

SHARING WATER TO SAVE THE FARM:

A Guide to Agricultural-Municipal Water Sharing for Colorado's Land Conservation Community

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Jack Nicholson's character stumbles upon buy and dry in the movie Chinatown

INTRODUCTION

The authors have directed this guide primarily to the land conservation community in Colorado – land trusts, local government open space programs, and the appraisers, attorneys, and other experts who frequently work on private land conservation. However, this guide may also be helpful to landowners, and to those in the water community who may be interested in the role land conservation can play in their planning.

The Colorado land conservation community has, out of necessity, developed a level of expertise and savvy about water rights. Early conservation easements in Colorado often referenced water rights generally as being encumbered by the conservation easement but usually didn't reference the specific water rights or explicitly set forth what that encumbrance meant, or didn't reference water rights at all. Project staff did not necessarily conduct any due diligence to determine the conservation need, historical use or ownership of water rights. As water attorneys became more familiar with conservation easements and organizations like the Colorado Water Trust stepped up to offer water expertise in land conservation transactions, the conservation community largely shifted its approach to encumber all water rights on a property and often developed narrow language perpetually limiting those water rights to historic use on the property.

When water rights are encumbered in a conservation easement, there is a recognition that they contribute to particular conservation values on that property. Generally, this means that those water rights are now legally restricted to their historical use in perpetuity. Practically speaking, if water rights have historically been used for irrigation, this means that the current and future owners' use of the water is limited to continued irrigation of the property. There are, however, emerging issues for both existing and future conservation easements that call into question the practice of encumbering all water rights associated with a property and forever limiting these rights to their historical use.

As easements age, ownership changes, and land trusts encounter a variety of situations in stewarding easements, there may be situations in which it becomes impractical, unnecessary, or undesirable to keep all water rights tied to a specific parcel of land in their historical use. For example, a situation recently arose in which a Colorado irrigator wished to enter into a short-term lease with the Colorado Water Conservation Board to augment instream flows for environmental use but was prevented from doing so by the language of the conservation easement on the property, which prohibited leasing. A conservation easement holder may also face a situation in which a landowner has ceased irrigating because the costs of repairing or maintaining infrastructure are so prohibitive relative to the amount of water that can be applied that irrigation is no longer viable. Another scenario may arise in which increased irrigation efficiencies are realized, allowing conservation values to be maintained with less water. In each of these situations, the easement holder may wish to have the option to at least evaluate the impacts of reduced irrigation on the conservation values and desire the flexibility to consider alternatives to requiring irrigation as historically practiced, particularly where a change would provide a public benefit.

The publication *Land Trusts and Water*, released by the Land Trust Alliance in 2014, touches upon different scenarios in which land trusts may desire to 1) prohibit change of use of water rights, 2) allow for a change, subject to certain parameters, or 3) require a change of water right. Scenarios two and three contemplate change of use to instream flow or other uses that are consistent with the conservation purposes of the easement. Instream flow seems to be an acceptable realm of flexibility for the land trust community to experiment within because of its support of ecosystem function and species that may be in jeopardy. This handbook also considers that the land conservation community should consider the same flexibility for projects that may provide municipal or industrial water use. While the authors do not explore this subject, land

trusts and local governments may also want to consider flexibility for leasing between agricultural users.

Colorado's Water Plan (2016) underscores the reality that in order for the state to meet projected growth demand for municipal water, the most likely source of the majority of that supply will come from existing irrigated agriculture in eastern Colorado. For example, the Colorado Water Conservation Board estimates that the South Platte River basin could lose nearly 50% of its 830,000 acres of irrigated acreage by 2050 if recent practices of drying up irrigated land to meet municipal water supply demands continue. Water transfers that permanently remove water from agriculture (commonly known as "buy and dry") have been most prevalent in the South Platte and Arkansas River basins to supply municipal demands on the Front Range. The first large-scale instances of buy-and-dry occurred in South Park in the 1920s, when Denver Water purchased most of the irrigation water rights for its customers. The Cities of Colorado Springs, Pueblo and Aurora began purchasing senior irrigation rights in the 1950s, although public knowledge and concern with buy-and-dry did not arise until the Cities bought a majority interest in the Colorado Canal around Otero and Sugar City in the Lower Arkansas River Valley and dried up nearly 50,000 acres. When the City of Thornton similarly bought over 100 farms served by the Water Supply and Storage Company along the Cache la Poudre in the 1990s, buy-and-dry became an issue in the South Platte. While these events provided a wake-up call regarding municipal strategies to meet growing population water supply demands, widespread public concern beyond the affected rural communities about the long-term effects on the future of Colorado developed slowly until the turn of the century. Colorado's Water Plan includes the diagram at right showing anticipated loss of irrigated acreage by river basin by the year 2050 (diagram 6-1, Section 6.2: Meeting Colorado's Water Gaps).

This scale of loss of irrigated farmland not only has the potential to radically shift rural economies and communities, but it drastically impacts many of the conservation values that many are working to protect.

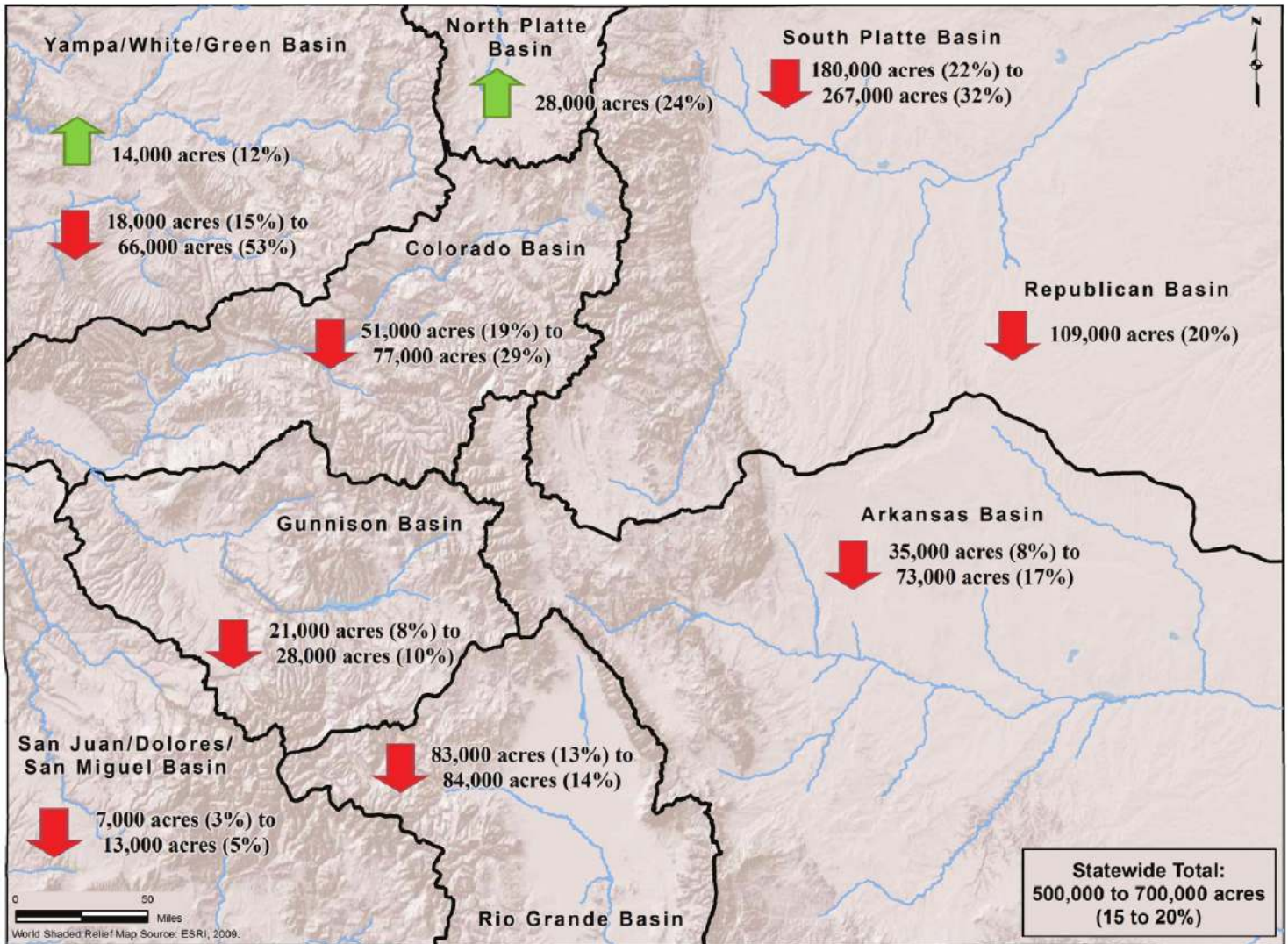
Well managed, working agricultural lands also contribute to watershed health, and conservation of these private lands and their associated water rights is critical to the maintenance of many native species of Colorado wildlife. Working agricultural lands also help maintain the open spaces and scenic vistas that Coloradans (and tourists) know and love.

Alternative transfer mechanisms (ATMs) have been touted as a solution to keep productive lands in irrigated agriculture. Examples of ATM projects include interruptible supply agreements and lease fallowing. However, some municipal providers contend that leasing water rights does not provide adequate certainty and they may worry that for valuable senior water rights, competing municipalities may purchase the water right at a higher price before the expiration of their lease, leaving them high and dry. Conservation easements coupled with perpetual municipal leases, however, may provide the permanence and enforceability necessary to give all parties comfort that the water rights can never be permanently severed from the property, while the municipal leasing structure remains in place.

The authors of this handbook believe that a permanent, if not full, supply of irrigation water for productive agriculture is more beneficial to conservation than the large-scale complete dry-up of irrigated lands that is the anticipated outcome of the status quo. Consequently, the authors believe it is in the interest of the land conservation community to support ATMs as an alternative to buy-and-dry. This handbook explores the questions, challenges, and opportunities that may arise when trying to couple existing and future conservation easements with ATM projects.

FIGURE 6.2-1**POTENTIAL CHANGES IN IRRIGATED ACRES BY 2050⁷⁴**

(↑ = increase in irrigated acres; ↓ = decrease in irrigated acres)





BACKGROUND: DEVELOPING CONTEXT FOR ALTERNATIVE TRANSFER MECHANISMS

Why Buy and Dry?

Colorado's water belongs to the people of Colorado pursuant to the State's Constitution. Colorado water law, however, establishes a system of private property rights that govern the beneficial use of this public resource. These "water rights" can be bought and sold and are transferable. The quantity of a water right (and the portion that can actually be transferred) is based on historical use, such as the irrigation of land. As a result, people seeking water rights for new or different uses, such as to meet municipal growth, have historically purchased the land associated with the water rights. If the new owner wants to move the water to use it for a different purpose, in most cases, the user will have to adjudicate that change in the appropriate water court (there are seven; one for each major river basin), which have jurisdiction over the public's water resources, including changes to the type or place of use of existing water rights, such as from irrigation to municipal. In most cases, in order to change a water right, the applicant must demonstrate that the change will not result in injury to other water rights holders. Depending on the river basin and the type of water right or change requested, it may take years and significant financial resources to successfully adjudicate a change of use of a water right. The level of investment required to change a water right accordingly creates a strong incentive for

full ownership and control of that right.

Water providers strongly prefer to own the water rights they use to supply their customers to provide certainty and exclusive control. Municipalities turn to agricultural water rights as an affordable, reliable source of water, and purchase them from willing sellers in the absence of alternative sources of additional supply. In a 2011 Denver Post article¹, Rod Kuharich, then director of the South Metro Water Supply Authority, representing fifteen groundwater-dependent Denver suburbs was quoted as saying, "If the farmers own it, and you have to rely on getting the water from farmers, what security do you have?" In the face of unprecedented growth projections in Colorado, water providers must work to develop water portfolios that meet the demand of current and future residents. However, the concept of joint interest in the water rights is gaining interest by municipalities. For instance, the City and County of Broomfield and Larimer County (which owns a farm with associated water) entered into a perpetual agreement for water supply within the last year. The city of Aurora has also been exploring the concept of co-owning farms coupled with water sharing agreements to provide them with the desired ownership of the water rights.

¹ <http://www.denverpost.com/2011/03/11/colorado-farmland-goes-dry-as-suburbs-secure-water-supplies/>

Understanding Municipal Needs and Constraints

Not all municipal needs are the same. Colorado's communities are diverse in their geography, economies and cultures and societal values. Our state has cities with high density urban environments, suburbs, exurbs, rural towns and mountain resort communities with each community having specific water needs and water supply portfolios to meet their current and future water needs. Each community has a unique mix of land uses and associated water demands including those for commercial, residential, environmental, recreational, and industrial purposes. Typically, municipal water providers have three overarching types of water rights needs – base supply, drought supply, and insurance supply. Base supply is the water needed to meet a variety of demands (e.g. commercial and residential) on a daily basis so that when someone turns on a tap, water flows out. The second type of need is drought or post-

1 acre-foot of water (the amount of water that would cover a football field, 1 foot deep) is estimated to supply 1-2 households for 1 year

drought recovery water, which is only needed in the year of or years following a drought to replenish storage to prepare for the next drought. Insurance or redundancy water may be sought by a municipality to increase the reliability of a system and insure against unknown circumstances, such as those posed by climate change and identified in the table below in the Colorado's Water Plan. Thus, water providers must continually assess their current supplies and the risk that they may not be sufficient to meet future demands.

SUMMARY OF PROJECTED CLIMATE CHANGES AND POTENTIAL EFFECTS ON COLORADO'S WATER RESOURCES (Table 4-1 in Colorado's Water Plan)

ELEMENT	PROJECTED CHANGES AND POTENTIAL EFFECTS	STUDIES THAT HAVE ASSESSED THIS VULNERABILITY FOR COLORADO
Overall Surface-Water Supply	Most projections of future hydrology for Colorado's river basins show decreasing annual runoff and less overall water supply, but some projections show increasing runoff. Warming temperatures could continue the recent trend toward earlier peak runoff and lower late-summer flows.	Colorado Water Conservation Board (CWCB) (2012); Bureau of Reclamation (BOR) (2012); Woodbury et al. (2012)
Water Infrastructure Operations	Changes in the snowpack and in streamflow timing could affect reservoir operations, including flood control and storage. Changes in the timing and magnitude of runoff could affect the functioning of diversion, storage, and conveyance structures.	CWCB (2012); BOR (2012)
Crop Water Demand, Outdoor Urban Watering	Warming temperatures could increase the loss of water from plants and soil, lengthen growing seasons, and increase overall water demand.	CWCB (2012); BOR (2012)
Legal Water Systems	Earlier and/or lower runoff could complicate administration of water rights and interstate water compacts, and could affect which rights-holders receive water.	CWCB (2012)
Water Quality	Warmer water temperatures could cause many indicators of water quality to decline. Lower streamflows could lead to increasing concentrations of pollutants.	Environmental Protection Agency (EPA) (2013)
Groundwater Resources	Groundwater demand for agricultural use could increase with warmer temperatures. Changes in precipitation could affect groundwater recharge rates.	
Energy Demand and Operations Costs	Warmer temperatures could place higher demands on hydropower facilities for peaking power in summer. Warmer lake and stream temperatures, and earlier runoff, could affect water use for cooling-power plants and in other industries.	Mackenick et al. (2012)
Forest Disturbances in Headwaters Region	Warmer temperatures could increase the frequency and severity of wildfire, and make trees more vulnerable to insect infestation. Both have implications for water quality and watershed health.	
Riparian Habitats and Fisheries	Warmer stream temperatures could have direct and indirect effects on aquatic ecosystems, including the spread of non-native species and diseases to higher elevations. Changes in streamflow timing could also affect riparian ecosystems.	Rieman and Isaak (2010)
Water- and Snow-based Recreation	Earlier streamflow timing could affect rafting and fishing. Changes in reservoir storage could affect recreation on-site and downstream. Declining snowpacks could affect winter mountain recreation and tourism.	BOR (2012); Battaglin et al. (2011); Lazar and Williams (2008)

Our state's water supply consists of both surface water (83%) and groundwater sources (17%). How much of this water is available for use of any kind depends on variables including geography, weather, and laws and regulations. For any given municipality, water supply may consist of groundwater, appropriated direct flow rights to surface water, and/or storage of surface water rights. They may also include trans-basin water which can be reused to extinction and transferred agricultural water, whose use is based on the specific water court decision related to its historical use. Moreover, every municipal water system has unique existing and planned infrastructure to deliver water to its system, related to its sources of supply.

For example, most of the municipalities in northern Colorado hold shares in nearby agricultural ditch companies associated with urbanized land. Available irrigated agricultural lands, however, are located downstream of Denver-metro cities, so that cities must either develop and adjudicate complex exchanges of water rights upstream, or pump water long distances uphill to deliver it to their water systems. For instance, the City of Castle Rock recently purchased an irrigated farm in Eastern Weld County, 80 miles away as the crow flies.

There is, however, the potential for cooperative agreements between water providers to share existing or planned infrastructure. For instance, the Water Infrastructure and Supply Efficiency (WISE) Partnership is a regional water supply project between Aurora Water, Denver Water and South Metro Water Supply Authority where the parties agree to share available water supplies and infrastructure capacity.

Colorado's West Slope contains 70 percent of the state's surface water, while the Eastern Slope consumes 70 percent of the state's water. The Colorado-Big Thompson project ((C-BT) collects and delivers on average more than 200,000 acre-feet of water each year. Most of this water is the result of melting snow in the upper Colorado River basin west of the Continental Divide. The project transports the water to the East Slope via a 13.1-mile tunnel beneath Rocky Mountain National Park. C-BT water flows to more than 640,000 acres of irrigated farm and ranch land and 925,000 people in portions of eight counties. In addition to the delivery tunnel, the project infrastructure includes 12 reservoirs,

35 miles of tunnels, and 95 miles of canals.

Most of the municipalities in northern Colorado hold shares of C-BT water, which is administered by Northern Colorado Water Conservancy District (Northern Water). C-BT water is particularly valuable to municipalities because of the extensive Project infrastructure that facilitates delivery throughout Northeastern Colorado. Project storage increases its reliability, and a change in type or place of use does not have to go through the water court process, unlike native ditch water rights.



It may feel like to stretch to land conservation staff to try to understand the portfolio of a municipality—its existing rights, needs, and current and planned infrastructure; however, such an understanding allows perspective as to what degree of flexibility and creativity might be possible, and may be gleaned through increased conversation with municipal staff members. Municipalities located near (or with existing delivery infrastructure near) the irrigated agricultural lands are in a better position to incorporate irrigation water into their systems. For instance, communities such as Greeley, Loveland and Windsor with farmland in close proximity would have an easier task of delivering the alternative transfer water than Metro Denver communities would. Water quality is another factor in the municipal decision-making process.

What are ATMs, and How do They Work?

ATM is short for alternative transfer mechanism and is often used as an umbrella term for any method of using agricultural water to supply water for non-agricultural uses. The word “alternative” in the name suggests an alternative to the practice of buy and dry to meet non-agricultural needs, but increasingly suggests an alternative to the status quo of single beneficial use for a water right, which could include transfers or sharing between agricultural users as well as municipal, environmental, or recreational transfer or sharing. While this handbook occasionally discusses multiple types of uses, the focus of this handbook is on ATMs related to municipal and industrial (M&I) uses. Proponents of ATMs believe that ATMs create the possibility of supplying water for M&I uses without permanently transferring agricultural water rights from the ranch or the farm and foster sustainable agriculture by supplementing farm/ranch income. The focus of the authors on M&I water sharing is not intended to imply that there is not a market for agriculture to agriculture sharing or for environmental uses (such as the Colorado Water Conservation Board’s short-term instream flow lease program, facilitated by the Colorado Water Trust), but rather in recognition that the municipal water supply gap is the primary threat to the preservation of

irrigated agriculture.

There are two main legal mechanisms available to those seeking to use ATMs: administrative approval or the water court process of seeking a change of use to a decree. Some types of ATMs require administrative approval to share water between an agricultural/irrigation water right owner and another user, either directly or through a third party. This approval is usually sought from the State Engineer, or in some instances the Colorado Water Conservation Board, to manage the irrigation use and to supply water for another use pursuant to the agreement, such as temporarily fallowing irrigated land.

ATMs can also utilize the water court process to allow for a permanent water sharing arrangement that is not currently available under administrative approvals. The idea is to change the use of a senior irrigation right to include additional uses such as municipal or instream flow. The goal of this approach is to allow part of the senior right to be used by municipal water providers through contractual arrangements. Through these contracts, joint use of a water right is established, allowing for both the municipality and the irrigator to rely on part of the water right.

Types of ATMs

As noted previously, ATM is an umbrella term encompassing a broad idea, rather than a specific mechanism. Several variations of alternative water transfer methods have been implemented, attempted, and discussed in Colorado to supply consumptive uses. We have chosen to group methods into the agricultural practices that may be used to make water available and the legal mechanisms that can facilitate ATM projects. The feasibility of both the legal mechanism and agricultural practice must take into account the needs and logistics of both users. For example, it may be more feasible to do rotational fallowing on grain crops whereas split season may be the only feasible option for alfalfa producers because of the reduced yield and recovery time following a fully dry season (see Appendix A for Fallowing Impacts to Yield and Recovery).

Agricultural practices:

- Rotational fallowing
- Deficit irrigation
- Crop change
- Split season irrigation
- Irrigation efficiency improvements*

Rotational fallowing may be practiced on a farm scale or on a system scale, such as by different farms on the same irrigation ditch (or multiple ditches, as discussed later in the case study of the Super Ditch). Rotational fallowing may allow a farm to continue agricultural production every year, but with the systematic fallowing of a portion of the historically irrigated land each year. Colorado’s Water Plan notes that this method may provide base supply, drought supply, or drought recovery supply for a municipality.

Deficit Irrigation is practiced on a farm or ranch scale and involves the irrigator applying less water to a crop than the crop needs for optimal growth. Research conducted on USDA's Agriculture Research Service test plots near Greeley showed that a 50% reduction in water applied may still produce 75% of corn yield, if applied during the drought-sensitive stage of the crop. http://www.journal-advocate.com/sterling-local_news/ci_30637827/deficit-irrigation-still-worth-look

Crop Change involves a switch from a crop that requires significant water consumption to one that requires less. For example, in the Fort Lupton area, the seasonal water use of alfalfa is 43.5 inches per season (consumptive use) while grain corn uses only 25.9 inches of water (Seasonal Water Needs and Opportunities for Limited Irrigation for Colorado Crops, CSU Extension, J. Schneekloth and A. Andales, Fact Sheet No. 4.718, February 2017).

Split season is achieved by the irrigation of the full water right for part of the season and another use of the water during the remainder of the season to supplement late season flows, or visa versa to enhance spring flushing flows. Typically, historical irrigation occurs early in the season when water supplies are more plentiful, and another use in the latter part of the season when junior rights are out-of-priority. This can be financially attractive on hay crops where the first and second cuttings tend to be more valuable than the later-season cuttings.

