FIRST LEVEL SCREENING – *WEEG 2015*

APPLICANT NAME: Tumalo I.D.	CONTROL NUMBER: 77
APPLICANT LOCATION: Bend, OR	TASK AREA: AC
PROJECT NAME: Phase 4 - Piping of the Tumalo Feed Canal	BOR $: 1,000,000 Cost Share $: 1,100,000

	SCREENING FACTOR	COMPLETE	COMMENTS
1	Eligibility requirements		
	• Eligible applicant in a Reclamation state	✓YES __NO	
	• 50% or more non-Federal cost share	✓YES __NO	
	• Authorized funding amount ($1 Million total – no more than $500,000 a year)	✓YES __NO	
	• Funding Group I or II	__I ✓II	
	• Length of project (9/30/17 – FG I or 9/30/18 – FG II)	✓YES __NO	5/31/16
2	Proper format and length (75 pages)	✓YES __NO	
3	Proposal content		
	• SF-424 (authorized signature)	✓YES __NO	
	• SF-424B or SF-424D (authorized signature)	✓YES __NO	
	• Title page	✓YES __NO	
	• Table of contents	✓YES __NO	
	TECHNICAL PROPOSAL/EVALUATION CRITERIA (No More Than 50 Pages)		
	• Executive summary	✓YES __NO	
	• Background data	✓YES __NO	
	• Technical Project description	✓YES __NO	
	• Evaluation Criteria	✓YES __NO	
	• Project Benefits/Performance Measures	✓YES __NO	
	• Potential Environmental Impact Desc.	✓YES __NO	
	• Required Permits/Approvals, if applicable	✓YES __NO	will obtain
	• Letters of Project Support	✓YES __NO	
	• Official Resolution (Required 30 Days After)	✓YES __NO	
	PROJECT BUDGET		
	• Funding Plan	✓YES __NO	
	• Letters of Funding Commitment	✓YES __NO	850K accounted for, need for other 250K
	• Budget Proposal	✓YES __NO	
	• Budget Narrative	✓YES __NO	
	• SF-424A or SF-424C	✓YES __NO	

1st Level Screening Comments (Screening Committee Member):

Summary Comments (Grants Officer):

Applicant is eligible for consideration during the Second Level Evaluation phase X **Yes** ____ **No**

Grants Officer 1/26/15 **Date**

TUMALO FEED CANAL PIPING PROJECT PHASE IV

Applicant:

Tumalo Irrigation District
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January 2015

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LIST OF ACRONYMS AND ABBREVIATIONS

AgriMet: Pacific Northwest Cooperative Agricultural Weather Network
cfs: cubic feet per second
DRC: Deschutes River Conservancy
HAER: Historic American Engineering Record
HYDROMET: Reclamation's Pacific Northwest hydrologic/meteorologic monitoring network.
HCP: Habitat Conservation Plan
NMFS: National Marine Fisheries Service
ODFW: Oregon Department of Fish and Wildlife
OWEB Oregon Watershed Enhancement Board
OWRD: Oregon Water Resources Department
Reclamation: US Department of the Interior, Bureau of Reclamation
SHPO: State Historic Preservation Office ()
TID: Tumalo Irrigation District
USFWS: US Fish and Wildlife Service

c. TECHNICAL PROPOSAL and EVALUATION CRITERIA

1. Executive Summary

Date	January 23,2015
Applicant	Tumalo Irrigation District Bend, Deschutes County Oregon

This application is for Phase IV of the Tumalo Feed Canal Piping Project; a Task A and C (Canal Lining and Piping) project, which is expected to complete approximately 14% of the remaining project. After completion of all phases, approximately six miles of open irrigation canal in the Tumalo Feed Canal will be piped (see Figure 1 for a typical section of canal). Piping the entire Tumalo Feed Canal will conserve an estimated 20 cfs (6,664 acre-feet) of flow by eliminating seepage and evaporation losses. The state of Oregon would receive the water rights to the conserved water associated with public funding will be permanently allocated to instream use in Tumalo Creek, Crescent Creek, and the Little Deschutes River. When complete, the Tumalo Feed Canal Piping Project (all phases) will have increased dry season stream flows in Tumalo Creek from 5.8 cfs to approximately 17.6 cfs. Correspondingly, it will have increased fall, winter and spring stream flows in Crescent Creek, the Little Deschutes River, and the Deschutes River by approximately 8.2 cfs and improved conditions for federally listed Oregon Spotted Frogs. The final order (Appendix D) for these rights has already been established with the Oregon Water Resources Department (OWRD). The water rights will be held and monitored by the Oregon Water Resources Department. As individual phases are completed, proportionate amounts of the water right will be applied to instream use (Incremental conserved water orders have been finalized for Phases 1-3). Phase IV as proposed will permanently protect 1.24 cfs in Tumalo Creek, and 333.80 acre-feet of stored water in Crescent Lake.

Directly below is a list of water quantities affected by this project (Phase IV):

- Average annual water supply: 50,000 acre-feet[1]
- Estimated amount of water saved by Phase IV: 775.83 acre-feet per year
- Estimated amount of water better managed:
    - Approximately 40,000 acre-feet per year will be better managed for agricultural use by being transported through approximately 3,400 additional feet of leak-free pipeline.
    - Approximately 441.93 acre-feet per year will be permanently restored to Tumalo Creek, improving stream flows and water quality for native redband trout.
    - Approximately 333.90 acre-feet of stored water in Crescent Lake will be restored to Crescent Creek and the Little Deschutes River, improving conditions for Endangered Species Act listed Oregon Spotted Frogs.

[1] TID Water Conservation Project 2005, Ex. 2 Tab

- Current water marketing is done within the TID customer base. The amount seasonally varies, but is typically 15-30 acre feet per year. Additionally, approximately 1200 acre-feet (3.5 cfs) are leased for instream use through the Oregon Instream Lease Program.

- As delivery and on-farm efficiencies continue to increase in the Tumalo Irrigation District, water available for marketing will increase. The Phase IV project, in conjunction with ongoing Basin Study efforts will result in greater irrigation patron conservation awareness, and is expected to increase on-farm efficiency gains in the District.

Tumalo has completed the environmental studies, a majority of the engineering design and is prepared to begin construction in September of 2015 with installation of pipe beginning in October of 2015 and completion in April of 2016.

Tumalo is no longer a Bureau of Reclamation district. However, Tumalo Irrigation District and the Bureau of Reclamation have a productive and long-lasting partnership of working together on piping projects to conserve water.

Figure 1: Tumalo Feed Canal; typical channel in northern section of project.

2. Background Data

Tumalo Irrigation District (TID) is located in central Oregon, just outside the City of Bend (Figure 2).

Springs and snowmelt in the Cascade Mountains west of Bend are the source of TID water. Diversions into TID occur at two main locations (Figure 3) one on the Deschutes River (via the Bend Feed Canal), and one on Tumalo Creek (via the Tumalo Feed Canal). Tumalo Creek is a tributary to the Deschutes River.

TID has already piped portions of its delivery system, but most of the canals and laterals remain as open ditches. TID consists of approximately 12 miles of canals (Bend and Tumalo Feed Canals) and approximately 68 miles of laterals (Figure 2).

The Bend Feed Canal (about 5 miles) was converted from open channel to pipe in 2004, and as of 2005, TID had piped about 3,500 feet of small laterals.[2] The first 2.2 miles of Tumalo Feed Canal has been piped.

TID serves about 8,110 acres (Figure 2) and has about 675 patrons. Most of the water use is agricultural (7,400 acres); however, the City of Bend holds approximately 700 acres of irrigation rights it purchased in the 1950's and has transferred this water to municipal use within its own diversion system. . Approximately 35% of the land served by TID is planted in alfalfa, 40% in hay/pasture, 15% in grains, and 10% in lawn and garden.[3] A relatively small portion of irrigation water is used by patrons for household domestic use, after implementation of State recommended treatment.

Water Rights

TID currently has the right to divert a total of 207.2 cubic feet per second (cfs) of natural flow from the Deschutes River and Tumalo Creek. TID also has the right to 77,084 acre-feet of stored water in Crescent Lake Reservoir.

At the start of the irrigation season, water is diverted primarily from Tumalo Creek and its tributaries. At the same time, approximately 10 CFS of natural flow rights from the Deschutes River are diverted into the delivery system through the Bend Feed Canal. When flows are low in Tumalo Creek, TID uses rights to stored water in Crescent Lake Reservoir to supplement its diversions from Tumalo Creek, , albeit with a five day lag time. Crescent Lake Reservoir releases into Crescent Creek and ultimately into the Deschutes River, so that flows that are not available in Tumalo Creek can be taken from the Deschutes River via the Bend Feed Canal.

Current Water Demand

According to TID's Water Conservation Plan Update (2005; see Appendix B), TID must deliver approximately 29,600 acre-feet of irrigation to meet the peak annual demand of its patrons. The existing water rights allow an annual delivery to a farm of 5.5 feet/acre. The estimated requirement for alfalfa is approximately 3.25 feet. The difference between the two values is required for either on-farm losses, which for some irrigators are significant, or increased crop requirements for future crop changes. The farming industry, for the economic health of the industry, regularly encourages the use of alternative crops, some of which may have greater irrigation demands than the current crops. TID encourages irrigators to use the delivery that best meets the needs of the crop and the community, within the conditions of the water right. Within this standard, individual irrigators have discretion. Therefore, all studies of TID have used a target delivery of 5.5 feet on which to assess deficiencies.

Crops currently grown within the TID are alfalfa, pasture, and small grains. All of these crops have consumptive uses similar to alfalfa. The consumptive use for alfalfa was based on consideration of data from TID, the Oregon State Extension Service, and Agrimet. Irrigation water is also used for landscaping purposes. From seven years of available data, the peak annual consumptive use is five to ten percent greater than the average use. Therefore, a peak annual consumptive use of 3.5 feet is used.

[2] Water Conservation Plan Update, TID, November 22 2005

[3] Bend Feed Canal Pipeline Replacement Project TID, Oregon, Final Environmental Assessment and Finding of No Significant Impact. Bureau of Reclamation, Pacific Northwest Region, Lower Columbia Area Office. March 2000

Projected Water Demand

If the duty of water is increased to the permitted 5.5 feet, the total demand would be increased to approximately 40,700 acre-feet for the 7,400 acres in irrigation. This delivery requirement is based on the 3.5 acre-feet of current peak annual consumptive demand, plus 0.5 acre-feet of assumed annual on-farm losses, multiplied by the 7,400 acres of irrigation served by TID. Differences between current delivery and diversion are the result of total system losses.

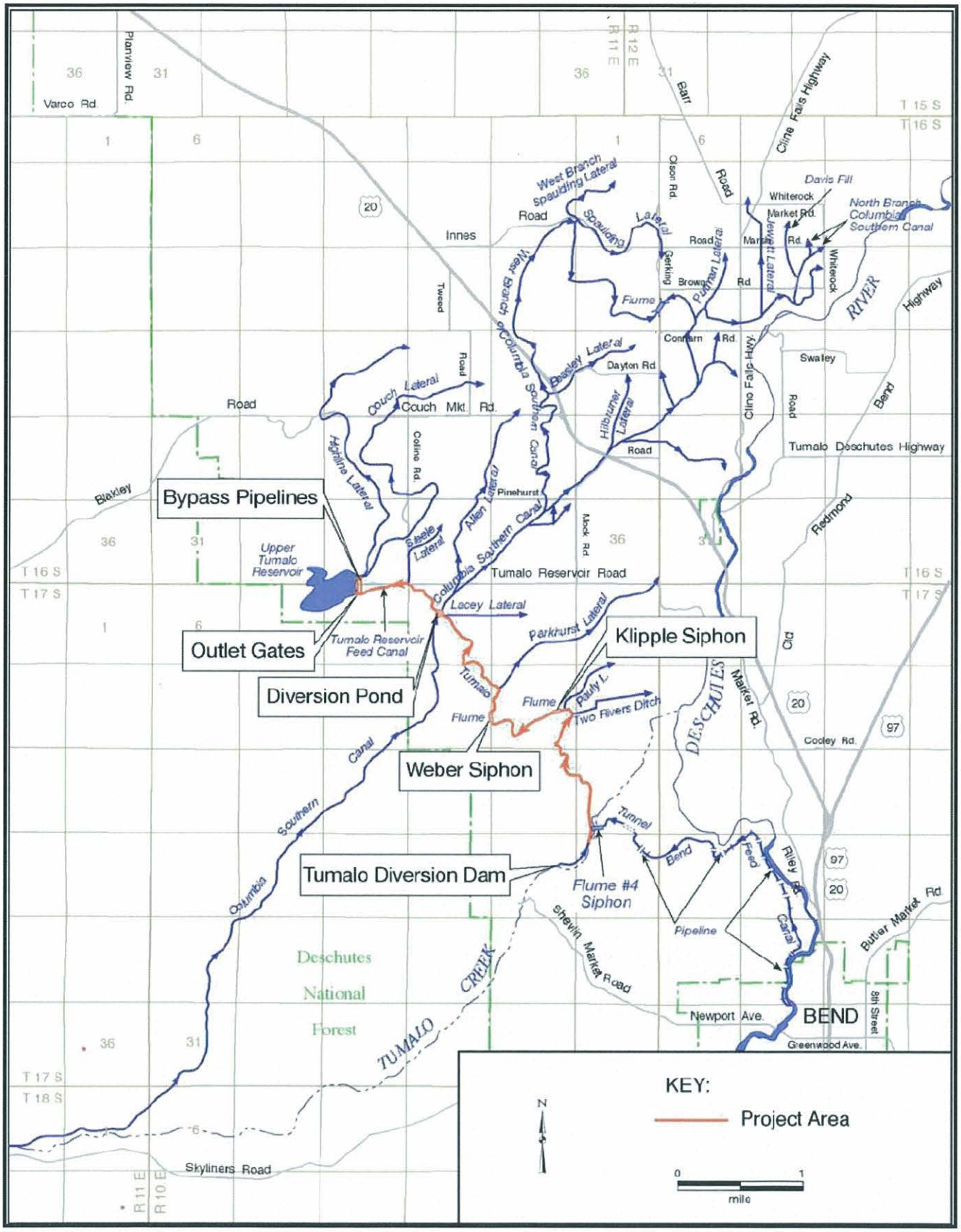


Figure 2: Vicinity, Project Location, and TID network. Near Bend, Oregon.

Potential Shortfalls in Water Supply

Historically, TID has been unable to meet the full demands of its water users during water-short years. In only two years between 1967 and 1990, and again in 2003, did TID meet the targeted peak demand. Major irrigation deficiencies occurred in 1992 and 1994, and most recently in 2004 and 2005. In all of those years, TID responded initially by a proportionate reduction of all irrigation delivery throughout the district. The only exception was for holders of 1961 (junior) water rights, compared to the senior water rights. Consistent with Oregon water law, deliveries were terminated to the holders of 1961 water rights. As the irrigation deficiencies worsened, TID implemented a rotation system of one week on, one week off for all remaining water rights.

Crescent Lake had low storage levels from 1969 through 1971 and again from 1980 through 1982. Low storage levels are an indicator of deficient water supply. Although no TID records are available to confirm this, current TID staff believes that similar strategies of reduced deliveries followed by rotation were used.

Losses from the TID irrigation system do not cause immediate delivery deficiencies. Instead, delivery deficiencies are the result of extended draw-down on storage at Crescent Lake, which in turn is exacerbated by the delivery system losses.

In any year of historical record, full irrigation deliveries can be made if the irrigation season begins with adequate storage in Crescent Lake. Periods of inadequate delivery have always been the result of multiple years of deficient precipitation, resulting in a drawdown of Crescent Lake so that storage isn't available to supplement current run-off. However, losses from the delivery system cause the drawdown of Crescent Lake to be greater, as water is withdrawn from storage to replace the water lost from seepage. If system losses are reduced, then irrigation deficiencies can be reduced or eliminated.

Based on the capability of Crescent Lake to provide carry-over storage, TID's current water rights are adequate to provide delivery of full water rights, if delivery system losses are greatly reduced or eliminated.

Endangered Species Act (ESA) Issues

The Phase IV project area has been surveyed by a biologist, and no threatened or endangered species were found, refer to section "g. Environmental Compliance" for additional detail.

TID expects this project to benefit the Endangered Species Act listed Oregon Spotted Frog in Crescent Creek, downstream of Crescent Lake. The release conserved stored water during the over-wintering and critical spring mating seasons will contribute to improving conditions for this species.

Past Working Relationships with Reclamation

The District has a long working relationship with the Reclamation dating back to the construction of Crescent Lake Dam in the 1950's and the Bend Feed Canal Piping and flume replacement projects in the 1970s, to the Reclamation 2025 Grants for Bend Feed piping projects and WaterSMART Bend Feed and Tumalo Feed canal piping projects. The District has also partnered with Reclamation on canal lining projects and test segments, telemetry and small water conservation assistance grants over the years. Reclamation provides routine inspections of District piping project areas and civil works, and provides technical assistance when appropriate.

Conversion of the Bend Feed Canal from open channel to pipe was completed in 2004. Reclamation provided partial funding for the project and prepared the Environmental Assessment.

In 1997, TID worked with Reclamation to close the Columbia Southern Canal, pipe the first ¾ mile of the Tumalo Feed Canal, install an electronic flow meter on the Tumalo Feed Canal, and connect the meter to the HYDROMET system. Reclamation provided partial funding.

In 2010, TID received WaterSMART funding in the amount of $1,000,000 for Phase II, an approximately 3,200 foot long section of the project. Phase II was successfully completed in 2011.

In 2011, TID received WaterSMART funding in the amount of $850,000 for Phase III. With matching funds from the District and from OWEB, TID piped approximately 3,817 feet of canal. Phase III was completed prior to the 2012 irrigation season.

