disturbing work at and near project sites. Because wildlife using habitat near construction areas are expected to be sufficiently mobile to relocate to available habitat elsewhere, short-term effects would be minimal. Construction would occur outside of the irrigation season, when many of the sites proposed for improvements under the Modernization Alternative are dry. If water is

present at any sites when construction occurs, BMPs (Appendix E.8.12) would be implemented at those sites to minimize the effects of turbidity on amphibians or other wildlife that may be present (see Appendix E.7.4). Effects would cease upon completion of construction and reestablishment of vegetation.

As discussed in Sections 6.5.2 (Vegetation) and 6.6.2 (Water Resources), potential long-term impacts on vegetated habitats or aquatic habitats used by wildlife would be minimal to none. Therefore, minimal long-term effects on wildlife would be expected under the Modernization Alternative.

6.9.2.2 Migratory Bird Treaty Act / Bald and Golden Eagle Protection Act Protected Species

Migrating or wintering birds would be minimally affected by construction activities due to their ability to move from disturbed areas to other suitable habitats. No effects on breeding migratory birds are expected because construction activities would occur outside of the irrigation season and therefore outside of the primary nesting season for migratory birds. See Appendix E.7.8 for a discussion of measures that would be implemented to avoid and minimize potential impacts on migratory birds.

Bald eagles may be found foraging within the District in spring and summer months (see Section 4.9.2). The critical nesting period for bald and golden eagles is January 1 through August 31. If any construction activities occur during the nesting period, the District would follow USFWS guidelines to ensure minimal to no disturbance to bald or golden eagles nesting near the project area (USFWS 2007).

6.9.2.3 Federally Listed Species

The Modernization Alternative would have possible minor short-term effects on northwestern pond turtle during construction, specifically from ground disturbance adjacent to canals and laterals. Best management practices such as exclusionary fencing would be used to avoid and minimize impacts to the species. Depending on saved water use and management, District irrigators could increase the amount of tailwater available in the Tule Lake sumps. Increased tailwater inputs into Tule Lake sumps could improve habitat availability for northwestern pond turtle and could have a minor long-term benefit to the species. Construction activities would occur during the non-irrigation season, which is when monarch butterflies are absent from the region. Therefore, the Modernization Alternative would have no effect on monarch butterfly. No other federally listed terrestrial species have been documented within the project area (see Section 4.9.3, Federally Listed Species).

6.9.2.4 State-Listed Species

State-listed sensitive species known to occur within the project area and vicinity are limited to species that are also protected under the MBTA. The effects of the Modernization Alternative and related minimization measures are the same as those discussed in Section 6.9.2.2.

7 Consultation, Coordination, and Public Participation

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

A Preliminary Investigative Feasibility Report was prepared to provide sponsors, local partners, agencies, and the public with information to evaluate the goals and objectives of the project (FCA 2023). During the development of the report, project sponsors conducted initial coordination with natural resource agencies and stakeholders in the Klamath Basin.

Public participation activities prior to release of the Draft Plan-EA included:

Public Announcements

- NRCS public notice
www.nrcs.usda.gov/conservation-basics/conservation-by-state/california/environmental-compliance-notice
- Herald & News—three public notices (1/25/23, 2/01/23, and 2/04/23)
- Postcard to District patrons (1/25/23)
- NRCS news release

Public Involvement Website

Information about the proposed project was added to a website to inform the public.

<https://watershedplans.org/> includes the following information:

- Overview of the NRCS PL 83-566 funding program
- Overview of NEPA and EA public participation process
- Frequently Asked Questions about the EA process
- Background on the District, the Draft Plan-EA and appendices, the PIFR and appendices, and presentations and handouts from public meetings
- Contact information and how to submit public comments
- Email signup option for more information; subscribers receive updates over the course of project development

Public Scoping Meeting

A public scoping meeting was held on February 8, 2023. Presenters at the meeting included Raija Bushnell, FCA, and Brad Kirby, TID. The presentations covered the financial assistance available through PL 83-566, the project purpose and need, the Plan-EA process, and ways in which the public could get involved. After the presentations, attendees had the opportunity to ask questions and provided comments for the public record. A recording of the public scoping meeting was posted on the project website.