Example: Little Cimarron

The Colorado Water Trust purchased water rights on a ditch in the Gunnison Basin to help restore late summer flows to the Little Cimarron River. One of the goals of the project was to keep land in agriculture while keeping water in the river at a key time. In order to do this, the Water Trust and Colorado Water Conservation Board filed for a change of water right to a split-season right to be able to use the water in spring and early summer for irrigation and for instream flow use in late summer and early fall.

***Irrigation Efficiency Improvements** involve a change in irrigation infrastructure that increases the efficiency of water delivery and application, such as that from center pivot to drip irrigation. However, because irrigation efficiency improvements can deliver water exactly as needed to crops, it can increase yield, therefore increasing crop consumptive use per amount of water diverted. Even if total consumptive use has not changed, and less water is being diverted, the increase in crop consumptive use means that the decrease in diversion hasn't created legally transferable water (though it may have benefited stream flow). In some other states, irrigation efficiency improvements can create (transferable) water for new consumptive uses, although not in Colorado.

Legal Mechanisms to Facilitate ATMs

- Water court adjudication of changes and plans of augmentation
- Water Banking
- Lease-fallow Agreements
- Rotational Crop Management Contracts
- Flex water rights
- Substitute Water Supply Plans
- Interruptible Water Supply Agreements

The water court has adjudicated several changes of irrigation water rights and plans of augmentation that allow industrial and municipal users to use irrigation rights for other purposes, while continuing agricultural irrigation and production in most years.

Example: Lease between Xcel Energy and Fort Morgan Reservoir and Irrigation Company

The two parties entered into a 40 year lease agreement under which Fort Morgan delivers 2,500 acre-feet of consumptive use water to Xcel Energy's Pawnee Generation Station in exchange for an annual fee (designed to keep pace with inflation), that is then distributed to participating farmers. The ditch runs adjacent to the Pawnee station, which facilitates easy direct delivery. The fact that Fort Morgan has both direct flow and storage rights ensures delivery, even in drought years. Fort Morgan changed the use of its water rights in water court to enable agricultural or industrial use.

Water banks were enabled by the Colorado legislature in 2003, with the general concept that an irrigator may forgo the use of his or her water and “bank” that water, which would then be available for sale and use by other users. Rather than detailing the structure of water banks, the General Assembly granted the State Engineer the authority to promulgate governing rules that a water court must approve. According to the Water Bank Rules, stored water could not be used for instream flows (except by the Colorado Water Conservation Board) or

Example: The Grand Valley Water Bank Pilot Project*

*It should be noted that this is an example of how a water bank can function, but is not an application of Colorado’s water bank legislation, which is unused to date.

The Nature Conservancy is in its first year of working with the Grand Valley Water Users’ Association (GVWUA) on the Grand Valley Water Bank Pilot Project. Through the project, GVWUA will contract with 10 participating shareholders and implement four different water savings practices on approximately 1,250 acres. These practices include a full season of fallowing and three options for partial-season fallowing with irrigation water available after August 1, September 1, and October 1. Each practice has an associated estimate of reduced consumptive use and corresponding payment. Payments will go to both the participating farmer as well as to GVWUA for infrastructure upgrades. The total consumptive water savings for the 2017 participating acres is approximately 3,200 acre-feet. GVWUA will monitor contract compliance, account for and manage the conserved water savings within its system, and deliver this water to a section of the river that is critical habitat for four endangered fish species in the Colorado River. From there, the water will then make its way downstream to support reservoir levels in Lake Powell.

exports out of state and use of the bank must comply with all state and federal laws. Furthermore, the rules required any potential depositor to pay an application fee and provide information including, among other things, proof that depositing the water would not result in an expansion of water use and an engineering report estimating historical consumptive use. If the Water Bank deemed the water eligible, the depositor and Water Bank entered a deposit agreement that included the minimum price the depositor would accept for their water, a provision stating that the Water Bank had the exclusive right to lease the water, and a provision stating that the depositor could withdraw their water at any time. Subsequently, the Water Bank would list the water on its website for bids, and the depositor was required to accept any in-basin bids meeting the minimum price within the first ten business days.¹

Lease-fallow agreements have been authorized through the Agricultural to Municipal Leasing-Fallowing Pilot Program created in 2013. While lease-fallow agreements have existed for some time, the 2013 pilot program allows agreements to be put into place with administrative approval, rather than requiring a water court process. Agreements could be structured between irrigators and municipalities, in which irrigators forgo watering parcels of land and lease the water temporarily to cities. This program was extended in 2015 to include environmental, industrial, and recreational uses, and not just municipal uses and was authorized through the end of 2023. Through the pilot program, the Colorado Water Conservation Board may approve up to fifteen pilot projects lasting ten years, with no more than five in any major river basin. One goal of the program is to encourage cooperation among water owners such as irrigators, ditch companies, and cities. A key aspect of the pilot program is to evaluate the feasibility of delivering temporary water to municipalities through a streamlined approach for determining historical consumptive use and injury. Additionally, the legislation requires projects to meet local land use regulations, prevent erosion, and comply with noxious weed requirements, which help mitigate the potential negative effects of fallowing land.²

¹ CRS 37-80.5-101 et seq.

² CRS § 37-60-115(8)

Example:

The Super Ditch and the Catlin Pilot Project

The Catlin Pilot Project, a lease-fallow program of the Super Ditch and the Lower Arkansas Valley Water Conservancy District, has been used successfully in the Arkansas River Basin to supply municipal water demands to the City of Fountain, Security Water District and Town of Fowler since 2015. The 10-year project involves the rotational fallowing of approximately 1,200 acres of irrigated land to generate up to 500 acre-feet of water available for lease to the three municipal participants, although Fountain, Security and Fowler may expand their leases up to 2,000, 500, and 250 acre-feet per year respectively. Seventy percent of each farm (including one under conservation easement with the Lower Arkansas Water Conservancy District) remains irrigated, making it a sustainable alternative to the previous “buy and dry” policies. Other contemplated pilots include the City of Colorado Springs and the U.S. Forest Service’s Lake Isabel recreation area.

The Super Ditch

In the Lower Arkansas Basin, there are approximately 20 major mutual irrigation ditch systems. The Super Ditch, however, is not a real ditch. Rather, it’s a corporation—the Lower Arkansas Valley Super Ditch Company, Inc., which represents seven ditch companies operating eight ditches between the Pueblo Reservoir and the John Martin Reservoir. Supplies from different farmers are pooled by the Super Ditch, and provided to cities under long-term lease contracts..

Rotational Crop Management Contracts (RCMCs) are a statutorily specified mechanism that water owners may implement to change the use of water. The Colorado General Assembly authorized these contracts in 2006. Under an RCMC, owners of irrigation water rights may transfer the water to another use and rotate the lands that they fallow. This method avoids the permanent dry-up of agricultural lands by allowing the water owner to only fallow certain parcels at a time. Although authorized by the legislature, RCMCs must go through a water court proceeding. According to the Colorado Division of Water Resources, RCMCs have never been used since the passing of enabling legislation.³

Flex Water Rights are a concept which would allow for the change of use of a senior irrigation right to include multiple end uses. The idea was passed in a limited form through legislation that authorized water court applications for changes in use of absolute decreed irrigation water rights, in order to facilitate loans, leases, or trades within Water Divisions No. 1 (South Platte River Basin) and No. 2 (Arkansas River Basin). These new water court decrees for “agricultural water protection water rights” allow up to fifty percent of the quantified historical consumptive use portion of the irrigation right to be delivered to other types of beneficial use at other decreed locations within the specified water division, but cannot be transferred out of the water division. The balance of the consumptive use water must continue to serve the property for which the irrigation rights were historically decreed, or another property served by the same ditch system. The owner of these water rights are required to participate in a federal, state, local government, or non-profit conservation easement program that conserves land historically conserved by the water right, or other conservation program that meets criteria and guidelines established by the Colorado Water Conservation Board. The legislation required the Colorado Water Conservation Board to develop criteria and guidelines for the program and the State Engineer to promulgate rules for the substitute supply plans. Agricultural Water Protection Water Rights were created through House Bill 16-1228.

*Substitute Water Supply Plans and Interruptible Water Supply Agreements*⁴ are both legal mechanisms that emerged after the 2002 drought in order to grant the State Engineer authority to approve temporary changes to water rights. Although temporary, both of these mechanisms allow for contractual agreements between water rights holders and non-agricultural users.

Substitute Water Supply Plans (SWSPs) may allow new or different uses of water rights while change-of-use applications are pending in water court, as long as such use does not injure other water rights. SWSPs were first used as an interim approval method for augmentation plans to replace out-of-priority diversions with senior direct flow irrigation or storage rights in the same amount, location, and time, and quality. SWSPs provide only an annual approval for an interim use and must be renewed by application each year while the water court adjudicates a permanent change.

Interruptible Water Supply Agreements (IWSAs) are temporary agreements allowed under Colorado Statute (CRS 37-92-309). An IWSA basically functions as a loan, and allows the borrower to exercise an option to

use the loaned water in accordance with the agreement while the owner of the water right stops using the water. IWSAs are limited to transferring water no more than three years in a 10-year approval period, with up to two renewals of the 10-year period. The amount of water available to loan is limited to the historical consumptive use. Since the enactment of the IWSA statute in 2003, no agreements have actually been put into operation.

Purchase and lease-back is another type of agreement or contract between non-agricultural water users and farmers after water is transferred from agricultural use to another use, such as municipal or environmental. Irrigated lands are fully or partially fallowed during a specific period, and water is provided for a different use based on the historical consumptive use portion of the water right. In most cases, this type of arrangement would have to go to water court to quantify the amount of water that is transferable (i.e. quantify the historic consumptive use) prior and to ensure protection of other water right holders. The benefit of this type of arrangement is that it can be perpetual in nature and thereby satisfying the municipality's interest in ownership and certainty.

⁴ (CRS 37-92-308 and 37-92-309)

Why Aren't More ATMs Happening?

The barriers to ATMs have been extensively discussed and documented, so the authors have summarized them here, rather than providing an exhaustive review of the factors inhibiting the widespread development of ATMs. If you are interested in additional reading on this topic, *Alternative Water Transfers in Colorado: A Review of Alternative Transfer Mechanisms for Front Range Municipalities* is an excellent report focused on the economic barriers of ATMs.

Cost

Water court is a notoriously costly process. In all of the major basins, there are at least one and usually several users who object to a change of use case, in order to make sure that they are protected from injury by terms and conditions that may accompany a change of use

decree. Water court cases may last years, depending on the number of objectors involved in an application. The legal fees for experienced water attorneys together with necessary engineering expertise can be staggering. Even temporary mechanisms which may not require water court have a burden of non-injury, which can be costly to demonstrate. In the report referenced above, the authors conducted a financial analysis of the portfolios of two representative Front Range municipalities which do have some ATM supplies. The analysis showed that ATM water can be cost competitive with traditional buy and dry, and especially when compared to groundwater development (cost to augment and treat wells). However, ATMs structured entirely as lease agreements had a higher long-term cost, relative to traditional buy and dry. Therefore, lease agreements may need to

demonstrate other types of benefits (such as social or political capital) and may require third-party support of initial costs.

Risk (perceived and real)

All of the available legal mechanisms—whether a temporary loan or change approved by the state engineer or a permanent change approved by a water judge—rely on a calculation of the historical consumptive use (HCU) of the water right. Often HCU is quantified month-by-month by comparing the monthly irrigation water requirement (IWR) against the same month's diversion records for every month in the study period (intended to be a “representative period”). The IWR can be calculated from approved methods, using monthly temperature and precipitation values for the site. As part of the HCU analysis, the portion of the flow that is not consumed (a.k.a. return flows) must also be evaluated.

Because HCU calculation is subject to challenge by objectors (who can contest data and assumptions in the model), there is a real concern by farmers and ranchers that a calculation of HCU in order to pursue an ATM may lead to a reduction from the water right's original decree, although the laws authorizing administratively-approved ATMs all have “no precedent” language that at least theoretically protects water rights owners. Additionally, some farmers and ranchers are concerned that by “opening their water books,” information will be used against them by municipalities, who typically have more resources at their disposal.

On the part of municipalities, there are perceived risks associated with term leasing rather than owning water rights. There is a concern that water will not be available in the place and time they need it and some are concerned that if they lease a water right for a specific term and invest in the due diligence process to prove HCU and non-injury, there is a possibility that another municipality might capitalize on their efforts and purchase the land and water rights with the intent to use them after the expiration of the lease term.

Social Framework

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CONSERVATION AND ATMS: WHY SHOULD THE LAND TRUST AND OPEN SPACE COMMUNITY BECOME INVOLVED?

The authors tried to make a case in the introduction that there is a high price associated with the status quo – municipalities will continue to buy farms and irrigated land will permanently go out of production.

This chapter lays out some of the opportunities for Colorado's conservation community, exploring both the why and the how of land trust and local government open space involvement in ATMs.

Fulfilling the Mandate of Colorado's Water Plan

Colorado's Water Plan sets the goal of implementing short-term or long-term ATM water-transfers that provide options that address concerns about permanent agricultural buy-and-dry. Program goals related to ATMs are aimed at specific objectives for various regions across Colorado. The plan recognizes it is highly unlikely that any one concept will be universally accepted in every basin. Rather than a one-size-fits-all approach, the plan recognizes that a variety of alternatives will be needed to meet specific needs. The goal of alternative water transfers is to benefit the agricultural community, as well as cities and towns that

are seeking viable sources of water supply to keep up with demands. While much has been learned about developing, evaluating, and monitoring ATMs from pilot and demonstration projects, there is more to learn to fully understand the potential of ATMs.

Specifically, the State Water Plan's goal towards ATMs is the following: *"Respect the contributions of the agricultural industry by maximizing options to permanent buy-and-dry. Achievement of a sharing goal of 50,000 acre-feet could serve up to 350,000 people annually."*

Collaborative Expertise

Land trusts and local government open space programs are highly collaborative both in an organized fashion through the Colorado Coalition of Land Trusts and Colorado Open Space Alliance, but much more often informally, with local and statewide or national organizations partnering to get a complicated acquisition or conservation easement (or both!) completed. The community is used to talking about land use implications and working with the public and private sector to achieve identified objectives. The community has worked hard to build trust with a large swath of the state's farmers and ranchers and

have an ongoing relationship with many of them. Many conservation organizations are also beginning to develop relationships with water providers as those water providers become landowners in their operating areas. In the case of local government open space programs, the local government may be well-suited to develop cooperative agreements with the water providers in their geography to conserve land and meet future water supply demands. The land conservation community has the skills and the relationships to play a meaningful role in how and where the state's water is used in the future.

Landowner Options

In the basins where the greatest dry-up is anticipated, water rights are increasing in value. With certain water rights, this is very transparent, such as with Colorado-Big Thompson water rights, and in other situations, there may not yet be significant market activity, but there is a virtual certainty that the market will come. Landowners realize that their water rights may be their most valuable and appreciating property right and may be reluctant to place all of their water rights in conservation easement. If the conservation community can provide landowners the opportunity to protect their land and water with the option to leasing a portion of their water for municipal (or environmental) purposes, it may secure the interest of landowners who would otherwise be inclined to hold onto their land and water for possible sale for buy and dry.

Two surveys of agricultural producers highlight the increasing interest in participating in ATMs. The first survey is most limited in geographic scope. The survey was mailed in the fall of 2007 to farmers in the South Platte basin who had reported more than 50 acres of irrigated land in the 2002 Census of Agriculture. The following survey results were analyzed and reported on by DiNatale Water Consultants, Inc. as part of a report titled “An Evaluation of Alternative Agricultural Water Transfer Methods in the South Platte Basin.”

These results reflect a recognition by the community that buy and dry negatively impacts rural communities and a majority whose preference is to lease, rather than sell, water rights.

More recently, Colorado Cattlemen’s Association and the Partners for Western Conservation conducted a

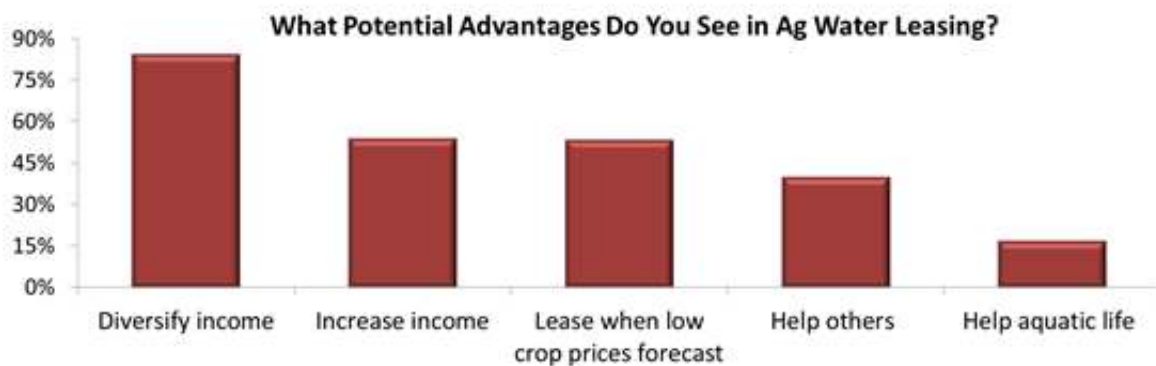
Table 4-1. General View of Leases

	Agree (%)	Disagree (%)	Average Rank
Water leases between agriculture and cities will help meet Colorado's future water needs.	53.4	31.0	3.2*
Water leases are more beneficial to rural communities when compared to the sale of water rights.	65.5	8.6	3.6*

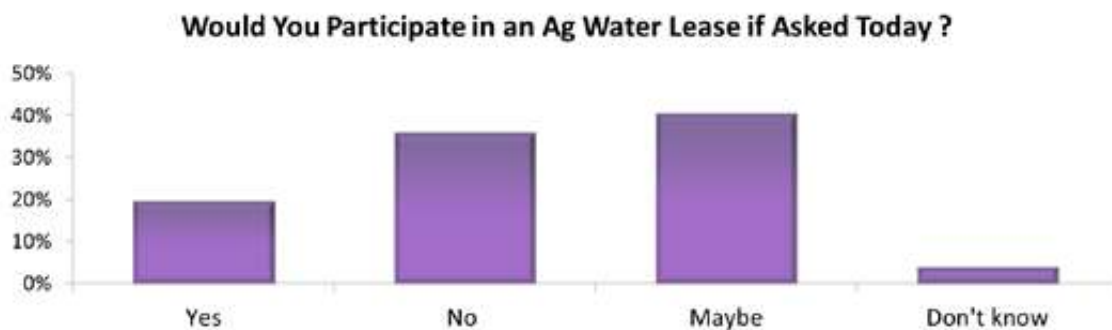
Table 4-2. Willingness to Participate in a Lease

	Agree (%)	Disagree (%)	Average Rank
I am willing to participate in a water lease if paid enough.	56.9	19.0	3.4
I am willing to lease rather than sell my water rights.	56.9	17.2	3.4
I am willing to lease senior water rights and keep junior water rights.	34.5	25.9	2.9
I am willing to sign a lease in which the water is used to maintain instream flows for river system recreation.	24.1	48.3	2.4
I am willing to sign a lease in which water is used to maintain wildlife habitat.	29.3	37.9	2.7

statewide survey of their members in 2016 to determine awareness of and interest in ATMs. Results, shown below, demonstrate that nearly all believed that leasing has the potential to diversify their income and one-fifth of respondents would actually be interested in entering into an agreement.



n = 234, nr = 32



Clearly, there is landowner interest and community need that may support Colorado's conservation community becoming more involved in water-sharing or other types of alternative water transfer mechanisms. At the very least, a land trust may want to consider introducing

more flexibility into its water rights language for certain projects. In the next section, the authors explore how increased flexibility for water sharing fits into the legal structure of conservation easements.

Coupling Conservation Easements and ATMs

Given the importance of the federal tax code and Colorado's conservation easement tax credit (enabled by the state statute which mirrors the Internal Revenue Code), conservation attorneys Jessica Jay and Peter Nichols were engaged to provide a legal analysis of considerations for including an ability for municipal water leasing within a conservation easement on the qualification of such a conservation easement for tax benefits. Jay and Nichols also develop an opinion of land trust's ability to amend existing conservation easements to allow for municipal water sharing in the context of private benefit.

The threshold topics addressed by this chapter include:

first, examining the framework provided by Colorado's conservation easement enabling act to understand the potential for allowing municipal water sharing under in future conservation easements; and second, reviewing federal charitable tax laws that may affect the ability of conservation organizations to allow municipal water sharing in future and existing conservation easements.

Conservation easements have been shaped by and drafted for conservation purposes, or values, as defined by Internal Revenue Code 170(h) and closely mirrored in Colorado's conservation easement enabling statute. Consequently, defining water sharing as a conservation purpose in support of agricultural viability and

avoidance of buy and dry is an important paradigm shift for the conservation community. New conservation easements could define conservation values and public benefits to include ag-muni water sharing in support of agricultural sustainability through limited leasing of water for use off the property, if the separation would not diminish the agricultural conservation value of the land, and if the supplemental income would in fact further and sustain the property's agricultural uses. An argument may be made that when a conservation easement fully encumbers a water right without any flexibility, the pressure for buy and dry increases on surrounding unencumbered land. On the other hand,

when conserved land permits agricultural-municipal water sharing, the shared water satisfies municipal water supply demands in a corresponding amount and reduces the need for the municipality to buy-and-dry other irrigated land to obtain equivalent water to meet its water supply demands. This should give comfort to land trusts and local governments that water sharing furthers the organization's goals both with regard to specifically conserved properties as well as on a landscape conservation scale and river basin municipal water supply scale. This approach arguably would be consistent with aspects of Colorado state law, and possibly also consistent with federal tax law, as discussed below.

Exploring Colorado's Conservation Easement Enabling Statute

Colorado revised its conservation easement enabling statute in 2003 to include water and water rights as a qualified conservation value that can be encumbered by or released from a conservation easement, and further, to define such water and water rights as those beneficially used on the protected land, in support of agricultural or other conservation values. See CRS § 38-30.5-102:

"Conservation easement in gross"... means a right in the owner of the easement to prohibit or require a limitation upon or an obligation to perform acts on or with respect to a land or water area, ... or water rights beneficially used upon that land or water area, owned by the grantor appropriate to the retaining or maintaining of such land, water, airspace, or water rights, including improvements, predominantly in a natural, scenic, or open condition, or for wildlife habitat, or for agricultural, horticultural, wetlands, recreational, forest, or other use or condition consistent with the protection of open land, environmental quality or life-sustaining ecological diversity...

The definition specifically defines the water rights beneficially used on the land as appropriate to retaining or maintaining (uses on) the protected property and other conservation values. This might seem like a barrier to recognizing benefits for uses off the property. However, consequent subsections introduce more flexibility. The definition of the residual estate in subsection 105 implicitly recognizes flexibility in

the use of water and water rights by providing that all interests not bound by the easement remain with the grantor of the easement, including the right to engage in all uses of the lands, water, and water rights affected by a conservation easement that are not inconsistent with the easement or prohibited by law. Subsection 103 authorizes both the creation of a conservation easement encumbering water or a water right and the revocation of the encumbrance of water or a water right, if allowed within the conservation easement. See CRS §38-30.5-103(5):

A conservation easement in gross that encumbers water or a water right as permitted by section 38-30.5-104 (1) may be created only by the voluntary act of the owner of the water or water right **and may be made revocable by the instrument creating it** [emphasis added].

