Piping Lateral Canals in the Vale Bench: Building on Experience

Table of Contents

Executive summary

Date: July 28, 2022
Applicant Name: Malheur Watershed Council (Category B: see attached letter)
City: Ontario
County: Malheur
State: Oregon

Applicant Status: The Malheur Watershed Council (Council) is a Category B applicant working with the Vale Oregon Irrigation District (District), a Category A entity. The Council will be the project applicant and sponsor responsible for fiscal administration, and technical reporting. The District will implement the project. See the attached letter from the District confirming this relationship.

Project Summary

We are proposing to pipe 10.4 miles of earthen lateral canals. Our project will result in savings of approximately 4,896 acre-feet per year. These savings will help us achieve a carryover pool in Beulah Reservoir to benefit the habitat of the federally listed bull trout. Side benefits of piping will be improved water quality by enabling landowners to convert from furrow to sprinklers, which will eliminate irrigation-induced erosion. The future of our food supply will be protected by ensuring irrigation water supply and maintaining our soil quality.

This proposal is a part of an ongoing program of water conservation and water quality improvements the District has been engaged in for many years. The District has piped over 50 miles of open laterals to eliminate losses from seepage and evaporation.

Project location

Our project is located just outside of Vale, Oregon, on what is know as the West Vale Bench.

- Latitude/Longitude (in decimal degrees): 43. 9655 / -117.3712
- County: Malheur
- Watershed/Basin: Lower Malheur

See the attached location map.

Background Data

The Vale Oregon Irrigation District is located in Malheur County, Oregon. Vale is about 60 miles northwest of Boise Idaho. The District's average annual water supply is 87,000 acre-feet per year and farmers use all of that water for irrigation. The District has 412 water accounts with 34,993 acres of irrigable farmland. The annual assessment is $36.70 an acre with an account fee of $90 per year. This money helps to pay for 13 full time employees and other expenses.

Crops grown include grains, potatoes, onions, irrigated pastures, hay, alfalfa seed, other seed crops, sugar beets, and corn. The most common method of irrigating is furrow irrigation, although drip and sprinkler irrigation are gaining in popularity.

The District diverts water at the Namorf Diversion from the Malheur River using a low profile dam constructed about 10 miles west of Harper, Oregon. From this point of diversion, the water flows down 73 miles of main canal to Jamieson on the west side of Willow Creek. This main canal is designed to carry 1 cubic foot of water per second for every 50 acres of irrigated land. Lateral canals intersect the main canal at irregular intervals to deliver water to individual farms in the Willow Creek and Vale area.

The District has three storage facilities. They are: Warm Springs Reservoir on the middle fork of the Malheur River, Bully Creek Reservoir on Bully Creek a tributary of the Malheur River, and Beulah Reservoir on the north fork of the Malheur River. This system was constructed in the early 1930's. The Agency Valley Dam, creating Beulah Reservoir, was completed in 1935.

The total storage capacity available to the District is 185,000 acre-feet. Warm Springs Reservoir holds 190,000 acre-feet, but other irrigation districts use half of this capacity. Beulah Reservoir holds 60,000 acre-feet, and Bully Creek Reservoir stores 30,000 acre-feet.

Overall, the district operates at an estimated 60 to 65% delivery efficiency. We estimate that the on-farm efficiency is approximately 30 to 40% at best. It is most likely that furrow irrigation is much less efficient than what we cite here.

Shortfalls in Water

Water shortages have been an increasing problem for the District, especially since 2000. Because of a lack of water in the reservoirs, the irrigation season has ended early **for 10 of the past 17 years**. It is likely with a changing climate and increased demands for existing water for environmental concerns and ESA listed species, we expect shortages will continue and may become worse.

In recent years farmers have let many fields lie fallow because of the shortage in irrigation water. Estimates are that about 20% of the land, 7,000 acres, within the nearby area was left fallow in 2015 (OSU Extension). Cropping patterns have changed as well. Crops that don't require irrigation or no late season irrigation have increased. Extension estimates the conversion to these kinds of crops accounted for about 30% of the acres in 2015 (OSU Extension). With our continued improvements in water conservation that this proposal represents, we will help minimize the number of fallow ares and help farmers produce more productive crops.

