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International Commission on Irrigation and Drainage (ICID)
WATSAVE AWARDS 2011

Farmer Award

Summary of Mr. Jerry Erstrom's work

"The Willow Creek Piping Project"

(continued on next page)

Nominee Statement of about 1500 Words (in the following format)

I. Describe the innovation

Introduction to the Willow Creek Piping Project

The Willow Creek Piping Project addresses 35,000 acres within the Willow Creek basin adjacent to Willow Creek and the Malheur River. Most of the area's agricultural activity occurs here, and it is where the majority of water quality and water conservation concerns exist. Piping irrigation laterals facilitates on-farm conversion to sprinklers, reduces the need for hydro-power, reduces tillage and fuel usage, conserves water, improves fish habitat, and benefits the local economy.

The total length of delivery canals and laterals under this project is approximately 65 linear miles with 51.4 linear miles already completed. However, the length of pipe required is much longer. Due to the ever-increasing cost of pipe, the Willow Creek Piping Project has conserved resources and facilitated maximum financial benefit by laying two smaller pipelines side-by-side rather than using one larger diameter pipeline.

Background: Status Prior to Implementation of the Project

Prior to the Willow Creek Piping Project, all irrigation water was delivered to users from the main canal through a complex network of open earthen ditches. These systems were established in the 1930s, increasing concerns associated with breaches as well as human and animal safety. Open canals also substantially increased operation and maintenance costs for the Vale Oregon Irrigation District ("District").

Benefits of the Willow Creek Piping Project

Piping irrigation laterals:

- Virtually eliminates conveyance losses from seepage and evaporation.
- Provides gravity pressurized water to irrigators and decreases power costs by reducing or eliminating the need to operate irrigation pumps.
- Improves reliability, control and consistency of water delivery and measurement.
- Reduces operations and maintenance requirements.
- Provides possible opportunities for small "low-head" hydro-power facilities.
- Utilizes water more effectively in connection with irrigation without increasing consumption.

Several priority concerns are addressed in this project including:

- Water conservation
- Environmental improvements
- Reduction of electricity and fossil fuel requirements

- Economic benefits

A piped irrigation delivery system also improves the efficiency of water use on the farm. A pressurized system makes switching from flood irrigation to sprinkler irrigation easier, more cost effective, and reduces the need for additional power. Sprinklers improve irrigation application efficiency, reduce tillage needed for crop production, and can decrease crop consumptive use. Other on-farm conservation methods that have been implemented include pumpback systems which capture irrigation runoff from crop fields and enable multiple re-use of irrigation water.

Over the last five years the following accomplishments have been achieved in the Willow Creek watershed:

- Total Individual Projects (excluding Laterals) = 56
- Total Acres Converted From Flood To Sprinkler = 1,692
- Total Miles of Pipe for Laterals and Mainlines = 66.45
- Total Miles of Drains and Canals Piped = 4.14
- Total Number of Pumpback Systems = 15 systems serving 1,175 acres
- Total Number of Off-stream Water Troughs Installed = 19
- Total Miles of Pipe for Troughs = 1.93 (10,210 feet)
- Total Miles of Cross Fencing = 2.5
- Total Miles of Riparian and Wetland Protection Fencing = 13.32
- Total Riparian Plantings = 4,000
- Total Number of Wetland Filter Ponds = 3
- Total Acres of Rangeland Improved = 755
- Total Acres Served By Piped Laterals = 6,500

II. Describe how the innovation saves water

Without implementation of the Willow Creek Piping Project, a significant amount of water is lost from seepage and evaporation, especially in the beginning of the five to seven-month irrigation season when the canals are dry. Calculations from the Vale Oregon Irrigation District show that during the first month of the irrigation season, typically in April, water loss averages more than 90%. This loss drops some in the following months, but rarely falls below 30%. These issues are exacerbated in years when runoff is below normal. In our high-desert region, average rainfall is 10" per year. In low water years the irrigation district may not receive sufficient water to meet all crop demands.

Simply put, piping and burying open laterals as done under the Willow Creek Piping Project, prevents virtually all water loss from seepage and evaporation, and enables more accurate delivery quantities and measurement. For specific water saving information related to this project, please see the letter from Vale Oregon Irrigation District dated May 26, 2011 enclosed herein as part of the Nomination Form.

III. Describe how the innovation was introduced and spread (for Young Professional award, describe how the innovation will be introduced and spread).

In the 1990s, the Malheur Watershed Council began a program of water quality monitoring that encompassed Willow Creek. The results consistently indicated problems and in 2000 the Lower Willow Creek Working Group was formed to address the issues.