TID is currently partnering with Reclamation, State of Oregon, and local stakeholders to complete a Reclamation Basin Study. The Basin Study will project future water supply and demand, identify imbalances between supply and demand under current and future climate conditions, develop options to address those imbalances, and complete a tradeoff analysis of these options. It will coordinate all of the conservation activities in the upper Deschutes Basin, helping to meet future water supply needs for TID, Tumalo Creek, and other water users.

3. Technical Project Description

The Tumalo Feed Canal piping project will pipe approximately 6-miles of open canal. With the completion of this project, TID will conserve 20 cfs. 100% of the publicly funded portion of this water will be left instream.

The Tumalo Feed Canal diverts water from Tumalo Creek. It meets the Bend Feed Canal, which diverts Crescent Lake water that has been delivered through Crescent Creek, the Little Deschutes River, and the Deschutes River, and carries their combined diversions to the district. The Tumalo Feed Canal is capable of carrying approximately 190 cfs and feeds the entire district through a series of laterals.

The proposed piping will range from 90-inch diameter pipe down to 48-inch diameter pipe. As laterals divert water from the main canal, the pipe size will be reduced. The inlet of the pipe was connected to the outlet of the dual concrete pipes approximately ¾ mile from the Tumalo Creek Diversion under Phase I project piping. Approximately ¼ mile downstream of the initial connection, the Bend Feed Canal confluences with the Tumalo Feed Canal. From that interconnection of the main canal feeds to the District, the Tumalo Feed Canal continues approximately 5 ½ miles to its outlet at the Tumalo Reservoir.

Piping the Tumalo Feed Canal l will conserve water that is currently lost through evaporation and through infiltration into the porous volcanic soils. Under current conditions, water that infiltrates into the soil enters the regional aquifer and eventually discharges in the Deschutes River 40 miles downstream. This project will eliminate a portion of that seepage and restore conditions in the upper Deschutes River and its tributaries. In addition to conserving water, piping will increase the efficiency of water delivery by decreasing the response time required for head gate changes.

With help from multiple funding partners including the Department of Environmental Quality, the United Stated Bureau of Reclamation and the Deschutes River Conservancy, TID has completed the first three phases of the Tumalo Feed Canal piping project. Phase I piped approximately 2,900-feet of open canal and connecting to the Bend Feed Canal. Phase II piped approximately 3,458-feet of open canal, and added a flow metering station. Phase III piped approximately 3,817-feet of canal. Phases I through III have permanently protected 4.3 cfs in Tumalo Creek, and have resulted in approximately 709 acre-feet of additional stored water in Crescent Lake. The proposed Phase IV project will con-

tinue to pipe open canal and, when completed, will conserve approximately 1.24 cfs in Tumalo Creek and 333.80 acre-feet in Crescent Lake (subject to final funding and associated piping length).

- **Schedule**

TID is prepared to complete Phase IV of the project in the irrigation off-season of 2015-2016. Once funds are committed, TID will be able to quickly expend funds. Design and solicitation package will be complete by July 2015. While installation of pipe in the canal cannot proceed until the end of the irrigation season (October 2015), manufacturing the pipe and preparation of the construction area could begin in September 2015. Bids will be solicited for this project when funds are secured (Fall 2015), and construction will be substantially completed by April 2016.

- **Engineering Plans, Designs, and Analysis**

TID has prepared specifications and design drawings to 70%. These plans and specifications will be finalized in the Spring/Summer of 2015. In addition to the plans and specifications, TID/USBR has completed an Environmental Assessment and FONSI for the project ("Tumalo Feed Canal Piping Project Finding of No Significant Impact and Final Environmental Assessment").

TID has demonstrated its preparation to pipe open canal by completing Phases 1, 2 and 3.

- **Conservation Mechanism**

The Tumalo Feed Canal is built on a base of fracture basalt rock. TID has measured losses of 20-cfs due to infiltration through the rock base. By piping the canal, TID will eliminate these losses which will allow the District to divert less water to serve the same user base.

- **Sustainable Water Supply Improvement**

In addition to conserving water, the piping project allows for improved operations and management of water throughout the District. TID depends on stored water in Crescent Lake for late season water supply. Through the conservation efforts and improved management demonstrated by this Phase and previous phases, TID will be able to store more water and call on the water later in the year, thus reducing water shortages.

- **Sources of non-Federal funding**

Tumalo Irrigation District has invested over $1.5 million of District money in preparing environmental studies, engineering design, and piping sections of the Tumalo Feed Canal. The Oregon Watershed Enhancement Board (OWEB) invested $2.32 million in Phases I, II, and III of the piping project. TID has secured $750,000 from OWEB for Phase IV and will be seeking an additional $250,000 from OWEB for phase IV. Additionally, TID will provide $100,000 of cash and in-kind services during Phase IV.

4. Evaluation Criteria

(a) V.A.1 – Criterion A: Water Conservation

Subcriteria No.A.1: Quantifiable Water Savings

The Tumalo Feed Canal Project (all phases) will conserve approximately 6,664 acre-feet per year. 2,732 acre-feet will come from stored water at Crescent Lake and 3,932 acre-feet (11.8 cfs) will come from natural flow in Tumalo Creek

Phase IV will conserve and permanently protect approximately 775.83 acre-feet per year. It will protect approximately 441.93 acre-feet (1.24 cfs) in Tumalo Creek, and approximately 333.80 acre-feet of stored water in Crescent Lake).

- TID currently uses approximately 45,000 acre-feet of water each year. This water is supplied directly from Tumalo Creek and from stored water in Crescent Lake.
- All of the water is currently used within the District by District irrigators or is lost to seepage and evaporation in conveyance or on-farms.
- Water conserved with public funds will be left instream in Tumalo Creek and as stored water in Crescent Lake.

Canal Lining/Piping

a. The estimate for the annual water savings that will result from the project has been determined based on canal seepage loss calculations described below.
b. The estimate for the conserved water is based on flow test completed for the entire Tumalo Feed Canal with all laterals and deliveries turned off (see Table 1). Each Phase of the project conserves an incremental and pro-rated amount of water based on the length of the project, remaining unpiped canal length and remaining water to be conserved.

Table 1. Seepage Loss From Canal Junction To Upper Tumalo Reservoir

Date	Time	Tumalo Feed Canal Diversion	Diversions From Canal	Delivery To Reservoir	Seepage Loss
4/6/05	800	52.8	0.1	33.6	19.1
4/6/05	900	52.1	0.1	33.6	18.4
4/6/05	1000	52.1	0.1	33.6	18.4
4/6/05	1100	52.2	0.1	33.6	18.5
4/6/05	1200	60.6	0.1	33.7	26.8
4/6/05	1300	55.6	0.1	33.7	21.8
4/6/05	1400	55.6	0.1	33.7	21.4

c. Once the canal is piped, there will be no loss in the piped section. The pipe being used has water-tight joints. During construction water tightness of the pipe is verified with pneumatic and hydrostatic testing methods.
d. Transit loss reductions AF/mile – Total Project: 1,047AF/mile – Phase IV: 1,205AF/mile
e. Water that is left instream will be permanently protected as an instream water right through Oregon's Allocation of Conserved Water program.. It will be measured by an existing station located immediately downstream of the diversion structure on Tumalo Creek. TID will work closely with the State of Oregon Water Resource Department to meet instream flow requirements.
f. For the Phase IV project, 84" diameter HDPE pipe will be used. In the past, TID has used Weholite manufactured by KWH and DuroMaxx manufactured by Contech. Because of pressure requirements for Phase IV, Weholite is anticipated to be used as its manufacturer has indicated an installed pressure rating of 22.5 PSI. This will be verified in final design. Alternatively, polyurethane lined and coated steel pipe could be specified and would satisfy the pressure requirement.
g. Piping the Tumalo Feed Canal will give TID the ability to manage the water that is diverted more efficiently and with less overall water loss. With the completion of this project, TID will be able to automate the head gates to only divert the water that is required to serve the users. This will allow the District to better manage the entire district (approx. 45,000 AF/yr). By eliminating 6.3 miles of open canal, adjustments to the head gate are more accurate and will not have multiple day delays. This change will allow TID to better meet patron needs while greatly increasing its ability to manage instream flows to benefit fish and wildlife.

Estimated Amount of Water Better Managed= Average Annual Water Supply =45,000 AF/yr =100% of Supply

Subcriteria No.A.2: Percentage of Total Supply

On average, TID diverts about 45,000 acre-feet per year. Diversions were calculated from 15 minute Hydromet data each month on both the Bend Feed Canal and the Tumalo Feed Canal; the measurements were averaged over four years (2000 and 2002-2004)[4]. Therefore, conserving 6,664 acre-feet per year equates to 13.3% of total the total supply.

Estimated Amount of Water ConservedAverage Annual Water Supply= 6,664 AF/yr45,000 AF/yr=14.8%

Phase IV will conserve 775.83 AF/yr:

Estimated Amount of Water Conserved Average Annual Water Supply= 775.83 AF/yr45,000 AF/yr=1.7%

(b) V.A.2 – Criterion B: Energy-Water Nexus

Subcriteria No.B.1: Implementation of Renewable Energy Projects

This project provides infrastructure required for future implementation of renewable energy products, specifically low-head hydroelectric generation. While the current design does not include any hydroelectric component, it does produce a pressurized pipe outlet which could be retrofitted with a generation facility, if economically feasible.

TID has looked into the potential of integrating renewable energy projects into its piping projects. However, TID feels that by keeping the potential energy in the pipe, the District can deliver that energy to farms in the form of pressurized deliveries. This is much more efficient use of the potential energy than running the water through a turbine/generator which will decrease the benefit by about 20% and then using electricity to power a pump which looses another 30% of the power. By providing pressurized deliveries, the District has the potential to conserve at least 50% more energy.

TID fully intends to pipe the entire district and provide pressurized deliveries to its users. At that point, TID will have the potential of conserving over 5,000,000 kWh per year (see Table 2).

Table 2. Potential of Energy Conservation

							Pump		Ann Power
				Flow (gpm)	Flow (cfs)	Power	Eff	Use	kW/hr
	psi	AC		7.5	448.83	KW	65%	90%	4320
total acres		8100		60750	135.35				
> 75 psi	50	3276	40%	24570	54.74	535.83	824.3	741.91	3,205,060
> 50 psi	50	1068	13%	8010	17.85	174.68	268.7	241.87	

[4] TID Water Conservation Project 2005, Ex. 2 Tab

									1,044,873
> 25 psi	25	1555	19%	11662.5	25.98	127.17	195.6	176.08	760,664
< 25 psi	0	2201	27%	16507.5	36.78	0	0	0	
									5,010,597

Additionally, as part of Phase IV, TID intends to replace the current pipe control gate power source with a solar-electric source. The gate is currently operated by a 4-hp motor that is fed from grid power. This improvement is an example of the District's continued effort to reduce energy consumption.

Subcriteria No.B.2: Increasing Energy Efficiency in Water Management

This project would complete the "backbone" of TID's water management conservation plan of piping the entire District. Once the backbone is complete, the District will continue to pipe lateral canals, which will conserve further water and provide pressurized deliveries to water users. With pressurized deliveries, water users will have opportunities for on-farm conservation projects, including reduction and elimination of pumping depending upon where in the District the farm lies. Table 2 above provides an estimate of potential District energy savings. No treating of water is required in the Tumalo Irrigation District at this time. Significant vehicle miles will be reduced as a result of this District piping program. Whereas ditch riders currently ride all major portions of the District daily, with piping this is being reduced to a lower frequency. Currently, piped sections of the District are only patrolled weekly versus open canal segments that are patrolled daily.

(c) V.A.3 – Criterion C: Benefits to Endangered Species

This project will benefit Oregon Spotted Frog in Crescent Creek and the Little Deschutes River. The Fish and Wildlife Service listed the Oregon Spotted Frog (Rana pretiosa) as threatened under the Endangered Species Act in 2014. Federal agencies have declared Crescent Creek, the Little Deschutes River, and the Deschutes River down to the City of Bend as critical habitat for the frog (see https://www.fws.gov/oregonfwo/Species/Data/OregonSpottedFrog/). They have documented the presence of the frog in Crescent Creek downstream from Crescent Lake.

The Fish and Wildlife Service has identified Crescent Creek as a priority for the recovery of the Oregon Spotted Frog. The agency has suggested that increasing winter and spring stream flows in Crescent Creek will benefit the Oregon Spotted Frog. This project will conserve stored water from Crescent Lake and allow for its release during the storage season, contributing to improved conditions for frog overwintering and mating.

The additional instream flows resulting from this project will also benefit federally threatened, Forest Service sensitive, and State of Oregon sensitive-vulnerable species downstream of TID diversions. A documented supporting letter from Oregon Department of Fish and Wildlife is included as Appendix G. Throughout the Deschutes Basin projects are being completed that increase stream flow. While increases in stream flow are clearly beneficial, such flow increases do not necessarily equate to an increase in quality. The Tumalo Feed Canal Piping project increases stream flow AND increases water quality. Tumalo Creek is one of the only sources of

cold water in the middle Deschutes and is also a critical gravel-bearing stream that enhances fish habitat within the Tumalo Creek and Deschutes River systems.

With the presence of endangered steelhead and threatened Bull Trout in the Deschutes Basin, the quantity and quality of water in the Deschutes River becomes increasingly important. Tumalo Creek is one of the only cold water sources for the middle Deschutes. Piping of the Tumalo Feed Canal is one of the only ways to increase the flow of this cold water into the Deschutes River that improves habitat for the endangered species.

(d) V.A.4 – Criterion D: Water Marketing

100% of the publicly funded water will be permanently allocated instream and protected under and instream water right. TID has partnered with local, state, and federal agencies and organizations to complete a Reclamation Basin Study for the upper Deschutes Basin. As a part of this study, partners will identify and evaluate options to meet imbalances between supply and demand.

Tumalo Irrigation District participates in the Deschutes Instream Leasing Program and its patrons have access to the program to protect water rights through instream leasing. This program has resulted in great success in shoring up instream water supplies in the Deschutes River while also protecting patron water rights when needed.

As described below, Tumalo Creek provides one of the only sources of cold water to the middle Deschutes River. Local stakeholders have prioritized the restoration of Tumalo Creek stream flows to improve stream temperatures in the Deschutes River. TID expects that the Basin Study will identify the water conserved through the entire Tumalo Feed Canal Piping Project as an option critical to meeting instream needs. The Basin Study will ultimately suggest the framework for marketing water created through this option and other options to instream and out-of-stream water users throughout the basin.

(e) V.A.5 – Criterion E: Other Contributions to Water Supply Sustainability

Subcriteria No.E.1: Addressing Adaptation Strategies in a WaterSMART Basin Study

TID is part of the Deschutes Basin Study Work Group (BSWG) that is actively managing a Deschutes Basin Study right now. TID is a direct voting member of the study group and is also an active member of the Deschutes Basin Board of Control (representing the Central Oregon Irrigation Districts) that is also the applicant for the WaterSMART awarded Basin Study. The Basin Study will project future water supply and demand, identify imbalances between supply and demand under current and future climate conditions, develop options to address those imbalances, and develop a complete a tradeoff analysis of these options. It will coordinate all of the conservation activities in the upper Deschutes Basin, helping to meet future water supply needs for TID, Tumalo Creek, and other water users.

The Deschutes Basin Study Work Group has developed a Plan-of-Study that includes development and acceleration of District water conservation programs largely through piping evaluations and implementation strategies. The TID Phase IV piping project is aligned with and considered part of the adaptation strategies identified in the Study steering committees. BOR and the BSWG are anticipating signing the MOA and Plan of Study in March.

Tumalo Creek provides one of the only sources of cold water to the middle Deschutes River. Local stakeholder participants in the Basin Study have prioritized the restoration of Tumalo Creek stream flows to improve stream temperatures in the Deschutes River. The Basin Study

will identify the water conserved through the entire Tumalo Feed Canal Piping Project as an option critical to meeting instream needs. The Basin Study will ultimately suggest the framework for marketing water created through this option and other options to instream and out-of-stream water users throughout the basin.

The completion of the Tumalo Feed Canal Piping Project will facilitate and allow for improved water management. TID has a dual source system, drawing water from either the Deschutes River or Tumalo Creek. With the completion of the Tumalo Feed Canal, TID will be able to work in collaboration with other irrigators and water users in the basin to better manage water in both the Deschutes River and Tumalo Creek for multiple uses. This will help reduce the supply and demand imbalance by continuing to meet irrigation demand, while making water available for instream and municipal mitigation needs. The project will reduce the potential for conflicts and crisis in the future. The Basin Study will provide the additional analysis necessary to optimize this water amongst sources and needs. The project proposed in this WaterSMART grant is the next critical piece of the longer-term piping strategy. Implementing this project now will increase the collaborative energy to achieve the longer-term strategy through Basin Study planning.

Subcriteria No.E.2: Expediting Future On-Farm Irrigation Improvements

TID has an exceptional record of on-farm efficiency improvements. It was estimated by TID staff that less than 10% of all acreage in the district (666 acres or less) are irrigated through flood or other low-efficiency application method. The District has been aggressive through its Water Conservation Plan and patron involvement (i.e. District Web site and monthly newsletter) to educate its users regarding the benefits of on-farm efficiency.

The Phase IV project provides incremental seepage loss conservation that provides the District with more delivery flexibility, especially given the Junior and Senior water right mix in the District thus reducing on-farm delivery expectation conflict. A significant benefit of piping the Tumalo Feed Canal will be to allow for the continuation of system piping and pressurization. Phase IV will increase the system head to approximately 15 PSI and as the system piping continues, this value will increase. As indicated above, the benefits of piping the TID system from an energy conservation perspective are significant and will reduce the District carbon footprint and dramatically reduce electrical grid demands.
Piping the TID system through incremental projects will also reduce on-farm losses largely through pond loss management. Generally, irrigators receive water from the TID system across a weir to a pond. The pond receives incoming flows from the TID system and the farmer pumps from the pond to his sprinkler irrigation system or flood diversion system. As is common with open channel delivery systems, Districts have difficulty regulating open channel flow rates, especially with long canal systems such as the TID system. Water is diverted at the top end of the project and once diverted it must flow through the system. This results in water wastage, especially at lateral end points and farmers at those locations have true difficulty capturing the varying flows that result and therefore wastage and spillage occurs. Phase IV continues an incremental piping program that is intended to fully pipe the TID system. Once complete, the District will be able to much more precisely regulate flows to the end users and prevent excess deliveries from overflowing existing ponds. A fully piped system will allow the District to regulate all the way to the river diversion points and leave water in the Deschutes

River and Tumalo Creek whereas traditionally, they have had to divert extra "carry water" to insure water made it from the upper limits of the system to the lower limits in the open canals. TID estimates that this delivery improvement may result in as much as 10-20 CFS of peak flow on-farm conservation in the system once system piping is completed.

