

Radio Telemetered Flow Monitoring and Canal Control Technologies

Accelerating adoption of canal modernization technologies by using hands-on demonstration sites

Bottom Line

Radio telemetered monitoring and control can be cost effective for irrigation districts.

Better, Faster, Cheaper

Irrigation districts can improve service while using staff and equipment resources more efficiently.

Principle Investigator

Tom Gill
tgill@usbr.gov
303-445-2201

R&D Office Contact

Miguel Rocha
Science and Technology Program
Coordinator
mrocha@usbr.gov
303-445-2841

Collaborators

Reclamation:

- Science and Technology Program
- Dakotas Area Office
- Nebraska-Kansas Area Office
- Yuma Area Office
- Oklahoma-Texas Area Office

Colorado Water Conservation Board

Problem

Integrating electronic control and communication technologies into an irrigation district's operations can enhance system performance and help use district's staff and equipment resources more efficiently. Irrigation districts typically operate under differing site-specific conditions and under a wide range of institutional requirements and constraints. Moreover, they often employ unique operational strategies that have evolved in response to unique characteristics of each district.

Therefore, a generic or "one-size-fits-all" approach to integrating electronic technologies into an irrigation district delivery system's operations may yield limited returns on resources invested. Reclamation researchers have encountered multiple cases in which an irrigation district's initial efforts at using electronic technologies have fallen short of expectations, and in some cases, the equipment has been abandoned. Factors contributing to project shortcomings include limited ability to customize system functions, excessive need for technical support to maintain the system, poor performance reliability of equipment, and—in some instances—high, recurring communication system costs.

Solution

This Science and Technology Program has partnered with Reclamation area offices and cooperating water districts to set up demonstration sites in areas that have had limited opportunity to implement canal modernization techniques. This provided prospective users with knowledge and experience with these technologies before decisions were made to purchase canal modernization equipment. It has also enabled Reclamation researchers to develop system components and operating functions that can significantly enhance the value a district may realize from the equipment.

Science and Technology Program funding has been leveraged by support from Reclamation's Dakota Area Office, Nebraska-Kansas Area Office, Oklahoma-Texas Area Office, and the Yuma Area Office. Additional cooperative support has included grant funding from the Colorado Water Conservation Board plus extensive in-kind services provided by cooperating irrigation districts. At each site, existing equipment has been used to the extent possible. Tasks such as motorizing existing gates were performed using tools and metal fabrication skills irrigation districts typically use for regular maintenance tasks. To the extent district personnel could be made available, they assisted with equipment installation. This served to provide districts with a degree of in-house familiarity with operation and maintenance of the equipment. In all projects, district management and/or staff have provided input on the functions they want the electronic system to perform.

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Applications

Demonstration sites have been established at Buford-Trenton Irrigation District in North Dakota; at Angostura Irrigation District in South Dakota; at Ainsworth, Twin Loups, and Bostwick Irrigation Districts in Nebraska; at the South Platte Ditch Company in Colorado; at Tom Green County Water Control and Improvement District in Texas; at the Unit B Irrigation and Drainage District; and at the Yuma County Water Users Association in Arizona.



In the photo at left, Buford-Trenton ditch-riders are installing a gate motor at the end of system spill site. In the bottom right photo, Nebraska Bostwick personnel are installing an overshot gate that was fabricated in the district's shop.



Workshops that focused on operation and maintenance tasks associated with equipment installed at the demonstration sites were held in Hot Springs, South Dakota, and in Red Cloud, Nebraska, in February 2009. Approximately 20 participants attended each workshop.

A paper on the Ainsworth and Twin Loups Projects was presented at the June 2009 U.S. Committee on Irrigation and Drainage (USCID) conference in Reno, Nevada. Papers on the South Platte Ditch and Nebraska Bostwick Projects were presented at the September 2010 USCID conference in Fort Collins, Colorado. These papers may be accessed at:

- http://www.usbr.gov/pmts/hydraulics_lab/pubs/PAP/PAP-0986.pdf
- http://www.usbr.gov/pmts/hydraulics_lab/pubs/PAP/PAP-1048.pdf
- http://www.usbr.gov/pmts/hydraulics_lab/pubs/PAP/PAP-1047.pdf

Future Plans

The Reclamation project team is currently working with the Nebraska-Kansas Area Office in planning a demonstration system at the Mirage Flats Irrigation District in Nebraska and with the Yuma Area Office in planning a demonstration system at Coachella Valley in California.

“The most important aspect of the workshop was to provide an exposure that was unavailable anywhere else .

Now our employees are wanting to make improvements faster than we can fund them.”
Mike Delka,
Nebraska Bostwick Irrigation District Manager

