

Stream Restoration through Agricultural Irrigation Improvements

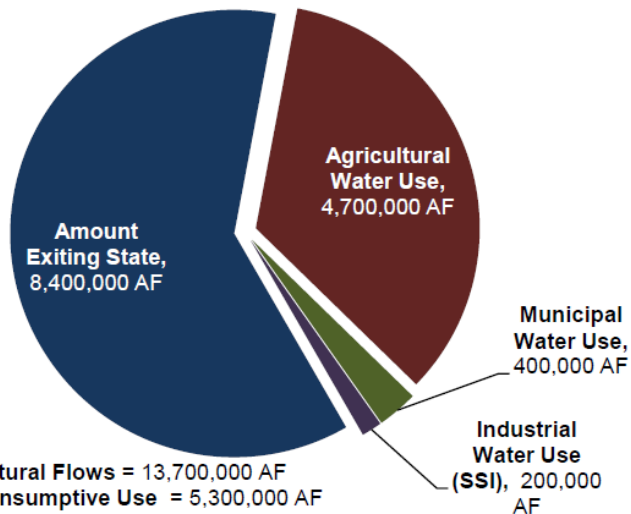
Cary Denison, Trout Unlimited



www.tu.org

‘.....as the mustard on your face’

Figure 5-1: Statewide Consumptive Water Use¹



- Ag water use accounts for 88% of States consumptive use (CU).SWP
- Most streams and rivers in the State are over appropriated.
- Demand for food and water will increase.

2nd Draft Colorado Water Plan

Because that's where the water is.

TOOLS IN THE TOOL BOX!




If you're going to engage know the facts



- ✍ The value of diverted water
- ✍ Beneficial use? Crop value, production costs
- ✍ Accessory Values in and out of River- community, social etc.
- ✍ The irrigation process
- ✍ What tool to apply where
- ✍ Value of ag and environment
- ✍ Crop data

Maybe put it together and use math



 <https://www.youtube.com/watch?v=GG4tQNZuBgl&feature=youtu.be>



Status quo- flood/open ditch
 Diversions: avg. 1.5 cfs, 120 days = 354 AF
 300 AF over crop demand
 Total system loss CU: ~26 AF

Pumped/hybrid
 Diversions: avg. 0.5 cfs, 45 days = 44.34
 9.6 AF **under** crop demand
 Total system loss CU: ~0.25 AF

Piped
 Diversions: avg. 1.2 cfs, 110 days = 260 AF
 206 AF over crop demand
 Total system loss CU: ~9AF

Conservation
 Diversions: avg. 0.5 cfs, 30 days = 30 AF
 14 AF **under** crop demand
 Total system loss CU: 0 AF

Ditch Scale Example

Castle Creek



Provided real time flow monitoring in creek and ditch



Replaced inefficient flood irrigation with sprinkler



[SatAlarm](#) wireless asset tracking technology

 AMCI WIRELESS
 13:50:47 9/21/2014
 WEB1 [Browser Info](#)
 Technical Support
 303-279-2002

Company Select

Acme Ditch

Search

Current Status

Alarming 0
Warning 0
OK 1
Offline 0

[View All](#) 1
[No Communication](#) 0

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AMCI Links

- Visit the AMCI corporate website
- Download AMCI documentation
- Customer Support Information

Site Name: Castle Creek & Acme Ditch Flows
Company Name: Acme Ditch **Current Site State: OK**

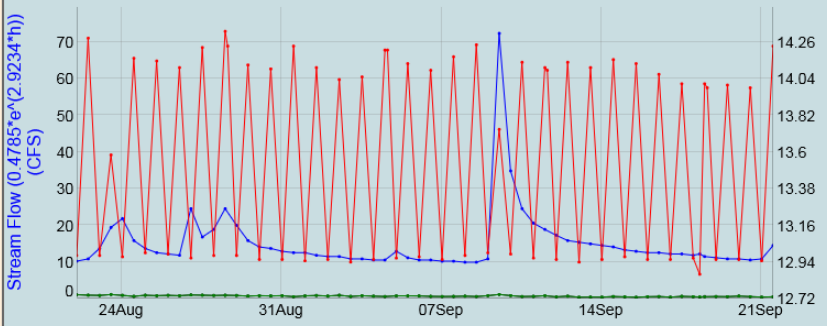
Component	Status	Value	Last Update
Stream Stage	NORMAL	1.16 feet	09/21/2014 13:38:00
Stream Flow (0.4785'e*(2.9234'h))	OK	14.48 CFS	09/21/2014 13:38:00
Flume Stage	OK	0.073 feet	09/21/2014 13:38:00
Flume Flow	OK	0.48 CFS	09/21/2014 13:38:00

[expand channel summary](#)

Site Summary

AMCI Serial Number: SMJ6801145	Terminal Serial Number: 01057067SKYCD14
Last Incoming Message: 9/21/2014 1:38:00 PM	Last Reported Location: City/State: Gunnison, CO County: Gunnison Co.
Last Position: LAT:38.769417 LON:-107.076767 Date: 7/11/2014 6:57:00 PM	Time Zone: Mountain Time

— Stream Flow (0.4785'e*(2.9234'h)) (CFS)
— power (volts)
— Flume Flow (CFS)
— Flume Flow (8-hour avg.) (CFS)



[Display Map](#)

100%

1:50 PM
9/21/2014

Landscape scale example



No-Chico Brush

A group of farmers, ranchers, water managers, and conservation organizations including Trout Unlimited and The Nature Conservancy who've partnered to address irrigation demands and impacts on water resources in the Gunnison Basin.