This language provides that the water or water right attached to and bound by the conservation easement may be separated from such easement by the voluntary act of its owner, if permitted by the conservation easement. In sum, Colorado's enabling statute provides for revocation of the encumbrance or separation of the water or water rights from the conserved land, depending on the easement's specific language. However, because a conservation easement donation must qualify for a federal charitable tax deduction to be eligible for a state tax credit, the Internal Revenue Code (Code) is effectively the controlling tax law applicable to donations within Colorado.¹

¹ CRS §39-22-522(2)

Water Sharing as a Conservation Purpose

Section 170(h) of the Code describes four distinct conservation purposes for which a conservation easement can be created in order to qualify for a federal deduction; one explicitly references agricultural land conservation either as pursuant to a clearly delineated governmental conservation policy and providing a significant public benefit, or as visually aesthetically pleasing to the public and providing a significant public benefit, as described in Section 170(h)(4)(A)(iii)(I) and (II). The open space conservation value described at Section 170(h)(4)(A)(iii) references the preservation of open space and defines the same expressly to include “farmland and forest land.”

Farmland conservation pursuant to a clearly delineated government conservation policy is illustrated by an example provided in Treasury Regulations Section 1.170A-14(d)(4)(iii)(A) as “the preservation of farmland pursuant to a state program for flood prevention and control, which demonstrates a governmental policy furthered by agricultural lands’ conservation **with dedicated resources and benefits that cause the policy to amount to more than declaratory or aspirational.**” Both scenic and conservation policy prongs of the open space test must also create significant public benefit, which requirement is met by proving the public benefits of the continued agricultural use of the land, scenically, or as a matter of public policy, or both.

The following are examples of Colorado’s policy which provides both declaratory priority, together with the dedication of resources and benefits that make that policy “more than declaratory or aspirational.” Governor Hickenlooper recently stated that “Coloradoans find that the current rate of purchase and transfer of water rights from irrigated agriculture (also known as “buy-and-dry”) is unacceptable.” Exec. Ord. D 2013-005, at ¶ II.A (May 14, 2013). The Governor then directed the Colorado Water Conservation Board to prepare the “Colorado Water Plan,” which “must incorporate . . . a productive economy that supports vibrant and sustainable cities, [and] viable and productive agriculture . . .” to address the State’s water supply “gap.” Id. at ¶¶ II.A, III.A. The need to meet future municipal water demands paired with the desire to keep water

available to support agricultural and natural resources mandates that Coloradoans find alternatives to buy-and-dry.

The Colorado General Assembly has funded CWCB’s alternative transfer methods program to develop alternatives to agricultural buy-and-dry for the past six years, which is a dedication of state resources to encourage ATMs and demonstrates that the state’s policy is more than declaratory or aspirational. Further, the legislature affirmed “its commitment to develop and implement programs to advance various agricultural transfer methods as alternatives to permanent agricultural dry up. . .” HB 13-1248, at § 1 (May 13, 2013). The Colorado Water Conservation Board unanimously supported passage of HB 13-1248, believing that it is urgent to implement alternatives to traditional permanent ag to municipal transfers. See Preamble to HB 13-1248.

Several Colorado policies address the governmental conservation policy objective of the Code and Regulation’s open space test. Colorado’s enabling statute specifically discusses the encumbrance of water for agricultural uses and water sharing occurs pursuant to state laws explicitly enacted to permit such sharing. Furthermore, Colorado’s conservation easement tax credit is unquestionably a dedication of government resources that demonstrate that the state policy that encourages conservation easements is more than declaratory or aspirational, i.e., the tax credit is effectively an expenditure of state tax dollars to further the policies of the State’s conservation easement enabling act.

Some in the conservation community may be concerned that allowing water rights to be used off of the land undermines the justification for its inclusion in the conservation easement to support conservation values **on** the property. However, importantly, one example in the IRS Regulations clearly contemplates public benefits **that flow from** the conserved land because the value of farmland for flood prevention and control is in allowing floodwaters to spread out, lowering flood crests and water levels, which reduces flood damage to off-farm developed areas. In agricultural-municipal

water sharing, the public benefits similarly occur offsite. Finally, when conserved land permits agricultural-municipal water sharing, the shared water satisfies municipal water supply demands in a corresponding amount – a clear public benefit – and reduces the need for the municipality to buy-and-dry other irrigated land in fee to obtain equivalent water rights to meet its water supply demands.

Now that there is a determination of clearly delineated policy in Colorado to support water sharing, the next step is to determine whether a conservation easement with an ATM would also provide the required public benefit for conservation purposes. Guidance for determining public benefit is provided in 1.170A-14(d)(4)(iv)(A), which states that among the factors to be considered are:

1.170A-14(d)(4)(iv)(A)(3) “The consistency of the proposed open space use with public programs (whether Federal, state or local) for conservation in the region, including programs for outdoor recreation, **irrigation** or water supply protection, water quality maintenance or enhancement, flood prevention and control, erosion control, shoreline protection, and protection of land areas included in, or related

to, a government approved master plan or land management area;”

Irrigation is specifically called out as a possible public program that provide public benefit and since public programs, such as CWCB’s alternative transfer methods program, have been created to address irrigated agriculture, ATMs squarely meet this public benefit standard.

Given the overlapping provisions of Colorado statutes that reserve all interests not conveyed and authorize the revocation of an encumbrance on water and water rights, there doesn’t seem to be any legal bar that would prevent an irrigator from reserving the right to participate in ag-muni water sharing in a conservation easement, so long as the conservation organization agrees that it is consistent with the conservation values it seeks to protect, and the deed. When drafting a new easement allowing agricultural-municipal water sharing, it may be wise to include a specific statement that the grantor reserves the right to share water with a municipality on terms to be negotiated between the two, and why agricultural-municipal water sharing is consistent with the conservation values.

Can Existing Conservation Easements be Amended to Allow for ATMs?

The challenge with amending existing conservation easements is to maintain or create a public benefit without creating impermissible private benefit or private inurement to the current landowners for existing perpetual easements that received federal or state tax deductions or credits. In this section we explore how a land trust might amend an existing conservation easement to allow the use of encumbered water or water rights through agricultural-municipal water sharing for use off of the protected property without creating impermissible private benefit that would put the organization at risk.

The purpose of the private inurement and private benefit rules is to ensure that tax-exempt organizations serve public interests and not private interests. Under

both doctrines, an organization must establish that it is not organized and operated for the benefit of private persons, such as the creators of the organization, trustees, directors, officers, members of their families, persons controlled by these individuals, or any other persons having a personal and private interest in the activities of the organization, or other private individuals who are unrelated to the organization.

The sanction for violation of the private inurement or private benefit doctrine is revocation of tax-exempt status, or, in the alternative for private inurement, subjecting the organization and benefiting insider to intermediate sanctions, short of revocation of tax exempt status. The U.S. Supreme Court in interpreting and elaborating on the doctrine of private benefit has

held that the presence of private benefit, if substantial in nature, will destroy an organization's exemption regardless of an organization's other charitable purposes or activities, even if the organization has many activities that further exempt purposes.¹ The amalgamation of the Code, Regulations, and common law definition of impermissible private benefit is of non-incidental benefit conferred on disinterested persons (non-insiders) that serve private, rather than public interests.

However, incidental private benefit will not cause the loss of tax-exempt status. Our understanding of private benefit is that as long as any private benefit is both qualitatively and quantitatively incidental to the furtherance of the nonprofit's exempt purposes, the organization's tax exemption will not be in jeopardy. Any private benefit therefore must be: (a) (quantitatively) insubstantial in comparison to the overall public benefit conferred by the activity, or an indirect economic benefit to the private individual; and (b) (qualitatively) incidental as a necessary side-effect of achieving the organization's charitable objectives through the activity that benefits the public, which benefits to the public cannot be achieved without benefiting private interests.

Easement holders and landowners both bear the responsibility of ensuring their collective actions through amending conservation easements do create public benefit and do not create impermissible private benefit as a consequence thereof. And it is not just charitable easement holders that need to be careful of impermissible private benefit; government easement holders are also barred from creating what amounts to impermissible private benefit by State Constitution Article 11, Section 2, which prohibits private benefit to individual constituents by government action in much the same way that a land trust is restricted pursuant to Code section 501(c)(3).

It is crucial therefore to examine the anticipated public and private benefits of water sharing in the context of amending conservation easements to ensure that the potential benefit to a landowner, income from leasing water, is not an impermissible private benefit. Breaking this inquiry into its component parts: ask first, what is the public benefit? And second, what is the private

benefit, and is it impermissible?

Public Benefit of ATMs

The public benefit of alternative transfer methods is a major reason why Colorado's State Water Plan places considerable emphasis on seeking alternative methods for transferring agricultural water to municipalities. The historic method of permanently drying up farms created documented negative impacts to rural communities.

Crowley County undoubtedly provides the best real-world evidence of the consequences of buy and dry. While the county once had over 50,000 irrigated acres, buy and dry from municipalities has left the county with less than 5,000 acres under irrigation. Accounting for prisoners in the private correctional facility located in the county, the population has declined as a direct result of the removal of land from irrigation. Agricultural support businesses have closed and the need for farm labor has declined dramatically. Crowley County has been left with median income levels at less than one third of the state median. Vacant commercial buildings are common and median home prices are only about ¼ of the statewide median. The lack of new home construction also results in an ever-aging housing stock, which makes it difficult to attract new residents. The plight of Crowley County was documented in a December 2014 article titled High + Dry by Robert Sanchez in 5280 Magazine.

The avoidance of the type of impacts experienced by Crowley County is a substantial public benefit of ATM's. A June 2007 report titled "Economic Impact Analysis of Reduced Irrigated Acreage in Four River Basins in Colorado" produced by the Colorado State Department of Agricultural and Resource Economics quantifies the economic impact of removing land from irrigation. This report puts specific numbers to what is so painfully visible in Crowley County.

A copy of the CSU study can be found in Appendix D. This report identifies the total economic impact of irrigated cropland and as one would expect, that impact goes well beyond income accruing to the farm and creates a considerable volume of economic activity associated with a variety of support businesses.

¹ Better Business Bureau of Washington, D.C., Inc. v. United States, 326 U.S. 279 (1945).

The following chart is an excerpt from that report.

Irrigated Agriculture and Economic Activity for Colorado Regions

Region	Farm Gate Receipts Relative to Regional Sales	Economic Activity Generated per Acre of Irrigated Cropland	Representative Cropping Pattern
Arkansas	31%	\$428	Forage Crops
Republican	37%	\$678	Continuous Corn, Alfalfa
Rio Grande	48%	\$1,127	Potatoes, Barley, Alfalfa
East South Platte	2%	\$690	Corn, Alfalfa, Sugar Beets

While a 3 in 10-year lease could have some level of negative impact to the local economy with reduced inputs during those three years, the consequences would be far different than permanent buy and dry. The farmers would continue to be in place and if lease rates were above agricultural income, it could actually be a stabilizing influence on farm income, potentially translating into more purchasing power with local businesses. Most importantly, when weighed against the alternative of buy and dry, ATM's can avoid the devastating community-wide economic impacts that come with widespread permanent abandonment of irrigation.

Additionally, agricultural-municipal water sharing satisfies municipal demands in a corresponding amount, thereby reducing the need for the municipality to buy-and-dry other irrigated land to acquire equivalent water rights to meet its water supply demands. This has the effect of meeting public municipal water supply needs while simultaneously and correspondingly reducing municipal demands that would likely lead to the buy and dry of other (unencumbered) ag land. From this

perspective, it could be argued that the supplemental farm income provided by leasing is quantitatively insubstantial and an indirect private economic benefit compared to the overall public benefit – avoidance of buy and dry and additional water supplies – and a qualitatively incidental side effect of the organization's charitable objectives of sustainable agriculture.

Private Benefit of ATMs

The private benefit of water sharing is the potential supplemental income to landowner from water leasing, which income may be variable and difficult to determine at the time of amendment based on whether an amendment allows landowner to seek out prospective lease opportunities, or allows landowner to enter into a specific lease for a known water quantity and value, but nonetheless has the potential to be quite high.

Such a private benefit might still be permissible, or at least not impermissible, if it can be shown to be both qualitatively incidental of the public benefit being achieved and quantitatively insubstantial compared to the overall public benefit being achieved. The supplemental income could be considered qualitatively

incidental, or a necessary side effect and byproduct of the public benefit achieved, because the greater good of saving land from buy and dry practices and creating additional public water supplies cannot be achieved without allowing the leasing of water by landowner. The focus therefore becomes the comparative analysis of the potential income to the landowner and the public benefit of less buy and dry lands, and more public water supply, and whether the potential income to the landowner is quantitatively insubstantial, when compared to the public benefits.

Given the tremendous public benefit of reducing buy and dry of agricultural land and increasing public water supplies as inherently substantial public benefits, worthy of pursuit and consistent with a mission of land conservation, there is a strong argument to be made that the potentially known value of leasing water rights to the landowner pales in comparison. The potential for lease income will therefore be shown to be qualitatively insubstantial to the public benefits, and private benefits therefore permissible.



Formerly irrigated, “revegetated” cropland, Crowley County, Colorado, April 2014. Photo by Kevin McCarty



VALUING ATM RESERVED RIGHTS WITHIN A CONSERVATION EASEMENT

Now that the authors have established that an allowance or reserved right for agricultural-municipal water sharing can legally be included within a conservation easement in such a way to qualify for state and federal tax benefits, this section examines how such a right might impact the value of a conservation easement.

Conservation easement appraisals are conducted under specific guidelines and those guidelines may constrain the effectiveness of protecting vulnerable water rights in Colorado. In order to obtain Colorado tax credits or claim a federal donation, appraisals must be conducted according to Treasury Regulations. Projects funded with Great Outdoors Colorado funds or federal funds are either appraised under the Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA) or before and after appraisals conforming to the Uniform Standards of Professional Appraisal Practice (USPAP). Regardless of the type of methodology required, each standard requires the appraisal to consider the subject property “as is” as of the valuation date. This has important ramifications when it comes to the value of water rights.

Because appraisers must consider the contributory value of water right as of the valuation date when valuing a conservation easement that includes irrigation water, they have to support a value that could actually be obtained for the land and associated water as of that moment in time. If prospects to change a water right to municipal use are so imminent that sales are reflecting higher values because of that reality, an appraiser is able to take such market activity into account. However, any valuations based on municipal influences without market evidence to support such influences is not

appropriate and would be speculative.

Highest and Best Use of Water Rights

The concept of highest and best use relating to transitional water rights (i.e., water which is transitioning from agricultural to municipal use, such shares in a ditch that a municipality(s) has or is actively acquiring), is often a matter of degree. Determination of highest and best use is clearer for 1) agricultural water rights with low potential for a change of use in the near term, due to factors such as downstream location, junior priority or a small quantity of water, and 2) agricultural water rights that have been or are already in the process of being changed to municipal or other use. Transitional water rights falling between those extremes are worthy of closer look relative the concept of highest and best use.

While highest and best use can be any realistic, objective potential use of the property, it is presumed to be the use to which the land [and presumably water] is currently being put absent proof to the contrary.¹ The nature of transitional water rights can sometimes cause confusion in the description of highest and best use and ultimately the valuation of a particular water right. From a highest and best use standpoint, it is certainly appropriate to discuss potential for changes of use on water rights without demonstrable market evidence that contributory water values are being influenced by that potential. However, the ultimate value conclusion must reflect current market responses to those potentials, if any, and cannot be speculative about what those values might be in the future.

¹ United States v. L.E. Cooke Co., Inc., 991 F.2d 336, 341 (6th Cir. 1993); Symington v. Commissioner, 87 T.C. 892, 896 (1986). Esgar Corporation, et al. v. Commissioner, T.C. Memo. 2012-35

Valuation of Water Rights in Conservation Easements

Water rights valuations must be based on the best available market evidence for determining such values. Comparisons of sales of the same water right are preferred and if none exist, the best available proxy should be sought. In many cases, water right comparable sales may be sales where the land and water are combined. In some cases, separate water sales are available and appropriate to use for comparison. Comparability should be based on such factors as decreed uses, existing municipal influences (or lack thereof), seniority and location among other factors. If differences exist between sales and subject that influence market value, the sales become less relevant and the appraisal may be less reliable.

The nature of the water market is an important aspect of water valuation. Agricultural water rights tend to have an agricultural value up until the point at which a domestic water provider enters into the market. Once that takes place, values can increase rapidly. Numerous examples can be given of water rights that have experienced as much as three or four-fold value increases in one year once a municipal provider enters the market for a particular water right. For example, in early 1999, shares of the Home Supply Ditch were trading for approximately \$10,000 per share. Johnstown then initiated a change of use for shares it purchased on the ditch and within one year, values had reached \$60,000 per share. There are many other examples, particularly in the South Platte and Arkansas Basins.

From a valuation standpoint, even though a particular ditch system may appear vulnerable to municipal takeover, appraisers cannot speculate on when a shift to municipal use might happen or the extent to which values will be influenced. This limitation can prove frustrating for the conservation community when it may be obvious a particular water right is vulnerable, and a land trust or open space program may be in a position to act proactively to get ahead of municipal interests, but an appraiser may be able to only support a low conservation easement value attributable to the water and so landowners may have little incentive to conserve what they know will one day be a very valuable asset.

One unique valuation issue related to transitional water rights is water rights contracts contingent on a change of

use. These contingent contracts are sometimes available for appraisers to review and can be given consideration with appropriate levels of adjustment. Given that these contracts are subject to some risk along with time/value of money considerations, they do not reflect pure “as is” values. However, the fact these contracts may give a subject water right potential for higher values in the foreseeable future could influence the contributory water value under consideration. As a result, it is ultimately incumbent on the appraiser to demonstrate how the market would respond to the existence of the contingent contract.

The number of conservation easements in Colorado has reached a point where a substantial number of sales of conservation easement restricted properties are available, including easement restricted properties with water rights. The lesson has been that in areas where water rights are already municipally-influenced, a conservation easement encumbering water rights can create a large value loss and provide significant incentive. Conversely, value losses associated with conservation easements are negligible on water rights without immediate municipal influence, even if such water rights appear vulnerable to change at some point in the future.

From a conservation opportunity perspective, this creates an unfortunate situation where there is little incentive for landowners to encumber water rights because the conservation easement doesn't diminish the value of the water, since that value conclusion is informed by low value loss conservation easement restricted sales. As a result, Conservation efforts involving water rights associated with low values loss restricted sales are regularly being thwarted, even though they may be vulnerable to an eventual change of use as warned by Colorado's Water Plan. The authors would caution that if water rights are critical to the conservation values of a potential conservation property, easement holders should avoid encumbering the land only. In many areas, it may be a matter of time before the market begins to demonstrate value, making conservation easements more appealing to landowners.

Water Leasing and the Impact on Water Valuation

Water leasing is relatively common in Colorado, but it most often involves agricultural leasing within the same ditch system. These agricultural leases are usually annual one-time or year-to-year leases at modest prices, often based only on the current ditch assessment. While these leases are common, they have little or no effect on the market value of the water rights. Effluent leasing, leasing of treated municipal or industrial wastewater, is also commonly practiced, but like agricultural leasing is often done on a single year or short-term basis. This short-term leasing is reflective of the desire of municipalities to maintain long term control over these water rights.

A few longer term industrial water leases exist around the state, including a handful of leases in the South Platte Basin. When these leases are compared with market values for the water rights involved, historic capitalization rates have been on the order of 5%. That capitalization rate is not static and further analysis might reveal a slight different rate. However, because of the existence of low interest funds for water and water projects available from the Colorado Water Conservation Board, it is logical that water capitalization rates would be relatively low in Colorado.

Capitalization rates, as discussed here, are a tool used by appraisers to estimate value. When two of three variables, income (I), value (V) or rate (R) are known, a capitalization rate (R) can be calculated. For example, if a water right sells for \$20,000 but is leased annually for \$1,000, the rate is 5% ($I/V=R$, or $\$1,000/\$20,000 = 5\%$).

Lease rates will depend a great deal upon specific lease terms, the water right involved, location and competing supplies, among many other factors. In Colorado, some water leased for fracking reached elevated levels, but that was often a function of having a water right available for industrial use in the exact location where it was needed. Thus, the highly variable nature of fracking

leases may not give a good general picture of what may happen with municipal water leasing. However, it could demonstrate what could take place in a situation where a domestic provider is particularly desperate.

An examination of municipally-influenced water values in the South Platte shows a low value of \$10,000 per consumptive acre-foot and a high value of \$40,000 per acre-foot of consumptive water on the northern edge of the Denver metro area; however, these values are for water rights that have already been changed to municipal use. There is also a premium being placed on dry year yields.

If \$10,000 per consumptive acre-foot is used as the bottom end of municipal values, a 5% capitalization rate would represent a \$500 per acre-foot lease rate. Perhaps not coincidentally, \$500 per acre-foot is the base lease rate for Super Ditch leases to Fountain, Security and Fowler. Based on current agricultural land lease rates, this would appear to provide adequate incentive for farmers to enter into municipal leases. For example, there is significant demand to lease water among farmers who did not volunteer for the first round of Super Ditch leases to Fountain and Security. If those capitalization rates hold at values in excess of \$10,000, there would be even greater incentive. Dry year leases would also have significant upside in terms of lease rates.

If farmers are able to enter into stable long-term leases, the consistent predictable income will be internalized into the value of the water rights, particularly if the lease income exceeds anticipated agricultural income. The amount of market value increase will depend on the amount of added income and the level of certainty given by the specific lease. As an example, if the lease adds \$500 per acre income to the property 3 out of 10 years, the added average income of \$150 per acre per year, capitalized at say 5%, would add a market value of \$3,000 per acre to the property.

Conservation Easements on Properties with Retained Lease

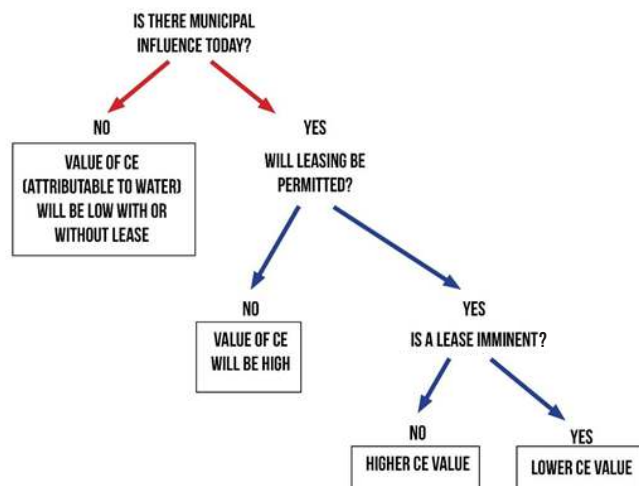
The same “as is” valuation issues that are present for appraising water rights without leasing rights will exist when appraising water rights with retained leasing rights. If a conservation easement with retained lease rights are done on agriculturally-decreed water rights with no immediate potential for municipal use, there may be little or no added value attributed to the water rights. If a lease is likely to be in place in the foreseeable future, then fully restricting the water right, as most conservation easement holders have historically done, would certainly generate conservation easement value; however, if flexibility is retained to allow for leasing and the leasing is creating the value, then the conservation easement value associated with the water may be lower.