7.1 List of Persons and Agencies Consulted

Appendix E describes communications with agency personnel that were consulted during development of this Plan-EA. This includes agencies that provided formal or required consultation, or individuals who were conferred with and who provided substantial input. Coordination with state and local agencies has been ongoing since project inception.

7.2 Consultation Process

7.2.1 Section 106 Consultation

In 2024, NRCS, as the lead federal agency, initiated Section 106 consultation with the California and Oregon SHPOs and Tribes pursuant to the National Historic Preservation Act (NHPA). After reviewing draft and final cultural resource technical reports, NRCS determined a finding of no adverse effect. In August 2026, California SHPO agreed with the finding of no adverse effect to historic properties, and the Oregon SHPO chose not to comment and indicated the project “may continue as described” (see Appendix A.2.2).

7.2.2 Section 7 Consultation

NRCS has completed compliance with the Endangered Species Act (ESA) for federally listed species and designated critical habitat that may occur within the project area. NRCS has completed a Biological Assessment (BA) and effects determination based on available species data, habitat assessments, and project details (ongoing). NRCS initiated Section 7 consultation with the U.S. Fish and Wildlife Service (April 1, 2026). Consultation concluded with a written concurrence letter from USFWS on July 20, 2026.

The BA concluded that the proposed action may affect but is not likely to adversely affect the Lost River and shortnose sucker. These species are discussed in detail in Section 4 and Section 6 of this document, and the effects analysis and rationale supporting the determination are provided in the BA. In addition, although the northwestern pond turtle (NWPT) is a proposed species, the proposed action is not likely to adversely affect the NWPT. NRCS has requested informal conferencing with USFWS for this species.

7.3 Review of Draft Plan-EA

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

8 Preferred Alternative

8.1 Selection and Rationale for the Preferred Alternative

NRCS and the District agree that the Modernization Alternative is the Preferred Alternative. NRCS has selected the Modernization Alternative as the Preferred Alternative based on its ability to meet the purpose and need for the project, best address the Federal Objective and Guiding Principles, and provide the most beneficial effects on environmental, social, and economic resources.

Section 6, Environmental Consequences, describes effects on resources in detail. The Preferred Alternative would be expected to have no long-term negative effects on water resources because the changes would be measurable, apparent, and localized to the project area. Effects on soil resources would be short-term and minor because the effects would only occur in a relatively small portion of the larger project area and primarily during the construction period. All potential adverse effects on resources would be mitigated through BMPs and other compliance measures. Irreversible or irretrievable commitment of resources would include the use of material for construction. At this time, no areas of controversy have been identified.

In the long term, the Preferred Alternative would benefit several resources assessed. As analyzed in the Economic Analysis, this alternative would yield positive economic benefits including increased agricultural yield and reduced O&M costs. When compared with the No Action Alternative in the face of current conditions and future environmental and agricultural changes, the Preferred Alternative would support the agricultural resiliency of District patrons and the health and resiliency of the ecosystem downstream.

8.2 Measures to be Installed

The Preferred Alternative includes pump modifications and SCADA installation at gate and check valves. These projects would include the following improvements to the TID system:

- Upgrade pumps at 28 locations throughout the District. These pump upgrades would include various improvements such as replacement of the pump and motor, VFD installation, SCADA upgrades for individual pumps, and traveling screen installations.
- Install SCADA and automation equipment at 74 locations throughout the District. SCADA installation would allow the District to more effectively measure and control water within the District.

The Preferred Alternative would be implemented in multiple project groups with construction occurring over portions of 5 years (four non-irrigation seasons). Sections 8.7, Installation and Financing, and 8.8, Operations and Maintenance, provide additional details about construction and O&M of the Preferred Alternative. Appendix D.4 includes a detailed breakdown of project costs.