Lower Gunnison Basin- 145,000 acres including 66,000 served by the Uncompahgre Valley Water Users Association. Gunnison Basin efficiency nears 30%

Core Principles



- Balancing water supplies to meet multiple uses is critical to maintaining agriculture and community viability in the Gunnison Basin.
- NCB is a collaborative effort that harnesses the energy and resources of agriculture, conservation organizations, local business and government to achieve its goals.
- Improving water efficiency on and off farm can improve agricultural profitability while addressing other critical water needs, such as river health.
- NCB supports current efforts to improve water quality by reducing salinity and selenium and would like to build on those programs to maximize benefits to producers, address environmental needs, and meet the needs of other water users.
- NCB envisions a “Grand Design” for irrigation infrastructure that includes piping and lining of canals along with improvements to on-farm irrigation systems to optimize water use, reduce system losses, and maintain or improve stream flows.

What's happening?



- Partnering with CSU and local farmers to study on farm water budget, crop yield, and other outcomes by comparing drip and sprinkler irrigation to flood irrigation.
- Providing outreach and education about study findings for irrigators and water managers throughout the basin.
- NCB was critical to the designation of Critical Conservation Area to Colorado River
- By working with partners accessed \$8 million through NRCS RCPP program to irrigation infrastructure on and off farm
- Improving measurement on canals to identify system deficiencies and provide pre project information

Measurement/Monitoring



Remote Monitoring



14:59:02 6/11/2015

WEB1 [Browser Info](#)

Technical Support
303-279-2002

Company Select

Uncompahgre Valley Water

Search

Current Status

Alarming 0
Warning 0
OK 4
Offline 0

View All 4

No Communication 1

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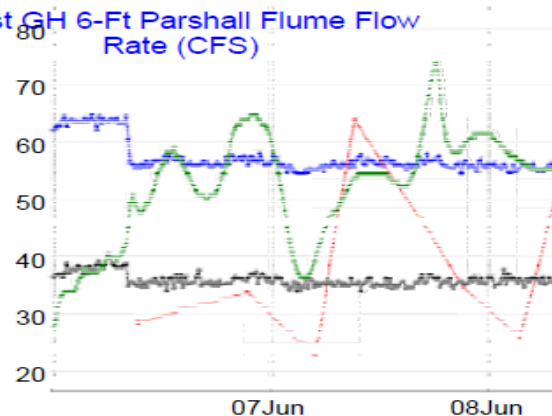
Site Name: East Canal
Company Name: Uncompahgre Valley Water Users Association

Most Recent Status Current Site State: OK

Component	Status	Value	Last Update	Graph?
West GH 6-Ft Parshall Flume Stage	OK	1.544 feet	06/11/2015 14:45:45	<input type="checkbox"/>
West GH 6-Ft Parshall Flume Flow Rate	OK	47.98 CFS	06/11/2015 14:45:45	<input type="checkbox"/>
East GK 6-Ft Parshall Flume Stage	OK	1.378 feet	06/11/2015 14:45:45	<input type="checkbox"/>
East GK 6-Ft Parshall Flume Flow Rate	OK	40.02 CFS	06/11/2015 14:45:45	<input type="checkbox"/>
Dragons Teeth 15-Ft Broad-Crested Weir Stage	OK	3.25 feet	06/11/2015 14:45:45	<input type="checkbox"/>
Dragons Teeth Adjusted Stage	OK	1.333 feet	06/11/2015 14:45:45	<input type="checkbox"/>
Dragons Teeth 15-Ft Broad-Crested Weir Flow Rate	OK	76.02 CFS	06/11/2015 14:45:45	<input type="checkbox"/>
solar charged battery voltage	OK	13.167 volts	06/11/2015 09:20:22	<input type="checkbox"/>

— West GH 6-Ft Parshall Flume Flow Rate (CFS)
— solar charged battery voltage (volts)
— East GK 6-Ft Parshall Flume Flow Rate (CFS)
— Dragons Teeth 15-Ft Broad-Crested Weir Flow Rate (CFS)

West GH 6-Ft Parshall Flume Flow Rate (CFS)



[Display Map](#)

Process



1. Identify benefits of water, in and out of river
2. Create realistic opportunities
3. Apply solutions that can positively affect streamflow long term

Long term flow restoration will require innovative approaches that involve collaboration between all water users.

The foundation of flow restoration through modernization of agricultural infrastructure will depend on understanding of where to apply the right tools.

Knowledge about agriculture including markets, water demands, crop types etc. is critical to implementing successful projects.

Incentivize change !!! (it apparently doesn't come naturally)



WHEW!

QUESTIONS?

And

Thank You