In the situation where water rights already have high values due to municipal influence, a conservation easement with retained lease rights will be lower in value than one which prohibits leasing, but it may still create substantial value loss. Even in the lease rate is based on the typical market relationship between lease rates and market value (capitalization rate), if a landowner is limited to receiving that income three in ten years, then agricultural values must play a major role in the easement valuation. The present worth of three years of municipal lease income combined with seven years of the net present worth of the agricultural income will likely be much less than the value of a full sale of the water right to a municipal or industrial user. Therefore, an appraiser may be able to demonstrate value attributed to water rights in the conservation easement. While the value created by this easement will likely be less than the value of an easement that fully restricts the water rights, the potential for future income (and diversity of income) from a lease may give landowners an incentive to conserve.

The potential lease rate and the certainty of the lease are both critical valuation factors when considering the present worth of an easement restricted property with retained leasing rights. Where leasing is already

occurring or is imminent, there is a greater present worth associated with the lease (a buyer would be willing to pay more for the added benefit of the extra lease income). In areas where water values are rising, but leasing is uncertain, there is a lower value associated with a right to lease. The less certain a lease is, the less the present worth of that potential (a buyer doesn't know when the extra income from the lease would become available). In that scenario, not only is the buyer not able to enjoy the benefit of the added lease income, they are uncertain about when that extra lease income will become available. However, in that situation, a conservation easement with a retained right to lease may have substantial value because the value of the water (for outright sale) is increasing, but the value of the right to lease is low. The general relationship between municipal influence, leasing certainty, and easement value is illustrated below.

Impact of Reserved Leasing Rights on Conservation Easement Value



Seeking a Change of Use Prior to Doing a Conservation Easement

Because of the restriction on valuing a water right “as is,” which is typically as an agriculturally-decreed water right, it may seem tempting for a landowner to work proactively with a conservation organization to change all or a portion of a water right to increase the value of that water right and realize increased easement value by then encumbering the right. However, it is important to understand that in any of these scenarios, the expense and time involved in seeking a change of use may be prohibitive, and there may be legal risk associated with seeking a change in use solely for the purpose of increasing the amount of a charitable contribution. If this strategy is utilized, an end user would need to be identified to avoid legally-impermissible speculation, unless Agricultural Water Protection Water Rights were sought (see page X). Ideally, an end user who will stand to gain by the change of use will participate and help shoulder some of the costs of the change. One cautionary note is that a change in use could also pave the way for other changes of use within the same ditch system, running counter to the intended conservation goals, unless there has been coordinated conservation planning across the ditch system.

Future Value of Water Rights

Another method that has been discussed relating to agricultural water rights preservation is an attempt to determine the future value of a given water right. There are certainly a number of water rights in both the Arkansas and South Platte basins that appear to have some long term or even short-term potential for a change to municipal use. The use of market data from already changed water rights to predict those potential values might one strategy to determine compensation. However, the speculative nature of this strategy and inability to arrive at consistent values would likely undermine this approach. It would also not meet the market value definition required under Treasury Regulations or for appraisals conducted to meet the requirements of traditional funders, such as GOCO or NRCS.



IMPLEMENTING A LAND CONSERVATION PROJECT WITH AN ATM

Depending on your service area and mission or local government mandate, you may decide that water rights are so important that you may take a proactive strategic approach and meet with municipal water providers, talk to local water conservancy districts, have conversations with your division engineer, and attend your basin roundtable meetings to begin to understand the larger context of water pressure and identify ditches or specific properties that have critical water rights and may be

optimal for ATMs. Perhaps your organization decides to wait and see whether there is a specific project that comes along where a landowner expresses interest in an ATM. Whatever your approach, the authors have attempted to provide some guidance on how you might think about implementing a project that involves an ATM, recognizing that every water right and ATM will be different.

Evaluating for Feasibility and Fit

Knowledge is power, the saying goes, and this is certainly true in the world of water. When evaluating a potential land conservation project with water rights, then the more understanding there is about the water rights historically used on that property, the easier it will be to consider different opportunities. The Water Rights Handbook for Colorado Water Professionals has an excellent checklist for understanding water rights for a conservation transaction that the authors will not duplicate here, however, the following questions that may be particularly helpful when considering the feasibility of an ATM:

- What is the seniority and amount of water used on the property?
- Have any of the water rights that serve the property or others in the area seen any changes of use in water court?
- Is there any talk of municipal interest in water rights in the area?
- Is there any planned municipal investment in water storage or delivery infrastructure occurring in the area?

Additionally the following questions may be helpful when considering the compatibility of an ATM:

- What is the organization's mission? What are the primary conservation values that the organization

is interested in and which of these are supported by or dependent on water rights?

- Are all of the water rights necessary to support the conservation values?
- Would the conservation values be supported by all of the water some of the time or some of the water all of the time?
- What are the implications for the landowner?

Decision Support Tool

The Colorado Cattlemen's Ag Water Network has created an online tool that allows an irrigator (or land conservation organization) to determine whether there may be leasing potential for multiple uses based on the basic characteristics of the water right. The numeric score and rating may be very helpful as a preliminary step in exploring feasibility of a water right for inclusion in an ATM.

www.agwaternet.org

Neighbors?

- Does an ATM open the door for partnerships or community cooperation/collaboration?

When contemplating whether to attempt agricultural municipal sharing, an easement-holding organization or agency might fret that such an endeavor is outside the scope of its direct mission of protecting open space. It would be helpful for land trusts and government agencies to address this issue head-on by considering whether the water sharing is consistent with their mission or requires some form of mission-deepening to accomplish the objectives. In Appendix E, the authors have provided a sample resolution and policy which could be adopted by an organization's Board of Directors to demonstrate alignment with mission and provide guidance to staff. Moreover, examination of the pertinent/preferred conservation values consistency would also be prudent/recommended at the outset of a proposed project.

One of the most challenging things about these projects is that simply evaluating options may be a costly venture, particularly if it is the first examination of water rights in an area, and depending on the landowner's knowledge and documentation of their water rights. If agricultural open space is the primary conservation value of interest for a property, then you may want to engage an agronomist to scope the viability of production and impact to soils of different water scenarios. If scenic open space is important, it may be ideal to have some of the water every year, rather than having a few years where a property is completely dry. If there are irrigation-supported wetlands or other water-dependent wildlife habitat, then you may want a biologist to work in conjunction with an agronomist or water engineer. The scale of your need for expertise is driven by your interest in the property and the relationship between the conservation values of interest

and the current water availability and management.

A viability analysis or plan may be helpful for a land trust or local government to analyze an ATM and develop scenarios on how the farm would operate during normal years, ATM years and recovery years. Such an analysis may be performed by an agronomist or agricultural consultant and may also require the input of a water engineer or attorney. This consulting team would provide recommendations on water management with a potential ATM and could provide a determination of the type of the optimal ATM to be pursued in order for the property to be economically viable and support the conservation values. Such analysis could be formalized into a Farm (or Ranch) Water Operations Plan, which could guide the development of an ATM (and the easement holder approval process) in the short or long-term.

A Farm (or Ranch) Water Operations Plan would provide operational recommendations from a water supply and irrigation perspective so that combined agricultural sales revenues and water lease revenue will sustain the operational costs of the farm in the long term. The plan will also provide recommendations for operations for multiple water supply scenarios, including years with a full water supply and years that the municipality uses some of the water for off-farm uses pursuant to the ATM.

The plan should be used as a guide for the management of the water and land with the ATM water agreement and may provide guidance on mitigation needed to prevent erosion and minimize production loss when water is returned to the land. The intent of the plan is to provide guidance on how to maximize the use and management of the water and land in such a way that it benefits all parties and fulfills the multiple purposes for which the land and water were conserved.

Most land trusts and government holders utilize a

Conservation Easement Language

template conservation easement as a starting point for all conservation projects. Some entities may feel comfortable including some level of flexibility for off-site water use (municipal water-sharing or instream flow leasing) within their template. This approach may make sense if your geographic area of interest is relatively homogeneous or if your mission clearly supports

ATMs. The timing of an ATM (whether the structure of the ATM will be known prior to the completion of the conservation easement) may influence the degree of flexibility that a holder feels comfortable allowing as a reserved right and particularly, the level of approval or involvement that the holder may want to require.

The approach that Colorado Open Lands has taken

is to develop recommended language to allow for an ATM, but to not include this in our template, and rather to determine on a case-by-case basis whether flexibility is aligned with the conservation values or even feasible, given the location, type, or seniority of the water right. The authors have developed examples of language which could be modified and inserted into the water rights provision of a conservation easement. If any such language is used, the authors recommend that recitals be included that support water-sharing as a conservation purpose. The language for the

water rights section is included here, but recitals and alternative language is found in Appendix E. When drafting to include water-sharing as a future reserved right, a holder may want to consider prioritizing agriculture as a conservation value, either across the entire property, or at least the irrigated portions of the property, so that the holder can make a cleaner analysis of impact to that primary conservation value when evaluating a water-sharing agreement.

If a land trust or local government has done significant

Permitted Use of Water Rights. The Parties agree that the Water Rights are hereby dedicated and restricted primarily for continued agricultural use and future viability and related Conservation Values of the Property, and that Grantor shall continue to maintain their historic beneficial use. Notwithstanding the foregoing, Grantor reserves the right to enter into any leases or agreements for use of Water Rights off the property, subject to the restrictions below.

1) For purposes of this Deed, the term “Water Agreement” shall mean any interruptible water supply agreement, a water conservation program, or any other lease or use agreement related to the Water Rights, such as an interruptible supply contract, water lease, fallowing program, forbearance agreement, emergency water loan, or other similar agreement to allow the temporary agricultural, environmental (including, without limitation, in-stream flow, wetland, piscatorial, and similar uses beneficial to preservation of wildlife, wildlife habitat and bio-diversity), municipal, commercial, or industrial use of the Water Rights off the property.

2) Grantor shall not enter into any Water Agreement without Grantee approval to ensure that said document is consistent with the Purpose and this Section. Grantee shall have the right to charge a fee to Grantor for time and costs associated with review of any proposed Water Agreement.

3) Any Water Agreement must: (i) define the term of the agreement, (ii) include provisions that ensure the proposed activities are consistent with the Conservation Purpose, including preservation of soil health and agricultural viability, and (iii) not permanently separate the Water Rights from the Property. In the case that the term of the Water Agreement is less than 10 years in duration, water may not be removed from the Property more than three years in that ten-year term, and not for more than two consecutive years. In the case that Grantor wishes to enter into a Water Agreement for a term longer than 10 years, water may not be removed from the Property more than three years in any ten-year term, and not for more than two consecutive years in any ten-year period, unless otherwise agreed by the Parties in consultation with a mutually acceptable resource management professional to develop a Farm/Ranch Water Operations Plan. Such plan will assess the impact to the Conservation Values of application of less than full Water Rights on the Property in some years and make recommendations as to the timing and amount of water that should be applied to the Property in order to manage erosion and prevent damage to the soil. The cost of a Farm/Ranch Water Operations Plan shall be borne by Grantor.

Evaluating a Proposed Water Agreement

evaluation prior to the inclusion of flexible water language, such as to develop an agreed upon Farm (or Ranch) and Water Operations Plan, then it may need to do minimal work to evaluate whether a specific proposal is consistent with the Operations Plan. If a permanent ATM is done prior to or simultaneous to a conservation easement, then the organization may provide for a specific allowance for the ATM in its agreed upon form within the body of the easement.

However, in any provision allowing for use of water rights off of the property, the easement holder will want the right of approval based on a determination as to whether the proposed water agreement would have a long-term negative impact on the Conservation Values. Again, ideally if a holder has included this language, then there is also language recognizing an ATM as aligned

with Colorado's public policy goal of avoiding buy and dry, but a holder is still tasked with documenting a decision about a specific proposal. Depending on the complexity of the agreement, amount of water, and duration of the agreement, a holder may be able to utilize information that is being produced as part of the creation of an agreement (and if applicable the water court process or Division Engineer's approval) or a holder may need to engage its own expertise to make a determination. If the latter, then it may be prudent to determine (and possibly include in the conservation easement language) which party will bear the costs of expert consultants, or to create a calculation in your stewardship reserve (or endowment) that reflects the staff time and possible expense of reviewing a proposed agreement.

The Yahn Ranch is in Logan County, just east of the

Example: Yahn Ranch Conservation Easement

North Sterling Reservoir, adjacent to parts of the North Sterling State Park, and just slightly north of the South Platte River. A portion of the ranch is irrigated for alfalfa, winter wheat, or corn and the remainder of the property is used for grazing pasture. The Property's location between the riverine habitat provided by the South Platte and the deep-water habitat of the North Sterling Reservoir provides fresh-water marshes and canals that offer alternate food sources and thermal cover for a diverse array of species. Most of the wetlands on the Yahn Ranch are associated with the presence of the North Sterling Outlet Canal which meanders along the southern boundary. In addition to the canal, Cedar Creek is located just to the west and provides significant waterfowl habitat.

Landowner Jim Yahn is a leader in the water community. Jim currently sits on the Colorado Water Conservation Board and serves on the leadership team of the South Platte Basin Roundtable. As President of the North Sterling Irrigation District, Jim helped facilitate one of the state's first ATMs. The North Sterling Irrigation District has two storage decrees, a 1908 storage decree for 69,446 acre feet and a 1915 decree for an additional 11,956 acre feet (for

more than the reservoir can actually hold at any given time) as well as a direct flow water right. In 2006, the District changed a portion (15,000 acre-feet) of their water rights so that they could be used for purposes other than agricultural irrigation. The District (via an LLC it formed called Point of Rocks Water Company) entered into a 25 year lease with Xcel Energy that allows the Public Service Company the ability to utilize up to 10% of the consumptive use associated with these District Acres for cooling purposes at the Pawnee Generating Station.

In 2010, the Yahns began exploring a conservation easement with Colorado Open Lands. Jim wanted to ensure that the water rights could never be permanently severed from the land, but that water could continue to be leased. From a land trust perspective, the analysis was easier in that there was an existing agreement to consider. At the time of the easement, the 25 year agreement with Xcel had been in place for 7 years and Xcel had never exercised their rights under the lease, therefore water availability during the irrigation season has not been impacted.

However, even if Xcel did exercise its right to delivered

water; there are aspects of the agreement and Irrigation Company water rights that minimize potential impacts to farmers. Xcel can only take water during the storage season, November 1 through the end of March. This allows farmers to know the potential impacts to their operation before planting. In addition, even though the farmers may forgo the diversion of some of their stored water during the storage season, there is still the opportunity to fill the reservoir in a free river situation during the spring snowmelt and therefore farmers would not realize an impact to the amount of water available for irrigation.

As of the time of the conservation easement, a total of 99.77 acres of the Property was included within the boundaries of the North Sterling Irrigation District, which entitled the ranch to receive a pro-rata delivery of water from the water rights owned by the District, including North Sterling Reservoir Water Rights (“Storage Water Rights”), based on the relative acreage of the Property located within the District boundaries (“District Acres”). Jim Yahn irrigates approximately 90 acres of the property, 60 under sprinkler and 30 by flood. He rotates his crop between corn and alfalfa hay. Corn requires multiple irrigations over the growing season to finish, depending on the precipitation. Alternatively, Jim can put up three to four cuttings of hay over a typical season, each usually requiring an irrigation, once again depending on precipitation. Jim’s preference is not to allow any of the land to fallow under a lease situation. Assuming this lease limitation, one scenario is that a lease would limit the range of potential crops that could be grown on the property (i.e. it might not be possible to grow corn). Under a hay scenario, he might be restricted to two cuttings rather than three or four.

In addition to recognizing the current lease agreement with Xcel, Colorado Open Lands and the Yahns agreed on the following language:

Grantor reserves the right to enter into any leases or agreements for use of up to a total of 35% of the historical yield of Grantor’s storage Water Rights associated with Grantor’s District Acres each year, for use off the Property, subject to the following terms of this Easement: (1) Grantor shall consult with and obtain Grantee’s written consent that any additional future change will be consistent with the permitted uses and will not impair the Conservation

Values; (2) The total amount of water to be used off the Property each year under all agreements combined shall not exceed 35% of the average amount of water available from Grantor’s storage Water Rights, unless Grantee agrees in writing that the reduction in water deliveries to the Property, together with Grantor’s management plan, will not adversely affect any of the Conservation Values; (3) No more than 35% of the District Acres on the Property shall be removed from irrigation each year; (4) any lands temporarily removed from irrigation pursuant to such agreements shall be managed to avoid erosion and damage to the soil; and (5) the term of the lease or other agreement shall not exceed 30 years. The average amount of water available from the storage Water Rights shall be determined at the time of entry into such agreement based on the District’s storage records for a period of years prior to entry into the agreement equal to the length of the term of such agreement. If Grantor enters into more than one agreement for use of Grantor’s storage Water Rights off the Property, the average amount of water available for all agreements shall be recalculated based on the District’s storage records for the relevant number of years immediately prior to entry into each subsequent agreement. Any of Grantor’s storage Water Rights used off the Property as described in the Water Company agreements listed above in Section 5.7.2 shall count toward the 35% total limit set forth in this section.

Important components of this language include: 1) the water is based on a more conservative historical yield, 2) the average amount of water available is re-calculated for each new agreement, such that any long-term changes in the river conditions will be captured, and 3) management objectives for any fallowing are addressed.



Partnerships and Funding Resources

When looking at an expensive prospect outside of internal staff expertise, partnerships become increasingly important. Consider looking to groups such as Ducks Unlimited, Trout Unlimited, the Colorado Water Trust, or to the local water community to see whether they may be able to lend expertise. Land trusts and local governments may also be able to share expertise or resources for a project of common interest.

Great Outdoors Colorado (GOCO)

In October 2013, the Board of Great Outdoors Colorado decided that GOCO should not consider allowing municipal leasing of water, so any conservation project allowing an ATM would not have qualified for a grant, unless a portion of the water rights were simply left out of the conservation easement. The passage of the Colorado Water Plan and emerging interest within the community prompted the GOCO Board to consider the issue once again in October 2016, and this time unanimously voted for the following: “In response to the Colorado Water Plan and in furtherance of conservation in Colorado, GOCO will consider requests for open space funding for projects that allow temporary leasing of the water encumbered by a conservation easement in a manner that does not fundamentally compromise the conservation values. These projects will be evaluated on a case-by-case basis under GOCO’s standard open space application criteria.”

Colorado Water Conservation Board (CWCB)

The Colorado Water Conservation Board has various grant programs available; however, there are three that are most relevant: 1) the Alternative Agricultural Water Transfer Program, 2) the Colorado Water Plan Grants, and 3) the Water Supply Reserve Fund Grants.

The Alternative Agricultural Water Transfer Program is specifically designed to “assist in developing and implementing creative alternatives to the traditional purchase and transfer of agricultural water.” As of the date of this handbook, there was \$1,000,000 per year available in funds for this program and those funds could be used for research and/or implementation of specific ATM projects (technical analysis of consumptive use,

exploration of delivery, assistance addressing third party concerns, etc.), excluding any water court costs. Colorado Water Plan Grants are now available in the different categories that are outlined in the plan itself to further identified objectives. The categories are defined as:

- Supply and Demand Gap Projects
- Water Storage Projects
- Conservation, Land Use Planning
- Engagement & Innovation Activities
- Agricultural Projects
- Environmental & Recreation Projects

The total amount of Water Plan funding available in 2017 was \$9 million, across the 6 categories.

Water Supply Reserve Fund requests must originate from a Basin Roundtable and can be requests of Basin Funds, Statewide Funds, or both sources of funds. Types of projects funded are varied, but should further objectives identified in the Basin Implementation Plan, and must be recommended by the Basin Roundtable in which the project would occur. Basin Roundtables may have different processes for consideration.

Gates Family Foundation

The Foundation supports projects that advance new tools, processes and ideas to realize a long-term, sustainable balance between future urban, agricultural, recreational and environmental needs in the state’s rivers. The Foundation works closely with all relevant stakeholders including policy leaders, agricultural interests, nonprofit advocates, scientists and water resource managers to identify high leverage, high impact investments to balance competing demands and protect the state’s water resources. Aspects of this program may be complementary with Foundation activities focused on land conservation, stewardship, community development and ecosystem services. Looking forward, Foundation staff will continue to support models of cross-sector cooperation and market-based tools, connect land use and water conservation, support instream flows and healthy rivers, explore means to develop better water data and analysis, and advance implementation of the State Water Plan toward balanced water outcomes.

Walton Family Foundation

The Foundation supports local and national efforts to ensure healthy rivers throughout the Colorado River Basin by addressing the region's overuse of water, creating a flexible market-based water management system, rewarding efficiency and restoring targeted flows and riparian habitat in both the Upper and Lower Colorado River Basins.

Social impact investment

Depending on the nature of the project, the authors believe there may be a role for social impact investment or program related investment (PRI). The concept behind social impact investment is for individuals or entities to invest in a project or enterprise that may provide a modest return on investment, but that will also achieve a beneficial social or environmental outcome in their area of interest. For some with philanthropic interest, this is a preferred approach, because it may allow for deployment of the same capital over and over (in contrast to a grant). The specific terms and rates of these type of investments are unique to the individuals or entities that offer them; however, these tools may

take some of the following forms:

- Loan with below market-rate interest
- Investment with shorter horizon on return, but no to low return expectation (somewhat like a revolving loan fund)
- Investment with longer horizon on return but clear expectation of positive return on investment

One opportunity to work with impact investors may be for a land trust (or local government entity) to purchase a property with valuable water rights and high conservation value and work to structure an ATM where a portion of the water rights might be sold (see Larimer County case study below), or where a municipal lease is put in place. The entity could then conserve and resell the land to an agricultural producer, ensuring that the remaining water is permanently restricted, while the investment partner retains a portion of the lease income (or is repaid through the sale of a portion of the water, if that is the structure). The Gates Family Foundation offers Program Related Investments and the Colorado Impact Fund is an organization that provides helpful information to nonprofits about social impact investing.



Example: Larimer County Open Space ATM on The Little Thompson Farm

Through various public planning efforts from 2012-2015, Larimer County Open Lands Program heard from citizens emphasizing the importance of acquiring water rights to protect prime agricultural lands, providing land for emerging farmers and small-acreage farming, and conserving working farms and ranch lands. The owners of a prime farm with excellent water rights along the Little Thompson, just west of Berthoud began discussions with the County in 2014. They wanted to learn how they could go about conserving the family farm, but needed to sell outright and therefore were not interested in a conservation easement. Larimer County recognized that the farm had many conservation values and met many of its conservation criteria, however Larimer County also acknowledged that the farm was out of

its price range and something creative would need to be done to conserve the farm.