8.3 Minimization, Avoidance, and Compensatory Mitigation Measures

Project design features and BMPs would be applied during construction of the Preferred Alternative to avoid and minimize effects on environmental and social resources. No mitigation measures are expected. The District would coordinate with landowners prior to construction, limit work to designated easements, maintain property access, and schedule activities to minimize disturbance.

Throughout construction, best management practices would be used to control erosion, prevent spills, manage traffic, and avoid invasive species spread. Disturbed areas would be restored and revegetated with native species, and all work would comply with applicable local, state, and federal permitting requirements. Additional details are described in Appendix E.8.

8.4 Land Rights and Easements

Prior to construction and where needed, the District would communicate with landowners and obtain all necessary easements or agreements.

8.5 Permits and Compliance

See Appendix E.9 for local and county, state, and federal permits and compliance requirements for planning and implementation of the Preferred Alternative.

8.6 Costs

Table 8-1 presents the total project cost of \$16,302,000 for the Preferred Alternative. PL 83-566 funds would support \$12,533,000 of the total project cost, where the \$3,769,000 remainder of the cost would be contributed by other, non-federal funds. Table 8-3 itemizes the costs for each project group and the distribution of how the costs would be shared by the sponsors and NRCS for each cost item.

Table 8-1. Construction Timeline and Installation Costs by Funding Source for the Preferred Alternative, 2025 dollars.¹

Action ²	Construction Years	PL 83-566 Funds	Other, Non-Federal Funds	Total Construction Costs
PG1 Pump Replacement	0–4	\$9,464,000	\$2,854,000	\$12,318,000
PG2 SCADA	1	\$3,069,000	\$915,000	\$3,984,000
Total Project		\$12,533,000	\$3,769,000	\$16,302,000

Notes:

¹ Price Base: 2025 dollars.

² PG = Project Group

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Table 8-2 in Section 8.9, Economic and Structural Tables, itemizes the costs and shows the distribution of costs between the sponsors and NRCS. The costs presented are planning-level estimates and do not reflect final costs. Detailed designs and construction cost estimates would be completed prior to initiating the proposed project. Final construction costs would only reflect the time and materials to perform the work.

8.7 Installation and Financing

The following subsections present further details regarding installation of and financing the Preferred Alternative. Included in this section is a framework for implementing the Preferred Alternative, the sequence of installation, responsibilities, contracting, real property and relocations, financing, and conditions for providing assistance.

8.7.1 Framework for Carrying out the Plan

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

8.7.2 Planned Sequence of Installation

The District would obtain all approvals and permits for the proposed project prior to the start of construction. The entire project would be completed over portions of a 5-year period expected to commence during the 2026–2027 non-irrigation season and end by 2030. The District has developed a project phasing schedule that addresses District priorities while working within engineering and funding constraints to meet District, patron, and community development needs.

8.7.3 Responsibilities

NRCS would be responsible for leading the planning efforts, providing engineering design and construction oversight assistance, and certifying completion of the project. The District would be responsible for engineering design, project administration, environmental permitting, contracting, and construction implementation.

As cooperating agencies, Reclamation and USFWS are responsible for assisting in the planning effort; reviewing engineering designs to ensure construction methods meet Reclamation standards; participating in Section 106 of NHPA as the owner of the infrastructure; providing language for this Plan-EA; and providing subject matter experts to answer questions regarding topics such as the history of the Klamath Project, O&M plans, past ESA consultations, and other topics as needed. Reclamation would also be responsible for construction inspection to ensure accordance with Reclamation standards.

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

8.7.4 Contracting

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

8.7.5 Real Property and Relocations

All construction would be completed under either existing Reclamation-operated and -maintained easements or the newly obtained easements or agreements as described in Section 6.2.2.

8.7.6 Financing

NRCS would provide up to 75 percent of the total eligible project cost, which would include technical and financial assistance for the Preferred Alternative through PL 83-566. The District would be responsible for securing funding for the remaining 25 percent of the costs, including funds that are not eligible under the National Watershed Program (project administration and technical assistance).

The District is planning to match non-federal cost share requirements through grants and loans.