An experiment conducted by Dr. Clint Shock and others showed that tail water from irrigated pastures could contain up to 230,000 *E. coli* colonies per 100 mL of sample. The state's bacteria standard allows only 406 colonies per 100 mL.

Another problem being addressed is irrigation-induced erosion. The most common method of irrigating is called furrow irrigation. This method consists of delivering water to a field via a ditch or pipe. Water is then sent by gravity down a furrow (also referred to as a corrugate), a narrow trench made by a plow. Crops are grown on raised beds between the furrows. Massive amounts of soil are carried off the fields by the irrigation water. When water reaches the end of each furrow it is collected in a receiving ditch. These tail water ditches eventually lead to Willow Creek.

Experiments and computer modeling have shown that soil losses from furrow irrigation can be as high as 15 to 20 tons per acre per year. About 30,000 acres in Willow Creek are furrow irrigated. If every field eroded at 15 to 20 tons per acre per year that would mean 600,000 tons or about 50,000 dump truck loads of dirt potentially enters Willow Creek each year.

We are aware of the main water-related concerns within the Willow Creek and Malheur River basins and have concentrated educational efforts there for many years. In the last five years, through a variety of funders, over \$7.8 million has been invested in the restoration of the Willow Creek watershed. This includes over \$1.3 million from private landowners. Along with the projects accomplished by the irrigation district, over 50 projects have been implemented on private lands. These projects have positively affected more than 8,000 acres in the Willow Creek watershed. These restoration efforts are complemented by more than 10 years of water quality and project monitoring data to document the success of our work. While the accomplishments are substantial, there remains much more to be done.

IV. Describe the scope for further expansion of the innovation

The benefits of this project have been calculated according to known amounts associated with labor and equipment usage, energy consumption and typical farming practices in this area. Totals are approximated to the nearest reasonable figure. Once all irrigation laterals are piped that are able to provide gravity-pressurized water to users, the following will be accomplished:

Environmental Benefits Achieved:

- 400,000 lbs of CO₂ emissions eliminated annually.

- 36,000 lbs. of phosphorus annually prevented from leaving the field.
- 120,000 tons of annual soil loss will cease.
- 183.5 billion colonies of E.coli bacteria per acre prevented from leaving the fields as runoff.
- Virtually all evaporation and seepage eliminated.

Energy Conservation Realized:

- 2 to 3 million Kilowatt hours of electricity saved annually.
- 25,000 gallons of diesel fuel per year conserved.

Water Conservation Benefits:

- More than 12,000 acre feet (14.8 mcm) of irrigation water should be saved annually.

Economic Advantages Gained:

- 15 jobs potentially created.
- \$81,000 per year in fuel costs saved (this amount is rising rapidly).
- \$115,000 in electrical pumping costs saved annually (also rising).
- At least 23 Oregon businesses involved.
- \$1.8 million generated for the local economies of Ontario and Vale.

Ecological, community and economic outcomes are all being addressed through this project. The livelihood of the farmers and producers in the Willow Creek and Malheur basins depends on the health of the watershed. A large number of area businesses depend on purchases from and business dealings with local producers. With Malheur County being one of the poorest counties in Oregon, economic decline can spell disaster for many locally owned businesses.

This project directly provides much needed jobs and opportunities for local businesses. The balance of the construction phase of the project will last one to three years once funding is secured. In addition, yield increases due to more efficient sprinkler irrigation will increase revenues to producers, which in turn will help the local economies of Vale and Ontario. These benefits will last for the life of the project. Vale Oregon Irrigation District will hire additional personnel within the local area for jobs related to labor, equipment operation, engineering and other staff necessary to implement the project.

V. Describe the roles of the individual nominee

Jerry Erstrom has lived in the Vale area his entire life, but that's not to say he doesn't get out once in a while. His engaging personality and unique ability to find common ground with everyone he meets has given Jerry quite a reputation. Retired from the U.S. Bureau of Land Management, Jerry is very involved in the Malheur County Weed Board, Vector Control, Malheur Watershed Council, and Lower Willow Creek Working Group. He has served four years on the Oregon State Weed Board, and regularly travels to Washington DC to speak with Senators and Representatives about significant issues important to our high-desert region.

Jerry Erstrom believes that a strong agriculture-based economy and natural resource conservation can go hand in hand. In the Willow Creek basin alone Jerry has been instrumental in leveraging more than \$6.5 million in state and federal grant funds to assist local farmers and ranchers in implementing better management practices that protect our natural resources, conserve water and improve the water quality in our rivers and streams. Over many years, Jerry has spent countless hours on education and outreach, helping to create an impressively pro-active movement within the community. Without Jerry's efforts we would never have made the kind of progress being accomplished in the Willow Creek and Malheur basins today.