Existing Irrigation Improvements

The District has been heavily involved in improving its infrastructure for many years, but especially in the last 17 years. We have been integral partners in a diverse partnership consisting of:

- Landowners
- NRCS
- Malheur Watershed Council
- Bureau of Reclamation
- Oregon Department of Environmental Quality
- Oregon Department of Agriculture

- Oregon Watershed Enhancement Board
- Oregon Department of Fish and Wildlife
- Pheasants Forever
- Malheur County Weed Advisory Board

Since 2003, this consortium has implemented more than **$15 million** worth of improvements.

Technical project description

We are proposing to pipe 10.4 miles of earthen lateral canals. Our project will result in savings of approximately 4,896 acre-feet per year. These savings will help us achieve a carryover pool in Beulah Reservoir to benefit the habitat of the federally listed bull trout. Side benefits of piping will be improved water quality by enabling landowners to convert from furrow to sprinklers, which will eliminate irrigation-induced erosion. The future of our food supply will be protected by ensuring irrigation water supply and maintaining our soil quality.

This proposal is a part of an ongoing program of water conservation and water quality improvements the District has been engaged in for many years. The District has piped over 50 miles of open laterals to eliminate losses from seepage and evaporation.

Project Design

The District will hire a qualified engineer to finalize designs and provide construction oversite. Each pipeline will be designed to accommodate maximum flows and pressures. The District, has successfully installed miles of pipe with little trouble. Each piped lateral will have to meet NRCS, BOR and the Irrigation Districts' specifications.

Construction Method

District staff will excavate trenches and install pipe after the end of the irrigation season while the canal is not in operation. All design, installation, and construction methods will meet or exceed Reclamation specifications.

The design calls for the pipeline to deliver an inch per acre at less than 5 foot per second velocity. The pipes will be covered with a minimum of 3 feet of material. Each turnout will be gated and fitted with a flow meter. They will be designed for hook up to sprinklers for on demand irrigation.

Besides water savings from eliminating seepage and evaporation, piping the laterals allows for some gravity pressure. This energy savings will provide an incentive for farmers to convert to sprinklers from furrow and flood irrigation of pastures. Sprinklers will enable water savings above the savings from piping alone. The gravity pressure will vary, depending on the lateral and the location on the particular lateral. We estimate the highest pressure will be 100 psi.

Evaluation criteria

A. Quantifiable Water Savings

1) Describe the amount of estimated water savings. For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project.

We are proposing to pipe 10.4 miles of earthen lateral canals. Our project will result in savings of approximately 4,896 acre-feet per year.

2) Describe current losses: Please explain where the water that will be conserved is currently going and how it is being used. Consider the following:

a. Explain where current losses are going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground)?

Currently, losses are both seeping into the ground and evaporating into the atmosphere.

b. If known, please explain how current losses are being used. For example, are current losses returning to the system for use by others? Are current losses entering an impaired groundwater table becoming unsuitable for future use?

Losses are not being used by others since the loss is due to evaporation and seepage. The seepage loss from the earthen canal provides no known benefit to adjacent landowners.

c. Are there any known benefits associated with where the current losses are going? For example, is seepage water providing additional habitat for fish or animal species?

None

3) Describe the support/documentation of estimated water savings: Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations. Note: projects that do not provide sufficient supporting detail/calculations may not receive credit under this section. Please be sure to consider the questions associated with your project type (listed below) when determining the estimated water savings, along with the necessary support needed for a full review of your proposal.

We have learned over many years of experience and actual measurement how much water is lost in the lateral canals. The measurements are simple. We measure how much is diverted into a lateral and then measure how much is applied to the fields. The difference is the amount lost to seepage and evaporation. Consistently our average loss is 1 cfs per mile per day of earthen lateral.

Piping canals increases efficiency by saving water, delivers water to the farm more precisely, and in a timelier fashion. VOID's average annual water supply is 87,000 acre-feet per year, and it is estimated they lose about 37% or 32,000 acre-feet. Most of the lost water is seeping into the ground and a smaller percentage is lost to evaporation. The irrigation district estimates yearly losses in the dirt lateral canals to be about 470 acre-feet per mile per year. Yearly losses in the dirt lateral canals are estimated to be about 470 acre-feet per mile per year. Installing the 55,000 feet of pipe requested in this proposal will save about 4,896 acre-feet per-year. Enabling farmers to convert to sprinkler will save an estimated 0.7 acre-feet per-acre annually for each acre converted.

