

A close-up photograph of a pair of weathered, brown hands gently holding a small green seedling with soil. The background is a blurred blue sky. The text is overlaid on the image within a white rectangular border.

Evaluation of Opportunities for Irrigation System Improvements and Water Markets to Support San Juan River Basin Environmental Flows

Funded by the U.S. Bureau of Reclamation

DALE LYONS
DIRECTOR OF FRESHWATER PROGRAMS
NEW MEXICO CHAPTER

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ENGAGEMENT WITH SAN JUAN RIVER BASIN RECOVERY IMPLEMENTATION PROGRAM

- Since 2009, TNC staff have served on Recovery Program Coordination Committee and Biology Committee.
- TNC has led two phases of habitat restoration along the San Juan River, totaling of 7.12 miles of restored secondary channels and 67 acres of non-native vegetation removal.
- Since 2002, TNC's Colorado River Program staff plays an important role in Upper Colorado River Recovery Programs.



OBJECTIVE

Identify opportunities for irrigation system improvements and/or water markets to support San Juan Basin environmental flows for the benefit of endangered fish.

METHODS

- Literature Review
 - Irrigation System Improvements (Off-Farm)
 - Irrigation Efficiency (On-Farm)
 - Water Markets
- Case Studies
- Interview of NM Ditch Associations
- Project Recommendations and Funding Sources



HIGHLIGHTS OF LITERATURE REVIEW

OFF-FARM IRRIGATION EFFICIENCY

Significantly greater benefits accrue from a modernization program that successfully employs a combination of institutional and technical measures.

ON-FARM IRRIGATION EFFICIENCY

Increased net water use results from:

- Conserved water is used to bring additional acreage into production;
- Linear relationship between ET and crop yield; and
- More closely meeting ET requirements and extending growing season.

WATER MARKETS

In the presence of environmental flow requirements, water market solutions (temporary and permanent transfers) are more cost effective than irrigation efficiency measures.

CASE STUDIES

VERDE RIVER, AZ

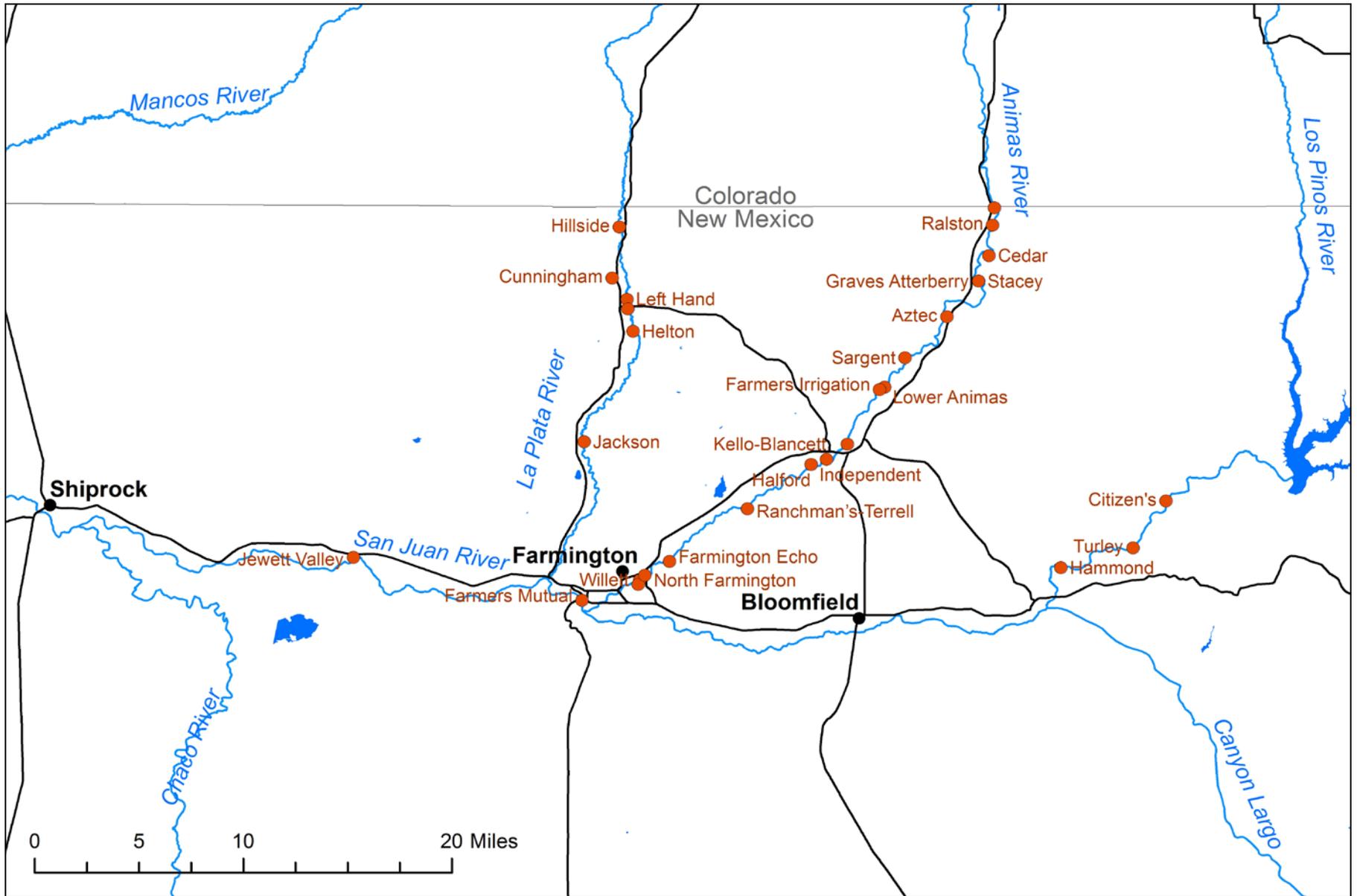
Irrigation system improvements: 1) flow measurement; 2) automation of diversion; 3) new automated check structures; 4) replacement of leaky turn-out gates; and 5) ditch lining. Result: doubling streamflow downstream of diversion during summer months.