This project directly compliments the NRCS on-farm efficiency programs such as the RCPP and the EQUIP programs. Pressurized piping will work in direct conjunction with these on-farm programs to upgrade the final 10% of farms to efficient drip of sprinkler systems and will allow for direct pressurized piping service upgrades to on-farm systems to replace pumps or reduce pumping horsepower (both NRCS supported and funded programs).

Subcriteria No.E3: Building Drought Resiliency

Piping the TID system with continuing projects such as the Phase IV piping project incrementally improve the District's drought resiliency and are a key method to achieve District drought tolerance.

TID is located in an arid region of Oregon known as "the high desert". TID relies on its two sources of water supply from Cresent Lake and from Tumalo Creek. Tumalo Creek has a rapid run-off in the early irrigation season and provides flows through June and then drops off. Crescent Lake is then called on by the District to deliver flows with a ramp-up from June through the end of the irrigation season as Tumalo Creek drops off.

Crescent Lake is fed from a small tributary basin that typically provides a snow-pack melt feed in the Winter and Spring of each year. Historically, Crescent Lake's fill cycle has not been sufficient in conjunction with Tumalo Creek flows to serve the District patrons irrigation demands every year (see TID Water Conservation Plan attached). As the District patrons are served by both junior and senior water rights, the junior rights have been curtailed in the past and in some instances senior rights have been as well depending upon the severity of the drought cycle. Climate change will be evaluated as part of the Reclamation Basin Study but it is anticipated that a warming trend may exacerbate drought conditions.

Water conservation through system piping has improved the District's ability to function and to store water in Crescent Lake by reducing diversion demands on the Lake. The Phase IV piping project will reduce seepage losses, reduce diversion rates into the District's system, store more water in Crescent Lake through additional conservation water right and therefore will provide more drought tolerance for the District.

Subcriteria No.E4: Other Water Supply Sustainability Benefits

When fully piped, the District will have a much greater control over delivery consistency Conserved water from the Tumalo Feed Canal project will improve ecological conditions in Tumalo Creek and the middle Deschutes River. The Oregon Department of Fish and Wildlife has identified a 32 cfs late summer stream flow target in Tumalo Creek and a 250 cfs stream flow target in the Deschutes River downstream from the City of Bend. This project will contribute to meeting that target in Tumalo Creek and in the Deschutes River downstream from its confluence with Tumalo Creek, a few miles downstream from the City of Bend.

The Oregon Department of Environmental Quality has included Tumalo Creek and the middle Deschutes River on its 303(d) list of impaired waterways for not meeting temperatures standards for salmon and trout rearing and migration. .

Temperatures in Tumalo Creek upstream from the Tumalo Feed Canal diversion generally meet state water quality standards. Rapid warming associated with historically low stream flows has historically caused temperatures in the the 2.8 mile reach immediately below the Tumalo Feed Canal Diversion to exceed state standards. Monitoring and evaluation by the Upper Deschutes Watershed Council (UDWC 2012) suggests that the completion of the whole Tumalo Feed Canal Piping Project will provide the stream flows necessary to meet state water temperature standards in this reach. Monitoring by the Oregon Department of Fish and Wildlife (ODFW 2012) suggests that native redband trout concentrate in and around cold water inputs to the Deschutes River, including Tumalo Creek, and further emphasize the importance of these stream flows.

Excerpts from these studies indicate:

ODFW Middle Deschutes Monitoring (2012)

- The Deschutes River is on the Oregon Department of Environmental Quality 303d list for water quality impairment due to excessive temperature. Negative impacts of high temperature on salmonid growth and survival are well documented (Recsetar et al. 2012).
- All size classes of redband were present at higher frequencies directly downstream of or in cold water inputs; 51% of redband were caught at the site closest to Tumalo Creek and in Foley Waters. The highest frequencies of brown trout were at Foley Waters and the highest frequencies of juvenile brown trout were located at the first site below Tumalo Creek.
- Our distribution data also suggests fish concentrate near areas of cold-water inputs and average fish lengths and average relative weights are greater in these areas. Another point of interest was juvenile brown trout were only found in the three sites directly below Tumalo Creek and their frequency decreased with distance from Tumalo Creek.

Upper Deschutes Watershed Council (2012) WQ Monitoring Program:

- Restoration effectiveness analysis indicated that temperatures immediately downstream of the confluence with Tumalo Creek cooled in response to cumulative increases in combined streamflow from North Canal Dam and from Tumalo Creek from 2005 to 2012.
- The temperature response observed in the Tumalo reach suggests a strong cooling effect as a result of the increased contribution of cool Tumalo Creek flows in combination with the increase in flows from the Deschutes.
- Streamflow restoration projects that strategically increase flows in Tumalo Creek in proportion to the flow contribution of the upper Deschutes at North Canal Dam may therefore be an effective approach to maximize reductions in temperature in the middle Deschutes downstream of Tumalo Creek.
- As flows in Tumalo Creek increase, temperature benefits of higher flows in the Deschutes diminish and ultimately are lost altogether, such that increasing flows in the Deschutes requires commensurate increases in Tumalo flows to achieve the same temperature benefits obtained at lower Deschutes and Tumalo flows.

- These results provide support for the conclusion that achieving temperature reductions in the Deschutes may be accelerated by strategically prioritizing Tumalo Creek water transactions; preferentially increasing flows in Tumalo Creek over restoring streamflow in the Deschutes may achieve greater temperature benefits at an equivalent cost.

The other major water user on Tumalo Creek is the City of Bend. Currently the City draws approximately 50% of their annual demand from Bridge Creek, a tributary of Tumalo Creek. The City has been working on an update to their diversion system, and local and national conservation groups have indicated their concerns associated with continued diversions from Bridge Creek. The City has worked with many of these groups to reiterate the importance of Tumalo Creek to the local community. TID, the City of Bend and natural resource interest groups are coordinating on efforts to better manage water use on Tumalo Creek. The completion of the Tumalo Feed Canal Piping Project will facilitate and allow for improved water management. TID has a dual source system, drawing water from either the Deschutes River or Tumalo Creek. With the completion of the Tumalo Feed Canal, TID will be able to work in collaboration with other irrigators and water users in the basin to better manage water in both the Deschutes River and Tumalo Creek for multiple uses. The project will reduce the potential for conflicts and crisis in the future.

TID continues to work closely with the Deschutes River Conservancy (DRC) on this project. The DRC's mission is to restore stream flow and improve water quality in the Deschutes Basin. Their objectives are to meet or exceed state water quality standards and to restore the natural hydrograph to the extent environmentally, socially and economically feasible in the Deschutes River and its tributaries. This project would support the mission and objectives of the DRC.

Based upon the significant public and environmental benefits of this project, letters of support have been provided by the Governor, the State of Oregon Water Resources Department, the City of Bend, the Deschutes River Conservancy, Trout Unlimited, and Oregon Department of Fish and Wildlife (Appendix A).

(f) V.A.6 – Criterion F: Implementation and Results

Subcriteria No.F.1: Project Planning

Water Conservation Plan and other plans

1. The current Water Conservation Plan (2005) identifies the piping of Tumalo Feed Canal as its top priority. In 2000, TID submitted a Water Conservation Plan to OWRD, outlining efforts and proposed actions to address its water conservation goals. After the conservation plan was accepted by the state, TID began to implement its conservation strategies, including piping of the remaining open-channel section of the Bend Feed Canal. TID updated its Water Conservation Plan in November of 2005. The updated plan was approved by OWRD and shall remain in effect until May 17, 2016. In the current phase of the Water Conservation Plan, conserved water is primarily returned to the Deschutes River, Crescent Creek, and Tumalo Creek, improving aquatic habitat. In later phases of the Water Conservation Plan, more of the conserved water can be used to strengthen deliveries to patrons and to prepare for climate changes.
2. TID has prepared specifications and design drawings to 70%. These plans and specifications will be finalized as part of the project. In addition to the plans and specifica-

tions, TID has also completed an Environmental Assessment for the project resulting in a Finding of Non-Significant Impact (FONSI).

3. The USFWS has proposed restoration of aquatic habitat in its bull trout recovery program. The recovery program references an application for 250 cfs of water rights in the middle Deschutes River. A widely accepted flow target for the middle Deschutes River is 250 cfs. Both the ODFW and the USFWS have proposed this flow target. Piping of the Tumalo Feed Canal would directly contribute to the 250 cfs called for in this recovery program[5].

   The Upper Deschutes River Subbasin Fish Management Plan (ODFW 1996) identified low flows in Tumalo Creek and the Deschutes River as contributing to degraded aquatic habitat. While the piping of the Tumalo Feed Canal was not specifically addressed in the management plan, Action 5.1 of its management direction identified working with irrigation districts to "use less water more efficiently in order to establish increased minimum flows necessary to maintain aquatic life."[6]

4. The ongoing Reclamation Basin Study will identify options to meet future water needs in the upper Deschutes Basin. Preliminary planning efforts led by the Deschutes River Conservancy under the Deschutes Water Planning Initiative prioritized the Tumalo Feed Canal Piping Project as a strategy to meet environmental water demands. TID expects that stakeholders will further support this strategy under the Basin Study.

Subcriteria No.F.2: Readiness to Proceed

The construction of Phase IV is expected to commence in mid-October, 2015. The significant remaining obstacle to the implementation is procurement of funding. TID has shown an unwavering ability to complete projects on time and within budget. All permits have been received, and all environmental compliance has been completed. TID intends to complete the Phase IV piping project by April 2016.

Subcriteria No.F.3: Performance Measures

Conserving water by eliminating seepage from canals is the primary direct benefit of piping the Tumalo Feed Canal. In addition to TID's on-going water monitoring program, a water loss test was performed in 2005. During this test, all side laterals and headgates were shut off and water was run through the Tumalo Feed Canal. The diversion into the canal was measured and contrasted with the amount of water delivered at the end of the canal, which empties into the Tumalo Reservoir, as summarized in Table 1, above. The amount of water lost between those two points was measured to be approximately 20 cfs[7]. This data was taken during a controlled canal run, in which no deliveries were made to users, and the Bend Feed Canal was off. At higher canal flow, the losses are expected to be larger due to greater head-pressure causing the seepage and more surface area of side canal banks exposed to the flows.

Tumalo Irrigation District has an approved Final Order for Conserved Water with the State of Oregon Water Resource Department. TID will work closely with the Water Resource Depart-

[5] Tumalo Irrigation District Water Conservation Program: Federal Need for Project, March 2006
[6] Upper Deschutes River Subbasin Fish Management Plan, Upper Deschutes Fish District. ODFW, October 1996
[7] Tumalo Irrigation District Water Conservation Program: Federal Need for Project, March 2006

ment to ensure that water is left instream. Each of the points of diversion has stream gages and canal flow measurement devices that upload information to the HydroMet system operated by the Bureau of Reclamation.

Additional information is provided above, in Evaluation Criteria, "(f) Demonstrated Results".

The Final Order for Conserved water is attached (Appendix D).

Subcriteria No.F.4: Reasonableness of Costs

The pipe proposed for this project has an expected life of at least 100 years. The cost benefits of individual phases are expected to be approximately equal to that of the entire project as illustrated below.

Complete Project:

Total Project CostAF Better Managed x Improveme t life= $16,500,00045,000 x 100=3.7

Total Project CostAF Conserved x Improvement life= $16,500,0006,664 x 100=24.8

Phase IV Only:

Total Project CostAF Better Mana ed x Improvement life= $2,100,00045,000 x 100=0.5

Total Project CostAF Conserved x Improvement life= $2,100,000775.83 x 100=27.1

(g) V.A.7 – Criterion G: Additional Non-Federal Funding

TID has secured $750,000 (35.7% of total project cost) in state funding through the Oregon Watershed Enhancement Board (OWEB). TID will be submitting an application for an additional $250,000 (11.9% of total project cost) in state funding through OWEB. Additionally TID is prepared to provide $100,000 (4.76% of total project cost) of cash and in-kind services. With the current budget plan, the non-Federal funding portion is 52.38% of the total cost.

Table 3: Project Financing and Cost Sharing (Phase IV)

	Estimated Project Cost	BOR	OWEB	TID	Non-Federal Funding
Total	$ 2,100,000	$1,000,000	$1,000,000	$100,000	52.38%

TID has invested approximately $1,500,000 in the preparation of the engineering studies and design drawings and the Environmental Assessment for the project as well as piping some sections of the Feed Canal. TID is working closely with OWEB to secure approximately

$1,000,000 in funding for the project (OWEB 213-4017 currently authorized in an amount of $750,000 with the balance of $250,000 to be requested pending this WaterSMART grant application).

(h) V.A.8 – Criterion H: Connection to Reclamation Project Activities

Under Title IX of the "Omnibus Public Land Management Act of 2009", the Bureau of Reclamation was authorized to participate in the Tumalo Irrigation District Water Conservation Project.

TID has worked closely with Reclamation on a number of important projects, including the Bend Feed Canal, a 2.5-mile project piped in 2005, with $2.5 million of the project costs provided by Reclamation.

In 1999, TID with assistance from Reclamation abandoned the Columbia Southern Canal from Tumalo Creek to the Tumalo Feed Canal. This project allowed around nine miles of Tumalo Creek to return to natural flow conditions.

The DRC has completed a number of research documents for Reclamation under the Deschutes Water Alliance Water 2025 Grant.

In 2010/2011, BOR supported construction of Phase II of the Tumalo Feed Canal through the 2010 – WaterSMART grant program. Phase II was completed and the conserved water is now perpetually protected instream. Phase III (WaterSMART funded) was completed in April 2012. The water conserved from Phase III was permanently protected in stream beginning in 2012.

Tumalo Irrigation District shares the Deschutes Basin with Central Oregon Irrigation District, Swalley Irrigation District, Arnold Irrigation District, Lone Pine Irrigation District and North Unit Irrigation District. Each of these district's diversions affect one another. The Tumalo Feed Canal Project is not located on Reclamation land and does not receive Reclamation water, however, it shares a basin with North Unit Irrigation District, a Reclamation Irrigation District. This project will place water instream increasing the quality of the water throughout the Basin. As standards for water quality to support threatened and endangered species continue to tighten, the improvement in water quality from the completion of the Tumalo Feed Canal piping project will have a positive effect on each of the irrigation districts that share the basin.

TID has been and continues to participate with Reclamation in the Deschutes Basin Study as indicated in more detail above.

5. Environmental and Cultural Resources Compliance

Information in this section comes from the Environmental Assessment for the proposed project, which was completed in June 2010.

A Finding of Non-Significant Impact has been issued on this project (PN-FONSI-10-06).

Description of Project Activities

The pipe will be installed within the existing canal. Excavation two to four feet below the existing bottom of the canal will be needed to accommodate the larger diameter (84 inch) pipe. All bank excavation will be confined to TID's easement.

Once the pipe is installed, the ditch will be backfilled first with gravel to about halfway up the side of the pipe, where geotextile fabric will be placed, and then backfilled with on-site or imported fill. Imported fill will be obtained from an active source, or by excavation from the Tumalo Reservoir during the off-season when the reservoir bed is mostly dry.

During construction, the project will consist of exposed earth, the pipe, staging areas for construction equipment, and stockpiles of native and imported fill. Trees may be pruned to allow passage of construction equipment and vehicles, and if deemed a safety hazard, some trees may be removed. Construction noise could also affect the recreation and aesthetic experience in those portions of the canal.

After construction, the piped Tumalo Feed Canal would look like a broad path covered by natural ground cover, with the same elevation as the existing top of bank (see Figure 4, below). The project area may be slightly mounded or dipped below grade in some locations, depending on the amount of fill needed or site excavation constraints. The canal alignment would no longer provide the same aesthetic atmosphere as the open water canal.

Air Quality

Impacts to air quality from construction dust will be minor. Dust generated by piping projects tends to be minimal. This is largely because only a small portion of the ground will be disturbed at any one time. In addition, construction will occur in fall, winter, and/or spring, when conditions will not be as dry, and which will reduce air-born dust.

Water and Wildlife Habitat

The project area does not interface with Tumalo Creek or any other natural water body. In addition, construction will be in the irrigation off-season, and no water will be running in the canal. During irrigation season, any excess water is stored in a reservoir, storage ponds, or spilled on-farm. No TID irrigation water is returned to natural water bodies. The project will have a beneficial impact on water quality and quantity by transferring 20 cfs of water rights to the state for instream use.

The canal offers no significant habitat for water-dependent wildlife because of its intensive seasonal maintenance, and because of its extreme seasonal flow variations. Piping the open canal would eliminate a seasonal source of water for wildlife. However, the piping of the canal will happen over the span of several years, and many nearby laterals will also remain open during the piping of the Tumalo Feed Canal. Access to water by wildlife will be lost gradually, allowing an adaptation to other sources of water. The Tumalo Reservoir and Tumalo Creek are at each end of the project area, and the maximum straight-line distance to either of these water sources is approximately two miles.

Some trees that are dependant upon the canal leakage for water may not survive the piping of the canal. Experience with the piping of the Bend Feed Canal showed that some trees that would not normally have survived in such a location without the canal did die off after piping, but the majority of the well-established trees survived.