These estimates are calculated by measuring how much water is diverted from the main canal into the lateral canal. VOID then measures the amount applied to each field served by that canal. The difference between what is diverted and what is applied is the loss to seepage and evaporation. VOID upgraded its ability to measure water significantly in the past few years. The pipelines allow for more sophisticated measuring devices to be installed for each field. The headwalls installed for the pipelines will allow for more precise measurement of the water diverted from the main canal. VOID is in the process of installing real-time measuring devices within the main canal to get even more precise data on water losses and improve water management.

4) Please address the following questions according to the type of infrastructure improvement you are proposing for funding. See Appendix A: *Benefit Quantification and Performance Measure Guidance* for additional guidance on quantifying water savings.

1. **Canal Lining/Piping:** Canal lining/piping projects can provide water savings when irrigation delivery systems experience significant losses due to canal seepage. Applicants proposing lining/piping projects should address the following:

a. How has the estimated average annual water savings that will result from the project been determined? Please provide all relevant calculations, assumptions, and supporting data.

We have learned over many years of experience and actual measurement how much water is lost in the lateral canals. The measurements are simple. We measure how much is diverted into a lateral and then measure how much is applied to the fields. The difference is the amount lost to seepage and evaporation. Consistently our average loss is 1 cfs per mile per day of earthen lateral.

Piping canals increases efficiency by saving water, delivers water to the farm more precisely, and in a timelier fashion**. VOID's average annual water supply is 87,000 acre-feet per year, and it is estimated they lose about 37% or 32,000 acre-feet. Most of the lost water is seeping into the ground and a smaller percentage is lost to evaporation.** The irrigation district estimates yearly losses in the dirt lateral canals to be about 470 acre-feet per mile per year. Yearly losses in the dirt lateral canals are estimated to be about 470 acre-feet per mile per year. Installing the 55,000 feet of pipe requested in this proposal will save about 4,896 acre-feet per-year. Enabling farmers to convert to sprinkler will **save an estimated 0.7 acre-feet per-acre annually** for each acre converted.

These estimates are calculated by measuring how much water is diverted from the main canal into the lateral canal. VOID then measures the amount applied to each field served by that canal. The difference between what is diverted and what is applied is the loss to seepage and evaporation. VOID upgraded its ability to measure water significantly in the past few years. The pipelines allow for more sophisticated measuring devices to be installed for each field. The headwalls installed for the pipelines will allow for more precise measurement of the water diverted from the main canal. VOID is in the process of installing real-time measuring devices within the main canal to get even more precise data on water losses and improve water management.

We are proposing to pipe 10.4 miles of open-earthen lateral canals that irrigate 10,000 acres. Our project will result in savings of approximately 4,896 acre-feet per-year. These savings will help us achieve a carry-over pool in Beulah Reservoir to benefit habitat of the federally listed bull trout, (*Salvelinus confluentus*). Ancillary additional environmental benefits of piping will be improved water quality by enabling landowners to convert from furrow-flood to sprinkler irrigation which eliminates irrigation-induced erosion while using significantly less water. The future of our food supply will be protected by ensuring irrigation water supply and maintaining our soil quality. Likewise, the ability of this community to maintain a viable agriculture will also be protected.

This proposal is a part of an ongoing program of water conservation and water quality improvements that the Vale Oregon Irrigation District (VOID) has been engaged in for many years. Over the 15 plus years, VOID piped over 100 miles of open-earthen laterals to eliminate losses from seepage and evaporation.

a. How have average annual canal seepage losses been determined?

We have measured how much water is diverted from the main canal into the lateral and then how much is applied to the fields. The difference is the loss due to seepage and evaporation.

b. Have ponding and/or inflow/outflow tests been conducted to determine seepage rates under varying conditions? If so, please provide detailed descriptions of testing methods and all results. If not, please provide an explanation of the method(s) used to calculate seepage losses. All estimates should be supported with multiple sets of data/measurements from representative sections of canals.

Inflow/outflow measurements are made routinely in this Irrigation District. We know that seepage is greatest in the spring, moderate throughout the summer and the fall.

c. What are the expected post-project seepage/leakage losses and how were these estimates determined (e.g., can data specific to the type of material being used in the project be provided)?

Expected losses post- project will be none or at least minimal. Once the earthen laterals are piped, there should be no post-project seepage/leakage losses. The earthen laterals will piped and the system will be “closed”. No water can leak from the pipes. The exception would be if there happened to be a break in the line, which is very unlikely. VOID has successfully piped over 100 miles of earthen laterals and mainlines in the last 20 years. The only major break that occurred in these pipes was caused by defective glue that was sold to VOID which was previously frozen – and unknown to the supplier and VOID. Their track record for implementation is impressive.

d. What are the anticipated annual transit loss reductions in terms of acre-feet per mile for the overall project and for each section of canal included in the project?