In exploring options and potential tools for conserving this irrigated farm and its valuable water at a reduced cost, the County learned of water sharing tools that were being promoted through the Colorado Water Plan and Colorado Water Conservation Board. The County began discussing the concept in local water groups like Poudre Runs Through it, the Poudre River Sharing Group, and the South Platte Roundtable. Before the County could get funding and implementation plans in place, the farm went on the market and was advertised by the realtor as developable land and water and essentially slated for buy-and-dry. The Colorado-

“By successfully piloting this agreement, Larimer County and the City and County of Broomfield are demonstrating that, by working together and sharing valuable resources, it is feasible to preserve fast-disappearing farmland at a reduced cost and secure a perpetual source of drought firming water for Colorado’s growing cities.”

- Alex Castino, Larimer County Open Space



Larimer County and City of Broomfield staff responsible for innovative ATM.

Big Thompson (“C-BT”) water associated with the farm was highly transferable to municipal and industrial uses and thus commanded a premium that only developers or municipalities could afford. Native surface water rights from the Handy Ditch could also have been dedicated permanently to the local water district for residential use and could have served 112 new urban or 56 new rural residences. The threat of development was evident when the farm immediately went under contract to a developer. Although Larimer County still needed to go through lots of process, fundraising, and partner searching, it placed a backup contract on the property as it continued to learn and come up with a strategy.

In August of 2016, Larimer County purchased the 211 acres of productive farmland and water for \$8.4 million. The acquisition included 240 units of Colorado-Big Thompson (C-BT) and 16 shares of Handy Ditch water as well as 20 shares of Dry Creek Lateral (delivery rights), along with the minerals and farm and water infrastructure. The Town of Berthoud, using their share of the county open space sales tax dollars, contributed \$100,000 toward the acquisition and the remaining funds were provided by LCOLP through an interdepartmental loan to bridge the gap until a municipal water partner was identified. The farm was conserved for its high agricultural, historic, scenic, community buffer and educational values. There were at least two additional backup contracts behind the County’s, both from developers and water brokers

With funding from the Colorado Water Conservation Board (CWCB), the County hired a team of water and agriculture experts to help it design an agreement that would work for both the farm and a water provider, with the goals of 1) conserving a viable, irrigated farm in perpetuity, 2) leveraging funds through piloting a water-sharing agreement, and 3) creating a viable model to catalyze future ATMs. Designing a new type of partnership required the project team to navigate new waters. Larimer County engaged various stakeholders to advise on the project, including local ditch boards, the farm lessee, and the Northern Colorado Water Conservancy District (Northern Water). These

Terms of the Agreement

Larimer County sold 115 C-BT units to Broomfield and retained a first right of refusal to lease back these units for assessment cost plus 10%, when available.

Larimer County retained 125 C-BT units, 80 of which are subject to an ATM that allows Broomfield to use the water 3 out of 10 years on a rolling basis.

- Broomfield paid 40% of the appraised value of the C-BT units up front for this right.
- Broomfield will pay a fee of \$225 per unit when it uses the water. This payment will be subject to a custom escalator beginning in 2028 that tracks the value of water.
- The water-sharing agreement included the following additional terms:
- Broomfield must notify Larimer County it will be using the water by Jan. 31 of that water year.
- Broomfield may provide late notice to use the water up to June 1, so long as the farmer’s crop-related costs are reimbursed.
- Broomfield may not partially exercise the ATM; all 80 units must be taken and charged.
- The ATM water may not be sub-leased by Broomfield.
- Larimer County retained native Handy Ditch water and will likely obtain additional Handy shares with the proceeds of the ATM, to add redundancy to the farm’s viability.

discussions were fruitful in informing the parameters of the ATM and providing on-the-ground checks and balances for the team’s assumptions. One unexpected result of these conversations was a rulemaking process initiated by Northern Water to provide guidelines for perpetual water-sharing agreements on C-BT water.

Even when an ATM appeared feasible, according to the experts, Larimer County needed to find the right

water-sharing partner with compatible water portfolio needs, financial capacity, and decision-maker support for trying something new and innovative. The project team met with more than two dozen water providers over two years, beginning with those closest to the farm, before broadening the search outside Larimer County but remaining within Northern Water's boundaries and the South Platte River Basin. Ultimately, the City and County of Broomfield (Broomfield) rose to the top and ticked all the boxes of a great water-sharing partner.

Getting to the final agreement required extensive negotiations between Larimer County and Broomfield. The project team provided guidance to ensure the final deal would meet the above-stated goals for Larimer County, as well as the needs of Broomfield and the

farmer. The team produced a Farm and Water Viability Plan to guide how the farm might be operated under the terms of the water-sharing agreement and remain viable into the future under various hydrologic and market conditions.

Ultimately, Larimer County and Broomfield reached a deal on a perpetual Interruptible Water Supply ATM that allowed Larimer County to conserve a viable 211-acre farm in perpetuity for about half of the initial purchase price and allowed Broomfield to acquire a dependable water supply and reliable drought, drought-recovery, and emergency water supply at a reduced cost and without utilizing buy-and-dry.

Please see Appendix C for Q&A with Larimer County Open Space staff on this project.



Photo credit: Charlie Johnson

RECOMMENDATIONS: INCREASING INCENTIVES AND IMPACT

Water Rights Compensation Structure

The limitations on valuing water rights in a conservation easement have been outlined by the authors. Determining “as is” values before and after restricting water rights has proven ineffective for many water rights. One method for dealing with the lack of indicated value loss under certain vulnerable ditch systems would be to establish a set percentage for conservation easement compensation as a percentage of the market value of water rights within a specific area. The following section discusses ideas which are not supported by the existing Colorado statutes and which would require amendment to change the basis of the conservation easement tax credit.¹

While not based on market value of the water per se, the Lower Arkansas Water Conservancy District (LAWCD) has internally determined a set level of compensation for purchasing conservation easements, using its funds from its special tax district status. Several years ago, LAWCD engaged an appraiser and engineer to study property along a primary canal with direct flow water rights. The analysis determined that while the market value of the property was \$4,000/acre, agricultural production could only support a value of \$2,000/acre. LAWCD decided that for properties with similar water rights, they would pay landowners approximately

\$2,000/acre for a perpetual conservation easement with the right reserved to participate in the Super Ditch lease-fallowing project.

Currently, this type of compensation determination (or any not based on a qualified appraisal) would not qualify for Colorado conservation easement tax credits or for federal conservation easement charitable tax deduction benefits.

If the technique of establishing a set percentage of market value was used as a basis for generating tax credits, a number of issues would have to be carefully considered. First, how would compensation levels be determined? Would a set percentage of market value be available statewide or would it just be available for specific geographic areas or specific property types such as irrigated farms?

If this percentage approach were to only be used in certain situations, some mechanism would have to be in place to determine the geographic area and/or property type where this would be utilized. One avenue for determining where the approach could be used would be to have the Conservation Easement Oversight Commission involved in approval of the alternative approach.

¹ Immediately before this guide went to print, legislation was passed which creates an administrative valuation process, but that process will be determined by a working group and is yet unknown.

Areawide Valuation Models and Set Percentage Compensation

The use of a set percentage to determine compensation would still involve considerable appraisal overhead if each potential conservation easement property was to be appraised. Therefore, this conservation strategy would

still involve significant costs and if the compensation was somewhat marginal, it might be worthwhile to consider ways to reduce that overhead and increase levels of compensation.

The Natural Resources Conservation Service has used the concept of “Areawide Valuation Models” and that continues to be an option under the new farm bill. In fact, the NRCS has used areawide model for Wetland Reserve Easements throughout the country. In the case of the NRCS, the valuation models were intended to replicate before and after market value, although that wasn’t always the case. In fact, WRP transactions have often gravitated towards locations where above market compensation occurred.

If a funder such as GOCO were to utilize an areawide model, a defined market area could first be identified (say a ditch system or group of ditches). Full “as is” market values could be determined. A set percentage could then be the basis for compensation. This approach certainly deviates from pure market values, but it would allow for vulnerable water rights to be identified and to possibly be protected in advance of looming municipal influences.

Potential Advantages of Using a Percentage of Market Value

A major problem with the tax credit program relating to irrigated lands is that it is based on the current value spread between unrestricted and conservation easement restricted sales. Due to a limited spread between these values, there is little incentive to do conservation easements in many locations. This has been the most obvious in the Arkansas Valley where numerous easement restricted farms have sold with limited value loss. These sales essentially prevent the tax credit program from being an effective preservation incentive in spite of the fact these irrigated farms are threatened with conversion to municipal use over the long term.

Paying landowners based on a percentage of market value has been an effective tool for Lower Arkansas Water Conservancy District and could be an effective tool for the state if tax credits could be issued for such transactions. If this was part of the tax credit program it could allow land trusts and local governments to preserve water rights in advance of the sudden value increases that occur when a municipality begins purchasing water in a given ditch system. An alternative approach to the tax credit could also lead to pooling money from other sources such as Great Outdoors Colorado or county open space taxes.

Public Funding for Conservation ATMs

It is abundantly clear that while GOCO funded projects and the Colorado state tax credit will remain critical resources to create incentives for conservation. These existing sources, however, may not be adequate to address the scale of the water rights challenge or to allow for creativity in providing incentives for water rights which are difficult to value under the USPAP rules.

Local government sale tax initiatives

While residents of the South Platte Basin are likely to be most familiar with the county sales tax programs that fund Larimer County and Boulder County’s Open Space programs, the basin offers another example in the Park County Land and Water Trust Fund. Unlike Larimer or Boulder Counties which have fully

staffed open space programs, the Park County Land and Water Trust Fund is administered by a Board of Directors that competitively fund projects cultivated and implemented by third-party partner entities, such as land trusts. Founded in 1998, the Park County Land and Water Trust uses revenues derived from a 1% sales tax to preserve, protect, acquire, improve and maintain Park County’s remaining water resources as well as lands in Park County containing water rights and resources. While the Fund does utilize a portion of one County staff member’s time as a liaison to the County Commissioners, this model is very low-cost to the County and shifts funds from administration and staffing directly to protection of water rights. For a County of modest size, the sales tax has generated an

average of \$640,000 per year, over the last five years. By leveraging funds brought by third-party partners, the County's investment of \$5.8 million over the last 29 years has made \$22.3 million of projects possible, including the protection of approximately 20,000 acres and associated water rights. This model could be of interest to other counties or municipalities.

An increase in the number of local government sale tax initiatives would greatly enhance the ability of the community to leverage a number of funding sources, while allowing the local government to drive the types of projects that are most beneficial to that particular jurisdiction.

Statewide funding

If the State values creative alternatives to buy and dry, it must address the higher transaction costs associated with ATMs and the long-term (or indefinite) costs

associated with leasing water supplies in order to incentivize participation by municipalities in ATM projects. Reducing the cost of leased water supplies might be explored through a number of ideas including: direct subsidies, creation of an institution (such as a water bank) to both reduce transaction costs and motivate participation by agricultural users by reducing lease terms, and/or development of shared infrastructure projects that could benefit water supply—all of these activities would benefit from dedicated water funding. Colorado's land conservation and recreation funding through Great Outdoors Colorado is the envy of the nation and perhaps Colorado should look to a similar type of funding structure to incentivize the types of water projects that will encourage creative solutions that smooth the path for combined conservation and water-sharing arrangements that collaboratively approach water management.

Scale – Moving Beyond Parcels

While landscape scale planning is common in the conservation community, most conservation projects are still implemented at the parcel level. Given the pace of water development and the costs associated with a change of use, it may be time for the conservation community to take a page from the water community's playbook and, like the Super Ditch and Northeast Colorado Water Cooperative, begin experimenting with project scale. Land trusts and local government open space programs might work with ditch companies

to implement multi-parcel, or at least simultaneous conservation easement/ATM agreements across multiple owners. While each conservation easement and lease agreement may differ, some efficiencies of scale could be realized in terms of both conservation easement costs and ATM costs. This would have the additional benefit of providing a larger amount of water to a municipal water provider, creating a greater incentive for their partnership and investment.

Legislation to Link Conservation Easements and ATMs

Although there is existing state policy that supports alternatives to buy and dry and there is a clear directive for the State to encourage ATMs in the Colorado Water Plan, it behooves the conservation community to seek an explicit legislative statement that the avoidance of buy and dry is a qualifying conservation value for which a conservation easement can be created (or amended) and a conservation easement tax credit can be claimed.

Either the conservation easement enabling statute could be amended to specifically address the use of water rights separate from the land in support of water sharing agreements with alternatives to buy and dry, or a separate affirmative statement could be introduced as a complementary piece of legislation. If and when any of these approaches are pursued, it is important for ATMs to be broadly defined as to not limit the flexibility

Parting Thoughts

If Colorado's land conservation community does not pursue more innovative land preservation techniques when it comes to water rights, the no action future is clear. One need go no further than the ditch systems on the main stem of the Lower Arkansas or South Platte rivers to see the steady and continuing conversion to municipal uses. Few South Platte ditches had municipal influences in 2000, while today almost every ditch between Brighton and Greeley has some municipal ownership.

Water leasing has potential to be a great benefit for farm incomes and while this may attract outside investment, it will surely help to keep more farmers on the land and more farm income within rural communities as opposed

to conventional buy and dry. Municipal water leasing may reduce total crop acres and that will certainly have some consequence, but the capital infusion could well be an offsetting factor, and perhaps/likely a net gain in terms of the impact on many agricultural communities. Higher farm income could also lead to positive investments in the land and farm infrastructure, as it has elsewhere. The conservation community has a unique opportunity to be part of a solution that reduces buy and dry, making water available for more diverse needs, while ensuring that it is permanently available in most years to support agricultural production and the myriad of conservation benefits that Colorado's agriculture provides.



Fallowing of Alfalfa and Grass Hayfields: Impacts to Yield and Recovery Times

To generate water for conservation projects, producers must reduce or stop irrigation on participating fields. This can be done by either choosing to not irrigate at all for an entire growing season (full-season non-irrigation), or to only irrigate for a certain part of the season (split-season irrigation). Reducing irrigation saves water because it reduces overall crop yield; the price of the water transaction is intended in part to offset this loss. Depending on the practice, reduced irrigation may conserve anywhere from 0.5 acre-feet of water/acre (in high-elevation pastures) to 3.4 acre-feet/acre (in lower elevation alfalfa fields).

To better understand the potential benefits and impacts to producers that reduce their irrigation for a conservation project, the Conservancy has partnered with Colorado State University (CSU) on multi-year field studies to:

1. Determine the impacts to yield and forage quality from different reduced irrigation practices on alfalfa and grass fields.
2. Gain a better understanding of the recovery period for these crops and any carry-over effects.
3. Assess the amount of water that might be available for water transactions through reduced irrigation.

Detailed Overview of Fallowing Field Studies

In 2016, we completed a three-year study to evaluate the agronomic impacts from reduced irrigation. We set up nine field sites throughout western Colorado where we did a side-by-side comparison of business-as-usual irrigation with a number of different reduced irrigation treatments for both alfalfa and grass. Each grass site had one year with no irrigation followed by two years of recovery under full irrigation. Each alfalfa site had a fully irrigated reference plot and then one to two treatment plots that received normal irrigation in the beginning of the season and then no irrigation after the first or second cutting. This study helped answer a number of important questions about impacts to yield and forage quality, but also raised other questions, including: Would the results hold at larger field sizes? What about other types of split-season irrigation arrangements? How can we best measure water savings?

To answer those questions, we embarked on a larger, five-year field study, also with CSU. For this study, we have seven field sites that also compare a variety of full- and reduced-irrigation treatments. These treatments include: cutting off irrigation in June, July, and August; not starting irrigation until June; as well as, taking an irrigation pause in July during the hottest part of the summer. For each field site we are continuing to look at yield and forage quality as well as weed pressure and other agronomic factors. We also have each site fully instrumented to measure all water applied, surface runoff, and soil moisture content at multiple depths. This will help us make measurements of water savings that would be available for a potential water transaction. This study is entering its third year. We have had two years of reduced irrigation and will be evaluating recovery and potential impacts on crop rotation for the next three years.

What did we find?

Multiple variables, including elevation, soil type, and precipitation, led to large variations in yield reductions in our test plots. While this makes it difficult to predict exact impacts to individual properties, preliminary results are as follows:

Full-season non-irrigation of grass hayfields and pastures:

- Although there is variability between locations, climates, and seasons, producers can expect significant yield reductions in both the non-irrigated year and first year of recovery.
- Based on the data collected to date, most grasses will recover to nearly normal productivity after two years of normal and sometimes sooner.
- Although producers can expect an increase in forage quality (lower fiber, higher crude protein) which is a positive outcome from an animal nutrition standpoint, these improvements do not offset the loss in production.

Split-season fallowing of grass hayfields:

- Producers can expect yield reductions during the non-irrigated months, especially summer and fall.
- Producers should expect modest yield reductions in the first harvest yield following water stress in the previous year
- Some grasses with higher drought tolerance (smooth brome grass, orchardgrass) exhibit good recovery following water stress in the previous year, so forehand knowledge of grass species is advised.
- Fields where deeper rooting occurs are also likely to support stronger recovery following irrigation reductions

Split-season irrigation of alfalfa hayfields:

- Alfalfa is very resilient and adapted to water stress, which makes it a good choice for saving water.
- As with grass fields, producers can expect an increase in alfalfa forage quality but it does not offset the loss in production.
- Although there is variability among sites and years, when irrigation was stopped after the first cutting, yield reductions ranged from 42 to 71%. When irrigation was stopped after the second cutting, yield reductions ranged from 0 to 54%.
- After two years in the study, the split-season irrigated fields yielded the same amount or more than the control field during the beginning of the year when both were fully irrigated. CSU is continuing to investigate this, but potential reasons include: reduced pressure from stem nematodes, reduced disease pressure, less weed competition, and an accumulation of carbohydrates as a response to drought stress.

Conclusions and recommendations:

- Based on the results of the field tests, The Nature Conservancy recommends split-season irrigation of grass hayfields for conservation projects.
- **In general, we have found that while there are impacts to crop yield from reduced irrigation, most producers are able to find options that work for their operation that have a manageable risk and a positive economic benefit.**

APPENDIX B

MEMORANDUM: AGRICULTURAL WATER SHARING UNDER CONSERVATION EASEMENTS TO SUSTAIN AGRICULTURAL PRODUCTIVITY, CONSERVE OTHER AGRICULTURAL LANDS, AND TO MEET MUNICIPAL WATER SUPPLY NEEDS

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Background:

The Statewide Water Supply Initiative forecast that Colorado’s population will double from 5 million people to nearly 10 million by the year 2050. As many as 80% of the new citizens will be located within Colorado’s Front Range. And much of that growth is expected to occur in northern Colorado, particularly Boulder, Larimer, Weld, Adams and Morgan counties. As a consequence of this growth, the Colorado Water Conservation Board estimates that the South Platte River basin could lose nearly 50% of its 830,000 acres of irrigated acreage by 2050 if recent practices continue to dry up irrigated land to meet municipal water supply demands.

Governor Hickenlooper stated that “Coloradoans find that the current rate of purchase and transfer of water rights from irrigated agriculture (also known as “buy-and-dry”) is unacceptable.” Exec. Ord. D 2013-005, at ¶ II.A (May 14, 2013). The Governor then directed the CWCB to prepare the “Colorado Water Plan,” which “must incorporate . . . a productive economy that supports vibrant and sustainable cities, [and] viable and productive agriculture . . .” to address the State’s water supply “gap.” *Id.* at ¶¶ II.A, III.A. The need to meet future municipal water demands paired with the desire to keep water available to support agricultural and natural resources mandates that Coloradoans find alternatives to buy-and-dry.

Agricultural-municipal (“ag-muni”) water sharing has broad-based support, including the Governor, the Colorado General Assembly, the Department of Natural Resources, the Colorado Water Conservation Board (CWCB), and the Interbasin Compact Committee (IBCC). The Colorado General Assembly has funded CWCB’s alternative transfer methods program to develop alternatives to agricultural buy-and-dry for the past six years, including this project. Further, the legislature affirmed “its commitment to develop and implement programs to advance various agricultural transfer methods as alternatives to permanent agricultural dry up. . .” HB 13-1248, at § 1 (May 13, 2013). The CWCB unanimously supported passage of HB 13-1248, believing that it is urgent to implement alternatives to traditional permanent agricultural to municipal transfers. *See* Preamble to HB 13-1248.

Noting that agriculture is the third largest component of our State’s economy and vital to the State’s culture and quality of life and rural communities, the IBCC believes “[l]arge-scale dry-up of irrigated agriculture has considerable adverse social, economic and environmental consequences.” Letter to Gov. Ritter and Gov.-Elect Hickenlooper, at 4 (Dec. 15, 2010). The IBCC concluded that “[a]lternatives to permanent agricultural water transfers represent a viable way to meet a portion of the M&I water supply gap. However, there are significant hurdles to implementing these programs . . .” *Id.* at 10

Coupling perpetual conservation easements on irrigated land with municipal water supply agreements is a means of sharing agricultural water to achieve the security of supply desired by municipal water providers, while sustaining long-term agricultural production.

However, most of the charitable entities that hold conservation easements (generally known as land trusts) are bound by federal tax laws requiring that their actions serve public, and not private, interests. These nongovernmental, nonprofit Internal Revenue Code Section 501(c)(3) land conservation organizations are rightly concerned that federal tax laws limit their ability to permit ag-muni water sharing in conservation easements, particularly regarding changes to existing conservation easements to allow ag-muni water sharing.

The topics addressed by this legal analysis/memorandum include: first, examining the framework provided by Colorado's conservation easement enabling act to understand the potential for allowing ag-muni water sharing under in future conservation easements; and second, reviewing federal charitable tax laws that may affect the ability of conservation organizations to allow ag-muni water sharing in future and existing conservation easements. Finally, the Handbook will include language for conservation easement deeds to allow ag-muni water sharing, including appropriate policy recitals, specific findings regarding ag-muni water sharing and the conservation values, and explicit authorization and parameters for ag-muni sharing.

Legal Queries:

Background, as set out in The Colorado Lawyer:

To explain the nature of a conservation easement, it is best to resort to the familiar law school analogy of the "bundle of sticks," or rights. Before granting a conservation easement, the owner of the unencumbered land owns the entire bundle of property rights which pertain to that land and which determine the lawful acts that may be performed on the land. The landowner may sell or give away this entire bundle of rights or may choose instead to dispose of one or more of the rights while retaining all of the others. For example, while retaining fee ownership, a landowner might nevertheless dispose of the right to (1) construct buildings on the land, (2) exclude the public from the land or (3) harvest timber or remove natural resources from the land.

When a landowner grants a conservation easement, the landowner gives up certain rights so that particular acts can no longer be performed on the land or can be performed only subject to certain restrictions. . .

The landowner has great flexibility in selecting which rights to relinquish and which restrictions to impose. . .

All interests of the landowner which are not conveyed away in the easement document remain the landowner's property. Thus, after the easement is granted, the landowner may engage in all lawful uses of the land which are not prohibited by or inconsistent with the easement.

Robt. C. Cutter, "Conservation Easements: A General Practitioners Guide," 19 Colo. Law. 221 (Feb. 1990).

Common examples of reserved rights in conservation easements on irrigated agriculture land include the right to maintain, repair, replace, or install new irrigation infrastructure, such as headgates, ditches, and center pivots without notice to or approval from a land trust.