O&M costs after project completion would be provided through TID revenues. O&M costs would not increase due to the proposed project and may decrease with the efficiency upgrades to the pumping infrastructure and would be budgeted on an annual basis.

8.7.7 Conditions for Providing Assistance

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

8.8 Operations and Maintenance

The District would be responsible for project O&M for the 50 years of its design life. Prior to construction, a separate O&M agreement, based on the NRCS National Operation and Maintenance Manual, would be made between NRCS and the District. The agreement would continue through the design life of the project and could be modified with NRCS approval.

Project sponsors and NRCS would conduct annual inspections of project measures to ensure the quality of ongoing O&M. The District would be in charge of scheduling O&M inspections and be responsible for necessary work. District O&M would consist of a pump and SCADA inspection program that would systematically cover inspection of the proposed project over a period of several years.

The proposed system would continue its current operation schedule and work would be performed on an as-needed basis. During the winter months, outside of the irrigation season, the District would perform system component maintenance including maintaining pumps, canals and laterals, moss screens, and other components of the water delivery system. All procedures would be followed as specified in the O&M agreement between the District and NRCS.

8.9 Economic and Structural Tables

The costs and benefits associated with the proposed project are detailed in the following tables in this section. Table 8-2 (NWPM 506.11, Economic Table 1) presents the projected installation costs and the percentages of costs to be shared by the sponsors and NRCS for the proposed project.

Table 8-3 (NWPM 506.12, Economic Table 2) presents the proposed project's cost, as well as the proportion of PL 83-566 funding and other funding sources. The average annual costs are shown in Table 8-4 (NWPM 506.18, Economic Table 3).

The Preferred Alternative damage-reduction benefits would include agricultural yields, power cost savings, reduced O&M costs, and avoided carbon emissions. Table 8-5 (NWPM 506.20, Economic Table 4) presents the average annual watershed protection damage-reduction benefits.

Using the resulting benefits and costs from the previous two tables, Table 8-6 (NWPM 506.21, Economic Table 5) presents a comparison of the average annual benefits and average annual costs.

The Preferred Alternative does not lend itself to the structural tables in the NWPM; therefore, they have not been included in the Plan-EA.

Table 8-2. Economic Table 1 – Estimated Installation Cost of the Preferred Alternative, Water Resource Project Measures, 2025 dollars.

Works of Improvement	Unit	Federal Land – Number	Non-Federal Land – Number	Total - Number	Pub. Law No. 83-566 Federal land NRCS	Pub. Law No. 83-566 Non-Federal land NRCS ³	Pub. Law No. 83-566 Total	Other Funds Federal Land	Other Funds Non-Federal Land	Other Funds Total	Total
PG1 Pump Replacement	acres	9.7	20.5	30.2	\$3,040,000	\$6,424,000	\$9,464,000	\$917,000	\$1,937,000	\$2,854,000	\$12,318,000
PG2 SCADA	acres	0.9	65.9	66.8	\$41,000	\$3,028,000	\$3,069,000	\$12,000	\$903,000	\$915,000	\$3,984,000
Total	acres	10.6	86.4	97.0	\$3,081,000	\$9,452,000	\$12,533,000	\$929,000	\$2,840,000	\$3,769,000	\$16,302,000

Note: Totals may not sum due to rounding.

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Table 8-3. Economic Table 2 – Estimated Preferred Alternative Cost Distribution, Water Resource Project Measures, 2025 dollars.

Works of Improvement	Pub. Law No. 83-566 Construction	Pub. Law No. 83-566 Engineering	Pub. Law No. 83-566 Project Admin ¹	Pub. Law No. 83-566 Total	Other Funds Construction	Other Funds Engineering	Other Funds Real Property Rights	Other Funds Permitting	Other Funds Project Admin	Other Funds Total	Total
PG1 Pump Replacement	\$7,541,000	\$270,000	\$1,653,000	\$9,464,000	\$2,514,000	\$90,000	\$0	\$218,000	\$32,000	\$2,854,000	\$12,318,000
PG2 SCADA	\$2,447,000	\$86,000	\$536,000	\$3,069,000	\$815,000	\$29,000	\$0	\$71,000	\$0	\$915,000	\$3,984,000
Total	\$9,988,000	\$356,000	\$2,189,000	\$12,533,000	\$3,329,000	\$119,000	\$0	\$289,000	\$32,000	\$3,769,000	\$16,302,000

Note: Totals may not sum due to rounding.