We expect the loss reductions to be about 479 acre-feet per mile per year.

e. How will actual canal loss seepage reductions be verified?

We will measure water diverted into the pipe at the headgate and then measure the amount applied to each field.

f. Include a detailed description of the materials being used.

Description	Quantity
PIPE (feet)	
27-inch 100 PIP	8840
24-inch 100 PIP	6100
21-inch 100 PIP	6680
18-inch 100 PIP	9960
15-inch 100 PIP	2820
12-inch 100 PIP	12020
10-inch 100 PIP	3380
8-inch 100 PIP	180
Tracer Wire -16 GA (feet)	55000
TEES (each)	48
AirVents	54
Reducers	24

Elbows 90 Degrees	7
Elbows 45 Degrees	21
Elbows 33 degrees	7
Elbows 22 degrees	15
Z-pipe Outlet Assembly	41
BURIED VALVE ASSEMBLY	9
Headgates	10
Thrust blocks	79
Inlet Structure	5

Sustainability Benefits

- Does the project seek to improve ecological resiliency to climate change?

Improving the ability of the District to manage water more efficiently will help them improve their environmental and economic resiliency to climate change. Improving infrastructure and becoming more efficient with water is one of the best ways farmers can adapt to climate change (John Stevenson, former OSU Regional Climate Specialist). Most estimates are that eastern Oregon will experience longer and dryer summers, and there will be less snow during the winter. This means more short water years, as we have experienced in the last 10 to 12 years.

Short water supply: Water shortages have been an increasing problem for the District, especially since 2000. Because of a lack of water in the reservoirs, the irrigation season has ended early for 7 of the past 12 years. We expect shortages will continue and may become worse with a changing climate. We are faced with increased demands for existing water for environmental concerns and a federally listed fish species.

Water quality*:* There are concerns in the Malheur River about poor water quality due to irrigation tail water runoff. The Oregon DEQ ranks the Malheur River in the top 3 rivers having the worst water quality in Oregon.

Bull trout habitat*:* There are Bull Trout in one of the reservoirs that supplies Vale Irrigation District with irrigation water, and there is a need to maintain water levels in the reservoir to protect Bull Trout. Bull Trout in Beulah Reservoir are federally ESA-listed as a “threatened” species. To protect bull trout, minimum reservoir depths have been established during the irrigation season. Since 2010 the District has leased water to the Bureau of Reclamation to **maintain 2,000 acre-feet carry over pool**. Strategies that reduce water withdrawals from the reservoir and maximize water use efficiency on irrigated lands in the watershed are critical to sustain bull trout and irrigated agriculture in the watershed.

Economic challenges in a rural area: Malheur County ranks near the bottom of all economic measures. Improving irrigation infrastructure helps creates jobs, and improves many other aspects of the economy.

The Malheur Watershed Council, irrigators, Vale Oregon, Warm Springs, Owyhee, and Orchard Irrigation Districts, and many other partners have been working on water quality and quantity improvement projects in the watershed for more than 20 years.

As cost share, VOID will incur all expenses to install the pipe. This proposal is requesting only materials, engineering, and project management. The District has an excellent record of conducting projects similar to this one. They have previously installed almost 100 miles of pipe on time, within budget, and with very little administrative costs.

- Will water remain in the system for longer periods of time? If so, provide details on current/future durations and any expected resulting benefits (e.g., maintaining water temperatures or water levels).

Our project will benefit the federally listed bull trout, which is also a species of significance to the Burns-Paiute Tribe. A 2005 Biological Opinion written by the USFWS directed the Bureau of Reclamation (BOR) to implement measures to minimize the effect Agency Valley Dam on the habitat of the federally listed bull trout. Carryover pool volume recommendations are needed to support a forage base for bull trout in Beulah Reservoir. A reservoir carryover pool can sustain a prey base for returning fish.

In the past, dam operations did not take into account the importance of a carryover pool. Water levels fluctuated widely, and depended only on water users needs during the late summer and fall. In low water years' drawdown was 100%. Effects of drawdowns are difficult to evaluate because data is sparse. USGS studied the reservoir twice, during the winters of 2002-03 and 2007-09. The first was a moderate draw down and the second an extreme drawdown. There is not yet enough information to make scientifically based recommendations. The Bureau of Reclamation continues to study the problem.