(1) What is the legal framework for new conservation easements in Colorado?

a. How does the ag-muni concept fit in to our conservation values language? Can/does it qualify as a public benefit?

New conservation easements could define conservation values and public benefits to include ag-muni water sharing in support of agricultural sustainability through limited leasing of water for use off the property, if the separation would not diminish the agricultural conservation value of the land, and if the supplemental income would in fact further and sustain the property's agricultural uses. Furthermore, when conserved land permits ag-muni water sharing, the shared water satisfies municipal water supply demands in a corresponding amount and reduces the need for the municipality to buy-and-dry other irrigated land to obtain equivalent water to meet its water supply demands. This has the effect of conserving other unencumbered irrigated ag land -- likely to be squarely within the mission of the conservation organization -- albeit indirectly and at no cost to the organization. This should give comfort to land trusts that ag-muni sharing furthers the organization's goals both with regard to specifically conserved properties as well as on a landscape conservation scale and river basin municipal water supply scale. This approach arguably would be consistent with aspects of Colorado state law, and possibly also consistent with federal tax law, as discussed below.

b. Colorado's Conservation Easement Enabling Statute

Colorado revised its conservation easement enabling statute (the Act), Colorado Revised Statutes (CRS) § 38-30.5-101, *et seq.*, in 2003 to include water and water rights as a qualified conservation value that can be encumbered by or released from a conservation easement, and further, to define such water and water rights as those beneficially used on the protected land, in support of agricultural or other conservation values. Colorado courts upheld challenges to the 2003 statutory changes in *Allen v. Mesa Land Conservancy*, 318 P.3d 46 (Colo. App, 2012); *cert denied* (Aug. 5, 2013).

The Act does not specifically address the use of water rights separate from the land in support of agriculture uses, but instead defines the water rights beneficially used on the land as appropriate to retaining or maintaining uses on the protected property and other conservation values. *See* CRS § 38-30.5-102:

"Conservation easement in gross" ... means a right in the owner of the easement to prohibit or require a limitation upon or an obligation to perform acts on or with respect to a land or water area, ... *or water rights beneficially used upon that land or water area, owned by the grantor appropriate to the retaining or maintaining of such land, water, airspace, or water rights*, including improvements, predominantly in a natural, scenic, or open condition, or for wildlife habitat, *or for*

agricultural, horticultural, wetlands, recreational, forest, or other use or condition consistent with the protection of open land, environmental quality or life-sustaining ecological diversity...

The definition of the residual estate in subsection 105 implicitly recognizes flexibility in the use of water and water rights by providing that all interests not bound by the easement remain with the grantor of the easement, including the right to engage in all uses of the lands, water, and water rights affected by a conservation easement that are not inconsistent with the easement or prohibited by law. CRS § 38-30.5-105. Moreover, CRS § 38-30.5-103 authorizes both the creation of a conservation easement encumbering water or a water right, as well as specifically authorizing revoking the encumbrance of water or a water right by a conservation easement. *See* CRS § 38-30.5-103(5):

A conservation easement in gross that encumbers *water or a water right* as permitted by section 38-30.5-104 (1) may be created only by the voluntary act of the owner of the water or water right *and may be made revocable by the instrument creating it.*

This language provides that the water or water right attached to and bound by the conservation easement may be separated from such easement by the voluntary act of its owner, as permitted by CRS § 38-30.5-104(1), which allows for a conservation easement in gross to be created by “the record owners of the surface of the land and, *if applicable, owners of the water or water rights beneficially used thereon* by a deed or other instrument of conveyance specifically stating the intention of the grantor to create such an easement under this article.”

The reference in CRS § 38-30.5- 104(1) to water and water rights is separate and distinct from the right to *revoke* the encumbrance of water or water right by the conservation easement referenced above in subsection 103(5). Furthermore, subsection 104(5) underscores the right to separate or revoke water from a conservation easement because it requires 60-day notice to ditch companies of intent to bind *or revoke* water rights with or from a conservation easement. Subsection 111(2) similarly provides that any conservation easement affecting water rights created prior to August 6, 2003 is a binding, legal, and enforceable obligation if it complies with the requirements of the Act. Both of these subsections underscore the validity of easements binding water and water rights created before August 6, 2003, while at the same time allowing separation of encumbered water and water rights through revocation under the statute if such revocation or separation is consistent with the language of the easement and applicable law. The Colorado Court of Appeals specifically upheld the encumbrance of water and water rights in pre-2003 conservation easements in *Allen v. Mesa Land Conservancy*.

In sum, whether the revocation of the encumbrance or separation of the water or water rights from the conserved land is consistent with the easement depends on an easement’s specific language. Whether such revocation or separation of water or water rights from the land in an existing conservation easement is consistent with applicable law, however, directs us to consider federal tax laws applicable to land trusts for charitable gifts of conservation easements.

c. Colorado Conservation Easement Tax Credits under the Federal Internal Revenue Code

Conservation values. A conservation easement donation must qualify for a federal charitable tax deduction to be eligible for a Colorado state tax credit, so the Internal Revenue Code (Code) is effectively the controlling tax law applicable to conservation easement donations within Colorado. CRS § 39-22-522(2) The federal charitable tax deduction in Section 170(h) of the Code describes four distinct conservation values the protection of which may yield a federal charitable tax deduction for qualifying donations; one explicitly references agricultural land conservation either as *pursuant to a clearly delineated governmental conservation policy and providing a significant public benefit*, or as visually aesthetically pleasing to the public and providing a significant public benefit, as described in Section 170(h)(4)(A)(iii)(I) and (II). The open space conservation value described at Section 170(h)(4)(A)(iii) references the preservation of open space and defines the same expressly to include “farmland and forest land.”

Government conservation policies. Using the factors provided by the supporting Treasury Regulations (Regulations) at Section 1.170A-14(d)(4)(ii)(A), farmland conservation pursuant to a clearly delineated government conservation policy is illustrated by an example provided in Section 1.170A-14(d)(4)(iii)(A) as “the preservation of farmland pursuant to a state program for flood prevention and control”, *which demonstrates a governmental policy furthered by agricultural lands’ conservation with dedicated resources and benefits that cause the policy to amount to more than declaratory or aspirational.*” Both scenic and conservation policy prongs of the open space test must also create significant public benefit, which requirement is met by proving the public benefits of the continued agricultural use of the land, scenically, or as a matter of public policy, or both. Guidance for determining public benefit is provided in 1.170A-14(d)(4)(iv)(A), which states that among the factors to be considered are:

1.170A-14(d)(4)(iv)(A)(3) “The consistency of the proposed open space use with public programs (whether Federal, state or local) for conservation in the region, including programs for outdoor recreation, **irrigation** or water supply protection, water quality maintenance or enhancement, flood prevention and control, erosion control, shoreline protection, and protection of land areas included in, or related to, a government approved master plan or land management area;”

Several Colorado policies address the governmental conservation policy objective (and prong) of the Code and Regulation’s open space test. The Colorado conservation easement enabling act expressly authorizes the creation of conservation easements on land and water for agricultural use at CRS § 38-30.5-102; recognizes the retention or reservation of all rights not granted at CRS § 38-30.5-105; and contemplates the revocation of encumbrances on water and water rights at CRS § 38-30.5-104(1). Moreover, ag-muni water sharing occurs pursuant to state laws explicitly enacted to permit such sharing. *See e.g.*, CRS §§ 37-60-115(8), 37-92-103 (10.6), 37-92-308, 37-92-309. Colorado’s conservation easement tax credit is unquestionably a dedication of government resources that demonstrate that the state policy that encourages conservation easements is more than declaratory or aspirational, i.e., the tax credit is effectively an expenditure of state tax dollars to further the policies of the State’s conservation easement enabling act. Further, the example in the Regulations clearly contemplates public benefits beyond and off of the conserved land because the value of farmland for flood prevention and control is in allowing floodwaters to spread out, lowering flood crests and water levels, which reduces flood damage to off-farm developed areas. In ag-muni water sharing, the public benefits similarly occur offsite. Finally, when conserved land permits ag-muni water sharing, the shared water satisfies

municipal water supply demands in a corresponding amount – a clear public benefit – and reduces the need for the municipality to buy-and-dry other irrigated land to obtain equivalent water rights to meet its water supply demands, thus indirectly conserving other irrigated land.

Incidentally, scenic farmland preservation for the scenic enjoyment of the general public if development of the property would “impair the scenic character of the local rural ... landscape or would interfere with a scenic panorama” that can be enjoyed from a public place also qualifies for a charitable donation under the Code. 26 CFR § 1.170A-14(d)(4)(ii).

Inconsistent uses. Beyond expressly defining agricultural lands as part of the open space conservation value of the tax benefit, the Regulations also address inconsistent uses of land proposed for or subject to perpetual conservation easements under subsection 1.170A-14(e), which might be fertile ground to explore the concept of allowing agriculture to continue on a protected property while sharing the water and water rights with a municipality. The “exclusively for conservation purposes” subsection 14(e) of the Regulations sets out a test for inconsistent uses that states “no inconsistent uses of the land will be allowed which would accomplish the enumerated conservation purposes if such uses would harm ‘other significant conservation interests’” pursuant to Section 1.170A-14(e)(ii). The drafters of the subsection provide two agricultural examples of this inconsistent use concept as not permitted and permitted, respectively:

the preservation of farmland pursuant to a State program for flood prevention and control would not qualify under paragraph (d)(4) of this section if under the terms of the contribution a significant naturally occurring ecosystem could be injured or destroyed by the use of pesticides in the operation of the farm. However, *this requirement is not intended to prohibit uses of the property, such as selective timber harvesting or selective farming if, under the circumstances, those uses do not impair significant conservation interests.*

Ag-muni water sharing is analogous to selective farming in the example because it is necessary to either fallow land or limit crop irrigation to less than crop demands (aka “deficit irrigation”) for a farm to have water to share. In the context of inconsistent uses of protected property, then, the sharing of water and water rights pursuant to public policies, as discussed above, would be permissible as a non-destructive, albeit arguably inconsistent, use. This conclusion requires that sharing the water and water rights from the property would not defeat the overall agricultural open space objective and, conversely might actually further that objective because the supplemental farm income would sustain agricultural productivity.

For donated conservation easements, the Code and Regulations also define agriculture as an expressly qualifying protected conservation value, the inconsistency of use of which is fairly flexible if the end result – supplemental farm income to support sustainable agricultural productivity – is further protection of the conservation values that are the subject of the conservation easement. (26 USC 170(h)(4)(A)(iii); 26 CFR 1.170A-14(d)(1)(3), (d)(4)(i).

Other significant conservation interests. Another Code and Regulation requirement is that ag-muni water sharing would not result in damage or harm to “other significant conservation interests” on the property, such as other “unprotected” but significant interests, such as habitat values (although perhaps not articulated or defined as conservation values in the conservation

easement). Regardless, inconsistent uses are expressly permitted by subsection (14)(e)(iii) of the Regulations if such inconsistent use is “necessary for the protection of the conservation interests that are the subject of the contribution,” even if such uses are destructive of other (undefined) conservation interests. Applying this somewhat nebulous test to ag-muni water sharing that might impact habitat values, sharing would be permitted if it was necessary to protect the agricultural conservation interests which are the subject of the conservation easement, such as sustainable agricultural productivity. Nonetheless, it would be prudent in this context to include explicit findings in the conservation easement deed and perhaps environmental baseline report that address what otherwise might appear to be inconsistent uses.

d. Conclusion

Given the overlapping provisions of Colorado statute that reserve all interests not conveyed and authorize the revocation of an encumbrance on water and water rights, there does not seem to be any legal bar that would prevent an irrigator from reserving the right to participate in ag-muni water sharing in a conservation easement, *so long as the conservation organization that holds the easement agrees that it is consistent with the conservation values it seeks to protect, and the deed.* Indeed, the Lower Arkansas Valley Water Conservancy District at least one conservation organization has regularly permitted ag-muni water sharing in its conservation easements, and Colorado Open Lands has permitted it in two instances.

When drafting a new easement allowing ag-muni water sharing, prudence would suggest including a specific statement that the grantor reserves the right to share water with a municipality on terms to be negotiated between the two, and that ag-muni water sharing is consistent with the conservation values and why, such as the rationales described above.

(2) What is the legal framework for amending existing conservation easements, including risks and possible options – if any?

The challenge with amending existing conservation easements is to create a public benefit without creating impermissible private benefit to the current landowners.

a. Parties to existing easements must prove they are creating public benefit without impermissible private benefit when amending those existing conservation easements

The principal legal issue and constraint associated with amending existing conservation easements is as follows: impermissible private benefit or private inurement may be created if a land trust amends an existing perpetual easement, which was given for tax benefits at the state or federal level, in order to allow the use of encumbered water or water rights through ag-muni water sharing for use off of the protected property in order to sustain that property’s agricultural uses.

b. Private Benefit and Private Inurement Defined and Distinguished:

The purpose of the private inurement and private benefit rules is to ensure that tax-exempt organizations serve public interests and not private interests. Under both doctrines, a tax-exempt

organization must establish that it is organized and operated for the benefit of the general public and not for the benefit of private persons, including insiders such as founders, trustees, directors, officers, members of their families, persons controlled by these individuals, or any other persons having a personal and private interest in the activities of the organization; or non-insiders, including private individuals who are unrelated to the organization or its insiders, but who benefit disproportionately from the organization's activities. The most severe consequence the IRS can impose for violating the private inurement or private benefit rules is to revoke a charity's tax-exempt status, or, in the alternative for private inurement, to subject the organization and benefitting insider to intermediate sanctions in lieu of revoking tax exempt status.

Private inurement. The Internal Revenue Code (Code) Section 501(c)(3) explicitly prohibits private inurement, as derived from the requirement that exempt organizations be organized and operated exclusively for charitable purposes of which "... no part of the net earnings of which inures to the benefit of any private shareholder or individual..." While private inurement lacks precise definition, it is generally understood to forbid the flow or transfer of income or assets of a tax-exempt organization through or away from the organization, and the use of this income or assets by one or more persons associated with, or for the benefit of one or more persons with some significant relationship to the organization, for nonexempt purposes. The IRS states further in its General Counsel Memorandum 38459 that private inurement is "likely to arise where the financial benefit represents a transfer of the organization's financial resources to an individual solely by virtue of the individual's relationship with the organization, and without regard to accomplishing exempt purposes".

Private benefit. The Code does not explicitly mention "private benefit," rather, it requires that an entity be "organized and operated exclusively for religious, charitable, scientific" and other specified purposes. Although the concept of private benefit is not explicitly stated in the Code, it is referenced in the attendant Treasury Regulations (Regulations). Regulation Section 1.501(c)(3)-1(c)(1) provides that an organization will be regarded as operated exclusively for exempt purposes only if it engages primarily in activities which accomplish one or more exempt purposes, and that an organization will not be so regarded if more than an insubstantial part of its activities is not in furtherance of an exempt purpose.

Moreover, Regulation Section 1.501(c)(3)-1(d)(1)(ii) provides that an organization is not organized or operated exclusively for exempt purposes unless it serves "a public rather than a private interest." The U.S. Supreme Court in interpreting and elaborating on the doctrine has held that the presence of private benefit, if substantial in nature, will destroy an organization's exemption regardless of an organization's other charitable purposes or activities, even if the organization has many activities that further exempt purposes. *Better Business Bureau of Washington, D.C., Inc. v. United States*, 326 U.S. 279 (1945). The amalgamation of the Code, Regulations, and common law definition of impermissible private benefit is of non-incidental benefit conferred on disinterested persons (non-insiders) that serve private, rather than public interests.

This means that even if a nonprofit pursues activities that further its exempt purposes, it may still place its tax exempt status in jeopardy if it ultimately serves private interests. However, *incidental* private benefit will not cause the loss of tax-exempt status. As long as any private benefit is both qualitatively and quantitatively incidental to the furtherance of the nonprofit's

exempt purposes, the organization's tax exemption will not be in jeopardy. Any private benefit therefore must be: (a) (quantitatively) insubstantial in comparison to the overall public benefit conferred by the activity, or an indirect economic benefit to the private individual; and (b) (qualitatively) incidental as a necessary side-effect of achieving the organization's charitable objectives through the activity that benefits the public, which public benefits cannot be achieved without benefitting private interests.

Applying the private benefit doctrine to agricultural water rights freed from perpetual use on the conserved land therefore requires consideration of whether the private benefit to the landowner is: (a) (quantitatively) insubstantial in comparison to the overall public benefit conferred by the activity of supporting and subsidizing the continued use of the protected property for agricultural purposes, or an indirect economic benefit to the private individual as a result of the public benefit of allowing agricultural uses to continue and thrive; and (b) (qualitatively) incidental as a necessary side-effect of achieving the organization's charitable objectives through the activity that benefits the public of allowing agriculture to continue and water supply to municipalities to increase, which benefits to the public cannot be achieved without benefitting the private interests of increasing the value to the landowner in proportion to the money received for sale, transfer, or lease of water rights.

Ag-muni water sharing satisfies municipal demands in a corresponding amount, thereby reducing the need for the municipality to buy-and-dry other irrigated land to acquire equivalent water rights to meet its water supply demands. This has the effect of meeting public municipal water supply needs while conserving other (unencumbered) ag land. From this perspective, the supplemental farm income provided by ag-muni water sharing is quantitatively insubstantial and an indirect private economic benefit compared to the overall public benefit – additional land conserved from buy-and-dry plus additional public water supplies – and a qualitatively incidental side effect of the organization's charitable objectives of sustainable agriculture.

The private benefit of any increase in value to landowners subject to perpetual conservation easements is a necessary side-effect (and in fact is the point) of allowing sharing the use of water and water rights off of the protected property, and increasing the public's benefit by sustaining agricultural uses and meeting the public's need for additional municipal water supplies. The benefits to the public of the sustainability and continuation of agricultural uses protected by perpetual conservation easements cannot be achieved without benefitting the private interests of the associated landowners through increased income from the sharing of water and water rights. The quantitative analysis of whether and to what extent there is any increase in value to the landowners of ag-muni water sharing remains important to the comparison of the qualitative analysis of the private benefit to the public benefit, and therefore, the complete analysis cannot be accomplished without the valuation component, although the framework for analysis can be and is established here.

Colorado Revised Statutes

38-30.5-101. Legislative intent.

The general assembly finds and declares that it is in the public interest to define conservation easements in gross, since such easements have not been defined by the judiciary. Further, the general assembly finds and declares that it is in the public interest to determine who may receive such easements and for what purpose such easements may be received.

38-30.5-102. Conservation easement in gross.

"Conservation easement in gross", for the purposes of this article, means a right in the owner of the easement to prohibit or require a limitation upon or an obligation to perform acts on or with respect to a land or **water area, airspace above the land or water, or water rights beneficially used upon that land or water area, owned by the grantor appropriate to the retaining or maintaining of such land, water, airspace, or water rights**, including improvements, predominantly in a natural, scenic, or open condition, or for wildlife habitat, **or for agricultural, horticultural, wetlands, recreational, forest, or other use or condition consistent with the protection of open land**, environmental quality or life-sustaining ecological diversity, or appropriate to the conservation and preservation of buildings, sites, or structures having historical, architectural, or cultural interest or value.

38-30.5-103. Nature of conservation easements in gross.

(1) A conservation easement in gross is an interest in real property freely transferable in whole or in part for the purposes stated in section 38-30.5-102 and transferable by any lawful method for the transfer of interests in real property in this state.

(2) A conservation easement in gross shall not be deemed personal in nature and shall constitute an interest in real property notwithstanding that it may be negative in character.

(3) A conservation easement in gross shall be perpetual unless otherwise stated in the instrument creating it.

(4) The particular characteristics of a conservation easement in gross shall be those granted or specified in the instrument creating the easement.

(5) A conservation easement in gross that **encumbers water or a water right** as permitted by section 38-30.5-104 (1) may be created only by the **voluntary act of the owner of the water or water right and may be made revocable by the instrument creating it**.

38-30.5-104. Creation of conservation easements in gross.

(1) A conservation easement in gross may only be created by the record owners of the surface of the land and, **if applicable, owners of the water or water rights beneficially used thereon** by a deed or other instrument of conveyance specifically stating the intention of the grantor to create such an easement under this article.

(2) A conservation easement in gross may only be created through a grant to or a reservation by a governmental entity or a grant to or a reservation by a charitable organization exempt under section 501 (c) (3) of the federal "Internal Revenue Code of 1986", as amended, which organization was created at least two years prior to receipt of the conservation easement.

(3) Repealed.

(4) Conservation easements relating to historical, architectural, or cultural significance may only be applied to buildings, sites, or structures which have been listed in the national register of historic places or the state register of historic properties, which have been designated as a landmark by a local government or landmarks commission under the provisions of the ordinances of the locality involved, or which are listed as contributing building sites or structures within a national, state, or locally designated historic district.

(5) **If a water right is represented by shares in a mutual ditch or reservoir company, a conservation easement in gross that encumbers the water right may be created or revoked only after sixty days' notice and in accordance with the applicable requirements of the**

mutual ditch or reservoir company, including, but not limited to, its articles of incorporation and bylaws as amended from time to time.

38-30.5-105. Residual estate.

All interests not transferred and conveyed by the instrument creating the easement shall remain in the grantor of the easement, including the right to engage in all uses of the lands or water or water rights affected by the easement that are not inconsistent with the easement or prohibited by the easement or by law.

38-30.5-106. Recordation upon public records.

Instruments creating, assigning, or otherwise transferring conservation easements must be recorded upon the public records affecting the ownership of real property in order to be valid and shall be subject in all respects to the laws relating to such recordation.

38-30.5-107. Release - termination.

Conservation easements in gross may, in whole or in part, be released, terminated, extinguished, or abandoned by merger with the underlying fee interest in the servient land or **water rights** or in any other manner in which easements may be lawfully terminated, released, extinguished, or abandoned.

38-30.5-108. Enforcement - remedies.

(1) No conservation easement in gross shall be unenforceable by reason of lack of privity of contract or lack of benefit to particular land or because not expressed as running with the land.

(2) Actual or threatened injury to or impairment of a conservation easement in gross or the interest intended for protection by such easement may be prohibited or restrained by injunctive relief granted by any court of competent jurisdiction in a proceeding initiated by the grantor or by an owner of the easement.

(3) In addition to the remedy of injunctive relief, the holder of a conservation easement in gross shall be entitled to recover money damages for injury thereto or to the interest to be protected thereby. In assessing such damages, there may be taken into account, in addition to the cost of restoration and other usual rules of the law of damages, the loss of scenic, aesthetic, and environmental values.

38-30.5-109. Taxation.

Conservation easements in gross shall be subject to assessment, taxation, or exemption from taxation in accordance with general laws applicable to the assessment and taxation of interests in real property. Real property subject to one or more conservation easements in gross shall be assessed, however, with due regard to the restricted uses to which the property may be devoted. The valuation for assessment of a conservation easement which is subject to assessment and taxation, plus the valuation for assessment of lands subject to such easement, shall equal the valuation for assessment which would have been determined as to such lands if there were no conservation easement.

38-30.5-110. Other interests not impaired.