Threatened and Endangered Species

The project area has been surveyed by a biologist, and no threatened or endangered species were found. A list of threatened and endangered species that may occur in Deschutes County was obtained from the USFWS (see Appendix F). The only federally listed species identified as potentially occurring in Deschutes County are northern spotted owl, bull trout and Oregon Spotted Frog. These species do not occur in the project area. The closest occurrence of bull trout is over 15 miles downstream of the project area in the Deschutes River and the closest Oregon Spotted Frog critical habitat is 10 miles upstream of the project area in the Deschutes River. Critical habitat has been designated for the northern spotted owl, but does not include the project area.

Wetlands

There are no wetlands in the project area. Two areas that appeared to have some of the characteristics of a wetland were tested, but the soils were not classified as hydric (see Appendix H).

Historic and Archeological Properties

The project will replace the Tumalo Feed Canal with pipe, and the headgate to the Highline/Couch lateral has been removed.

TID's earliest features date to 1900, with substantial building phases in 1903, 1913-1914, and 1922-1923. The Tumalo Feed Canal was constructed in 1913 and 1914. Beginning with a rehabilitation program in 1974, substantial changes have occurred to the canal structures. In 1974, the original flume at the head of the Tumalo Feed Canal, just beyond the lined section, was replaced with 54-inch diameter concrete pipe siphon. The Tumalo Feed Canal was also piped between its diversion point with Tumalo Creek to within a quarter mile of its intersection with the Bend Feed Canal. After the Bend Feed Canal junction, the Tumalo Feed Canal remains open, in its original design configuration. Since completion of a 1996 historical overview, two original wooden trestle flumes (the Klippel and Weber flumes) have been removed and replaced with buried steel siphons. The adjacent twin flumes downstream from the Klippel Siphon have also been removed. A mortared rock footing that once supported the outlet of the twin flumes now functions as the support for a bridge. In addition, a concrete delivery has been constructed to the Pauley Lateral.

TID's irrigation system was determined to be eligible for the National Register of Historic Places as a linear district by Reclamation, with the Tumalo Feed Canal listed as a contributing feature to that district. The State Historic Preservation Office (SHPO) concurred with this determination on April 16, 1997 (see Appendix E).

In 1996, an historic context and overview of the district features was prepared, and that information was subsequently incorporated into Historic American Engineering Record (HAER) Number OR-151, which documents the history of the Tumalo Irrigation District. The HAER provides photos and a written history of TID.

The HAER documentation and its distribution was deemed full mitigation for the piping of the Tumalo Feed Canal.[8] The HAER document serves as a record of the facilities for those interested in understanding TID's history. TID has provided the HAER to Reclamation, SHPO, the

[8] Memorandum of Agreement for the Piping of the Tumalo Feed Canal and Highline/Couch Lateral, October 30, 2006

Seattle office of the National Park Service (for provision to the Library of Congress), the Bend Public Library, and the Deschutes County Historical Society.

There are no archeological sites eligible or potentially eligible for the National Register of Historic Places in the project area. The project area was surveyed by an archaeologist in November of 2006. A copy of the archeologist's report and a determination of no effect form was submitted to SHPO on December 14, 2006. SHPO concurred with the determination of no effect to archeological sites in a letter dated February 28, 2007.

Minimizing and Mitigating Impacts

After construction, the project area will be graded to match adjacent grades where feasible, and planted with a seed mix of native grasses and forbs. Any excess excavated material will be removed to active disposal sites. No new staging areas outside TID's easement will be required. TID will be responsible for ensuring that the plants are established within a year, and that they survive for two years afterwards. The project site would look similar to the post-construction Bend Feed Canal alignment as shown in Figure 4, below.

Figure 3: Typical Post-Construction View of Buried Pipe Alignment, From Bend Feed Canal Piping Project.

6. Required Permits or Approvals

The Tumalo irrigation system does not drain into any water bodies of the U.S. and therefore is not under the jurisdiction of the US Army Corps of Engineers or Division of State Lands. No wetlands were found in the project area. No removal/fill permits are anticipated to be required to implement the project. Consultation with SHPO regarding historic properties (of both a historic and an archeological nature) has been completed. If Federal funding is received, TID will complete a final archaeological project walk as required by the National Environmental Policy Act. A environmental assessment has been completed and submitted to Reclamation's regional office. A Finding of Non-Significant Impact has been issued on the project (PN-FONSI-10-06). No other permits or approvals are required.

7. Letters of Support

DESCHUTES RIVER CONSERVANCY

January 19, 2015

Kenneth Rieck
Tumalo Irrigation District
64697 Cook Ave
Bend, OR 97701

The Deschutes River Conservancy strongly supports Tumalo Irrigation District's Tumalo Feed Canal Phase IV water conservation project. The mission of the Deschutes River Conservancy is to restore stream flow and improve water quality in the Deschutes River and its tributaries. Restoring flows in Tumalo Creek is one of the DRC's top priorities, particularly as recent analyses indicate that restoring flows in Tumalo Creek not only benefits Tumalo Creek, but is the key to reducing temperatures in the Middle Deschutes and provides key redband trout refugia in summer months in the Middle Deschutes. This project also provides needed benefit in Crescent Creek, a stronghold for the Oregon spotted frog, recently listed as threatened under the Endangered Species Act.

The DRC is currently partnering with the district on a longer-term strategy to pipe all district canals, which will meet instream water rights in Tumalo Creek, provide significant benefit in the Middle Deschutes River, and improve habitat for spotted frog. The DRC is committed to partnering with Tumalo Irrigation District to implement this long-term strategy in a cost-effective way that benefits the rivers as well as the district. The proposed project is a critical piece to keep this effort moving and to keep collaborative energy moving forward.

The Deschutes River Conservancy and Tumalo Irrigation District have partnered on prior conservation projects that have permanently restored stream flow in Tumalo Creek, Crescent Creek, and the Deschutes River. To date, the district has protected over 12 cfs of senior water rights in Tumalo Creek on an annual basis through water conservation and leasing projects.

In addition to these individual projects, Tumalo Irrigation District has joined other water users in a basin-wide water management planning effort through the Deschutes Basin Study. This effort will, when completed provide the information necessary to forge a basin-wide long-term management agreement that improves instream, agricultural, and municipal water supplies in the Deschutes Basin. Piping the Tumalo Feed Canal is a key piece of this larger planning effort, and will be integrated into the optimization of adaptation and mitigation strategies being analyzed in the Deschutes Basin. Restoring Tumalo Creek is a basin-wide priority.

Sincerely,

Kate Fitzpatrick
Program Director

03/11/2004 15:34 FAX 5413833287 SHELBY 02

THEODORE R. KULONGOSKI
GOVERNOR

February 26, 2004

RECEIVED
MAR 03 2004
By

Elmer McDaniels
Tumalo Irrigation District
64697 Cook Ave
Bend OR 97701

Dear Mr. McDaniels:

I am well aware of the good works Tumalo Irrigation District has done over the past several years, which include the piping of the Bend Feed Canal, the elimination of the Columbia Southern Canal Diversion and replacement of several flumes. I am pleased that Tumalo Irrigation District is continuing its water conservation efforts in seeking to pipe the Tumalo Feed Canal. The water saved and placed in Tumalo Creek, and subsequently the Deschutes River will have a great impact on Central Oregon fisheries.

Tumalo Irrigation District is and has been a leader in water conservation as can be seen in your selection to receive the 2003 Commissioner's Water Conservation Award from the Bureau of Reclamation. The new piping project will increase the efficiency of Tumalo Irrigation District's water distribution facilities by eliminating seepage loss. The District's work in achieving a more reliable water delivery for its patrons as well as enhancing stream flows is commendable and an example for other irrigation districts to follow.

Once again, Tumalo Irrigation District has provided a "win-win" solution on a complex issue and attempts to meet the needs of the diverse interests in the water resource of Central Oregon. I commend Tumalo Irrigation District on its dedication to this endeavor and strongly recommend the project.

Sincerely,

THEODORE R. KULONGOSKI
Governor

TRK:dv:tmt

c: Mike Dugan, District Attorney
Deschutes County

STATE CAPITOL, SALEM 97301-4047 (503) 378-3111 FAX (503) 378-4863 TTY (503) 378-4859
WWW.GOVERNOR.STATE.OR.US

Oregon

Theodore R. Kulongoski, Governor

Water Resources Department
North Mall Office Building
725 Summer Street NE, Suite A
Salem, OR 97301-1271
503-986-0900
FAX 503-986-0904

April 26, 2005

Elmer McDaniels
Tumalo Irrigation District
64697 Cook Avenue
Bend, Oregon 97701

Dear Elmer:

As you know the Water Resources Department has long supported the Tumalo Feed Canal Project, and that support continues. Tumalo Irrigation District has been a leader in water conservation, as guidanced by your selection to receive the 2002 Oregon Water Resource Commission's Water Conservation and Restoration award, and the 2003 Governor's Oregon Plan Certificate of Appreciation.

The Tumalo Feed Canal Project will continue this tradition of excellence in water resource management. The piping of the canal will eliminate seepage loss and provide for a more reliable delivery of water to TID patrons. The project also has the potential to significantly improve streamflows in Tumalo Creek and the middle Deschutes River. We look forward to receiving your application for allocation and use of conserved water.

If you have any questions, or if the Department can be of further assistance, please contact Kyle Gorman, SC Region Manager, at 541-388-6669.

Sincerely,

Phil Ward
Director

TROUT UNLIMITED

From: Trout Unlimited
50 SW Bond St. Suite 4
Bend, OR, 97702

February 2, 2014

To: Elmer McDaniels, Manager
Tumalo Irrigation district
64679 Cook Avenue
Bend, OR, 97701

Dear Mr. McDaniels:

The Deschutes Chapter of Trout Unlimited enthusiastically supports Tumalo Irrigation District (TID)'s phase IV canal piping project. TID is to be commended for it previous conservation projects, which have contributed significantly to restoration of instream flows in Tumalo Creek. The direct value of phase IV piping is described in their application, but the value is greater than the direct results. It is a necessary step towards later phase projects, which when completed will contribute 17.6 cfs of flows during the dry season to the lower reach of Tumalo Creek. Completion of the TID piping projects will also enable other water management strategies that will move Tumalo Creek close to its instream water right of 32 cfs during the low flow warm water late summer season. This instream transfer of water rights has already been approved by Oregon Water Resources Department (order CW-37), and the Oregon Department of Fish and Wildlife (ODFW) has supported its value for the recovering fishery of Tumalo Creek. Also, recent studies by ODFW have further established the value of Tumalo's cold water for the sensitive species of native Redband Trout in the Middle Deschutes River. Finally it is of note that these waters are also 303d listed by Oregon DEQ for excessive high temperatures. Recent studies by the Upper Deschutes Watershed Council have highlighted the critical role the cold water of Tumalo Creek will play in correcting this water quality deficiency. Phase IV is a critical step needed for both fisheries and water quality in both Tumalo Creek and the Middle Deschutes River.

Trout Unlimited's mission is to restore, connect, protect and sustain cold water fisheries. It has over 140,000 members nationally and the Deschutes Chapter has approximately 600 members. On behalf of our Chapter and TU, we are excited to support this project.

Sincerely,

M Tripp

Michael Tripp
Conservation Chair
Deschutes Chapter of Trout Unlimited

01/18/2010 09:52 5413833287 TUMALO PAGE 02/02

Oregon

Theodore R. Kulongoski, Governor

Department of Fish and Wildlife
High Desert Region
61374 Parrell Road
Bend, OR 97702
(541) 388-6363
FAX (541) 388-6281

RECEIVED
JAN 18 2010
By

January 15, 2010

Elmer McDaniels
Tumalo Irrigation District
64697 Cook Ave
Bend, Oregon 97701

Dear Mr. McDaniels:

The Oregon Department of Fish and Wildlife (ODFW) is writing in support of Tumalo Irrigation District's (TID) proposed piping project and instream transfer of the reduced seepage loss. The resulting instream water allocations will provide critical base habitat for native redband trout, bull trout, mountain whitefish, reintroduced anadromous Mid Columbia steelhead and other aquatic resources in the receiving streams. Both bull trout and Mid Columbia steelhead are federally listed as threatened species.

The proposed project will result in piping of approximately 6 miles of open canal with 100 percent of the reduced seepage loss allocated to the State of Oregon (State) as an instream water right. The completed piping project will result in an additional 20 cfs of conserved water protected instream. Of the 20 cfs, 11.8 will be protected from the Tumalo Feed Canal diversion located on Tumalo Creek downstream to Lake Billy Chinook. The primary purpose of the instream water rights are to provide for the conservation, maintenance, and enhancement of aquatic resources, fish life, and fish habitat.

The proposed transfer will compliment an earlier instream transfer of 5.8 cfs from a similar project and make significant contribution toward addressing instream flows necessary for spawning, rearing, and migration for fish populations in Tumalo Creek and the Deschutes River downstream. There have been extensive restoration efforts undertaken in Tumalo Creek including instream channel and habitat enhancements, instream flow supplementation, and most recently diversion screening and fish passage facilities at the Tumalo Feed Canal. The combination of these activities will reconnect fish populations and provide access to high quality spawning areas that have been inaccessible to redband populations in the Deschutes River for nearly 80 years. Additionally, temperature analysis by David Evans and Associates predicts this transfer will result in a net temperature reduction of approximately 1° Fahrenheit in the Deschutes River near its confluence with Tumalo Creek. It is anticipated that the temperature drop will be carried through the reach to below Lower Bridge and help reduce temperatures that have been documented to reach approximately 80° Fahrenheit.

The contribution to reduced temperatures in the Deschutes River between Big Falls and Lake Billy Chinook will provide benefits to migrating Chinook salmon, summer steelhead, and bull trout. The positive water quantity and quality benefits resulting from the increased contribution of 11.8 cfs of cold water from Tumalo Creek will be somewhat tempered by the recharge of groundwater via springs into the Deschutes River downstream of Big Falls. However, as groundwater extraction continues to increase in response to growth and development in central Oregon, it is anticipated the groundwater recharge will diminish. This will render the input of cold water from Tumalo Creek of increasing importance to the successful reintroduction of anadromous fish above the Pelton-Round Butte hydroelectric project. This project will compliment the extensive efforts by multiple partners and stakeholders devoted to restoring the historic assemblage of fish species in the Deschutes River.

ODFW appreciates the Tumalo Irrigation District's contribution and commitment to addressing multiple resource needs for all users through continued conservation and enhancement efforts.

Sincerely,

Oregon Dept. of Fish and Wildlife

November 3, 2010

Mr. Elmer G. McDaniels, Manager
Tumalo Irrigation District
64697 Cook Avenue
Bend, Oregon 97701

SUBJECT: LETTER OF SUPPORT, TUMALO IRRIGATION DISTRICT TUMALO FEED CANAL PROJECT

Dear Mr. McDaniels:

710 NW WALL STREET
PO BOX 431
BEND, OR 97701
(541) 388-5505 TEL
(541) 385-6676 FAX
WWW.CI.BEND.OR.US

KATHIE ECKMAN
Mayor

MARK CAPELL
Mayor Pro Tem

JIM CLINTON
City Councilor

JODIE BARRAM
City Councilor

JEFF EAGER
City Councilor

TOM GREENE
City Councilor

ORAN TEATER
City Councilor

ERIC KING
City Manager

It is the understanding of the City of Bend that the Tumalo Irrigation District is in the process of implementing its Tumalo Feed Canal piping project that involves the piping of about 5 miles of canal from the District's Tumalo Creek diversion to its re-regulating reservoir. If publicly funded, the project will result in 11.8 CFS of water conservation that will be left in Tumalo Creek. This conserved water, in addition to the 5.8 CFS already committed by the District based upon its Bend Feed Canal piping project is making great strides toward the flow restoration goal for Tumalo Creek.

As you know, the City and the Tumalo Irrigation District have been long time stewardship partners on Tumalo Creek requiring continuing cooperation to facilitate the proration of the various water rights held by both entities. We understand the proposed District project to enhance the Tumalo Creek watershed and associated fishery. Such contributions to the Tumalo Creek watershed are held in high regard by the City of Bend.

The City shares the District's desire to upgrade its systems and is in the process of upgrading its surface water delivery system as well and appreciates the support of the District in the City's endeavors on this same watershed.

The City of Bend is in support of the Tumalo Irrigation District's Tumalo Feed Canal piping and water conservation project designed to provide conserved water in-stream and to update the District's irrigation water delivery system. Furthermore the City commits to its partnership with the District in supporting the project to potential funding entities locally, and at the State and Federal levels when practical to do so.

Should you have any questions on this letter of support, please call.

Sincerely,

Eric King
City Manager

8. Official Resolution

TUMALO IRRIGATION DISTRICT

RESOLUTION #2015-01

THE FOLLOWING RESOLUTION WAS ADOPTED ON JANUARY 13TH, 2015 AT THE REGULAR BOARD MEETING OF THE BOARD OF DIRECTORS OF TUMALO IRRIGATION DISTRICT.

The Board of Directors of Tumalo Irrigation District hereby resolve as follows:

1. Kenneth B. Rieck, manager and secretary to the Board of Tumalo Irrigation District, is given authority to enter into an agreement for the WaterSMART Grant Program of the Bureau of Reclamation.
2. Kenneth B. Rieck, manager and secretary to the Board of Tumalo Irrigation District, is authorized to review and submit the application to the Bureau of Reclamation for the WaterSMART Grant Program.
3. The application for the WaterSMART Grant Program provides that matching funding shall come from the State of Oregon and from Tumalo Irrigation District.
4. Tumalo Irrigation District will work with the Bureau of Reclamation to meet any and all established deadlines for entering into a cooperative agreement.

Dated: January 13th, 2015.

TUMALO IRRIGATION DISTRICT

By: Ronald W Cochran

Ronald Cochran

Chairman of the Board

9. Funding Plan

Funding Plan

The total Phase IV project cost estimate is $2,100,000.

