

The Poudre Water Sharing Working Group

Who We Are, What We Set Out to Do, What We Accomplished, What We Learned, and What We Recommend Going Forward

A Report to the Colorado Water Conservation Board

EXECUTIVE SUMMARY

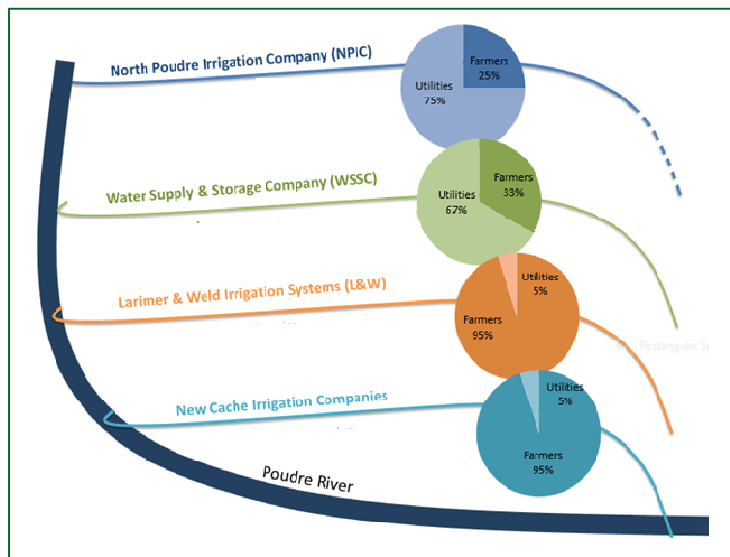
BACKGROUND

Can agricultural irrigation companies and domestic water providers in the Poudre Basin work together to meet future urban water needs while keeping agriculture viable? That's the question the Poudre Water Sharing Working Group (PWS) has been asking the past two years. Our investigation was funded by the Colorado Water Conservation Board; this is our report.

The people of Colorado have said they value agriculture: for food and fiber, wildlife habitat, open space, and rural culture. But we want water to drink, bathe in, and grow lawns with too. More people

moving here means more domestic water will be needed, even if urban water conservation reduces per capita consumption.

Domestic water providers have to make sure their customers have the water they need. When they sell a tap, they promise a secure source of water. Over the years they have purchased water from farmers to provide for long range growth and drought security. Much of that water is rented back to farmers—except in times of drought, and until area growth requires that water be used for base supply. Farmers in some areas who sold their water shares have come to rely on the rental water to continue their agricultural operations.



IRRIGATION COMPANY OWNERSHIP

prepared by Kim Frick for one of the Poudre Water Sharing Working Group Meetings

Why have farmers been willing to sell their water? Some sell for a retirement nest egg—when they have no family members to keep the farm going. Some sales took place during years when commodity prices were low for an extended period and farmers badly needed income. Though some of this water is sold from farms remote from cities, much of the market activity occurs as development grows over farm land.

Farmers want to retain the right to sell their water and to see a good return on their investment. At the same time, many farmers and city dwellers believe the permanent transfer of water from agriculture will have negative long-term impacts. While some of the sales keep the water within the Poudre Basin, increasingly buyers are looking for water to send south of the basin. Current market forces and the need for more urban water have placed a bull's eye on Poudre Basin agricultural water.

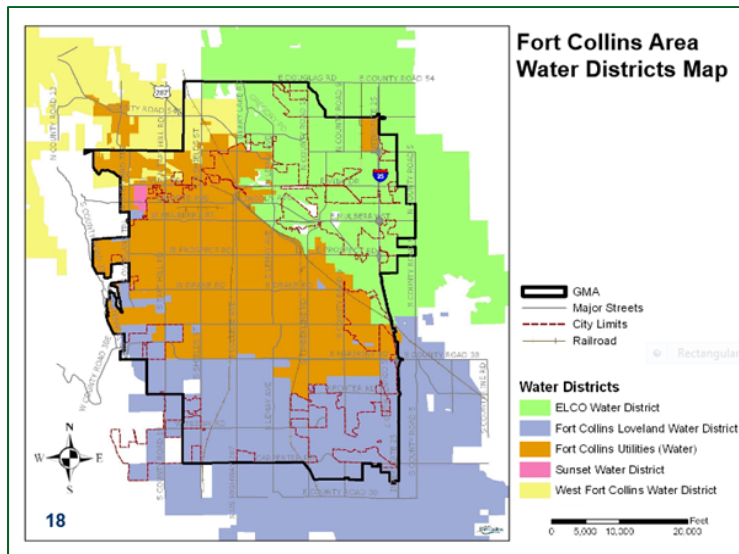
Faced with this dilemma across the state, the Colorado Water Conservation Board (CWCB) and others working on the first Colorado Water Plan are counting on an alternative kind of market transaction materializing between agricultural and urban interests such that we can have urban growth and agriculture too. CWCB has funded projects to study the feasibility of what they call “alternative transfer methods” or ATMs. The concept is to allow farmers to lease water temporarily to cities while keeping ownership of the water in agriculture.