Vale Oregon Irrigation District has agreed to maintain a minimum pool of 2,000 acre feet per-year. This gives researchers more time to determine if this size of carryover pool will benefit bull trout. The Districts' water conservation efforts made this carryover pool possible.

The Districts' water conservation efforts made this carry over pool possible. The latest published report in 2019 by the BOR, indicates the reservoir never fell below the 2,000-acre feet threshold. This is a significant achievement enabled by projects such as this one.

Note the gradual decline in the number of days the reservoir was below the threshold in the following table.

Year: Number of days below 2,000-acre feet

2007: 60 days
2008: 34 days
2009: 53 days
2010: 28 days
2013: 45 days
2014: 56 days
2015: 35 days
2016: 15 days
2017: 0 days
2018: 0 days

The Bureau of Reclamation and VOID have studied several alternatives to help maintain a sufficient carry over pool and meet the needs of the irrigators. Some options discussed included raising dam height, dredging sediment out of the reservoir and continuing water conservation efforts. While BOR has not made a definitive conclusion, it appears that preliminary analysis shows that conservation is the most practical, cost effective and beneficial way to address bull trout habitat needs in Beulah.

- Will the project benefit species (e.g., federally threatened or endangered, a federally recognized candidate species, a state listed species, or a species of particular recreational, or economic importance)? Please describe the relationship of the species to the water supply, and whether the species is adversely affected by a Reclamation project or is subject to a recovery plan or conservation plan under the Endangered Species Act (ESA).

Our project will benefit the federally listed bull trout, which is also a species of significance to the Burns-Paiute Tribe. A 2005 Biological Opinion written by the USFWS directed the Bureau of Reclamation (BOR) to implement measures to minimize the effect Agency Valley Dam on the habitat of the federally listed bull trout. Carryover pool volume recommendations are needed to support a forage base for bull trout in Beulah Reservoir. A reservoir carryover pool can sustain a prey base for returning fish.

- Please describe any other ecosystem benefits as a direct result of the project.

Oregon DEQ ranks the Malheur River to be in the top 2 most polluted rivers in Oregon (DEQ. 2014. OWQI Report). DEQ set Total Maximum Daily Load targets for the Malheur Basin in 2010. They identified sediment, nutrients, (Total Phosphorus in particular) and bacteria as the main water quality concerns. They also concluded that flood irrigation is the primary human activity that leads to these problems.

In DEQ's 2020 OWQI Report (2021), the Malheur River still is rated as having “Very Poor” water quality. However, the last 7 years the downward trends have stopped. In fact, there has been an improving trend in bacteria levels at the mouth of the river. Other encouraging signs of improvement in the Malheur Basin are that Bully Creek has a significant improving trend for phosphorous levels, and Willow

Creek has an improving trend for bacteria. The bright spot is that the Malheur River below Little Valley has an improving trend for nitrogen, phosphorus, and bacteria levels.

Flood and furrow irrigation systems present water quality and water quantity concerns because as irrigation water moves over the surface of cropland or pasture, it picks up bacteria and nutrients from manure, and sediment and nutrients from cropland soils. The drainage water moves to downstream water users and eventually into the Malheur River. This kind of irrigation also requires more applied water so that the water reaches the bottom of the field in a timely manner to allow for infiltration in the lower part of the field.

The Malheur Watershed Council has been intensively monitoring the Malheur River since 1997. We have measured the river itself, drains entering the river, and individual fields. Our conclusions are that tail-water from irrigated pastures and row crop fields have a significant detrimental effect on water quality. The Malheur meets most of the state's water quality standards in the reaches above the irrigated portion of the basin. However, it is among the most polluted rivers in the state at the mouth.

Our on-farm monitoring leads us to the following conclusions. When compared to the applied irrigation water:

- Bacteria levels increase 23-fold in tail-water from irrigated pastures.

- Total phosphorus levels increase 3.7 times in tail-water from furrow irrigated row-crop fields. Phosphorus amounts average about 10.4 pound per acre per year lost with furrow irrigation.

Thus, conversion to sprinkler or drip systems eliminates field runoff and erosion, greatly reducing pollutant loads going into the Malheur. Conversion of earth irrigation water laterals to pipe facilitates the conversion to efficient irrigation systems because growers receive pressurized water.

