Agricultural Improvements with Environmental Benefits – Things to Keep in Mind

Solutions that benefit both agricultural and the environmental/recreational needs exist. Many opportunities exist to improve irrigation and ranching operations that also have environmental/recreational benefits; refer to case studies of past projects and identify new opportunities with environmental partners.

A variety of environmental benefits should be considered. Certain stream reaches may be improved by increased flows and other reaches may see a greater benefit from improvements to water quality, floodplain connectivity, streambed geomorphology, and improvements to adjacent riparian areas. Recreational issues, including public access to fishing and trail systems, may also be considered.

Improvements are site-specific. Potential environmental/recreational issues are reach specific; therefore basin-wide assessments are not useful and often identify non-existent issues. Improvement projects also need to be site-specific. Both agricultural and environmental/recreational uses and needs must be understood to limit unintended consequences of improvements.

Stream/Watershed Management Planning is the current effort, other mechanisms exist. The Colorado Water Conservation Board funding was set up specifically to address environmental and recreational needs. They have been listening to the "lessons learned" from the few stream management plans that have been completed to date, and are taking the feedback to heart. The efforts are clearly evolving into "Integrated Management Plans", with the clear recognition that including solutions that support and improve existing agricultural and municipal consumptive uses is critical for the process. CWCB has other funding sources that can be used in conjunction with the Stream Management funding.

List of Example Projects with Agricultural and Environmental Benefits

Project	Agricultural Benefit	Environmental Benefit
Multi-purpose Storage (New/Enlarged/Rehabilitated)	Provides supplemental irrigation supplies	Releases benefit streamflow during low flow conditions
Diversion Structure Improvements (Headgate Automation, Reconfigure In-channel Diversion Dam)	Provides more control of irrigation supplies; reduces wasteway/tailwater operations; reduces annual maintenance	Keep more water in the river; improves fish and boat passage; may reduce flooding risks
Diversion Structure Inventory	Identifies and prioritizes structures in need of repair; provides alternatives; help to obtain funding for improvements	Prioritizes projects that provide environmental benefit
In-Ditch Improvements (Reconfigure Ditch Alignments, Lining)	Allows for better management of irrigation supplies; increased efficiency of diverted supplies	Reductions to “push”/carriage water to keep more water in the river reach; lining may improve water quality
On-Farm Irrigation Improvements (Flood to Sprinkler Conversion, Ditch Rehabilitation/Improvement)	More water to crops; less labor intensive; energy savings	Reduces erosion from return flows; reduces evaporative losses
Irrigation Management Improvements (Rotational Fallowing, Scheduling/ Monitoring)	Improved distribution of supplies to land; better field conditions and soil health	Reduces erosion from return flows; improve water quality
Riverbank Stabilization	Reduces erosion of land; reduces maintenance	Improves fish habitat; improves water quality
Grazing Improvements (Fencing)	Reduces erosion of land; reduces maintenance to structures	Improves water quality
Temporary Leasing Agreements	Economic benefits; operational flexibility	Keeps more water in the river during low flow periods

Case Studies[1]

Diversion and Bank Restoration for W-Mountain Ranch

This project is a partnership between Trout Unlimited, Gunnison County, Upper Gunnison River Water Conservancy District and the producers leasing the W-Mountain Ranch. Goals for this project are to improve riparian health, aquatic habitat, water quality, and to reduce erosion. This will be accomplished by:

- Replacing a problematic diversion that is creating channel instability, requires regular maintenance and is a barrier to trout
- Organize volunteer crews to plant willows and cottonwood on specific cut banks where highest levels of erosion are occurring.
- Installation of temporary fence and section of permanent fence to improve livestock grazing management on stream banks.

Improving the CCC Ditch Diversion Structure

In the forty years since the CCC Ditch diversion dam was built on the San Miguel River, a 1,500 foot stretch of river below the diversion dam would go dry when the San Miguel dropped below 150 cfs. A decade-long project broke ground in 2011 when the Colorado Water Trust, the Colorado Water Conservation Board, and other partner groups installed a fish ladder and a low flow channel at the CCC Ditch diversion dam. In most low flow periods, streamflow is concentrated into a smaller, but still flowing, river channel with drop pools, improving river connectivity and fish passage. The project also physically bolstered the CCC Ditch diversion dam and pushed water towards its headgate, improving its longevity and efficiency.