One way these leases can be done is through an interruptible supply agreement—where farmers agree to lease some of their water in at most three out of ten years to cities. They can plant crops that require less water (crop changes), take some of their land out of production temporarily (fallowing), or purposely apply less water than the crop needs for optimal yield (deficit irrigation.) The concept is that the money the farmer makes from the leased water will make up for lost crop production and the cost of interim management practices.

Are any of these ideas feasible in the Poudre Basin? Starting in early 2013, irrigation companies and domestic water providers who named themselves the Poudre Water Sharing Working Group (PWS) met monthly to find out.

All the major water users on the Poudre River are members of PWS.

Agricultural members include North Poudre Irrigation Company, Water Supply and Storage Company, New Cache la Poudre Irrigating Company, and Larimer/Weld Irrigation Company.



Domestic water providers include the City of Fort Collins Utilities, City of Greeley, and the Tri-Districts—a group of special districts who supply domestic water to customers outside the City of Fort Collins Utilities service area, some of which fall within the City of Fort Collins growth management area.

Tri-Districts is made up of Fort Collins-Loveland Water District, East Larimer County Water District, and North Weld County Water District. Because the major water users have C-BT water as part of their water portfolio, a representative from Northern Water is also part of the group.

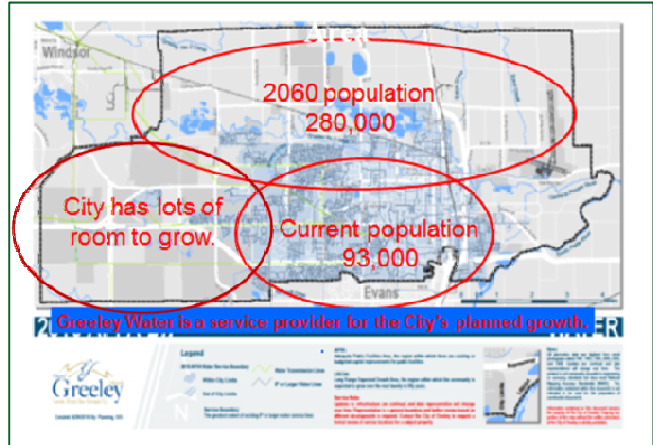
FORT COLLINS AREA WATER UTILITIES AND SPECIAL DISTRICTS

With the help of a research team led by CSU, PWS:

- Developed relationships and trust
- Shared information and data about our respective missions and operations
- Wrote descriptions of alternative transfer methods we thought might work in the Poudre basin
- Surveyed irrigation company shareholders to assess whether they might use these methods
- Developed prototype agreements that could be used for these methods
- Discussed the need for regional cooperation for strategies like shared infrastructure

WHAT DID WE LEARN?