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1/ Includes \$722,000 in project administration and \$2,189,000 in technical assistance.

Table 8-4. Economic Table 3 – Estimated Average Annual National Economic Development Costs, 2025 dollars.¹

Project Group	Project Outlays (Amortization of Installation Cost)	OMR Costs	Total Cost
PG1 Pump Replacement	\$471,000	\$0	\$471,000
PG2 SCADA	\$157,000	\$30,000	\$187,000
Total Costs	\$628,000	\$30,000	\$658,000

Notes:

Prepared: July 2026

1/ Price Base: 2025 dollars amortized over 50 years at a discount rate of 3.25 percent.

Table 8-5. Economic Table 4 – Estimated Average Annual Damage Reduction Benefits of the Modernization Alternative Over the Future Without Federal Investment (No Action) Alternative, Klamath Watershed, Oregon, 2025 dollars.¹

Project Group 1 (Pumps) On-Site Damage Reduction Benefits	Agricultural-Related	Non-Agricultural Related
Agricultural Damage Reduction	\$288,000	\$0
Production Cost Reductions	\$160,000	\$0
Avoided Pump Failure	\$140,000	\$0
On-site Subtotal	\$588,000	\$0
Project Group 1 (Pumps) Off-Site Damage Reduction Benefits	Agricultural-Related	Non-Agricultural Related
Off-site Quantified Subtotal	\$0	\$0
Total Quantified Benefits	\$588,000	\$0

Project Group 2 (SCADA) On-Site Damage Reduction Benefits	Agricultural-Related	Non-Agricultural Related
Agricultural Damage Reduction	\$1,796,000	\$0
Production Cost Reductions	\$71,000	\$0
Avoided Pump Failure	\$0	\$0
On-site Subtotal	\$1,867,000	\$0
Project Group 2 (SCADA) Off-Site Damage Reduction Benefits	Agricultural-Related	Non-Agricultural Related
Off-site Quantified Subtotal	\$0	\$0
Total Quantified Benefits	\$1,867,000	\$0

Note: Totals may not sum due to rounding.

Prepared July 2026

1/ Price Base: 2025 dollars amortized over 50 years at a discount rate of 3.25 percent.

Table 8-6. Economic Table 5 – Comparison of Average Annual National Economic Development Costs and Benefits, Tulelake Irrigation District Watershed Plan, 2025 dollars. ¹

Works of Improvement	Agriculture- Related Agricultural Benefits	Agriculture- Related Reduced Patron O&M	Agriculture- Related Reduced District OM&R	Average Annual Benefits	Average Annual Cost²	Benefit Cost Ratio
PG1 Pump Replacement	\$288,000	\$160,000	\$140,000	\$588,000	\$471,000	1.2
PG2 SCADA	\$1,796,000	\$71,000	\$0	\$1,867,000	\$187,000	10.0
Total	\$2,084,000	\$231,000	\$140,000	\$2,455,000	\$658,000	3.7

Notes:

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OM&R = operation, maintenance, and repair.

¹ Price base: 2025 dollars amortized over 50 years at a discount rate of 3.25 percent.² From Economic Table 2 (Table 8-3 of this Plan-EA).

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10 List of Preparers

See Appendix E.13 for the List of Preparers.

11 Distribution List

See Appendix E.14 for the Distribution List.

12 Acronyms, Abbreviations, and Short Forms

See Appendix E.15 for the Acronyms, Abbreviations, and Short Forms.

13 Index

See Appendix E.16 for the Index.

14 Appendix

Appendices are provided in a separate document.

Appendix A. Comments and Responses

Appendix B. Project Map

Appendix C. Supporting Maps

Appendix D. Investigation and Analysis Report

Appendix E. Other Supporting Information