No interest in real property cognizable under the statutes, common law, or custom in effect in this state prior to July 1, 1976, nor any lease or sublease thereof at any time, **nor any transfer of a water right or any change of a point of diversion decreed prior to the recordation of any conservation easement in gross restricting a transfer or change shall be impaired, invalidated, or in any way adversely affected by reason of any provision of this article.** No provision of this article shall be construed to mean that conservation easements in gross were not lawful estates in land prior to July 1, 1976. Nothing in this article shall be construed so as to impair the rights of a public utility, as that term is defined by section 40-1-103, C.R.S., with respect to rights-of-way, easements, or other property rights upon which facilities, plants, or systems of a public utility are located or are to be located. **Any conservation easement in gross concerning water or water rights shall be subject to the "Water Right Determination and Administration Act of 1969", as amended, article 92 of title 37, C.R.S., and any decree adjudicating the water or water rights.**

38-30.5-111. Validation.

(1) Any conservation easement in gross created on or after July 1, 1976, but before July 1, 1985, that would have been valid under this article except for section 38-30.5-104 (3) is valid and shall be a binding, legal, and enforceable obligation.

(2) **Any conservation easement in gross affecting water rights created prior to August 6, 2003, shall be a binding, legal, and enforceable obligation if it complies with the requirements of this article.**

Q&A with Larimer County Open Space about the Little Thompson Farm Acquisition and Open Space

Question: Can you provide background on Larimer County's Open Space program? When was it created and what is its budget and staffing?

Answer:

Larimer County's Open Lands Program (OLP) is a publicly-funded land conservation entity through a ¼-cent sales and use tax and is guided by a 12-person citizen advisory board. The sales tax generates around \$6 million per year that supports land conservation acquisitions, management, and staffing costs. LCOLP works with willing landowners to conserve land throughout the County using various conservation tools, including conservation easements and fee title acquisitions. Historically, the Open Lands Program has leveraged sales tax dollars through grants and donations to the tune of 47 cents to every Help Preserve Open Spaces sales tax dollar. Larimer County's Department of Natural Resources (LCDNR) currently employs 46 permanent and over 100 seasonal staff, a handful of which are under OLP. The staff members who primarily negotiated and brought the water sharing project to fruition were the OLP program manager, Kerri Rollins, and land agent, Alexandria Castino.

Question: With an \$8 million price tag, why did the County decide to make such an investment in irrigated farmland? How did staff secure necessary buy-in for such a substantial investment?

Answer:

In its 25-year history, of the 29,000 acres in fee and over 20,000 acres in conservation easement, OLP has conserved less than 1,000 acres in irrigated agriculture, primarily because the associated water rights are cost-prohibitive for OLP. At the same time, Larimer County's farmland has and continues to be converted to other uses at a rate of 4,500 acres each year. Between 1997 and 2007, 8.4% of farmland in Larimer County was converted to a non-agricultural use, although it is some of the most productive agricultural land in the state. This loss not only threatens a way of life in Larimer County, but also a major component of the local economy.

Through various public planning efforts, OLP heard from citizens and the Agricultural Advisory Board urging the County to acquire water rights to protect prime agricultural lands and provide land for emerging farmers and small-acreage farming. As a result, the Little Thompson Project was part of a greater vision identified in the 2015 OLP Master Plan to conserve prime agricultural lands and their integral water portfolios by investigating innovative approaches; and to conserve or share water and provide increased opportunities for emerging farmers and ranchers.

The support of County leadership was critical to the success of this project. County decisionmakers were also driven by the citizens to find a way to conserve irrigated farmland while also stewarding public resources responsibly. County staff was able to secure the support of County leadership through consistent informational and strategizing meetings and with a well-thought-out back up plan should the ATM not come to fruition. This continuous communication allowed staff to proceed confidently with negotiating the best possible deal for the County.

Question: Can you provide some background on the conservation values of this particular farm?

Answer:

The Little Thompson Farm has a wide array of conservation values, including agricultural, scenic, community buffer, historic, riparian, and educational values. A few of these are highlighted below:

Agriculture:

The Land Evaluation-Site Assessment tool was used to determine the overall quality of this farm by looking at soil quality, farm size, water availability, proximity to markets, weed and erosion issues, and visual and natural values. It rated this farm good-excellent.

The farm has about 180 irrigated acres, including about 141 under a center pivot sprinkler, historically irrigated by 16 Handy Ditch shares and 240 C-BT units. Corn and sugar beets have been the predominant crops, yielding 170-210 bu/ac and 29-42 tons/ac respectively, in wet to dry years. The south end of the farm has historically been planted in alfalfa and flood-irrigated. Recently the lessee has planted this area in Sudan grass or dryland wheat to avoid the need for irrigation.

Habitat:

Raptors and songbirds use the large cottonwood for roosting and perching sites, including an active red-tailed hawk nest. Black bears and their cubs have been known to frequent the property, as well as coyote, fox, and many small mammals.

Scenic:

Located one mile south of the town of Berthoud and just two miles from the Larimer/Boulder county line, about ¾-mile of the property is adjacent to Hwy 287 and provides scenic features such as the iconic red barn, large cottonwood trees and gently rolling agricultural fields. Views from the Farm include a largely uninterrupted view west to the mountains and south to the Little Thompson River corridor.

Historical:

The Farm has a rich cultural history. There are several historic buildings on-site including a barn, chicken house, two houses, and a beet shack owned by the Berthoud Historical Society. There is an unmarked gravesite on the east side of the pond thought to be that of a traveler who died in the 1850's-60's along the Cherokee/Overland Trail route that bisected the Farm north-south.

Question: When and why did the idea for some type of ATM emerge?

Answer:

The farm family, consisting of three siblings, engaged Larimer County to learn how they could go about conserving the family farm as a working landscape while meeting their need to dispose of the property. Larimer County was interested in the property due to its various conservation values, but also realized that the outright purchase of the farm and its water would require creativity and partnerships to help offset the significant purchase price of \$8.4 million. In exploring options and potential tools for conserving this irrigated farm and its valuable water at a reduced cost, Larimer County learned of water sharing partnerships or ATMs that were being promoted by the state and discussed in local water

groups like the Poudre Runs Through It, the Poudre River Sharing Group, and the South Platte Basin Roundtable.

Question: How did you explore the feasibility of an ATM?

Answer:

Once the property was under contract, Larimer County applied for and was awarded a CWCB ATM grant to hire a team of water and agricultural experts. Larimer County engaged stakeholders and began to propose ATM scenarios to the Northern Colorado Water Conservancy District (“Northern Water”). These discussions spurred Northern Water to initiate a rulemaking process to develop rules for entering into perpetual ATMs, or “interruptible supply contracts” with C-BT water that provided part of the basis for our ATM.

Throughout negotiations with potential water partners, the expert team provided technical support to the negotiating team to identify water supply and economic conditions necessary to maintain the long-term viability of the farm under various water agreement terms. The engineers, economist, and agronomist worked closely to develop models that simultaneously kept the farm financially viable while offering enough water to be sold and/or put into the ATM to attract a water partner and meet Larimer County’s budgetary needs for the conservation project. The team also produced a Farm and Water Viability Plan that provides operational recommendations from a water supply and irrigation perspective so that combined farming sales revenues and water lease revenues will sustain the operational costs of the farm in the long-term.

Question: Who was the “team” who made the ATM happen?

Answer:

The team that brought this first-of-its-kind ATM to fruition included:

- Kerri Rollins and Alex Castino, Larimer County
- Melanie Calvert and Erin Messner, City and County of Broomfield
- Todd Doherty, Western Water Partnerships
- Dan Brown and Sara Irby, Fischer, Brown, Bartlett & Gunn
- Matt Lindburg and Isabelle Lheritier, Brown & Caldwell
- Ben Norman, Harvey Economics
- Brad Walker, Ag Skill, Inc.
- Jason Brothers and George Wallace, Larimer County Open Lands and Agricultural Advisory Boards

Question: How did you evaluate impacts of the ATM to the conservation values?

Answer:

The LCDNR stewardship team evaluated each of the conservation values on the property and did not identify any specific water supply needs to exclusively serve the habitat, cultural, educational or scenic values on the property. The needs of the agricultural operation were evaluated by the team of consultants. The consultants provided acceptable ranges to the negotiating team, with confirmation from County leadership and the farm lessee, on the most important potential terms of the agreement to

achieve the County's goals of preserving a viable irrigated farm, obtaining a strong financial partnership, and creating a good model for future water sharing deals.

The team of experts in water and agriculture provided guidance to ensure the final deal would meet the above-stated goals for Larimer County, as well as the needs of Broomfield and the farmer. The Farm and Water Viability Plan, referenced above, also provides recommendations for operating the farm viably under the terms of the water-sharing agreement (ATM) and remain viable into the future under various hydrologic and market conditions. The Plan can be found at: <https://www.larimer.org/naturalresources/openlands/acquisitions/little-thompson-farm>

Ultimately, Larimer County and Broomfield reached a deal on a water-sharing agreement that served the needs of both. Many of the terms contribute to the agricultural viability, including the notice requirements and ATM-year lease payment. The final ATM is available in the Larimer County clerk and recorder records at reception number 20170065264. Larimer County also incorporated farm viability terms into its lease with the farm lessee, including a lower ATM-year lease payment, and guidelines for weed control and ground cover.

Question: What were the greatest hurdles to this project?

Answer:

This project, being the first of its kind in the state, overcame many hurdles to get to the finish line.

As previously discussed, something that was not anticipated when the project began was the Northern Water rulemaking. Although the team and potential water partners advocated strongly throughout the rulemaking for as much flexibility and incentives as possible to make ATM water more attractive than outright sales, many of these recommendations did not make it into the final rules. This means that the County needed to sell a larger block of C-BT to interest a partner in entering an ATM rather than buying all the water outright.

Finding the right water sharing partner was another big step in the process. Broomfield was initially overwhelmed with the broad conceptual character of what Larimer County was proposing, although their leadership supports open space conservation, and they had the necessary capital and need for dry-year water supply. Once Broomfield began putting the pieces together of what they needed from the deal, it became more tangible and wieldy for the parties to put down on paper and negotiate the finer details. The expert team was also invaluable to providing the support and technical expertise to gain Broomfield's confidence in the project, particularly through the Farm and Water Viability Plan.

Question: Have there been any political implications for the program?

Answer:

The County received some criticism for partnering with a water provider outside the county. County staff pursued a partnership with Larimer County water providers exclusively for a year before turning attention to potential partners outside of the county. Ultimately, the team was unable to negotiate a

deal with the entities within Larimer County that met the goals for the project. The team would advise other entities that pursue this sort of arrangement to begin as locally as possible to the farm and exhaust those opportunities before moving outward. The intrinsic value of keeping viable farmland close to the community involved in the water sharing deal may also add to the value of the arrangement, particularly in municipalities, which tend to have multiple objectives such as those with an open space initiative that also have unmet water needs, or a water district with board members that also farm in the same ditches as the farm being conserved. Although Broomfield is outside of Larimer County, it is still within Northern Water's boundaries and the South Platte Basin. Supplying Broomfield with needed water supplies benefits the basin and prevents more farms in Larimer County from being targeted for buy and dry to fill that need.

The County also had to overcome, to some extent, the perception that water sharing is essentially buying and drying a farm. As discussed above, of the choices we had, to pass on the opportunity, conserve a cheap dry-land farm, or pursue something innovative, we chose the option that had the greatest chance of keeping the most viable farming operation possible through a creative partnership, meeting multiple conservation and water supply objectives that serve the whole front range, minimize the impacts to the farm, and responsibly steward county tax dollars by leveraging to spread our dollars further.

Question: Is there anything you would do differently if another opportunity came up tomorrow?

Answer:

Ideally conservation organizations and water partners can approach future farm conservation and water sharing projects together from the outset. If not, then hopefully those conversations and relationships can be ongoing before the farm comes up for potential sale. We hope that the closing of this first-of-its-kind ATM catalyzes more of these conversations between municipal and agricultural/conservation interests that are win-win and not buy-and-dry. We also hope that this project provides a model for others to look at and learn from, and anticipate that the farm's operation over time will provide valuable insights into successful aspects and areas for improvement in future ATMs.

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ECONOMIC IMPACT ANALYSIS OF REDUCED IRRIGATED ACREAGE IN FOUR RIVER BASINS IN COLORADO

Jenny Thorvaldson and James Pritchett¹

Overview

Water is an important natural resource that contributes to the Colorado's economic, cultural and social well-being. But, as recent events have shown, our limited water supply has many competing uses and is undergoing many rapid changes. Water rights are being voluntarily transferred from irrigated agriculture to municipal use, groundwater supplies are diminishing and wells without sufficient augmentation are being retired. Ultimately, this means fewer irrigated acres, and the economic impacts of this reduced activity are a key concern for rural communities (Pritchett, 2007).

A recent study seeks to correlate increasing water demand with reduced irrigated acres. With the approval of the 2003 General Assembly, the Colorado Water Conservation Board commissioned the State-wide Water Supply Initiative (SWSI), an 18-month study to explore, basin by basin, existing water plans, supplies, and existing and projected demands through the year 2030, as well as a range of potential options to meet that demand (Colorado Water Conservation Board, December 2004). As Colorado's population grows and urbanizes, water is expected to shift from agriculture to municipal and industrial (M&I) uses. In addition to the urbanization of agricultural lands, most water providers continue to acquire agricultural water rights, which are then allocated to other uses. Indeed,

one of SWSI's major findings is that taking water from irrigated agricultural land and converting it to municipal use will be a primary source of water for cities. SWSI also estimates the number of acres of farmland that will be taken out of irrigation to meet future M&I water needs. Table 1 shows the projected water demand and acreage reductions in four of Colorado's river basins, as estimated by SWSI.

Table 1: Projected Growth in Municipal and Industrial Water

Basin	Pro- jected Demand Increase (AFY)	% Increase in Water Demand	Projected Reduction In Irri- gated Acres	Reduction as % of Currently Irrigated Cropland
Arkan- sas	98,000	38%	23,000- 72,000	10-31%
South Platte	409,700	53%	133,000- 226,000	29-49%
Repub- lican	*	*	20,000	4%
Rio Grande	43,000	25%	60,000- 100,000	20-32%

* SWSI did not analyze the Republican River Basin. Estimated acreage reductions for this basin were provided by the Republican River Conservation District, based on reductions required by Conservation Reserve Enhancement Program.

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Extension programs are available to all without discrimination.

If irrigated acres are reduced as is forecast in Figure 1, a significant reduction in a region's economic activity will result. Identifying and quantifying the economic impact of the reduction, disaggregating the impact among different industries in the region, and determining how government revenues might shrink is valuable information for many water stakeholders including farmers, businesses, water supply administrators, and regional leaders charged with economic development.

Four previous fact sheets described the economic, agricultural, and water use demographics of the East Arkansas, East South Platte, Republican, and Rio Grande Basins,² setting the foundation for discussing two overarching questions: what is irrigated agriculture's contribution to each regional economy and what economic activity will be lost if irrigated agriculture's reductions occur? Quantifying cash receipts is one way to measure the impact of irrigated agriculture to Colorado's economy, but the economic contribution of agriculture doesn't stop at the farm gate. Irrigated crop production supports agribusinesses. These primary industries encourage economic development through the purchase of inputs and the payment of wages and salaries to employees. Without other viable local base industries, a reduction in the revenue generated in the agricultural sector will have adverse economic impacts throughout the regional economy.

Recently, research from Colorado State University and the Colorado Water Resources Research Institute was undertaken to address these questions.³ To quantify economic activity, the IMPLAN software program was used to create an input-output (I-O) model for each basin under study. The SWSI estimates of reduced irrigated acreage in each basin were then used to "shock" the I-O models in order to quantify the economic impacts associated with a reduction in irrigated acreage. The full report (see footnote 2) contains an introduction to I-O models and economic impact analysis. The study considers the four distinct agricultural areas separately in order to increase the accuracy and applicability of the estimates. Analysis of the Arkansas and South Platte Basins is restricted to the eastern portion of the basin where most irrigated crop revenues are found. The study then compares the impacts in each region in order to assist these stake-

holders (and possibly others in similar situations) to prepare for, and minimize, the impacts.

A few details about the modeling assumptions are pertinent. Historically, most water transfers have been conducted on a wholesale basis, with the formerly irrigated lands being fallowed (i.e., converted to grassland) or converted entirely to dryland agriculture. However, the unfavorable economic outlook for dryland cropping and rangeland restoration has often led to land abandonment after water transfers, supporting the belief that all acres taken out of irrigation will be fallowed (Smith, 2005). Thus, the results presented here are based on the assumption that all acres taken out of irrigation will be subsequently fallowed.

Also, the economic impacts derived in this analysis represent what is likely to occur in the short run, when there is limited ability to react to the reduction in agricultural output. Over time, human resources and substitutable capital will migrate to other employment, although there will be less migration out of agriculture than would be the case with other sectors because of the culture of an agricultural way of life, the older average ages of farmers, and their more isolated locations (Howe and Goemans, 2003). In a prosperous region like the South Platte, displaced labor, capital, and land are likely to be reemployed in other productive activities within a relatively short period. The losses in the other basins are likely to persist over a longer period.

Results

The study results provide several insights. First, irrigated agriculture's contribution to economic activity varies by region, as can be seen in the second column of Table 2. Measured at the farm gate, production agriculture makes a significant portion of sales for the Rio Grande basin (48 percent of total output). In contrast, production agriculture is significant in the East South Platte basin but it makes a smaller proportion *relative* to total economic activity in the basin due to the sheer size of the economy. Simply put, the South Platte basin economy has more sources of economic activity when compared to the Rio Grande region.

² All four fact sheets can be found at <http://dare.agsci.colostate.edu/csusagecon/extension/pubstools.htm>

³ J. Thorvaldson and J. Pritchett. "Economic Impact Analysis of Irrigated Acreage in Four River Basins in Colorado." *Colorado Water Resources Research Institute Completion Report No. 207*, 2006. Located at <http://www.cwrri.colostate.edu/pubs/series/completionreport/crlst.htm>

The economic activity generated per acre of irrigated cropland also varies by region, as can be seen in the third column of Table 2. Total economic activity can be represented by the sum of the following three components (Anderson, Wengert, and Heil, 1976):

- **Direct Activity:** Revenue flows from the sale of crops
- **Indirect activities:** The revenue generated by irrigated agriculture's demand for inputs from other industries (e.g., fertilizer, machinery, etc.)
- **Induced activity:** The revenue generated as employees spend their wages in the regional economy (e.g., at restaurants, supermarkets, pharmacies, banks, etc.)

In the third column of Table 2, the direct, indirect and induced activity has been summed and then averaged for each acre of the regions' cropland. The lowest value is found in the Arkansas at \$428 per acre and the highest is in the Rio Grande at \$1,127 per acre. The prevailing crop mix describes, in part, the difference. The primary crop in the Rio Grand (in terms of its value) is potatoes, a high value crop that requires significant inputs to be grown and is exported almost exclusively out of the region. Forage crops are typical in the Arkansas, and these perennial crops require relatively fewer inputs. In addition, much of the forages grown in the Arkansas Valley are used locally. So when is economic activity high within a regional economy? When high value crops are sold outside the region, when revenues from the crop sales are spent on locally produced inputs and when local support industries use local labor and inputs.

Table 2. Irrigated Agriculture and Economic Activity for Colorado Regions

Region	Farm Gate Receipts Relative to Regional Sales ^a	Economic Activity Generated per Acre of Irrigated Cropland	Representative Cropping Pattern
Arkansas	31%	\$428	Forage Crops
Republican	37%	\$678	Continuous Corn, Alfalfa
Rio Grande	48%	\$1,127	Potatoes, Barley, Alfalfa
East South Platte	2%	\$690	Corn, Alfalfa, Sugar Beets

^aAll receipts from production agriculture

Output Impacts

Table 2 is a snapshot of economic activity, but does not indicate how this activity changes as irrigated acres are lost. To do this, the midpoints of reduced irrigated acreage from Table 1, valued according to 2004 prices and cropping patterns are used to shock that basin's I-O model, thus generating the direct, indirect and induced impacts. In Table 3, the total impact is broken down into its component parts, with the first column listing the region and the second column stating the acreage reduction. The total effect is the sum of the direct, indirect and induced effects, and is shown in the third column of the table. The direct effects represent the lost irrigated crop sales, and are shown in the fourth column of the table. The indirect and induced effects are an important part of an industry's contribution to the regional economy, and are shown in the fifth and sixth columns of the table, respectively. The indirect effects are the decreases in inter-industry purchases (fertilizer, seeds, etc.) in response to the decreased demands of irrigated agriculture. The induced effects reflect changes in household spending as household income decreases due to the decrease in production. From Table 3, The East South Platte region experiences the largest economic impact followed by the Rio Grande Basin.

Economic multipliers measure secondary economic impacts (indirect and induced) by quantifying the relationship between an initial change in an industry's final demand and the total effect that this has on the sales of goods and services of all sectors within the region, as well as its effect on regional household spending. The greater the indirect and induced effects are, the greater the multiplier will be. Each basin's output multiplier for irrigated agriculture is displayed in the final column of the table.

The output multiplier indicates the economic inter-connectedness that irrigated agriculture has with the region, and the degree to which a decrease in activity in the irrigated agriculture sector results in a decrease in purchases from other local industries and local resource providers. A large multiplier indicates that that industry has many ties to the local economy (it does not necessarily indicate high output). For instance, the East South Platte multiplier of 1.78 means that for every \$1 we take out of the production of irrigated agriculture, the total impact on the entire East South Platte Basin will be a loss of \$1.78 of economic activity. The output multiplier is thus a good indicator of the size and extent of the ripple effects and is intimately related to the proportion of inputs to irrigated

Table 3: Impact Components and Multipliers

Basin	Estimated Acres Lost	Total Economic Impact (mill \$)	Direct Effect (mill \$)	Indirect Effects (mill \$)	Induced Effects (mill \$)	Output Multiplier
East South	159,500	-\$110.07	-\$61.98	-\$36.96	-\$11.12	1.78
Arkansas East	47,500	-\$20.33	-\$13.80	-\$5.46	-\$1.07	1.43
Republican	20,000	-\$13.60	-\$10.75	-\$2.11	-\$0.69	1.25
Rio Grande	80,000	-\$98.78	-\$80.98	-\$9.10	-\$8.71	1.22

agriculture that are purchased locally (i.e., within the study region). There are likely many factors that influence the variations in output multipliers across basins seen here. Three of the most important factors include:

1. *Size and of the economy*

Typically, the larger the size of the economy, the more economic activity is internalized. Conversely, the smaller the economy is, the more dependent it is on economic activity from other functional economies, and hence the more income tends to leak outside the area as goods and services necessary for day-to-day commerce are imported (purchased from outside the area). Given the limited number of linkages that exist in these smaller economies, multipliers tend to be smaller, resulting in a smaller total effect for a given impact, since more of the ripple effects occur outside of the region. However, because there are fewer businesses among which the losses can be spread, the losses could actually be more concentrated and severe in these areas.