We estimate that approximately 12,000 acres have been converted to sprinklers in the Malheur River Basin since 2000. Applying the results of our monitoring, we estimate that we are preventing billions of colonies of bacteria, 240,000 tons of sediment and almost 125,000 pounds of phosphorus from entering streams in the basin each year. This is significant but there is still a long way to go. The completion of this project will only increase farmers' ability to convert to sprinklers or drip irrigation and continue the trend of improving water quality.

Groundwater

As stated earlier, DEQ designated northern Malheur County as a groundwater management area in the late 1980s. A quote from Gannett's report summarizes the situation with groundwater very well.

> "Reducing the level of ground water contamination will require reducing the amount of irrigation water lost to deep percolation, reducing the amount of nitrogen in the water that is

> lost to deep percolation, and reducing the amount of nitrogen in tail water from the fields discharging to ditches. Irrigation and nitrogen application should be managed to ensure that nitrogen in the soil profile is not flushed below the rooting depth of the crop during irrigation." Gannett 1990.

OSU Extension, the Malheur Experiment Station, the Council, the SWCD, NRCS, DEQ and ODA have worked with growers to cut their application of fertilizers and pesticides with great success. "Multiple lines of evidence suggesting improving water quality (including the statistically significant decreasing area-wide trend) provide sufficient evidence to conclude there has been an overall improvement in groundwater nitrate concentrations from 1991 through 2012." (DEQ. 2015. Groundwater Trend Analysis Report.) DEQ concludes that while progress has been made there is still much more work to be done.

The piping of canals and converting to sprinklers is the second component in protecting groundwater.

- Will the project directly result in more efficient management of the water supply? For example, will the project provide greater flexibility to water managers, resulting in a more efficient use of water supplies?

Xxxx

Other project benefits.

Economic Help for Disadvantaged or Underserved Communities:

According to the Oregon State Employment Bureau "Poverty is a serious issue in Malheur County." Based on U.S. Census Bureau statistics, Malheur County's 2012 poverty rate was 25.8 percent, which was Oregon's highest. Things have improved slightly in recent years with the poverty rate declining to 19.5 percent in 2020 But that is still very high. According to Oregon Employment Department data, the average job in Malheur County paid $43,313 in 2020.

We estimate the conservation work we have engaged in has directly or indirectly contributed to 18 or more jobs in the area. We suspect it is far more than 18 but it is difficult to quantify. When contacted, the owner of Roman's Irrigation Supply indicated that he has grown from a staff of 4 employees in 2000 to 17 employees currently. He attributes this growth to the activities by VOID and the private landowners to improve irrigation infrastructure. Other local irrigation companies report similar growth and activity.

The irrigation district itself has been able to keep 5 or more laborers employed during the non-irrigation season installing the miles of pipeline. Normally these employees would have reduced hours or be laid off for the winter. They are now employed in installing pipeline during the winter months.

Funding this proposal will continue the positive economic activity in a depressed rural area.

Piping laterals has shown to be a local driver for the farm economy in Malheur County. Grants totaling more than $15 million project since 2000. It is only common sense to believe this has added greatly to the local economy because most of the money has been spent locally. This $15 million does not include the cost share, most of it cash, provided by the landowners spending money to convert to sprinklers.

This spending has a multiplying effect on local economies. Research on spending on infrastructure projects such on highway projects indicates that for every dollar spent on the highway project 1.5 to 3 times that is re-spent in the local economy. Workers buy food, pay rent, buy gas and so forth (Highway Grants: Roads to prosperity? (Sylvain Leduc and Daniel Wilson, Federal Reserve Bank of San Francisco Economic Letter)).

More specific to spending in the Oregon natural resources' sector, Ecotrust (2011) published a short paper about Oregon's restoration economy. They estimate that 90% of the money spent on restoration stays local; for every $1 million spent on restoration 19 jobs are created; and specific to Malheur County, they estimate that restoration spending from 2001 to 2010 created 212 jobs and generated $35 million in economic output. Applying these figures to our proposed project the $900,000 requested should generate $1.4 million to $2.7 million in economic output and create or maintain 18 jobs.

Extension has found that irrigation supply companies all report increased activity in recent years. As stated before, Roman's Irrigation Company reports they needed to hire 13 more employees to keep up with the demand for new pivots. Extension has interviewed a few producers with new pivots, and they report that they are pleasantly surprised that pivots are paying for themselves faster than they expected.

As we discussed earlier, spending on natural resources benefits the local economy. Most of the money stays in the local economy and there is a 1.5 to 3.0 multiplier effect. Our spending on this project should benefit the local economy.