Tumalo Irrigation District is seeking a $1,000,000 Funding Group II WaterSMART grant to be funded over a two year period. There are three sources of funding planned for this project:

1) ***Oregon Watershed Enhancement Board*** - $750,000 secured (see following pages), $250,000 in additional funds will be requested upon WaterSMART grant award.
2) ***Reclamation*** – per this WaterSMART application, $1,000,000 in Group II funds are requested.
3) ***Tumalo Irrigation District*** - $100,000 committed with allocations as indicated in the Budget Proposal below.

Reclamation WaterSMART funding would be expended 50% in FY2015 and 50% in FY2016.

Tumalo Irrigation District has invested over $1.5 million of District money in preparing environmental studies, engineering design, and piping sections of the Tumalo Feed Canal. The Oregon Watershed Enhancement Board (OWEB) invested $2.32 million in Phases I, II, and III of the piping project. Reclamation has invested $1,850,000 on the overall project (Phases II, III) to date.

Oregon
John A. Kitzhaber, MD, Governor

Oregon Watershed Enhancement Board
775 Summer St NE Ste 360
Salem, OR 97301-1290
(503) 986-0178
FAX (503) 986-0199
www.oregon.gov/OWEB

OWEB

RECEIVED
By

August 1, 2013

Elmer McDaniels
Tumalo Irrigation District
64697 Cook Ave
Bend OR 97701

Project No. 213-4017

Dear Grantee:

Congratulations on your grant award made by Board conference call on March 18, 2013. Please read the enclosed grant agreement carefully. If it meets your needs, please sign and return two fully executed copies to the Oregon Watershed Enhancement Board (OWEB) at 775 Summer Street NE Suite 360, Salem, Oregon 97301-1290.

If you want to receive emails about upcoming grant cycles, Board decisions, and other important information for OWEB grantees, you can sign up for OWEB email notifications at https://public.govdelivery.com/accounts/ORWEB/subscriber/new.

IMPORTANT GRANT AGREEMENT PROVISIONS

- ***NEW: Project Completion Report – Online Option.*** You now have the option to submit your Project Completion Report electronically on OWEB's Grant Management System (OGMS). You will need an OGMS User Identification and password. If you do not have a User Identification and password, please call (503) 986-0232. See Exhibit C of your grant agreement for more information.

  - PLEASE NOTE: Your project completion reports must include a final project summary description and Final Metrics form, based on reporting requirements for federal Pacific Coastal Salmon Recovery Funds which comprise a large portion of OWEB grant funds. If you have questions, please contact Cecilia Noyes, OWEB Reporting Specialist, at 503-986-0204 or by email *cecilia.noyes@state.or.us*.

- **Permit requirements and release of funds.** Section D2 and Exhibit D or E (if Exhibit D or E is included in your grant agreement) are revised based on Senate Bill 342, passed by the 2011 Oregon legislature. OWEB cannot release funds for project components that require a permit or license until the required permits or licenses have been obtained and provided to OWEB. Section D2 and Exhibit D or E describe the factors OWEB project managers will consider in decisions on release of funds under the grant. **Please read your grant agreement carefully, including any Special Conditions in Exhibit B, and call your OWEB Project Manager if you have questions about how fund requests will be processed.**

- **Activities requiring permits.** If Exhibit D or E is included in your grant agreement, it includes a table to list any activities requiring permits, licenses or General Authorizations. If none are required for your project: Exhibit E write NONE in the table provided; Exhibit D check the box that applies. The Grantee must sign and date Exhibit D or E.

OREGON WATERSHED ENHANCEMENT BOARD
RESTORATION GRANT AGREEMENT

Grantee: **Tumalo Irrigation District** **Grant Number:** **213-4017**

Grant Name: **Tumalo Feed Canal Phase 4**

Award Amount: **$750,000.00** **Grant Completion Date:** **June 30, 2016**

Post-Implementation Reporting Period: **One (1) year** **(See Exhibits C and D)**

Post-Implementation Status Reporting Schedule: **One report due July 1 the year following approval of the Project Completion Report.**

Grantee

Tumalo Irrigation District
64697 Cook Ave
Bend OR 97701
Phone: 541-382-3053
Fax: 541-383-3287
Email: elmerg@tumalo.org
Contact: Elmer McDaniels

Project Manager for the Grantee

Jon Burgi
David Evans and Associates
320 SW Upper Terrace Dr Ste 101
Bend OR 97702
Phone: 541 749-1457
Fax: 541 389-7623
Email: jpbu@deainc.com

Fiscal Agent

Fran DeRock
Tumalo Irrigation District
64697 Cook Ave
Bend OR 97701
Phone: 541-382-3053
Fax: 541-383-3287
Email: fran@tumalo.org

Project Manager for the Board

Rick Craiger
OWEB
6574 NW Larch Dr
Redmond OR 97756
Phone: 541-923-7353
Fax: 541-923-7131
Email: SL00015@bendbroadband.com

Fund Source:
This grant includes **$750,000.00** of either Oregon Lottery funds or another state fund source and must comply with the requirements defined in Article XV, section 4b(2) of the Oregon Constitution.

This Grant Agreement is between the Oregon Watershed Enhancement Board, hereafter called "Board," and the Grantee as identified above, in consideration of the mutual covenants contained herein. This Agreement consists of the following, in descending order of precedence: this Agreement less all exhibits; attached Exhibits A (Schedule for Release of Funds), B (Special Conditions), C (Project Completion Report Requirements), D (Post-Implementation Status Report Requirements), E (Permits and Licenses), F (Cooperative/Landowner Agreement(s)), G (Oregon Prevailing Wage Rate Law), and H (Grant Application approved by the Board). All exhibits are incorporated by reference.

THIS AGREEMENT, INCLUDING ALL MATERIALS INCORPORATED BY REFERENCE, CONSTITUTES THE ENTIRE AGREEMENT BETWEEN THE PARTIES ON THIS SUBJECT. THERE ARE NO UNDERSTANDINGS, AGREEMENTS, OR REPRESENTATIONS, ORAL OR WRITTEN, NOT SPECIFIED HERE REGARDING THIS AGREEMENT. NO WAIVER, CONSENT, MODIFICATION OR CHANGE OF TERMS OF THIS AGREEMENT SHALL BIND EITHER PARTY UNLESS IN WRITING AND SIGNED BY BOTH PARTIES. SUCH WAIVER, CONSENT, MODIFICATION OR CHANGE, IF MADE, SHALL BE EFFECTIVE ONLY IN THE SPECIFIC INSTANCE AND FOR THE SPECIFIC PURPOSE GIVEN. THE FAILURE OF THE BOARD TO ENFORCE ANY PROVISION OF THIS AGREEMENT SHALL NOT CONSTITUTE A WAIVER BY THE BOARD OF THAT OR ANY OTHER PROVISION. GRANTEE, BY EXECUTING THIS AGREEMENT, HEREBY ACKNOWLEDGES THAT GRANTEE HAS READ THIS AGREEMENT, UNDERSTANDS IT AND AGREES TO BE BOUND BY ITS TERMS AND CONDITIONS.

CERTIFICATION

GRANTEE CERTIFIES THAT BEFORE BEGINNING WORK ON PROJECTS INVOLVING PRIVATE LANDS, GRANTEE HAS SECURED, OR WILL SECURE, COOPERATIVE LANDOWNER AGREEMENTS WITH ALL PARTICIPATING PRIVATE LANDOWNERS THAT, AT A MINIMUM, INCLUDE THE FOLLOWING:

(a) Permission to access the private land, at times agreeable to the landowner, to implement the project, inspect the project, track the status of the project, or perform repairs or maintenance;

(b) Permission for the Board or its representatives to access the private land for inspections and evaluations of the project;

(c) Identification of the party responsible for repairs and maintenance of the project; and

(d) Acknowledgement that the landowner is aware of the application to OWEB and that information relating to the work, including effectiveness monitoring data, is a public record.

AGREED:

FOR THE GRANTEE:

Elmer G McDaniels

ELMER G McDANIELS
Print Name

8-7-13
Date

FOR THE BOARD:

OWEB Program Manager

8/1/13
Date

(If the grant is for more than $150,000)
APPROVED FOR LEGAL SUFFICIENCY:

Assistant Attorney General
Oregon Department of Justice

Aug. 1, 2013
Date

Budget Proposal

TUMALO FEED CANAL
PHASE IV Budget Proposal

Description	Unit	Quant	Unit Price	OWEB	Recipient Funding	Reclamation Funding	Total
Salaries and Wages							
Ken Rieck	Hour	100	$45.52		$4,552		$4,552
Asst. Manager	Hour	480	$28.18		$13,526		$13,526
Administrative	Hour	350	$17.95		$6,283		$6,283
Field Labor	Hour	350	$26.45		$9,258		$9,258
Finge Benefits							
Manager	Hour	100	$7.75		$775		$775
Asst. Manager	Hour	480	$13.76		$6,605		$6,605
Full Time Emp.	Hour	700	$13.03		$9,121		$9,121
Supplies/Materials							
Pipe/Welding/Earthwork							
84-Inch Pipe	L.F.	3400	$280.00	$44,000		$908,000	$952,000
Angled Fitting	Each	9	$7,000.00			$63,000	$63,000
Manway	Each	4	$6,000.00			$24,000	$24,000
Contractual/Construction							
Mobilization Bonds and Insur	L.F.	3400	$23.65	$80,410			$80,410
Temporary Facil and Controls	L.F.	3400	$2.78	$9,452			$9,452
Clearing and Grubbing	L.F.	3400	$2.25	$7,650			$7,650
Earthwork/Pipe Installation	L.F.	3400	$140.00	$476,000			$476,000
Demolition	Each	1	$5,000.00	$5,000			$5,000
Steel/Weholite Connection	Each	0	$25,000.00	$0			$0
Outlet Structure	Each	1	$20,000.00		$20,000		$20,000
Outlet Slide Gate/Controls	Each	1	$10,000.00	$10,000			$10,000
Remove Existing Bridge	Each	1	$3,000.00	$3,000			$3,000
Ditch Rider Road	L.F.	3400	$6.00	$20,400			$20,400
Laterals	Each	1	$14,000.00	$14,000			$14,000
Turnouts	Each	6	$5,000.00	$25,000	$5,000		$30,000
AV/VR Vault	Each	2	$18,000.00	$36,000			$36,000
Restoration	L.F.	3400	$5.74	$5,957	$13,559		$19,516
Landscape Maintenance (1)	L.F.	3400	$1.67	$0	$5,678		$5,678
Landscape Maintenance (2)	L.F.	3400	$1.66	$0	$5,644		$5,644
Construction Manag/Admin	L.F.		6.60%	123,131			123131
Environmental and Regulatory Compliance							
Environmental Compliance	Each	1	$10,000	$10,000	$0		$10,000
Reporting	Each	1	$15,000	$10,000		$5,000	$15,000
Total Project Costs				**$880,000**	**$100,000**	**$1,000,000**	**$1,980,000**
Contingency			6.10%	$120,000			$120,000
Total Project Costs				**$1,000,000**	**$100,000**	**$1,000,000**	**$2,100,000**

Budget Narrative

(a) Salaries and Wages – Budget allows for Manager (Ken Rieck) to spend approximately 20% of his time and 33% of District Assistant Manager time on the project for 9 months. In addition to these time allocations, 350 hours of District administrative time and 350 hours of District field labor is included.

(b) Fringe benefits – these rates are fixed for the District personnel.

(c) Travel - None

(d) Equipment – None

(e) Materials and Supplies – Due to the compressed nature of the construction schedule, TID will purchase the pipe directly from the manufacturer. This will allow the manufacturing of the pipe to proceed prior to construction contracting. All of the items listed in the budget will be required for construction.

(f) Contractual – TID will contract with a general contractor licensed in the State of Oregon with appropriate experience to complete the project on time and within budget. It is anticipated that the construction contract will be awarded in September 2015.

(g) Environmental and Regulatory Compliance Costs – The budget for Environmental Compliance is low because both an Environmental and Biological Assessment have been completed and a Finding of Non-Significant Impact issued. Tumalo Irrigation District completed these documents in preparation for the project. Bureau of Reclamation completed the Finding of No Significant Impact and Final Environmental Assessment in 2010. There will be some costs associated with meeting other regulatory compliance requirements (ie NPDES 1200-C permit and archaeological final walk-through).

(h) Reporting – required reports will be prepared and submitted as described in the agreements.

(i) Other - None

(j) Indirect Costs - None

(k) Total Cost – The total cost to complete Phase IV of The Tumalo Feed Canal Piping project is estimated to be $2,100,000 including all materials and installation costs. The Federal share of this project is $1,000,000 and the non-federal share is $1,100,000.

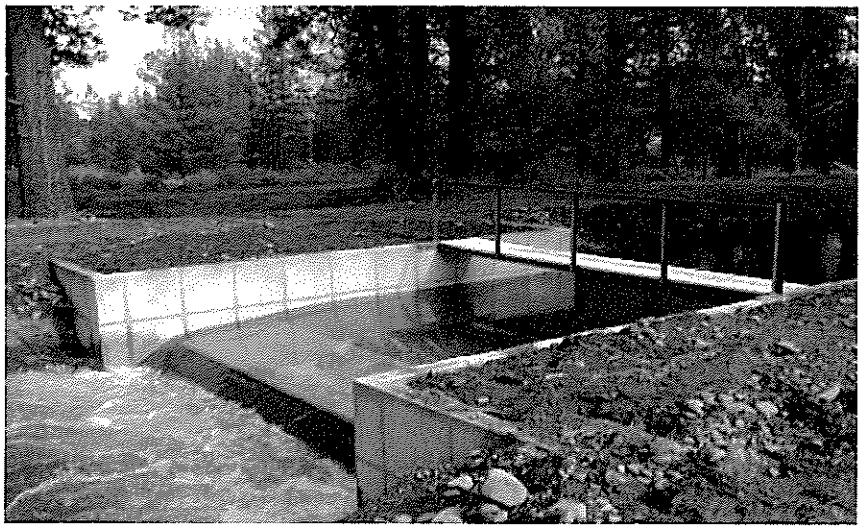
Appendix A

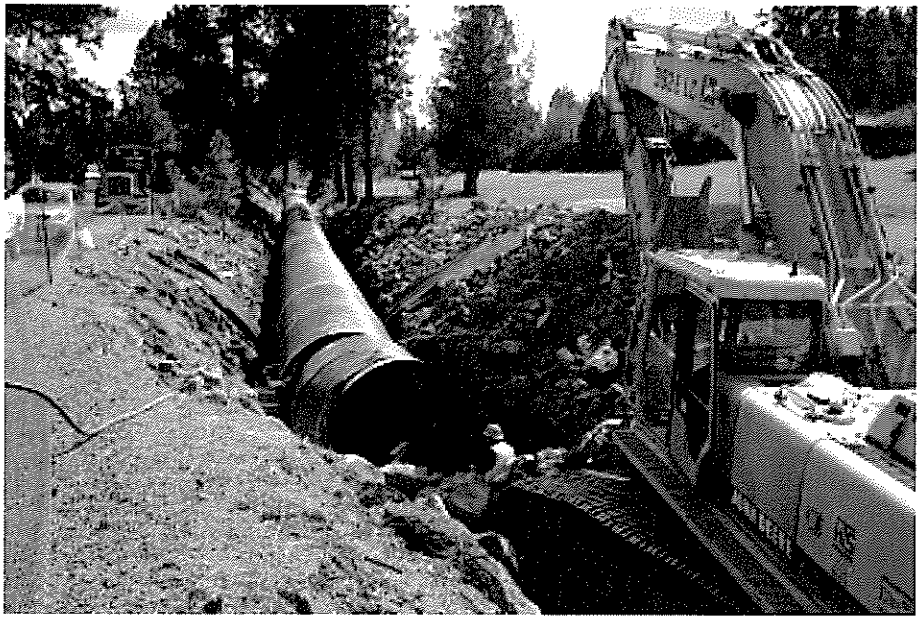
Tumalo Irrigation District Water Conservation Plan Update

(abbreviated to comply with page limitation for this application)

Tumalo Irrigation District

Water Conservation Plan Update
November 22, 2005





Prepared by:
David Evans and Associates
709 NW Wall Street, Suite 102
Bend, Oregon 97701

Executive Summary

Maximizing water conservation is a key goal of the Tumalo Irrigation District (TID). Especially in the last ten years, the district has been concerned with adequacy of deliveries, and has been focused on assessing water losses and developing water conservation alternatives. In 2000, the district submitted a Water Conservation Plan to the Oregon State Water Resources Department, outlining efforts and proposed actions to address their water conservation goals. The plan was approved, and the District began implementing its water conservation strategies. This document is the update to the initial Water Conservation Plan.

In the last five years, TID has taken steps toward improving the efficiency of their delivery system and fulfillment of the approved water conservation plan. Most notable is the completion of the Bend Feed Canal, which piped approximately 5 miles of open canals, resulting in a conserved water in-stream water right now held by the state of Oregon. The water right certificate includes 5.82 cfs of senior water rights, and 11.3 cfs of junior water rights.

With the completion of the Bend Feed Canal, the district is now focusing its efforts on the next critical section of the delivery system, the Tumalo Feed Canal. After analysis of available telemetry data and previous studies, the District concludes that approximately 20 cfs will be conserved by piping the approximate 6 mile reach of canal from just upstream of the confluence of the Bend Feed Canal with the Tumalo Feed Canal to the Tumalo Reservoir. TID is proposing that all 20 cfs of conserved water be dedicated to in-stream flow enhancement in Tumalo Creek and the Deschutes River. This allocation of conserved water will benefit the District and the general public, and will exceed TID's pro-rata share of the Deschutes Basin in-stream goal of 250 cfs in the middle Deschutes River.

Tumalo Irrigation District intends to obtain funding for and pipe the Tumalo Feed Canal over the next 5 years, and continue piping its open canals and distribution system until completion (by 2019). The district will also continue their irrigator education program, participation with other irrigation districts, agencies, and interested parties, and address the issues of urbanization to make the delivery system as safe and efficient at possible.