One way to measure the size of an economy is by the number of unique industries in that economy. For instance, the economy in the East South Platte Basin consists of roughly twice as many unique industries as the other three basins. This may suggest that farmers in the East South Platte Basin are able to purchase a larger proportion of their factors of production from within the basin, as compared to the other three basins. If indeed crop farmers can buy more of their inputs locally, then a reduction in the crop farmers' output will have a larger effect on the local economy, as the providers of those inputs to crop farming face reduced demand. Thus, the ripple effect within the region will be larger, resulting in a higher multiplier.

2. *Diversity of the economy*

An indicator of the diversity of an economy is the Shannon-Weaver diversity index, which is provided by IMPLAN. The Shannon-Weaver diversity index is determined by the number of industries there are in the region and how well-distributed employment is throughout all of those industries. Its values range

from zero to one, with one being perfect diversity. Conversely, as employment and output become concentrated in fewer industries, the Shannon-Weaver index approaches zero. The Shannon-Weaver diversity indices for each basin are displayed in Table 4. As might be expected, the Shannon-Weaver diversity index corresponds positively to the size of the multipliers in all four basins. For comparison purposes, the Shannon-Weaver diversity index for Colorado's economy as a whole is 0.77.

Table 4: Relationship between Shannon-Weaver Diversity Indices

Basin	S-W Index
East Arkansas	0.6095
East South Platte	0.7219
Republican	0.6228
Rio Grande	0.5776

3. *Use of locally-provided inputs*

When a sector relies heavily on local industries for inputs, it will have a relatively large multiplier. Large multipliers indicate that there are many ties to the local economy, such that money is used more times before it escapes from the economy. The use of locally-provided inputs depends on the land characteristics and crop-mix of the area, as these will affect the type and amount of inputs required. The use of locally-provided inputs also depends on the local availability of these inputs, which is determined to some extent by the size and diversity of the economy.

Table 5 shows the total output impact in each basin and compares the total impact to each basin's total output and agricultural output. The rows display the impacts by basin. The first column displays the value of total output in each basin, while the second column shows the total impact as a proportion of this output. The third column shows the total impact as a proportion of *all* agricultural output, while the fourth column shows the total impact as a proportion of *irrigated* agricultural output. The last column shows the

Table 5: Output Impacts Relative to Total Output and Agricultural Output

Basin	Total Out-put (million \$)	Total Economic Impact (million \$)	Impact as % of Total Output	Impact as % of Agriculture	Direct Impact as % of Irrigated Crop Sales	Lost Economic Activity per Acre
East Arkansas	\$2,001.26	-\$20.33	1.02%	3.20%	13.87%	\$428
East South Platte	\$95,827.04	-\$110.07	0.12%	5.64%	52.28%	\$690
Republican	\$3,116.60	-\$13.55	0.43%	0.82%	2.08%	\$678
Rio Grande	\$2,499.35	-\$98.78	3.95%	8.16%	8.72%	\$1,235

impact per acre lost, which can also be interpreted as the economic activity generated by one acre of irrigated crops in that basin.

The total impact is greatest in the East South Platte Basin, which is expected due to the fact that this basin is projected to experience the greatest loss of irrigated acreage. In this region, the total reduction in economic activity is \$110 million (about 0.12% of the region's total economic activity). The lost economic activity *per acre* is greatest in the Rio Grande Basin, where a high-value crop (potatoes) is largely exported out of the region. As stated previously, economic activity per acre tends to be higher when high value crops are sold outside the region and when local support industries use local labor and inputs.

Impacts per Capita

Even if the *total* impact in a particular basin is smaller than in others, if the population density in the first basin is much lower than in the others, the impact will be spread out over fewer people and thus the impact *per person* will be higher. Support for this idea

Table 6: Per Capita Impacts

	Total Impact (mill \$)	Population	Per Capita Impact
East Arkansas	-\$20.33	53,245	-\$382
East South Platte	-\$110.07	1,136,568	-\$97
Republican	-\$13.55	56,768	-\$239
Rio Grande	-\$98.783	46,726	-\$1,929

can be seen in Table 6. Due to the much lower population densities in the East Arkansas, Republican, and Rio Grande basins, the per capita losses are much greater in these basins. In contrast, the South Platte Basin, which has the highest population density of all basins under study, has the lowest per capita impact.

Other Impacts

The previous results examine the impact to the regional economy as a whole, but do not disaggregate the impact among different sectors or crops. The impacts are distributed unevenly among sectors and crops, a distribution which is sure to be important to stakeholders. A table of the top 5 most-affected sectors and crops in each basin can be found in CWRRI Completion Report No. 207 (see Footnote 3). Employment and tax impacts can also be found in the Completion Report.

Conclusions

Substantial differences between the regions exist, both in terms of impacts and multipliers, and further analysis suggests that differences in multipliers has much to do with differences in the diversity of each region's economic base, as is expected.

In terms of total impact, the South Platte Basin experiences the largest total impact, which is not surprising considering that this basin is projected to experience the largest decrease in irrigated acreage. The South Platte Basin also has the largest multiplier, meaning that the initial impact will generate more ripple effects within this basin. This can be explained by the greater size and diversity of the East South Platte Basin's economy. At first glance, these results may seem to suggest that the East South Platte Basin will be the area worst-hit by the acreage reductions. However, upon further analysis, it becomes apparent

that the East South Platte Basin experiences the lowest per capita impacts due to this basin's relatively high population density. Also, because of the greater diversity of the East South Platte Basin's economy, it may be better equipped to weather such an economic impact than the other economies under consideration.

Although the Rio Grande basin did not experience the greatest loss of acres, it did experience the largest employment loss, both in terms of total jobs lost and proportion of total workforce lost. This can be partially explained by the high labor requirements for producing hay, the main crop grown in this region. This outcome provides further evidence that it is important to look at more than just the raw numbers of acres that will be lost to predict the impact—the true impact depends on which crops are lost and in what region.

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APPENDIX E

SAMPLE LANGUAGE FOR CONSERVATION EASEMENTS AND TRANSACTIONS TO ALLOW AGRICULTURAL-MUNICIPAL WATER SHARING, INCLUDING APPROPRIATE BOARD RESOLUTION, POLICY, RECITALS, PURPOSE STATEMENT, WATER RIGHTS SECTION, AND AMENDMENT SECTION, AND CONSIDERATIONS, FINDINGS, AND ADDITIONAL SUPPORT

SAMPLE BOARD RESOLUTION LANGUAGE

Be it resolved that the Board of Directors of _____ believes that the permanent dry-up of irrigated land is detrimental to the agricultural sustainability, wildlife habitat, and scenic views of the lands in our service area; therefore, the Board finds that the exploration and implementation of alternative transfer mechanisms, which reduce permanent dry-up, is aligned with our mission and should be pursued on a case-by-case basis.

Be it resolved that going forward, _____ shall attempt when appropriate to use more flexible water language in its deeds of conservation easement, and as appropriate, the amendments thereto, to allow for alternative transfer mechanisms of water, including for purposes of municipal water leasing or instream flow leasing, provided that the water rights associated with the conserved property: (1) can never be permanently transferred from the property; and (2) may only be utilized upon a determination that temporary removal of water rights will not jeopardize the long-term conservation values of the conserved property.

SAMPLE POLICY LANGUAGE

Pursuant to Board Resolution X, it shall be the policy of _____ to allow when appropriate for use of more flexible water language in deeds of conservation easement, and as appropriate, the amendments thereto, to allow for alternative transfer mechanisms of water, including for purposes of municipal water leasing or instream flow leasing, provided that the water rights associated with the conserved property: (1) can never be permanently transferred from the property; and (2) may only be utilized upon a determination [by this organization] that the conservation values of the conserved property will not be diminished by such temporary removal.

CONSERVATION EASEMENT: RECITALS

Open Space: The Property qualifies as Open Space because it encompasses agricultural lands that will be preserved for the scenic enjoyment of the general public (or pursuant to clearly delineated conservation policies) and will yield a significant public benefit.

Agriculture:

The Property has traditionally been used for agriculture and continues the use through the production...The Property is associated with water rights that are important to its long-term productivity [and to sustainable local or regional irrigation]. Grantor acknowledges that temporary removal of water from the property will support the long-term irrigation by avoidance of buy and dry and by the diversification of income to support the long-term viability of the agricultural operation.

State water and land conservation policies:

- Colorado’s Water Plan, developed by the Colorado Water Conservation Board in 2015, has “set an objective that agricultural economic productivity will keep pace with growing state, national, and global needs, even if some acres go out of production. To achieve this objective, the State will work closely with the agricultural community, in the same collaborative manner that has produced agricultural transfer pilot projects, to share at least 50,000 acre-feet of agricultural water using voluntary alternative transfer methods by 2030... Colorado’s Water Plan describes market-competitive options to typical ‘buy-and-dry’” transactions. Such alternative transfer methods can keep agriculturally dependent communities whole and continue agricultural production in most years, and if such arrangements can be made more permanent in nature, they will provide certainty to both municipal water providers and agricultural producers. Options include lease-fallowing agreements, deficit irrigation, water banking, interruptible supply agreements, rotational fallowing, water conservation programs, and water cooperatives” and buy-and-supply, which may also include conservation easements. Colorado Water Conservation Board, Colorado’s Water Plan 2015, at 10-6, 6-116.
- The Colorado General Assembly affirmed the State’s “commitment to develop and implement programs to advance various agricultural transfer methods as alternatives to permanent agricultural dry up...” HB 13-1248, at § 1.
- The Colorado General Assembly has provided funding for the Colorado Water Conservation Board’s alternative transfer methods program to develop alternatives to agricultural buy-and-dry, demonstrating the financial commitment of the State to find ways to balance agricultural water needs with municipal and industrial needs. SB 07-122 and HB 14-1333.

CONSERVATION EASEMENT: PURPOSE STATEMENT

- The purpose of this Easement is to preserve and protect the Conservation Values in perpetuity [Insert as appropriate: in accordance with I.R.C. §170(h), Treasury Regulation § 1.170A-14, and C.R.S. §38-30.5-101 *et seq.*](“Purpose”). Of the identified Conservation Values, Agriculture shall be considered the primary Conservation Value* by which permitted acts and uses are evaluated.

*Depending on the property, Grantee may want to limit this prioritization to the area of the property on which the water rights have been historically used.

CONSERVATION EASEMENT: WATER RIGHTS SECTION: ADDITIONAL PARAGRAPHS

- Permitted Use of Water Rights. The Parties agree that the Water Rights are hereby dedicated and restricted primarily for continued agricultural use and future viability and related Conservation Values of the Property, and that Grantor shall continue to maintain their historic beneficial use. Notwithstanding the foregoing, Grantor reserves the right to enter into any leases or agreements for use of Water Rights off the property, subject to the restrictions below.

1) For purposes of this Deed, the term “Water Agreement” shall mean any interruptible water supply agreement, a water conservation program, or any other lease

or use agreement related to the Water Rights, such as an interruptible supply contract, water lease, fallowing program, forbearance agreement, emergency water loan, or other similar agreement to allow the temporary agricultural, environmental (including, without limitation, in-stream flow, wetland, piscatorial, and similar uses beneficial to preservation of wildlife, wildlife habitat and bio-diversity), municipal, commercial, or industrial use of the Water Rights off the property.

2) Grantor shall not enter into any Water Agreement without Grantee approval to ensure that said document is consistent with the Purpose and this Section. Grantee shall have the right to charge a fee to Grantor for time and costs associated with review of any proposed Water Agreement.

3) Any Water Agreement must: (i) define the term of the agreement, (ii) include provisions that ensure the proposed activities are consistent with the Conservation Purpose, including preservation of soil health and agricultural viability, and (iii) not permanently separate the Water Rights from the Property. In the case that the term of the Water Agreement is less than 10 years in duration, water may not be removed from the Property more than three years in that ten-year term, and not for more than two consecutive years. In the case that Grantor wishes to enter into a Water Agreement for a term longer than 10 years, water may not be removed from the Property more than three years in any ten-year term, and not for more than two consecutive years in any ten-year period, unless otherwise agreed by the Parties in consultation with a mutually acceptable resource management professional to develop a Farm/Ranch Water Operations Plan. Such plan will assess the impact to the Conservation Values of application of less than full Water Rights on the Property in some years and make recommendations as to the timing and amount of water that should be applied to the Property in order to manage erosion and prevent damage to the soil. The cost of a Farm/Ranch Water Operations Plan shall be borne by Grantor.

Considerations for drafting:

- 1) You may want to establish a maximum amount of water or frequency of removal of water, such as no more than 33% of the historical yield in any given year or no more than 3 years in 10.
- 2) Depending on the property, it may or may not make sense to include parameters in the easement for limiting whether removal of the water can occur in consecutive years (for some properties, 3 consecutive years in 10 may be no issue, whereas, in other areas, more than 1 consecutive year of fallowing may be problematic for yield recovery or other conservation values).
- 2) If there are multiple water rights associated with a property and one is more central to supporting the conservation values, you may want to provide flexibility only for the less critical right.
- 3) If there is already a water-sharing agreement, you may want to acknowledge that it does not impact the CVs, but also specify a process for any change to the current agreement.

Because the missions of organizations are different, and each property may be different, the authors have included other sample provisions for consideration when drafting. The following are all limited to temporary uses of the water rights.

OTHER SAMPLE PROVISIONS FOR TEMPORARY WATER SHARING FOR WATER RIGHTS SECTIONS

- Temporary Use of Water Rights. The parties recognize that the long-term economic viability of agricultural productivity is necessary to protect the Conservation Values, and that enhancing such economic viability will foster the purposes of this conservation easement. The parties also

recognize that adverse environmental conditions, such as drought, occur from time-to-time and that such conditions may prevent effective irrigation of the Property. Such conditions may also pose a significant threat to the natural environment and life-sustaining ecological diversity of streams, rivers, lakes and reservoirs, and may cause serious water supply problems for municipal, commercial, and industrial water users. Therefore, the parties specifically anticipate and intend that the Grantor (after 30 days' notice to the Grantee) may enter into legally-enforceable interruptible supply contracts, water leases, fallowing programs, emergency water loans, or other similar agreements to allow the temporary environmental, municipal, commercial, or industrial use of the Water Rights. No more than thirty-three percent (33%) of the Water Rights shall be used for such purposes without a written determination by the Grantee in its discretion that such use would not jeopardize the long-term Conservation Values of the Property. The Grantor may request temporary leases for more than thirty-three percent (33%) of said water rights, however, such leases will require the further written consent of the Grantee in its discretion. The parties agree that the provisions of this paragraph constitute an independent contract enforceable under law, in addition to any other remedies available under this Conservation Easement.

- Temporary Use of Water Rights. The Parties agree that Grantor may enter into legally-enforceable interruptible supply contracts, water leases, fallowing programs, emergency water loans, or other similar agreements to allow the temporary agricultural, environmental, municipal, commercial, or industrial use of the Water Rights, not to exceed three consecutive years or five out of every ten years, provided that: (1) Grantee, in its discretion, has given its prior written consent to such arrangements; (2) such use, in the opinion of Grantee in its discretion, would not jeopardize the long-term Conservation Values of the Property; and (3) such arrangements do not permanently separate the Water Rights from the Property. The Parties' intent is to structure such arrangements to comply with applicable laws. Grantor and Grantee agree that any costs associated with Grantee's evaluation of the proposed temporary water lease or transfer shall be borne by Grantor.
- Permitted Use of Water Rights. The Parties agree that the Water Rights are hereby dedicated and restricted primarily for continued agricultural use and future viability and related Conservation Values of the Property, and that Grantor shall continue to maintain their historic beneficial use. Grantor may enter into temporary legally enforceable water leases, contracts, emergency water loans, or similar agreements including, but not limited to: (A) an interruptible water supply agreement as authorized by C.R.S. Section 37-92-309, up to three years in every rolling ten year period; (B) participation in a water conservation program not to exceed 5 out of every 10 years, pursuant to C.R.S. Section 37-92-305(3)(c); or (C) other temporary transfers of water rights as authorized by law, including any temporary transfers authorized by modifications to the laws authorizing the temporary transfers described in subparagraphs (A) and (B), above ("Water Agreement"), provided that in each case: (1) Grantee has given its prior written consent to the Water Agreement in its sole discretion; (2) that such use, in the opinion of Grantee, would not jeopardize the long-term Conservation Values of the Property, including soil health and agricultural viability; (3) that such arrangements do not permanently separate the Water Rights from the Property; and (4) that such arrangements comply with then-current law.

AMENDMENT OF CONSERVATION EASEMENT LANGUAGE

Language below is an example of what holder may consider using for recitals to introduce and place into context a conservation easement amendment for water sharing, should it decide that amending an existing conservation easement meets any criteria provided by its amendment policy, which may include meeting the tests of private benefit and inurement. Any such amendment should be pursued with caution and only after obtaining specific legal counsel and possibly other expert advice regarding the particulars of the property, water rights, and conservation easement terms, purpose, and conservation values. The example below is drafted for an organization with a mission that includes sustainable agriculture. For entities that are unsure whether a proposed amendment is aligned with its mission, it would be helpful for land trusts and government agencies to address this issue head-on by considering whether the water sharing is consistent with their mission or requires some form of mission-deepening to accomplish the objectives (this may include an amendment to the organization's bylaws to make sure the benefits below are specifically related to their mission).

- Recitals:
 - Whereas, the Parties recognize/acknowledge/agree that the long-term economic viability of the agricultural use of the Property is necessary to accomplish the purposes of this Deed, and that enhancing and sustaining such economic viability will foster the purposes of this Deed.
 - Whereas, the Parties also recognize that adverse environmental conditions, such as drought, occur from time-to-time and that such conditions may prevent effective irrigation of the Property.
 - Whereas, the Parties acknowledge such conditions may also pose serious water supply problems for agricultural, environmental, recreational, municipal, commercial, or industrial water users, which users may need to acquire the temporary use of alternate water supplies to meet their needs.
 - Whereas, the Parties agree that agricultural water sharing satisfies other agricultural, environmental, recreational, municipal, commercial, or industrial water supply demands in a corresponding amount, thereby eliminating the need for buy-and-dry of other irrigated land to acquire equivalent water rights to meet water supply demands.
 - Whereas, this substitution allows other users to meet their water supply needs while conserving other (unencumbered) agricultural land.
 - Whereas, the supplemental agricultural income from water leasing provided by agricultural-municipal water sharing shall be/has been determined to be quantitatively insubstantial and an indirect private economic benefit compared to the overall public benefit – additional land conserved from buy-and-dry [plus additional water supplies for _____ [environmental, municipal, recreational, etc.] – and a qualitatively incidental side effect of the _____ [land trust's] charitable objectives of sustainable agriculture.
 - Whereas, the amendment of this conservation easement between ____ and ____, dated ____, and recorded in the real property records of ____ county at _____ reception number will not/has been determined not to result in private inurement, specifically any financial benefit or transfer of the _____ [land trust's] financial

- resources to an individual solely by virtue of the individual's relationship with _____ [land trust] , and without regard to accomplishing exempt purposes.
- Whereas, the amendment of this conservation easement between ____ and ____, dated ____, and recorded in the real property records of ____ county at _____ reception number will not/has been determined not to result in impermissible private benefit, because any supplemental agricultural income from water leasing provided by agricultural-municipal water sharing shall be/has been determined to be quantitatively insubstantial and an indirect private economic benefit compared to the overall public benefit – which public benefit is determined by [easement holder] to be additional land conserved from buy-and-dry [plus additional water supplies for _____ [environmental, municipal, recreational, etc.] – and a qualitatively incidental side effect of the _____ [land trust's] charitable objectives of sustainable agriculture.

FINDINGS, AND ADDITIONAL SUPPORT FOR RESOLUTIONS, POLICIES, EASEMENTS, AND AMENDMENTS

- “Coloradoans find that the current rate of purchase and transfer of water rights from irrigated agriculture (also known as “buy-and-dry”) is unacceptable.” Governor John Hickenlooper, Exec. Ord. D 2013-005, at ¶ II.A (May 14, 2013).
- Letter from Interbasin Compact Commission to Gov. Ritter and Gov.-Elect Hickenlooper, at 4 (Dec. 15, 2010) recognizes that “[l]arge-scale dry-up of irrigated agriculture has considerable adverse social, economic and environmental consequences.” The IBCC concluded that “[a]lternatives to permanent agricultural water transfers represent a viable way to meet a portion of the M&I water supply gap . . . ”

APPENDIX F

Further References on Alternative Transfer Mechanisms

Agricultural Water Conservation in the Colorado River Basin: Alternatives to Permanent Following Research Synthesis and Outreach Workshops Brad Udall and Greg Peterson, December 2017
<http://www.ceri.colostate.edu/media/publications/cr/2323.pdf>

Alternative Water Transfers in Colorado: A Review of Alternative Transfer Mechanisms for Front Range Municipalities Prepared by WestWater Research for Environmental Defense Fund, November 2016
<https://www.edf.org/sites/default/files/alternative-water-transfers-colorado.pdf>

Alternative Agricultural Water Transfer Methods Grant Program Summary and Status Update Prepared by CDM Smith for Colorado Water Conservation Board, November 2012
<https://www.colorado.gov/pacific/sites/default/files/14WaterResources1807CWCBATMGrantSummary.pdf>

Improving the Viability of Alternative Water Transfer Methods (ATMs) in Colorado: A Synthesis of Research and Findings from the Getches-Wilkinson Center, 2014-2015 Doug Kenney, October 2015
<http://www.waterpolicy.info/wp-content/uploads/2015/10/Summary-of-GWC-ATM-research-projects.pdf>

Water Partnerships: An Evaluation of Alternative Agricultural Water Transfer Methods in the South Platte Basin Prepared by DiNatale Water Consultants, Inc. for the Farmers Reservoir and Irrigation Company and Colorado Water Conservation Board, March, 2012
http://dinatalewater.com/pdf/water_partnerships.pdf

Moving Waters: The Legacy of Buy-and-Dry and the Challenge of Lease-Following in Colorado's Arkansas River Basin Brian Devine 2015
https://scholar.colorado.edu/envs_gradetds/27/

2016 Ag Water Right Holder Survey Results Summary Ag Water NetWORK, Colorado Cattlemen's Association, August 2016
<https://www.coloradocattle.org/CMFiles/ColoradoCattlemen/2016%20Ag%20Water%20Survey%20Results%20Report.pdf>

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- DiNatale Water Consultants, Inc. (2012). *Water Partnerships: An Evaluation of Alternative Agricultural Water Transfer Methods in the South Platte Basin*.
- Finley, B. (March 03, 2011). *Colorado farmland goes dry as suburbs secure water supplies*. Retrieved from <https://www.denverpost.com/2011/03/11/colorado-farmland-goes-dry-as-suburbs-secure-water-supplies/>.
- Rice, J. (December 7, 2016). *Deficit irrigation still worth a look*. Retrieved from http://www.journal-advocate.com/sterling-local_news/ci_30637827/deficit-irrigation-still-worth-look
- Schneekloth, J. & Andales, A. (February 2017). *Seasonal Water Needs and Opportunities for Limited Irrigation for Colorado Crops*. CSU Extension, Fact Sheet No. 4.718.
- WestWater Research for Environmental Defense Fund. *Alternative Water Transfers in Colorado: A Review of Alternative Transfer Mechanisms for Front Range Municipalities*. Retrieved from <https://www.edf.org/sites/default/files/alternative-water-transfers-colorado.pdf>.