GOVERNMENT HIGHLINE CANAL, CO

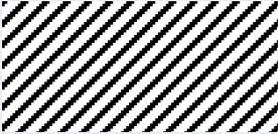
Integrated irrigation system improvements have allowed the canal to reduce diversion flow rates from 450-650 cfs to 150 cfs in the late season, while still achieving adequate head for water delivery. Since 1998, canal diversions reduced approximately 30,000 to 45,000 acre-feet per year

DESCHUTES RIVER BASIN, OR

The state overhauled its water laws and created procedures to give legal protections to instream flow, allowing a range of public, private, and nonprofit entities to engage in environmental flow restoration efforts through the use of market-based mechanisms. Increased annual streamflow by 27.3 cfs



NEW MEXICO DITCH ORGANIZATION INTERVIEWS

Animas River	La Plata River	San Juan River
Aztec Ditch		Bloomfield Irrigation District
Cedar Ditch		Hammond Conservancy District
Eledge Ditch		Jaquez Ditch
Farmer's Irrigation Ditch	Helton Ditch	Jewett Valley Ditch
Farmington-Echo Ditch	Highland Park Canal	
Graves-Atteberry Ditch	Hillside Irrigation District	
Halford Ditch	Jackson Ditch	San Juan River Diné Water Users, Inc.
Halford Ditch	La Plata Conservancy District	
Independent Ditch	La Plata Indian Ditch	
Kello-Blancett Ditch	Left Hand Ditch	
Lower Animas Community Ditch	McDermott Ditch	
North Farmington Ditch	Pioneer Ditch	
		
Stacy Ditch		
		
Wright-Leggett Ditch		
Farmers Mutual Ditch		

DITCH ORGANIZATION INTERVIEWS

DATA COLLECTION

- Total ditch length, length of concrete or piped sections (if any), number of irrigators, and number of irrigated acres;
- Method used to control river diversion flow rates;
- Distance between the diversion and (a) spillways and (b) first upstream irrigators;
- Amount of tailwater that normally returns to the river at the end of the ditch;
- Period of the year over which river diversion normally occurs; and
- Any previous or planned irrigation system improvement projects such as check dam installation, ditch lining or piping, diversion structure and/or spillway improvements, and lateral or farm turnout gate improvements.