Tumalo Irrigation District Water Conservation Plan

Section 1 – WATER CONSERVATION GOALS

Introduction

Adequacy of deliveries has always been a concern for the Tumalo Irrigation District, and water conservation has always been a District goal. In 1996, the District began more focused efforts to assess water losses, develop water conservation alternatives, and to secure funding to implement these alternatives.

Water Loss

Historically, water losses in the system after diversions from natural stream courses have approached 60 percent, but recent improvements from piping projects such as the Bend Feed Canal, canal sealing projects, and lateral piping have reduced losses.

The District, with the assistance of a consultant and the U.S. Bureau of Reclamation, has studied the water loss mechanisms and determined that there are several causes of water loss.

On-Farm Losses: On-farm losses occur after delivery from District facilities and before application to crops. Water losses generally occur at on-farm ponds and losses from irrigation inefficiencies (see section 2, "Irrigation Efficiencies"). Historically, these losses have been estimated by the USBR at 0.5 to 1 foot per year. For the 7,400 acres of irrigation, the annual loss is estimated to be 5,000 acre-feet.

Evaporation: The primary source of evaporative loss in the District system is Tumalo Reservoir, although evaporation also occurs from the canal and lateral system.

The District has field data and observations that have been used to estimate total water loss. However, this data includes the effects of both leakage and evaporation without differentiation. Therefore, most of the impact of evaporation on system losses is included in the discussion below on leakage. However, to assess the relative impacts of evaporation versus leakage, probable evaporative losses are estimated here.

Evaporation from Tumalo Reservoir is estimated as the area of the reservoir multiplied by an annual evaporation rate. According to TID staff, the area of the reservoir during irrigation season when water is still being diverted from Tumalo creek is 40-60 acres. On average, diversions from Tumalo Creek will stop around July 4th, and water will be diverted from Crescent Lake. At that time, the area of Tumalo reservoir will decrease to about 20 acres, and then continue to gradually decrease until December when the reservoir is virtually empty.

For Central Oregon, the net evaporation rate is 2.5-3 feet per year, with rates peaking in the summer months at 4-6 inches per month. Using the monthly average evaporation rates and the average monthly surface area of the reservoir, the annual evaporation loss from the reservoir is approximately 60 acre-feet per year.

Evaporation from the canal and lateral system may be estimated as the surface area of the canals and laterals, multiplied by the average monthly evaporation rate for the months when the canals are filled. With the completion of the Bend Feed Canal and other existing piped portions of the system, the current length of the existing un-piped canal and lateral system is approximately 63 miles. Based on an average surface width of 5 feet, there will be approximately 38 acres of canal and lateral surface, and approximately 70 acre-feet per year of evaporation.

Adding the two loss estimates, the evaporative loss for the existing system is approximately 130 acre-feet per year. For purposes of this report, this number is rounded up to 150 acre-feet per year.

Operational Losses: If an irrigator near the end of a lateral no longer requires an irrigation delivery and adjusts a head gate without adequate notification to the District office, the water in the lateral intended for delivery to the irrigator is lost until District staff can make flow adjustments. This water is generally spilled onto unproductive land or over-irrigates productive land. Although the District continues to remind irrigators of their responsibility to notify the District office of demand adjustments on a timely basis, occasional operating losses will continue as an unavoidable result of open channel flow delivery until additional system piping improvements are constructed.

Currently, no data exists for estimating the volume of operational losses. Based on experience and discussions with TID, 5,000 acre-feet is assumed for the existing system.

Leakage: Similar to evaporation, leakage from TID facilities may be considered in two primary areas, leakage from Tumalo Reservoir and leakage from the canal and lateral system. TID staff has estimated that annual loss, combining leakage, evaporation, and bypass from the current system was historically 40,000 acre-feet, an estimate that is generally verified by the available data. With the Bend Feed Canal piping project implemented by the district, and canal flow data available from telemetry stations, the estimated loss is now approximately 30,000 acre-feet.

TID maintains telemetry stations that measure the inflow and outflow of Tumalo Reservoir. This data was used to find reservoir leakage for 2003-2005. The average leakage from the reservoir over these years was found to be approximately 5000 acre-feet.

For the existing canal and lateral system, the apparent loss was calculated using available telemetry data from the district, and accounting for deliveries for each lateral. For the water years 2003-2005, the loss for the canal and lateral system averages 42% down stream of the main canals. This includes the Columbia Southern Lateral, Highline, and Couch laterals, and their associated laterals. This loss equates to approximately 10,000 acre-feet during the 167 day irrigation season. The 20 cfs of loss calculated for Tumalo Feed Canal equates to approximately 6500 acre-feet for a 167 day irrigating season.

The estimated water losses described above are summed in Table 1-1.

Table 1-1, Estimated Annual Water Losses

Evaporation (af)	On-Farm Loss (af)	Leakage from Tumalo Reservoir (af)	Leakage from Canals and Laterals (af)	Operational Loss (af)	Total (af)
150	5,000	5,000	16,500	5,000	31,650

Water Conservation Goals

After assessing different types of canal improvements, TID decided to pursue a piped system. This system would eliminate all losses except for minimal pipe leakage, fulfilling TID's water conservation goal.

Study Cooperation

David Evans and Associates appreciates the assistance of TID in the completion of this water conservation plan, with specific mention of the District Manager Elmer McDaniels and Assistant Manager Kenneth Rieck.

Tumalo Irrigation District Water Conservation Plan Update

Section 3 – PAST CONSERVATION EFFORTS

Introduction

The Tumalo Irrigation District has consistently sought measures to improve water conservation However, beginning in the mid 1990s, TID began a more aggressive program of measuring canal flows and proposing system improvements. The water measurements revealed unexpected facts about water losses and increased the desire for a comprehensive water conservation program. In 2000, TID submitted the first ever water conservation plan to the Oregon State Water Resources Department, which was subsequently approved. TID then secured funding for a comprehensive project, the Bend Feed Canal Project group. This project was aimed at conserving water by piping six open canal segments and replacing two trestle flumes and siphons. In 2005, the project was completed, resulting in the creation of a 5.82 cfs in-stream senior water right and 11.3 cfs in-stream junior water right from the saved water, and issued to the Oregon Water Resources Department. (See Appendix B)

Water Measurements

The district has continued and improved the annual system of measurement. Since the 2000 water conservation plan was submitted, TID has installed a network of telemetry stations to monitor the flow of irrigation water at the head and tail ends of laterals, and at Tumalo reservoir to measure inflow and outflow (see figure 1). A ramp flume at Flatcars has also been installed to measure total diversion into the district. Also, ultrasonic water meters have been installed at the TID diversion points that are monitored by the U.S. Bureau of Reclamation (USBR). The USBR meter data is sent to their Hydromet system by satellite uplink. The telemetry system allows TID to gather data for analyzing water losses within the system, and allows real time monitoring of the district system by district personnel with internet access.

During every winter, wooden and aging concrete measurement weirs are replaced with new concrete structures. As the system is piped, TID expects to convert to the use of meters at the points of delivery.

Previous Actions

TID completed the Bend Feed Canal project group in 2004, improving system reliability and reducing water losses. Completion of the project resulted in approximately 5 miles of piped canal from the Deschutes River diversion point to the Tumalo Feed canal, plus the replacement of two aging flume structures. The project phases since the July 2000 conservation plan included the following:

1) ***Pipeline 1b:*** Replaced 2,490 ft of open canal with 84-inch pipe, and installed two concrete transition structures.

Section 3 – Past Conservation Efforts (continued)

2) ***Pipeline 2b:*** Replaced 6,750 ft of open canal with 84-inch HDPE pipe, and connected to upstream and downstream pipelines

3) ***Pipeline 3b:*** Replaced 4,612 ft of open canal with 84-inch HDPE pipe, and connected to upstream and downstream pipelines.

4) ***Pipelines 4 &5:*** Replaced 2,657 ft of open canal with 84-inch HDPE pipe, construction of concrete transition structures, and connected to upstream and downstream pipelines.

5) ***Weber and Klippel siphon project***: Replaced a wooden trestle flume with an inverted siphon. Also replaced 1,135 ft of canal with 84" and 90" steel pipe, and installed concrete inlet and outlet structures. Conserved an estimated 2 cfs in water seepage.

6) ***Flume No. 4 Siphon:*** Replaced unsafe and aged flume and trestle structure. Installed 84-inch steel inverted siphon pipe across canyon and under Tumalo Creek, conserving an estimated 1 cfs of water seepage and leakage.

7) ***Gerking Market Flume:*** Replaced aging Flume structure.

TID has also completed approximately 3500 feet of small lateral piping to improve delivery efficiencies and decrease seepage.

Tumalo Irrigation District Water Conservation Plan

Section 5 – PROPOSED SOLUTIONS

With the completion of the Bend Feed Canal project, the district is now proposing the new Water Conservation Project to continue its water conservation efforts. The Bend Feed Canal is now piped from the diversion on the Deschutes River to the confluence with the Tumalo Feed Canal. The Tumalo Feed Canal is piped from the diversion in Tumalo Creek to a point about one-quarter mile above the junction of the two canals on the west side of Tumalo Creek. The Water Conservation Project will pipe all of the presently unlined or unpiped portions of the Tumalo Feed Canal from its piped diversion to the Upper Tumalo Reservoir, a distance of approximately 6 miles. The project will eliminate 20 cfs of seepage losses. The additional 20 cfs of conserved water will exceed TID's pro-rata share of the Deschutes Basin in-stream goal of 250 cfs in the middle Deschutes river, will minimize the distribution of noxious weeds, and improve safety, operations, and maintenance.

The district is proposing that all of the 20 cfs of conserved water (see figure 2) be dedicated to instream flow enhancement in Tumalo Creek and the Deschutes River. The canals operate about 168 days of the year, so 20 cfs equates to a water volume of 6664 acre-feet.

The district and the public will benefit from the piping by eliminating a significant power demand by district users with direct deliveries from the piped portion that will be under partial pressure. This project will continue the groundwork for the eventual piping and pressure delivery of the entire district. The public will benefit directly from the increased stream flow in Tumalo Creek, and a 67% increase in the mandated flow of the Deschutes River downstream from the mouth of Tumalo Creek.

Piping of the Tumalo Feed Canal will also be a significant safety enhancement for the central Oregon community. Central Oregon and the lands within the Tumalo Irrigation District have been subjected to rapid urbanization in the last 10 years, making open canals more dangerous to citizens. Unfortunately, there have been two tragic deaths in the last 5 years from drowning in district canals adjacent to TID. All new siphons and concrete structures have been designed with safety racks at inlet and outlet structures, and all new mechanical areas and structures are fenced for public safety concerns.

District staff is also piping the lower system incrementally, and TID is pursuing a cultural resources (state historic preservation office) clearance for piping the entire district.

The total project cost for the Water Conservation Project is $14 million (2004 dollars), including surveying, engineering, and construction.

Table 9-1 and the attached system map illustrate the district's intent to fully pipe the delivery system. It is the goal of TID to complete the piping by 2019.

Appendix B

Deschutes River Temperature Calculations

Decreased in-stream water temperature in Tumalo Creek and the Deschutes River is an anticipated benefit of the proposed project. Conserved water will remain in-stream instead of being diverted. This cooling water will compliment the Steelhead recovery program, and will increase survival rates for red-band trout.

An evaluation of August 2005 data indicates that the project will cool the middle Deschutes River by approximately one degree Fahrenheit.[1] ODFW representatives have indicated that 0.5 degree or more of cooling provides significant benefits to resident, bull trout, and anadromous fish.

The projected temperature change was calculated using the following equation:

$Tr = T1 - (Q2/(Q1+Q2))*(T1-T2)$[2], where:

Tr = Resulting temperature after mixing
T1 = Average temperature at location 1
T2 = Average temperature at location 2
Q1 = Average flow at location 1
Q2 = Average flow at location 2

Additionally, cooler water has the ability to contain higher levels of dissolved oxygen, which is a necessity for fish and many forms of aerobic aquatic life. Specific studies of potential affect to dissolved oxygen levels have not been done on this system. However, the maximum possible dissolved oxygen concentration (saturated concentration) is increased by approximately 1% as result of the temperature calculated decrease.

1 Tumalo Irrigation District Water Conservation Program: Federal Need for Project, March 2006
2 Ibid.

Appendix C

Final Order Approving Allocation of Conserved Water by TID

BEFORE THE WATER RESOURCES DEPARTMENT
OF THE
STATE OF OREGON

In the Matter of the Proposed Allocation of Conserved Water by Tumalo Irrigation District, for certificates 74146 and 74148, Deschutes County, Oregon	))))	FINAL ORDER APPROVING ALLOCATION OF CONSERVED WATER

ORS 537.455 to 537.500 as amended by 2003 HB 2456, and OAR Chapter 690, Division 018, authorize and establish the process and criteria for allocations of conserved water.

Findings of Fact

1. On May 20, 2005, Tumalo Irrigation District (TID) filed an application for an allocation of conserved water. The Department assigned the application number C-37.

2. The application requests an allocation of conserved water under certificates 74146 and 74148 in the name of TID. However, TID indicated a willingness to have the allocation of conserved water apply to other TID rights.

3. The Oregon Water Resources Department consulted with the Oregon Department of Fish and Wildlife (ODFW), Department of Environmental Quality, Oregon State Parks and Recreation Department, and TID to determine how the conserved water could best meet instream needs. Based on this consultation, the State of Oregon determined that the allocation of conserved water would be most beneficial if applied to the water rights TID proposed, certificates 74146 and 74148.

4. The rights involved in the allocation of conserved water are generally described below, and, reflect a previously approved allocation of conserved water, C-9, as evidenced by Special Order Volume 64, Page 157. However, these rights of record may be further modified by any cancellations, transfers, and other allocation of conserved water projects, completed pursuant to ORS 537 and ORS 540.

This is a final order in other than contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60 day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080 you may either petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

Certificate 74146

Source: Tumalo Creek

Priority Date	Acres (equivalent)	Maximum Rate (cfs)	Maximum Duty (AF)
August 5, 1900	407.60	5.823	733.68
September, 1900	3,265.85	40.835	5,878.63
April 28, 1905	301.60	4.309	542.88
May 27, 1907	43.20	0.603	77.76
June 1, 1907	992.65	14.181	1,786.77
Total	***5,010.90***	***65.751***	***9,019.62***

Total Duty: 1.8 AF/ac, being 9,019.62 AF measured at or within one-half mile of the place of use

On-Farm Rate: 1/70 cfs per acre

Type of Use: Irrigation, pond maintenance, industrial, domestic including livestock

Total Acres-Equivalent: 5,010.9

Points of Diversion:

Twp	Rng	Mer	Sec	Q-Q	Survey Coordinates
17 S	11 E	WM	23	SW NE	NORTH 70 DEGREES 21 MINUTES WEST, 1550 FEET FROM E1/4 CORNER, SECTION 23
18 S	10 E	WM	2	NW SW	NORTH 14 DEGREES 2 MINUTES EAST 1713 FEET FROM S1/4 CORNER, SECTION 2

Certificate 74148

Source: Crescent Lake Reservoir

Priority: April 7, 1911

Duty: 35,000 AF

Type of Use: Supplemental irrigation, pond maintenance, industrial use

Total Acres-Equivalent: 6,590.6

Point of Diversion:

Twp	Rng	Mer	Sec	Q-Q
24 S	6 E	WM	11	SE SW and SW SE

5. The conservation project involves piping the un-piped portion of the Tumalo Feed Canal above the junction with the Bend Feed Canal, and piping the two joined canals from the junction to Upper Tumalo Reservoir, a distance of approximately 6 miles. The replacement of open, unlined ditches with pipelines is a proven technology for conserving water.

6. The water conserved by this pipelining project is seepage losses from the ditches operated by TID. To the extent that the seepage losses eliminated by pipelines are in excess of the quantities of conserved water to be allocated, the project also will provide for more reliable delivery of water for the beneficial purposes under the water right.

7. Public notice was published as required under OAR 690-018-0050. No comments were received.

8. The application includes land use information forms completed and signed by Deschutes County demonstrating that the required land use approvals have been obtained by the applicant.

9. Pursuant to OAR 690-018-0012(1), the applicant's propose that 100 percent of the conserved water be allocated to the State for an instream water right.

10. Pursuant ORS 537.485, the applicant's request that the priority dates of the conserved water be the same as the originating rights.

11. The applicant has proposed to conserve 11.8 cubic feet per second (cfs) from Tumalo Creek under certificate 74146, with the rate proportionately distributed between all priority dates, and 2,732 acre-feet (AF) as measured at Crescent Creek Gauging Station No. 14060000, from Crescent Lake Reservoir under certificate 74148, with a priority date of April 7, 1911. After the allocation of conserved water, the water right held by the district and the State's instream water right will allow use of the following quantities of water:

Certificate	Priority Date	Before Project District Maximum Rate/Duty	After Project District Maximum Rate/Duty	Conserved Water Rate/Duty	Instream Water Right Rate/Duty
74146*	Aug. 5, 1900	5.823 cfs	4.778 cfs	1.045 cfs	1.045 cfs
	Sept. 1900	40.835 cfs	33.506 cfs	7.329 cfs	7.329 cfs
	April 28, 1905	4.309 cfs	3.536 cfs	0.773 cfs	0.773 cfs
	May 27, 1907	0.603 cfs	0.495 cfs	0.108 cfs	0.108 cfs
	June 1, 1907	14.181 cfs	11.636 cfs	2.545 cfs	2.545 cfs
	Subtotal	***65.751 cfs***	***53.951 cfs***	***11.8 cfs***	***11.8 cfs***
74148	April 7, 1911	35,000 AF	32,268 AF	2,732 AF	2,732 AF

* Certificate 74146 has a maximum rate at the point of diversion, but no duty associated with the point of diversion. The duty of 1.8 AF/ac is measured at or within one-half mile of the lands to be irrigated. Since this piping project is not affecting the amount of water to be delivered within ½ mile of the place of use, only the rate at the point of diversion is involved in this allocation of conserved water.

12. Project construction is proposed to begin in October 2006, and is scheduled for completion between April 2007 and April 2010.