Complementing On-Farm Irrigation Improvements

We fully expect that with more piping there will be more sprinklers. Landowners have spent a great deal of their own money in converting and we have been successful in obtaining OWEB, NRCS' EQIP, and other grants to install improved on-farm irrigation systems.

We work closely with our local NRCS office. We will be applying for a RCCP grant for the Vale Bench area to continue this work. NRCS has designated the Vale Bench area as a priority area for its irrigation improvement funding.

Another aspect of water conservation addressed by this project is improved on-farm efficiency. The pipelines make converting to sprinklers feasible. The District estimates, based on NRCS data and VOID observations, that furrow irrigation is only 30-40% efficient. Properly managed center pivot sprinklers are about 75 to 85% efficient and drip approaches 100% efficiency. It follows that about 0.7 acre-feet per-acre per-year could be saved when the fields served by these pipelines are converted to sprinkler.

Planning and Implementation

Our proposal furthers the goals of each of the collaborative basin planning efforts:

- Malheur River Watershed Action Plan. 2015. Malheur Watershed Council
- Malheur River TMDL. 2010.
- Malheur River Agricultural Water Quality Management Plan. 2021. ODA
- Bull Trout Recovery Plan. 2015. USFWS. Upper Snake River Recovery Unit. Pg. E-40.
- Oregon Conservation Strategy. 2016. ODFW
- Bull Trout Biological Opinion. 2005. USFWS
- Snake River-Hells Canyon TMDL. 2004. Idaho and Oregon DEQ

Readiness to Proceed

Based on the Districts 20 plus years of experience in piping canals we have developed a implementation plan. See the following.

Task 1. Finalize engineering designs
- Task schedule: September to October 2023
- Description of task activities: Our contracted engineer will work with NRCS engineering staff to ensure the pipe sizes and accessories are adequate to deliver the proper amount of water.
- Permits/regulatory approvals required: Obtain NEPA approvals from BOR

Task 2. Year 1 of pipe installation
- Task schedule: October 2023 to March 2024
- Description of task activities: VOID crews will begin installing pipelines. Goal for the first year is about 15,000 feet
- Permits/regulatory approvals required: Our proposed project consists of laying pipe in existing dirt lateral irrigation canals. We will not disturb any existing wetlands or impact creeks or rivers. Thus, we are confident that we will not require any permits to conduct this project. There are some seepage areas along the laterals and piping them will prevent the seepage. We believe these wet areas along the laterals are not classified as jurisdictional wetlands requiring permitting under the Clean Water Act or the state's fill and removal statutes.

Task 3. Year 2 of pipe installation
- Task schedule: October 2024 to March 2025
- Description of task activities: VOID crews will begin installing pipelines. Goal for the 2nd year is about 15,000 feet
- Permits/regulatory approvals required: See above

Task 4. Year 3 of Pipe installation
- Task schedule: October 2025 to March 2026
- Description of task activities: VOID crews will begin installing pipelines. Goal for the 3rd year is about 20,000 feet

- Permits/regulatory approvals required: See above

Task 5. Final Report and final financial report

- Task schedule: March 2026
- Description of task activities: Malheur WSC will write the final report and submit the final financial requests.
- Permits/regulatory approvals required: none

Collaboration

The District and the Malheur Watershed Council have a proven track record for more than 20 years of working collaboratively with a variety of groups. Our partners include:

BOR
DEQ
ODA
ODFW
OWRD
NRCS
SWCD
Burns-Paiute Tribe
OSU Extension/Experiment Station
Orchard Irrigation District
Idaho Power
BLM

Additional Non-Federal Funding

Non-Federal Funding	$2,659,141
Total Project Cost	$2,520,000

Nexus to Reclamation

Vale Oregon Irrigation District is a Reclamation project

Project budget

Budget Proposal and Funding Plan

Funding Sources	Amount
Non-Federal Entities	
OWRD	$ 488,429.00
VOID	$ 1,583,080.00 *
OWEB	$ 352,081.00
Malheur WSC	$ 235,551.00 *
Non-Federal Sub-total	$ 2,659,141.00
REQUESTED RECLAMATION FUNDING	$ 2,520,000.00

Source	Amount
Costs to be reimbursed with the requested Federal funding	$ 2,520,000.00
Costs to be paid by the applicant	$ 235,551.00
Value of third-party contributions	$ 2,423,590.00
TOTAL PROJECT COST	$ 5,179,141.00

Budget Narrative

Personnel

We will hire a project manager who will be responsible for the day-to-day direction of the project. The project manager will assist in the performance of all tasks for each budget year as described below. The hourly rate is based on the average of all personnel occupying this position. Compensation rates are consistently applied to Federal and non-Federal activities.