To meet the needs of the fish, recreationalists, and the ditch company, the Colorado Water Trust's contractor, FlyWater, designed a 200-foot long riffle that re-graded the San Miguel's channel downstream of the dam into a series of drop pools, bringing the downstream elevation of the river bed up near the height of the dam. This design shored up the diversion dam from erosion, eliminated a dangerous boating hydraulic, and provided a fish ladder to allow fast (trout) and slow (native) fish to migrate past the structure.

Improved Irrigation System for Deldorita Ranch

Trout Unlimited partnered with Deldorita Ranch and Upper Gunnison River District to purchase materials and construct 5 ditch check structures and 5 sluice gates to improve irrigation water

[1] Primarily collected from Improving Irrigation Water Uses for Agricultural and Environmental Benefits, A Getches-Wilkinson Center Working Paper, University of Colorado Boulder (http://scholar.law.colorado.edu/cgi/viewcontent.cgi?article=1181&context=books_reports_studies); supplemented with additional case studies found through other programs.

management and reduce fish entrainment in irrigation ditches on Cebolla Creek. The new check structures replaced existing rock and trash dams to allow irrigators to more effectively get water to areas that are difficult to irrigate and dry out areas that are permanently submerged. The sluice gates will be opened as the ditch headgate is shut down which will allow trout an opportunity to escape before the ditch is dried up.

Coats Brothers Ditch Temporary Instream Flow Lease

The Coats Brothers Ditch diverts water from the west side of Tomichi Creek to irrigate the Kruthaupt Ranch, which is located on Tomichi Creek near Gunnison. The Ditch is decreed for more than 19 cfs under 3 separate priorities with appropriation dates ranging from 1879 to 1887. The Kruthaupt family owns more than 3 cfs in the two senior-most priorities. In average and dry streamflow years, Tomichi Creek experiences localized dry ups, which affect river connectivity and present barriers to fish migration. Under this Temporary Instream Flow Lease (administratively approved for use in 3 out of 10 years, pursuant to § 37-83-105, C.R.S. (2015)), Trout Unlimited, the Colorado Water Trust, and the Colorado Water Conservation Board partnered with the Kruthaupt family to share use of the Coats Brothers Ditch for both irrigation and instream flow purposes. During years when the lease is implemented, the Kruthaupts will use the water rights for irrigation of hay meadows and pasture grass on the same land historically irrigated by those water rights. In July or August, the Kruthaupts will cease diversions, and the Colorado Water Conservation Board will use Coats Brothers Ditch water rights to protect up to 12.3 miles of instream flows in Tomichi Creek. In May 2015, the Division of Water Resources, Water Division 4, approved the Conservation Board's application for a temporary, short-term lease for more than 3 cfs in the Coats Brothers Ditch for instream flow.

McKinley Ditch and the Little Cimarron River – Permanent Water Sharing Agreement

The Little Cimarron River project is a pioneering attempt to permanently provide streamflow and ecological benefits for the Little Cimarron River while keeping agricultural lands in production. In January 2014, the Colorado Water Trust purchased 1.5 shares (5.89 cfs) in the McKinley Ditch, which diverts from the Little Cimarron River approximately 20 miles east of Montrose in the Gunnison Basin. The water rights historically irrigated almost 200 acres of pasture grass, producing one cutting and then grazing land. In partnership with Western Rivers Conservancy, the restoration project aims to keep water flowing through a 3-mile segment of what is often dry stream, restore flows to another 6 miles of stream, reconnecting habitat and allowing fish migration by adding flexibility of use to the senior water rights. The Colorado Water Trust and Colorado Water Conservation Board applied for water court approval in December 2014 to irrigate as historically done in the early irrigation season, and as streamflow drops, leave the historically used water in the Little Cimarron as a decreed instream flow. The timing of the switch between irrigation and instream flow in a given year will be determined by an agreement between the Colorado Water Trust, the landowner, and the Conservation Board.

Reducing Diversions and Spills in the Highline Canal

The Grand Valley Project, one of the nation's first Reclamation Projects, diverts water from the Colorado River upstream from the City of Grand Junction into the Highline Canal. The canal runs generally west for 55 miles on the north side of the Grand Valley and provides water to irrigate more than 30,000 acres of land. The project's water rights are relatively senior on the Colorado River and provide a full supply of water for irrigated lands. Interest in trying to improve late season flows through the 15 Mile Reach of the Colorado River above its junction with the Gunnison to benefit endangered fish prompted examination of ways to better manage the Grand Valley Project's water delivery system. The purpose was to reduce the level of operational spills along the length of the Highline Canal so that Project diversions could be reduced during the late summer and early fall. Improvements had already been made to portions of the Highline Canal and many of the laterals to reduce salt loadings carried to the river from Project lands. In this phase, Reclamation installed a series of check structures along the canal to better regulate the flows of water in relation to demands. The Colorado Water Conservation Board also participated in this project by providing funds to establish an endowment fund to pay for maintenance and repairs of the improvements made to the infrastructure improvements. The project enabled reduced diversions of from 30,000 to 45,000 acre-feet per year.