13. The applicant has proposed to create two instream reaches. One from the point of diversion on Tumalo Creek to Lake Billy Chinook and the other from Crescent Lake Reservoir to Lake Billy Chinook.

14. TID is located in an area that is underlain by highly permeable, fractured basalts. The canal seepage that is conserved by the project likely would have entered the regional ground water system that discharges near or into Lake Billy Chinook. The ground water flows in the area are generally parallel to Tumalo Creek. As a result, the canal seepage did not return to Tumalo Creek and did not become available to other water users in Tumalo Creek.

Channel loss is known to occur in the Little Deschutes River and in some segments of the Deschutes River. From Crescent Creek Gauging Station No. 14060000 to Benham Falls Gauging Station No. 14064500 on the Deschutes River there is an 18 percent channel loss. From Benham Falls to the City of Bend on the Deschutes River there is a 7 percent channel loss.

15. Instream water rights have been established in Tumalo Creek, Crescent Creek, the Little Deschutes River and the Deschutes River. However, these rights are frequently not met.

16. For many years an informal agreement has allowed for the release of approximately 5.0 cfs from Crescent Lake Reservoir, as measured at Crescent Creek Gauging Station Number 14060000. As part of this conserved water application, TID has requested that this gentleman's agreement be formalized.

17. The ODFW, Department of Environmental Quality, and Oregon Parks and Recreation Department were consulted and indicated that additional streamflows are needed in Tumalo Creek, Crescent Creek, the Little Deschutes River and the Deschutes River to provide for the conservation, maintenance and enhancement of aquatic and fish life and fish habitat.

18. Pursuant to OAR 690-018-0025, the applicant has an adopted allocation of conserved water policy, which was approved on March 8, 2005.

Ultimate Findings of Fact

Pursuant to OAR 690-018-0050, in reviewing the application for allocation of conserved water the Department has determined the following:

A. The proposed allocation of conserved water will result in a reduced diversion for the uses allowed under the original rights of 11.8 cfs for certificate 74146 and 2,732 AF for certificate 74148 as established in Finding of Fact 11. Additionally, a flow of 5.0 cfs shall be required at Crescent Creek Gauging Station Number 14060000. Any flow restoration activities, including, but not limited to, instream transfers, allocations of conserved water, and instream leases, shall be additive to the 5.0 cfs flow release.

B. The proposed allocation will not harm other water rights as long as the channel loss factors are applied as described in Finding of Fact 14.

C. The application is compatible with the local comprehensive land use plan as established in Finding of Fact 8.

D. Since no harm will occur to other water rights, no reduction in the quantity of conserved water to be allocated is required to mitigate for effects on other water rights.

E. Consistent with Finding of Fact 4 and 11, the maximum on-farm rate and duty associated with certificate 74146 remains unchanged at 1/70 cfs/ac and 1.8 AF/ac. The maximum rate at the point of diversion shall be:

Certificate	Priority Date	After Project District Maximum Rate (cfs)
74146	August 5, 1900	4.778
	September, 1900	33.506
	April 28, 1905	3.536
	May 27, 1907	0.495
	June 1, 1907	11.636
	Total	***53.951***

For certificate 74148 the maximum total diversion shall not exceed 32,268 AF for water used for supplemental irrigation, pond maintenance, and industrial use.

F. The State's portion of the conserved water is needed to improve aquatic resources and their habitat in Tumalo Creek, Crescent Creek, the Little Deschutes River and the Deschutes River.

G. The applicant is requesting that 100 percent of the conserved water be allocated to an instream water right to be held in trust by the Water Resources Department for the people of Oregon and that the priority dates of the conserved water rights are the same as the originating rights.

H. The State's portion of the conserved water shall be allocated to instream water rights for conservation, maintenance and enhancement of aquatic and fish life, wildlife, fish and wildlife habitat and other ecological values. The instream water rights that are being created shall provide for the protection of flows:

- From the authorized point of diversion for TID in Tumalo Creek at

Twp	Rng	Mer	Sec	Q-Q	Survey Coordinates
17 S	11 E	WM	23	SW NE	NORTH 70 DEGREES 21 MINUTES WEST, 1550 FEET FROM E1/4 CORNER, SECTION 23

to the mouth of Tumalo Creek and then into the Deschutes River from the mouth of Tumalo Creek to Lake Billy Chinook, and

- From the authorized point of diversion for TID in Crescent Lake Reservoir at

Twp	Rng	Mer	Sec	Q-Q
24 S	6 E	WM	11	SE SW & SW SE

to the mouth of Crescent Creek and then into the Little Deschutes River from the mouth of Crescent Creek to the mouth of the Little Deschutes River and then into the Deschutes River to Lake Billy Chinook.

The right originating in Tumalo Creek shall be for a total of 11.8 cfs, with the following priority dates and rates:

Priority Date	Rate (cfs)
August 5, 1900	1.045
September, 1900	7.329
April 28, 1905	0.773
May 27, 1907	0.108
June 1, 1907	2.545

and shall allow the use and protection of flows from April 15 through October 15.

The right originating in Crescent Creek shall be limited to a maximum of 2,732 AF, with an April 7, 1911 priority date, as measured at the Crescent Creek at Gauging Station No. 14060000. To account for channel losses, an 18 percent loss factor shall be used between the Crescent Creek Gauging Station and the Benham Falls Gauging Station No. 14064500 on the Deschutes River. A 7 percent loss factor shall be used on the Deschutes River between Benham Falls and the City of Bend. The right shall allow the use and protection of flows from January 1 through December 31, and shall be in addition to the 5.0 cfs flow required year-around at Crescent Creek Gauging Station.

I. The applicant has not requested additional time to finalize the project after the project has been completed.

J. No other conditions or limitations are needed to prevent or mitigate for harm to existing water rights.

Conclusion of Law

The project described in the application C-37 for allocation of conserved water is consistent with the criteria in ORS 537.455 to 537.500, as amended by 2003 HB 2456, and OAR Chapter 690, Division 018. Water will be conserved that can be allocated without harming other water rights.

Now, therefore, it is ORDERED:

1. The applicant has until October 31, 2015, to file a notice of completion of the conservation measures, unless the Director grants an extension of time.

2. When the applicant files the notice of completion, the project will be finalized, unless the applicant requests additional time to finalize the project and the Director grants an extension of time for the purposes of finalization.

On submittal of notice of completion of the conservation project described in the application for allocation of conserved water, the Department shall:

3. Cancel certificate 74146. A new superseding certificate shall be issued to TID for irrigating approximately 5,010.90 acres, pond maintenance, industrial use, and domestic use including livestock. The acreage, rate, duty, and priority dates are subject to modification by any previously approved transfers, cancellations, corrections, allocation of conserved water, or

other prior modification to Certificate 74146. The associated priority date and rate shall be approximately:

Priority Date	Acres (equivalent)	Maximum Rate (cfs)
August 5, 1900	407.60	4.778
September, 1900	3,265.85	33.506
April 28, 1905	301.60	3.536
May 27, 1907	43.20	0.495
June 1, 1907	992.65	11.636
Total	***5,010.90***	***53.951***

The maximum per acre rate associated with these rights is 1/70 cfs/ac. The duty remains at 1.8 AF/ac, measured at within one-half mile of the land to be irrigated. The place of use shall be those lands described under certificate 74146, as modified by any transfers completed pursuant to ORS 540.580 or other prior modifications. All other conditions and limitations of the existing water right shall be included in the superseding certificate.

4. Cancel certificate 74148. A new superseding certificate shall be issued to TID for the use of up to 32,268 AF of stored water. The use of the water shall be limited to total diversion of not to exceed 32,268 AF during any one irrigation season. Additionally, the water along with that described in #4 below shall be shared as follows: 3.175 % of Crescent Lake Reservoir's contents as of April 1 to the State for instream flow purposes, and 96.825 % to TID. Each party will share the storable inflow, from April 1 until maximum storage is reached, in this same proportion. Each party's usage of stored water during the year between April 1 and March 31 will be deducted from their respective accounts. On April 1 the contents of the reservoir shall again be divided between the parties as described above.

   The acreage, rate, duty, and priority dates are subject to modification by any transfers, cancellations, corrections, allocation of conserved water, or other prior modification to Certificate 74148. The place of use shall be those lands described under certificate 74148, as modified by any transfers completed pursuant to ORS 540.580 or other prior modifications. All other conditions and limitations of the existing water right shall be included in the superseding certificate.

5. Issue a new instream certificate for conservation, maintenance and enhancement of aquatic and fish life, wildlife, fish and wildlife habitat and other ecological values in Tumalo Creek from the authorized point of diversion for TID at the Tumalo Feed Canal:

Twp	Rng	Mer	Sec	Q-Q	Survey Coordinates
17 S	11 E	WM	23	SW NE	NORTH 70 DEGREES 21 MINUTES WEST, 1550 FEET FROM E1/4 CORNER, SECTION 23

   to the mouth of Tumalo Creek and then into the Deschutes River from the mouth of Tumalo Creek to Lake Billy Chinook at River Mile 120. The instream water right shall allow the use of the water to provide fish screen bypass and cleaning flows at the Tumalo Feed Canal diversion provided such use does not interfere with use of instream flow to operate fish passage facilities at the same site.

The instream water right shall be for a total of 11.8 cfs, with the following priority dates and rates

Priority Date	Rate (cfs)
August 5, 1900	1.045
September, 1900	7.329
April 28, 1905	0.773
May 27, 1907	0.108
June 1, 1907	2.545

and shall replace a portion of instream water rights established pursuant to ORS 537.341 or 537.346 and shall be in addition to any instream water rights established pursuant to ORS 537.348 or 537.470, unless otherwise specified by a subsequent order establishing a new instream water right. The rights shall allow for the use and protection of flows from April 15 to October 15.

6. Issue a new instream certificate for conservation, maintenance and enhancement of aquatic and fish life, wildlife, fish and wildlife habitat and other ecological values in Crescent Creek from the authorized point of diversion for TID at the Crescent Lake Reservoir:

Twp	Rng	Mer	Sec	Q-Q
24 S	6 E	WM	11	SE SW & SW SE

to the mouth of Crescent Creek and then into the Little Deschutes River from the mouth of Crescent Creek to the mouth of the Little Deschutes River and then into the Deschutes River to Lake Billy Chinook at River Mile 120.

The instream water right shall be for a maximum of 2,732 AF, to be drawn from the State's share of Crescent Lake Reservoir, with an April 7, 1911 priority date, and shall replace a portion of instream water rights established pursuant to ORS 537.341 or 537.346 and shall be in addition to any instream water rights established pursuant to ORS 537.348 or 537.470, unless otherwise specified by a subsequent order establishing a new instream water right. The right shall be limited to an annual maximum of 2,732 AF. No fee, annual or otherwise, will be assessed by TID or other parties to the State of Oregon for the 2,732 AF of stored water.

To account for channel losses, an 18 percent loss factor shall be applied between the mouth of Crescent Creek on the Little Deschutes River to Benham Falls on the Deschutes River. A 7 percent loss factor shall be applied on the Deschutes River between Benham Falls and the City of Bend. For example, if 9.18 cfs was protectable under this right at Crescent Creek Gauging Station No. 14060000, then the 7.53 cfs would be protectable at Benham Falls and 7.00 cfs would be protectable at Bend.

The State of Oregon may call for water to be released from storage during any month of the year, but the State is limited to a maximum of two changes in the amount of water being released in any month, unless the Water Resource Director and TID concur that additional changes may be made.

7. An operational flow release of not less than 5.0 cfs shall be required year-around at Crescent Creek Gauging Station Number 14060000. The instream water right described in #4 above shall be additive to the 5.0 cfs flow. However, the 5.0 cfs flow shall not be additive to TID irrigation releases. Any additional flow restoration activities, including but not limited to, instream transfers, allocations of conserved water, and instream leases, shall also be additive to the 5.0 cfs flow requirement, unless otherwise specified by a subsequent order. Water users above Crescent Lake Reservoir shall not be regulated to satisfy the 5.0 cfs requirement.

Dated at Salem, Oregon this 9th day of December 2005.

Debbie Colter

For Phillip C. Ward
Director

Date of Mailing: DEC 14 2005

BEFORE THE WATER RESOURCES DEPARTMENT
OF THE
STATE OF OREGON

In the Matter of the Allocation of Conserved Water Application CW-37, for Certificates 74146 and 74148, Deschutes County	))))	FINAL ORDER APPROVING THE FIRST INCREMENT OF A PARTIAL FINALIZATION OF CONSERVED WATER

Authority
ORS 537.455 to 537.500 as amended by 2003 HB 2456, authorize and establish the process in which a water right holder may submit a request for an allocation of conserved water. OAR Chapter 690, Division 018 implements the statutes and provides the Department's procedures and criteria for evaluating allocation of conserved water applications.

Applicant
TUMALO IRRIGATION DISTRICT
64697 COOK AVENUE
BEND, OR 97701

Findings of Fact

1. On May 20, 2005, Tumalo Irrigation District (TID) filed an application for an allocation of conserved water. The Department assigned the application number C-37. Application C-37 is now referred to as CW-37.

2. On December 9, 2005, the Department issued Special Order Volume 67, Pages 509 through 517 approving the allocation of conserved water application. The approval order gave the applicant until October 31, 2015, to file a notice of completion of the conservation measures, unless the Director granted an extension of time.

3. The entire project is to pipe 32,617 feet (approximately 6 miles) of the Tumalo Feed Canal. The project, when completed, was approved for the following amounts of conserved water:

This final order is subject to judicial review by the Court of Appeals under ORS 183.482. Any petition for judicial review must be filed within the 60-day time period specified by ORS 183.482(1). Pursuant to ORS 536.075 and OAR 137-003-0675, you may petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

Certificate	Priority Date	Before Project District Maximum Rate/Duty	After Total Project District Maximum Rate/Duty	Total Conserved Water Rate/Duty	Total Instream Water Right Rate/Duty
74146	Aug. 5, 1900	5.823 cfs	4.778 cfs	1.045 cfs	1.045 cfs
	Sept. 1900	40.835 cfs	33.506 cfs	7.329 cfs	7.329 cfs
	Apr. 28, 1905	4.309 cfs	3.536 cfs	0.773 cfs	0.773 cfs
	May 27, 1907	0.603 cfs	0.495 cfs	0.108 cfs	0.108 cfs
	June 1, 1907	14.181 cfs	11.636 cfs	2.545 cfs	2.545 cfs
	Subtotal	***65.751 cfs***	***53.951 cfs***	***11.800 cfs***	***11.800 cfs***
74148	April 7, 1911	35,000 AF	32,268 AF	2,732 AF	2,732 AF

4. On March 31, 2008, TID requested an incremental finalization of the allocation of conserved water application for the portion of the project that had been completed. The applicant and their engineer provided additional information on May 14, 2008 and June 19, 2008 describing the portion of the project that has been completed and the amount of water conserved.

5. TID has completed piping 2,759 feet of the project from the start of the unpiped section near Shevlin Park, just downstream of the confluence with the Bend Feed and Tumalo Feed Canals, and has requested that this first increment be finalized, as described below:

Certificate	Priority Date	Total Conserved Water Rate / Duty	1st Incremental Finalization Request	Conserved Water Remaining to be Finalized	District Maximum Rate/Duty After 1st Increment
74146	Aug. 5, 1900	1.045 cfs	0.178 cfs	0.867 cfs	5.645 cfs
	Sept. 1900	7.329 cfs	1.242 cfs	6.087 cfs	39.593 cfs
	Apr. 28, 1905	0.773 cfs	0.131 cfs	0.642 cfs	4.178 cfs
	May 27, 1907	0.108 cfs	0.018 cfs	0.090 cfs	0.585 cfs
	June 1, 1907	2.545 cfs	0.431 cfs	2.114 cfs	13.750 cfs
	Subtotal	***11.800 cfs***	***2.000 cfs***	***9.800 cfs***	***63.751 cfs***
74148	April 7, 1911	2,732 AF	89.25 AF	2,642.75 AF	34,910.75 AF

6. Special Order Volume 67, Pages 509 through 517 describes an informal agreement that has allowed for the release of approximately 5.0 cfs from Crescent Lake Reservoir, as measured at Crescent Creek Gauging Station Number 14060000. As part of the conserved water project, TID requested that this gentleman's agreement be formalized. However, the order approving the project did not anticipate an incremental finalization, and did not address when the informal agreement would be finalized. On June 23, 2008, TID requested that the gentlemen's agreement be formalized when the entire project is complete.

Conclusion of Law

The project described in application CW-37 for allocation of conserved water is consistent with the criteria in ORS 537.455 to 537.500, as amended by 2003 HB 2456, and OAR Chapter 690, Division 018. Water will be conserved that can be allocated without harming other water rights.

Now, therefore, it is ORDERED:

1. The applicant has until October 31, 2015, to file a notice of completion of the remaining conservation measures, unless the Director grants an extension of time.

2. When the applicant files the notice of completion, the project will be finalized, unless the applicant requests additional time to finalize the project and the Director grants an extension of time for the purposes of finalization.

3. As described below, the formalization of the gentlemen's agreement regarding the operational flow release at Crescent Lake Reservoir will occur when the entire project is complete, unless TID and the Department mutually agree on a different time-line.

   An operational flow release of not less than 5.0 cfs shall be required year-around at Crescent Creek Gauging Station Number 14060000. The instream water rights that are created by CW-37 from Crescent Lake Reservoir shall be additive to the 5.0 cfs flow. However, the 5.0 cfs flow shall not be additive to TID irrigation releases. Any additional flow restoration activities, including but not limited to, instream transfers, allocations of conserved water, and instream leases, shall also be additive to the 5.0 cfs flow requirement, unless otherwise specified by a subsequent order. Water users above Crescent Lake Reservoir shall not be regulated to satisfy the 5.0 cfs requirement.