Tasks : 2-4

Project Manager	**Per Year**
hours	2080.00
Cost/hr	$ 25.00
Gross	$ 52,000.00
3 years Total	$156,000

Fringe Benefits

Fringe benefits are based on hours and include benefits and required taxes paid for this position. Our estimate is about 23% of the hourly wage.

Tasks: 2-4

Project Manager	**Per Year**
Payroll taxes	$ 4,352.00
IRA	$ 1,560.00
Health insurance	$ 6,000.00
Total cost per hour	$ 30.73
3 years Total	$ 35,736.00

Supplies

Tasks: 2-4

Cost estimates are based on the best information available at the time of the grant proposal.

Description	Quantity	Unit Cost	Total
PIPE (feet)			
27-inch 100 PIP	8840	$ 89.70	$ 792,948.00
24-inch 100 PIP	6100	$ 39.06	$ 238,266.00
21-inch 100 PIP	6680	$ 45.32	$ 302,737.60
18-inch 100 PIP	9960	$ 38.90	$ 387,444.00
15-inch 100 PIP	2820	$ 26.00	$ 73,320.00
12-inch 100 PIP	12020	$ 16.45	$ 197,729.00
10-inch 100 PIP	3380	$ 11.40	$ 38,532.00
8-inch 100 PIP	180	$ 7.40	$ 1,332.00
Tracer Wire -16 GA (feet)	55000	$ 0.12	$ 6,600.00
			$ -
TEES (each)	48		$ 49,808.00
AirVents	54		$ 32,891.00
Reducers	24		$ 9,603.50
Elbows 90 Degrees	7		$ 7,671.00
Elbows 45 Degrees	21		$ 16,154.00
Elbows 33 degrees	7		$ 6,766.50
Elbows 22 degrees	15		$ 15,006.50
Z-pipe Outlet Assembly	41		$ 409,025.00
BURIED VALVE ASSEMBLY	9		$ 66,500.00
Headgates	10		$ 15,720.00
Thrust blocks	79		$ 9,875.00
Inlet Structure	5		$ 210,500.00
Total Supplies			**$ 2,888,429.10**

Contractual

Task 1. We will hire a certified engineer to finalize the preliminary designs and estimates.

Task 2-5: To determine the effectiveness of our work we will monitor the water quality 4 priority areas for irrigation improvement activities We are applying for grant funds to implement on farm conversions to sprinkler irrigation and to pipe dirt ditch laterals for better water management. We need to assess if our efforts are successful in improving water quality in the Malheur River, Bully and Willow Creeks. Continued monitoring is necessary to verify water quality improvements and to characterize further changes in water quality related to changes in land and irrigation management over time.

Description	Quantity	Unit Cost	Total
Contracted Services			
Engineering	1	$15,000	$ 15,000.00
Water Quality Monitoring	3 years	$53,448.33/year	$ 160,345.00
Total Contracted Services			**$ 175,345.00**

Construction

Tasks: 2-4

The Vale Oregon Irrigation District will install the pipelines. The cost estimates are based on their years of experience of installing pipe. The District owns all the necessary equipment and machinery that will be required for this project.

District Equipment Rates

Equipment	**Cost per hour or miles (no operator)**
Cat 320DL	$75/hr
Truck and Trailer	$45/hr
Backhoe	$45/hr
Hyster Truck	$0.58/mile
D5 Cat	$50/hr
Dump Truck	$2/mile
Grader	$50/hr

Description	Quantity	Unit Cost	Total
Installation			
Inlet structures (each)	5	$ 14,384.00	$ 71,920.00
Installing pipelines (feet)	49,872	$ 30.00	$ 1,496,160.00
Total Installation			**$ 1,568,080.00**

Indirect Costs

The Council does not have a current Federal negotiated indirect cost rate agreement so indirect costs were calculated using the 10% de minimis rate against MTDC as detailed below. Federal funding will used to pay for $120,000 of these costs.

Personnel	$156,000
Fringe Benefits	$ 35,736.00
Travel	NA
Equipment	NA
Supplies	$2,888,429
Contractual	$ 175,345.00
Construction	NA
Total	$3,255,510.00 * 10% = $325,551

Letters of commitment

Board Resolution

Letters of Support