Colorado Agricultural Energy Efficiency Program

The Colorado Agricultural Energy Efficiency Program was launched statewide in the summer of 2015 as the Colorado Dairy and Irrigation Efficiency Program, building on the success of its 2014 pilot initiative. According to the Colorado Agricultural Energy Market Research Report, prepared for the Colorado Energy Office (CEO) in 2013, Colorado farmers spend more than $400 million annually on energy, equaling 7 percent of the industry's total expenses, with dairy and irrigation farming having the highest energy costs. CEO created the Colorado Agricultural Energy Efficiency Program as a partnership, approaching energy efficiency not only as a utility operations strategy but also as a way of improving the financial standing of Colorado agricultural producers. The program addresses barriers that prevent producers from investing in energy efficiency by bringing existing resources and partners together and leveraging new funding with a turnkey approach. Program participants receive a free energy audit, a preliminary renewable energy assessment, technical assistance, energy coaching, and support for financing and implementing projects.

Program Success to Date:

- 107 producers have been approved for the program.
- 29 producers are in the process of implementing projects and will leverage over $400,000 in U.S. Department of Agriculture (USDA) funds.
- CEO was selected for a $1.1 million USDA award to help finance energy efficiency improvements for Colorado farmers. The award comes through USDA's Natural Resources Conservation Service's (NRCS) Regional Conservation Partnership Program, and is matched through a $1.3 million contribution from CEO, the Colorado Department of Agriculture and utility and industry partners.

The 107 producers currently enrolled have identified over 2,900 MWh of potential electricity savings. The program will expand to 200 producers during the next two years and is expected to generate more than $4.5 million in potential savings in only five years. The program will help Colorado producers be more competitive by providing efficiency investments with substantial returns on the investments, thus reducing the operating costs for the participants. Over the next two program years, the efficiency improvements are expected to achieve over 5,250 MWh of electricity savings and 524,000 gallons of water savings annually, and will provide additional environmental benefits to Colorado's agricultural producers.

Supporting Stream Management Planning in Colorado (From River Network website)

In 2016, the State of Colorado adopted the Colorado Water Plan which sets forth a water management roadmap to achieve a productive economy, vibrant and sustainable cities, productive agriculture, a strong environment, and a robust recreation industry. Specific to protecting and enhancing stream flows, the plan calls for 80 percent of locally prioritized rivers to be covered by Stream Management Plans by 2030. This goal builds upon years of conversation, research and some action to build a methodology to develop data-driven water management and physical project recommendations capable of protecting or enhancing environmental and recreational values on streams and rivers.

A well-developed ological and other data to assess t oratively identified envir y and prioritize management a ns at a reach scale.

In 2017, the Sta ects and plans that protect or resto d local interest across Colorado

CWCB has engaged Nicole Seltzer at the River Network to assist with developing SMP – this is their summary on the planning effort.

It may not be appropriate to distribute to the general CAWA audience however – it doesn't mention agricultural at all.

A handful of communities have pioneered methodologies, including a collaborative coalition on the Crystal River through the Town of Carbondale, and the City of Ft. Collins' assessment of the Poudre River. However, to meet the goal in Colorado's Water Plan of covering 80 percent of locally prioritized streams with plans, much more needs to be done.

River-related recreation on Colorado's western slope currently accounts for $6.4 billion in annual direct expenditures, and in the six counties that make up the headwaters of the Colorado River and its tributaries, tourism—including fishing and rafting—is the main economic driver. Many communities in the state have an economic interest in maintaining healthy rivers but few have developed strategies to comprehensively protect streamflows.

To address this gap, River Network, with support from the Colorado Water Conservation Board, the Gates Family Foundation and the Nature Conservancy, has launched a two-year project to enlarge the pipeline of local coalitions that are interested, ready and capable of undertaking stream management plans.

The project focuses on three areas:

- education to a broad constituency on what a stream management plan is, how and why communities undertake them and what lessons they've learned;
- fostering cooperation among Colorado's water management, NGO, academic, and research and science communities to help meet the capacity and knowledge needs of local coalitions as they initiate stream management planning;
- and direct support to local coalitions as they scope, write and fundraise for their plan.