Consistent with Special Order Volume 67, Pages 509 through 517, the Department takes the following actions:

4. Certificate 74146 shall be modified. A new superseding certificate shall be issued to Tumalo Irrigation District for the remaining portion of Certificate 74146 upon a determination that it is necessary to produce a certificate to confirm that remaining portion of the water right. Approval of this allocation of conserved water reduces the amount of water lawfully available under the remaining portion of Certificate 74146 as described below:

Certificate	Priority Date	Reduction Due to 1st Incremental Finalization (cfs)
74146	August 5, 1900	0.178
	September 1900	1.242
	April 28, 1905	0.131
	May 27, 1907	0.018
	June 1, 1907	0.431
	Total	*2.000*

The acreage, rate, duty, and priority dates are subject to modification by any previously approved transfers, cancellations, corrections, allocation of conserved water, or other prior modification to Certificate 74146. The associated priority date and rate of the remaining right shall be approximately:

Certificate	Priority Date	District Maximum Rate (cfs) After 1st Increment of Conserved Water
74146	August 5, 1900	5.645
	September 1900	39.593
	April 28, 1905	4.178
	May 27, 1907	0.585
	June 1, 1907	13.750
	Total	*63.751*

5. A new instream certificate shall be issued for conservation, maintenance and enhancement of aquatic and fish life, wildlife, fish and wildlife habitat and other ecological values in Tumalo Creek from the authorized point of diversion for TID at the Tumalo Feed Canal:

Twp	Rng	Mer	Sec	Q-Q	Survey Coordinates
17 S	11 E	WM	23	SW NE	NORTH 70 DEGREES 21 MINUTES WEST, 1550 FEET FROM THE E1/4 CORNER OF SECTION 23

to the mouth of Tumalo Creek and then into the Deschutes River from the mouth of Tumalo Creek to Lake Billy Chinook at River Mile 120. The instream water right shall allow the use of the water to provide fish screen bypass and cleaning flows at the Tumalo Feed Canal diversion provided such use does not interfere with use of instream flow to operate fish passage facilities at the same site.

The instream water right shall be for a total of 2.000 cfs, with the following priority dates and rates:

Priority Date	Rate (cfs)
August 5, 1900	0.178
September, 1900	1.242
April 28, 1905	0.131
May 27, 1907	0.018
June 1, 1907	0.431

and shall replace a portion of instream water rights established pursuant to ORS 537.341 or 537.346 and shall be in addition to any instream water rights established pursuant to ORS 537.348 or 537.470, unless otherwise specified by a subsequent order establishing a new instream water right. The rights shall allow for the use and protection of flows from April 15 to October 15.

6. Certificate 74148 shall be modified. A new superseding certificate shall be issued to Tumalo Irrigation District for the remaining portion of Certificate 74148 upon a determination that it is necessary to produce a certificate to confirm that remaining portion of the water right. Approval of this allocation of conserved water reduces the amount of water lawfully available under the remaining portion of Certificate 74148 as described below:

Certificate	Priority Date	Reduction Due to 1st Incremental Finalization
74148	April 7, 1911	89.25 AF

The acreage, rate, duty, and priority dates are subject to modification by any previously approved transfers, cancellations, corrections, allocation of conserved water, or other prior modification to Certificate 74148. The associated priority date and rate of the remaining right shall be approximately:

Certificate	Priority Date	District Maximum Duty After 1st Increment
74148	April 7, 1911	34,910.75 AF

7. A new instream certificate shall be issued for conservation, maintenance and enhancement of aquatic and fish life, wildlife, fish and wildlife habitat and other ecological values in Crescent Creek from the authorized point of diversion for TID at the Crescent Lake Reservoir:

Twp	Rng	Mer	Sec	Q-Q
24 S	6 E	WM	11	SE SW & SW SE

to the mouth of Crescent Creek and then into the Little Deschutes River from the mouth of Crescent Creek to the mouth of the Little Deschutes River and then into the Deschutes River to Lake Billy Chinook at River Mile 120.

The instream water right shall be for a maximum of 89.25 AF, to be drawn from the State's share of Crescent Lake Reservoir, with an April 7, 1911 priority date, and shall replace a portion of instream water rights established pursuant to ORS 537.341 or 537.346 and shall be in addition to any instream water rights established pursuant to ORS 537.348 or 537.470, unless otherwise specified by a subsequent order establishing a new instream water right. The right shall be limited to an annual maximum of 89.25 AF, from January 1 to December 31. No fee, annual or otherwise, will be assessed by TID or other parties to the State of Oregon for the 89.25 AF of stored water.

To account for channel losses, an 18 percent loss factor shall be applied between the mouth of Crescent Creek on the Little Deschutes River to Benham Falls on the Deschutes River. A 7 percent loss factor shall be applied on the Deschutes River between Benham Falls and the City of Bend. For example, if 9.18 cfs was protectable under this right at Crescent Creek Gauging Station No. 14060000, then the 7.53 cfs would be protectable at Benham Falls and 7.00 cfs would be protectable at Bend.

The State of Oregon may call for water to be released from storage during any month of the year, but the State is limited to a maximum of two changes in the amount of water being released in any month, unless the Water Resource Director and TID concur that additional changes may be made.

Dated at Salem, Oregon this 25th day of June, 2008.

Phillip C. Ward
Director

Mailing date: JUN 26 2008

Appendix D

Communications with SHPO

Oregon
Theodore R. Kulongoski, Governor

Parks and Recreation Department
State Historic Preservation Office
725 Summer St. NE, Suite C
Salem, OR 97301-1266
(503) 986-0707
FAX (503) 986-0793
www.hcd.state.or.us

2/28/2007

Mr. Elmer McDaniels
Tumalo Irrigation District
64697 Cook Ave
Bend, OR 97701

RE: SHPO Case No. 06-2972
Tumalo Irrigation Dist Feed Canal Pahse I
17S 11E 3, 4, 10, 11, 13, 14, 24, Bend, Deschutes County

Dear Mr. McDaniels:

Our office recently received the archaeological report about the project referenced above. I have reviewed the report and agree that the project will have no effect on any known archaeological resources. No further archaeological research is needed with this project.

I understand that the historic component of the Tumalo Feed Canal has been addressed with documentation and mitigative measures have been agreed upon in a Memorandum of Agreement created in conjunction with Sarah Jalving, OSHPO Above-Ground Resources Specialist.

It should be noted that the archaeological report does not include a "Background Research" section that includes a summary of the previous archaeological sites and surveys in the vicinity of your project area. I have contacted the report's author, Scott Stuemke, to rectify the omission.

If you have any questions regarding any future discovery or my letter, feel free to contact our office at your convenience.

Susan Lynn White, RPA
Assistant State Archaeologist
503- 986-0675
Susan.White@state.or.us

Appendix E

USFWS List of Threatened and Endangered Species Within Deschutes County

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Oregon Fish and Wildlife Office
2600 SE 98th Avenue, Suite 100
Portland, Oregon 97266
Phone: (503)231-6179 FAX: (503)231-6195

Reply To: 8330.SP08(07)

August 29, 2007

Jenney Severson
David Evans and Associates, Inc.
320 SW Upper Terrace Drive Suite 200
Bend, OR 97702

Subject: Tumalo Feed Canal Piping Project
USFWS Reference # BA9DAF60689F042F8825734600732C1A

Dear Ms. Jenney Severson:

This is in response to your request, dated August 29, 2007, requesting information on listed and proposed endangered and threatened species that may be present within the area of the Tumalo Feed Canal Piping Project in Deschutes County(s). The Fish and Wildlife Service (Service) received your correspondence on August 29, 2007.

We have attached a list (Enclosure A) of threatened and endangered species that may occur within the area of the Tumalo Feed Canal Piping Project. The list fulfills the requirement of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). U.S. Bureau of Reclamation requirements under the Act are outlined in Enclosure B.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems on which they depend may be conserved. Under section 7(a)(1) and 7(a)(2) of the Act and pursuant to 50 CFR 402 *et seq.*, the U.S. Bureau of Reclamation is required to utilize their authorities to carry out programs which further species conservation and to determine whether projects may affect threatened and endangered species, and/or critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) which are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (NEPA) (42 U.S.C. 4332 (2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to the Biological Assessment be prepared to determine whether they may affect listed and proposed species. Recommended contents of a Biological Assessment are described in Enclosure B, as well as 50 CFR 402.12.

If the U.S. Bureau of Reclamation determines, based on the Biological Assessment or evaluation, that threatened and endangered species and/or critical habitat may be affected by the project, the U.S. Bureau of Reclamation is required to consult with the Service following the requirements of 50 CFR 402 which implement the Act.

Enclosure A includes a list of candidate species under review for listing. The list reflects changes to the candidate species list published September 12, 2006, in the Federal Register (Vol. 71, No. 176, 53756) and the addition of "species of concern." Candidate species have no protection under the Act but are included for consideration as it is possible candidates could be

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listed prior to project completion. Species of concern are those taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

If a proposed project may affect only candidate species or species of concern, the U.S. Bureau of Reclamation is not required to perform a Biological Assessment or evaluation or consult with the Service. However, the Service recommends minimizing impacts to these species to the extent possible in order to prevent potential future conflicts. Therefore, if early evaluation of the project indicates that it is likely to adversely impact a candidate species or species of concern, the U.S. Bureau of Reclamation may wish to request technical assistance from this office.

Your interest in endangered species is appreciated. The Service encourages the U.S. Bureau of Reclamation to investigate opportunities for incorporating conservation of threatened and endangered species into project planning processes as a means of complying with the Act. If you have questions regarding your responsibilities under the Act, please contact Kevin Maurice at (503) 231-6179. All correspondence should include the above referenced file number. For questions regarding salmon and steelhead trout, please contact NOAA Fisheries Service, 525 NE Oregon Street, Suite 500, Portland, Oregon 97232, (503) 230-5400.

For future species list requests, please visit our website (http://www.fws.gov/oregonfwo/Species/default.asp) for instructions on how to make requests.

Enclosures
EnclosureA: Deschutes COUNTY.PDF
EnclosureB: EnclosureB_Federal_Agencies_Responsibilities.PDF

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ENCLOSURE A

FEDERALLY LISTED THREATENED, ENDANGERED, PROPOSED, CANDIDATE SPECIES AND SPECIES OF CONCERN WHICH MAY OCCUR WITHIN DESCHUTES COUNTY, OREGON

LISTED SPECIES[1/]

Birds		
Northern spotted owl[2/]	*Strix occidentalis caurina*	CH T
Fish		
Bull trout (Columbia River Basin)[3/]	*Salvelinus confluentus*	CH T

PROPOSED SPECIES

None

CANDIDATE SPECIES[4/]

Mammals	
Pacific fisher[5/]	*Martes pennanti pacifica*
Birds	
Yellow-billed cuckoo	*Coccyzus americanus*
Amphibians and Reptiles	
Oregon spotted frog	*Rana pretiosa*

SPECIES OF CONCERN

Mammals	
Pygmy rabbit	*Brachylagus idahoensis*
Pale western big-eared bat	*Corynorhinus townsendii pallescens*
California wolverine	*Gulo gulo luteus*
Silver-haired bat	*Lasionycteris noctivagans*
Small-footed myotis (bat)	*Myotis ciliolabrum*
Long-eared myotis (bat)	*Myotis evotis*
Long-legged myotis (bat)	*Myotis volans*
Yuma myotis (bat)	*Myotis yumanensis*
California bighorn	*Ovis canadensis californiana*
Preble's shrew	*Sorex preblei*
Birds	
Northern goshawk	*Accipiter gentilis*
Western burrowing owl	*Athene cunicularia hypugea*
Ferruginous hawk	*Buteo regalis*
Greater sage-grouse	*Centrocercus urophasianus*
Black tern	*Chlidonias niger*
Olive-sided flycatcher	*Contopus cooperi*
Willow flycatcher	*Empidonax trailli adastus*
Harlequin duck	*Histrionicus histrionicus*
Yellow-breasted chat	*Icteria virens*
Lewis' woodpecker	*Melanerpes lewis*
Mountain quail	*Oreortyx pictus*
White-headed woodpecker	*Picoides albolarvatus*

<u>Amphibians and Reptiles</u>	
Tailed frog	*Ascaphus truei*
Oregon slender salamander	*Batrachoseps wrighti*
Cascades frog	*Rana cascadae*
Northern sagebrush lizard	*Sceloporus graciosus graciosus*
<u>Fishes</u>	
Pacific lamprey	*Lampetra tridentata*
Interior redband trout	*Oncorhynchus mykiss gibbsi*
<u>Plants</u>	
Estes' artemisia	*Artemisia ludoviciana* ssp. *estesii*
Cliff paintbrush	*Castilleja rupicola*
Cusick's erigonum	*Eriogonum cusickii*
Disappearing monkeyflower	*Mimulus evanescens*
Little mousetail	*Myosurus minimus* ssp. *apus* (= var. *sessiliflorus*)
Peck's penstemon	*Penstemon peckii*
Howell's theylpody	*Thelypodium howellii* ssp. *howellii*

(E) - Listed Endangered *(T) - Listed Threatened* *(CH) - Critical Habitat has been designated for this species*
(PE) - Proposed Endangered *(PT) - Proposed Threatened* *(PCH) - Critical Habitat has been proposed for this species*

Species of Concern - Taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

* *Consultation with NOAA's National Marine Fisheries Service may be required.*

[1/] *U.S. Department of Interior, Fish and Wildlife Service, October 31, 2000, <u>Endangered and Threatened</u> <u>Wildlife and Plants</u>, 50 CFR 17.11 and 17.12*
[2/] *Federal Register Vol. 57, No. 10, January 15, 1992, Final Rule - Critical Habitat for the Northern Spotted Owl*
[3/] *Federal Register Vol. 63, No. 111, June 10, 1998, Final Rule - Columbia River and Klamath River Bull Trout*
[4/] *Federal Register Vol. 69, No. 86, May 4, 2004, Notice of Review - Candidate or Proposed Animals and Plants*
[5/] *Federal Register Vol. 69, No. 68, April 8, 2004, 12-Month Finding for a Petition to List the West Coast Distinct Population Segment of the Fisher*

Appendix F

Wetland Reconnaissance

DAVID EVANS
AND ASSOCIATES INC.

MEMORANDUM

DATE: June 13, 2006

TO: John Macklan

FROM: Shirley Walkey

SUBJECT: **WETLAND RECONNAISSANCE**

PROJECT: Tumalo Irrigation District Canal Property T.17S., R.11E., Sec. 03, Sec.10, Deschutes County

PROJECT NO: TIDX00000008

COPIES:

A wetland reconnaissance was conducted by a DEA Environmental Specialist on May 8, 2006. The study area was on Tumalo Irrigation District Property north of Kuhlman Road and east of Tyler Road in Sections 3 (plot #1) and 10 (plot #2).

The purpose of the wetland reconnaissance was to examine two areas along the Tumalo Feed Canal for possible wetlands. It appears that the canal is leaking, supplying the two study areas with water it would not normally have. The reconnaissance was conducted on May 8th, early in the season for the Bend area, and vegetation was just beginning to grow. The soils were examined in the two areas to determine if they were hydric.

The National Resources Conservation Service (NRCS) Upper Deschutes soil survey shows that the soil at both sites is 61c: Henkle-Fryrear-Lava flow complex, 0 to 15 percent slopes. According to the survey, Henkle is somewhat excessively drained and Fryrear is well drained. The soils are not on the hydric soil list.

The topography of the plot sites is shown on two USGS Quadrangle maps. The area of plot #1 was found on the Tumalo Dam Quad and the area of plot #2 was found on the Shevlin Park Quad. The quad maps show the land generally sloping toward the northeast from the plot sites.

Precipitation data was obtained from the Oregon Climate Service at Oregon State University. The Bend reporting station (closest station to the study area) had 5.75 inches of precipitation in 2006 through March. The station total for April was 1.5 inches of precipitation. According to the records, no precipitation fell at the Bend reporting station from April 18th until the time of the site reconnaissance on May 8th, 2006.

Results in Plot #1:

Plot #1 is located in a bend of the canal, resulting in the plot being bordered on three sides by the canal.

Hydrology

Free water in pit at 12 inches.

Soil

0-6 inches10YR 2/1+, no mottling. This was an organic layer, smooth and peaty.

6-18 inches 10YR 4/3, no mottling, sandy loam.

Vegetation

It was early in the year for the Bend area. Plants were just beginning to grow. Grasses and sedges (approximately 6 inches high) were noted in the plot area. No seed heads remained from last year except for common mullein (*Verbascum Thapsus*), also seen in the plot area.

Results in Plot #2:

Plot #2 is also located along a bend in the canal but the bend is not as acute as in plot #1. Plot #2 is bordered by the canal on less than two sides.

Hydrology

Dry hole.

Soil

0-6 inches 10YR 3/2, no mottling, loam

6-16 inches 10YR 3/3, no mottling, sandy clay loam.

The soil appears to have been disturbed. There were wood pieces in the upper 8 inches of soil indicating that the area had possibly been logged or had been used for wood cutting.

Vegetation

Grasses and sedges (approximately 6 inches high) were noted in the plot area. No seed heads remained from last year.

Conclusion

The method for wetland delineation described in the 1987 U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual requires an area to possess a prevalence of hydrophytic vegetation, hydric soils, and wetland hydrology. Under normal circumstances, positive indicators of each of these three parameters must be present for an area to satisfy the criteria for jurisdictional wetlands.

The feed canal was constructed approximately 85 years ago. It appears that in 85 years, due to canal leakage, the study areas have developed some wetland indicators. Both plot sites had some hydric

vegetation. In plot #2, the soils had no hydric indicators. Although plot #1 had a 6-inch organic layer of peaty soil at the surface, and water at 12 inches, the soils did not have enough hydric indicators to be classified as hydric. Lacking the three indicators (hydrophytic vegetation, hydric soils, and wetland hydrology) neither site would be classified as wetland at this time. If the canal leakage continues, it is likely that the study areas would develop hydric soils eventually, plot area #1 far before plot area #2.

Shirley Walkey,
DEA Environmental Specialist