- Two of the irrigation companies are already largely urban-owned. The idea of using short term leases and “water swaps” with domestic water providers as they have in the past is more appealing to them than the formality of an interruptible supply agreement.
- Two of the irrigation companies are still primarily farmer owned and have fewer shareholders selling water, though some sales activity is going on. They are less interested in alternative water markets because they are seeing good profit from operations and have very little interest in “diversifying” by entering a temporary lease water market to take pressure off agricultural sales.
- The City of Greeley recognizes that much of its cultural and economic strength comes from agriculture so they are motivated to keep agriculture strong. But they and the Tri-Districts require reliable supplies for considerable anticipated urban growth and feel safer buying that water. They are satisfied with the actions they are taking to secure water for growth, primarily through the transition of water from agricultural to urban as agricultural lands are bought for urban development and as they purchase water from farmers and rent it back until they need it for drought or future growth. They believe the current system works well for farmers and cities and that perhaps by the time the water they are purchasing is needed for base supply and is no longer available for rent back to farmers, there will be other solutions available through technology to reduce negative repercussions to agriculture.
- The City of Fort Collins Water Utility service area is bounded by Tri-Districts and other suppliers and has the water it needs for expected growth, though they lack sufficient storage to hold water for use in drought periods. Their supply and demand policy reads, in part: “The City will also work towards water sharing arrangements that provide water for municipal uses when critically needed and that allow for continued agricultural use of water at other times, in a manner that preserves irrigated agricultural lands over the long-term.”
- One alternative transfer method that surfaced for discussion is the concept variously named “buy and supply” or “land and water district.” An entity, perhaps public, would be formed to provide an alternative market for those who want to sell their land and water and desire to see it stay in agriculture. The entity would buy at the same market price as a farmer could sell to an in-basin or out-of-basin buyer. Simply stated, the entity would put the land under a conservation easement that has built in agreements for some of the water to be made available for urban use, likely on a rotational basis. Like any new and untested concept, this idea generated more questions than answers, but some of the members of the group, along with several individuals and organizations outside the group, intend to further investigate the idea.
- A fair number of the irrigators and water shareholders surveyed were willing to consider water sharing agreements as they become available. The majority were supportive of attempts to reduce “buy and dry” which is a term used to denote the permanent removal of water from agriculture.



LONG RANGE EXPECTED GROWTH FOR CITY OF GREELEY

- There are significant barriers to agricultural producers understanding their options for water transfers. Within the group, significant time was spent “chewing on” water sharing methods to understand the benefits that could result for both agricultural and municipal interests. Straightforward access to information about transfer methods and context about when various methods could work in site-specific situations is lacking. Education is complicated because water transfer transactions typically occur with individuals and not the irrigation company, although the company has a role in educating its shareholders.
- There is general concern about water moving out of the Poudre Basin, though some in the group pointed out the irony that our basin benefits from significant transbasin diversions from the West Slope. There is recognition that the water market will continue to be a driver for water transfers; however, there is also concern from some in the group that the free market will result in a situation that ultimately is less optimal for the entire system and in particular for agricultural viability.
- The unique aspects of the North Poudre Irrigation Company, with its Colorado-Big Thompson units, provide water sharing opportunities that cannot be easily duplicated. This provides a good example of how water sharing agreements must consider specific local constraints and opportunities, rather than broad concepts that do not clearly identify benefits and costs. This need for local focus points out the need to provide education and encourage dialog at a local level.

WHAT DO WE RECOMMEND?

- Domestic water providers and irrigation companies should continue to look for ways to work together. There is potential for shared expansion and use of storage and conveyance infrastructure beyond what is currently provided through exchanges.
- Focus groups or an irrigation company summit should be held to give irrigation company shareholders an opportunity to learn about alternative markets for their land and water should they decide to sell.
- Additional options for ongoing education about water transfer methods are needed, preferably from a neutral source that is easily accessible to agricultural producers and organizations that represent producers. Education needs to be provided at different levels including concepts down to details that allow agricultural producers to relate to their personal situations. Summaries of success stories for projects throughout the state would help illustrate potential for additional success. Similarly, analysis of barriers and failures will provide perspective when evaluating new opportunities.
- Though there are concerns and questions about the “buy and supply” concept, those interested in it should continue to investigate it with other interested parties outside the group.
- Continued educational outreach to the public and relevant groups about the multiple benefits and values provided by irrigated agriculture and the need to continue work on alternative transfer methods and related activities that will keep it viable should be undertaken.

Now the work started by the Poudre Water Sharing Working Group will continue as a newly adopted initiative of the Poudre Runs Through It Study/Action Work Group. That group brings together agricultural, urban, environmental, business and recreational stakeholders along the river from Fort Collins, Windsor, Timnath and Greeley. Their purpose is to learn from each other and collaborate on actions that meet the dual goals of “working river, healthy river.”