HIGHLIGHTS OF DITCH ORGANIZATION INTERVIEWS

- Ditch organizations manually control diversions, using gates and spillways.
 - Automated/remote control better match diversion rate with ditch demand, maintain constant flow rate with changes in river stage, and also reducing operational input. Reduced diversions support environmental flow. Potential funding: NRCS RCPP & EQIP, NMISC Acequia Program, and USBR WaterSMART.
- Extent and condition of ditch lining varies across the basin, but almost all ditches have high priority areas that require lining/piping.
 - Lining would limit seepage losses and reduce operation and maintenance inputs. Reduced diversions would support environmental flows. Potential funding: USBR Salinity Control Program & WaterSMART, NRCS RCPP & EQIP, and NMISC Acequia Program.
- City of Bloomfield normally received water from BID in winter months, entailing seepage losses and miles of dewatered river.
 - City invested in direct diversion infrastructure for emergency backup; use of this infrastructure during winter would eliminate BID ditch seepage losses and prevent dewatering below BID diversion, thereby supporting environmental flows. Potential funding: EPA Drinking Water SRF and NM Water Trust Board.

HIGHLIGHTS OF DITCH ORGANIZATION INTERVIEWS

- Several ditches now flow through urban development, leaving many water right holder not utilizing full water right allocation.
 - Water market program could be used to purchase or lease underutilized water rights, transfer for instream use; thereby protecting water rights from non-use forfeiture, and reducing irrigation diversions to support environmental flows. Funding could come from SJRRIP, State and Federal programs, or private foundations.
- Representatives of the Basin's ditch associations and the San Juan Agricultural Water Users Association support a coordinated effort to identify, prioritize, and fund irrigation system improvement projects.
 - A basin-wide irrigation system assessment could identify and prioritize irrigation system improvements, so that project funding could be secured. Potential funding: San Juan Agricultural Water Users Association cost share with NRCS, NMISC, USBR.

Next Steps

- Quantify irrigation diversion reductions
 - Estimate reduced diversion and implementation costs; develop project ranking.
- Secure project funding
 - Apply for 2016 project funding (NRCS, USBR, NMISC, EPA, NM Water Trust Board, etc.).
- Project implementation
 - Coordinate with Basin agricultural partners (ditch associations and agencies) to implement projects in 2016.



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Contact

Dale Lyons
Director of Freshwater Programs
The Nature Conservancy
New Mexico Chapter
212 E. Marcy Street
Santa Fe, NM 87501
(505) 946-2027
dlyons@tnc.org
www.tnc.org



Collaborative Projects in Arizona and Colorado

NRCS Regional Conservation Partnership Program (RCPP) funded projects:

1. Verde River Flow and Habitat Restoration Initiative, Verde Valley, AZ.
 - ⦿ Improve irrigation water management and irrigation water delivery on 1,000 acres and enhance 6,000 acres of riparian habitat over 5 years.
 - ⦿ \$4.9 million requested through RCPP; partner contributions \$4.9 million (EQIP)
2. Modernizing Agricultural Water Management in the Lower Gunnison River Basin, Lower Gunnison Basin, CO.
 - ⦿ Improve water quality and quantity by improving water application methods and increasing off-farm water use efficiency over 5 years.
 - ⦿ \$20 million requested through RCPP; partner contributions \$47 million (EQIP and Watershed Protection and Flood Prevention Act).
 - ⦿ \$75,000 TNC contribution (\$50,000 in-kind [staff time], \$10,000 PepsiCo, \$15,000 Walton Family Foundation).
3. Dolores and San Miguel Watersheds, Dolores River Watershed, CO.
 - ⦿ Address the needs of native fish and individual producers through comprehensive, integrated river restoration, fish passage, conserved land, and on-farm improvements over 5 years.
 - ⦿ \$5.6 million requested through RCPP; partner contributions \$5.6 million (EQUIP and ACEP).

Future Projects in the San Juan Basin

TNC's Goal: Develop projects in the San Juan Basin that improve both irrigation efficiency and environmental flows conditions. Develop voluntary water market program that protects water rights and supports environmental flows conditions.

Potential Projects:

- ⦿ Diversion efficiency improvements
- ⦿ Conveyance efficiency improvements
- ⦿ Change in point of diversion
- ⦿ Diversion/irrigation scheduling
- ⦿ On-farm storage
- ⦿ Voluntary lease or purchase of underutilized water rights