We hope the relationships built between irrigation companies and domestic water providers and our two year effort to better understand the feasibility of ag/urban water sharing arrangements for the Poudre Basin will result in keeping agriculture viable even as our population grows.

For more information, contact: MaryLou Smith, MaryLouSmith@colostate.edu

The Poudre Water Sharing Working Group

Who We Are, What We Set Out to Do, What We Accomplished, What We Learned, and What We Recommend Going Forward

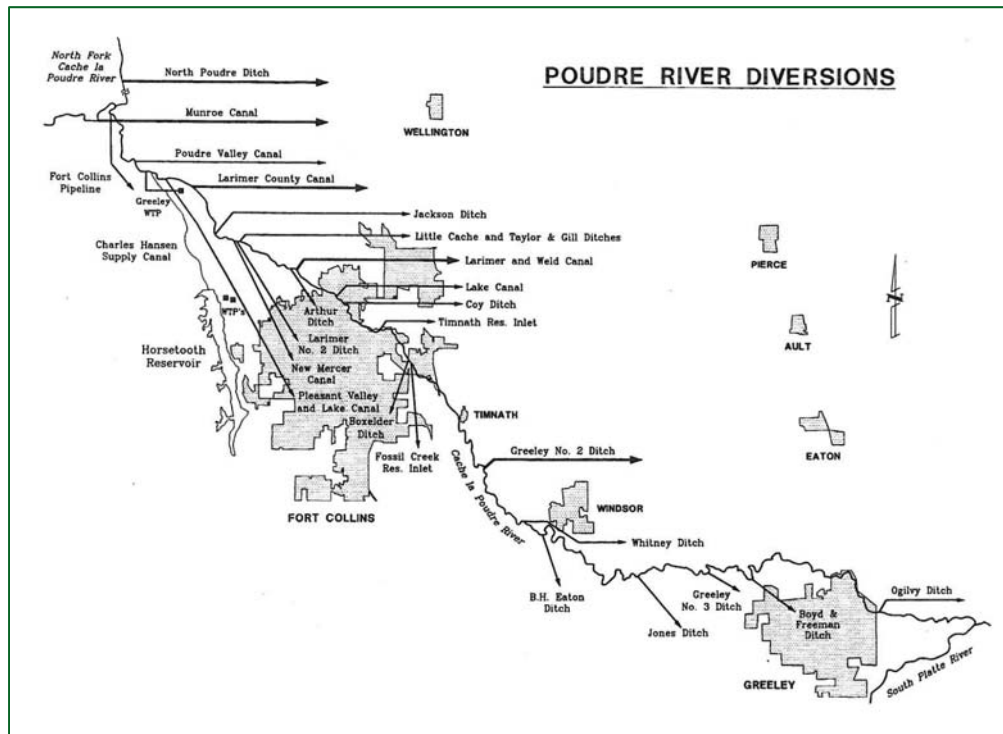
WHO WE ARE

The Poudre Water Sharing Working Group (PWS) was formed early in 2013 for the purpose of exploring whether irrigation companies and domestic water providers in the Poudre Basin could work together to “share water” in ways that would give agriculture more long term security while helping meet future urban water needs. Avoiding permanent “buy and dry” of agriculture in favor of “alternative transfer methods” (ATMs) is the focus of the group.

Members of the Larimer County Agriculture Advisory Board planted the seed. They participated in the 2012 revision of the [City of Fort Collins Utilities Water Supply and Demand Policy](#) that included a commitment to work toward water sharing with agriculture. They wanted to build on that resolve.

“The City will also work towards water sharing arrangements that provide water for municipal uses when critically needed and that allow for continued agricultural use of water at other times, in a manner that preserves irrigated agricultural lands over the long-term.”

Though it appeared that strengthening ongoing “water sharing via rental” arrangements between the City of Fort Collins Utilities and North Poudre Irrigation Company (NPIC) was of prime interest, it was determined that convening all the major domestic water providers and irrigation companies on the Poudre would provide broader opportunities, as the systems are interrelated and the NPIC system represents only a part of agricultural use in the basin. It was thought that by learning from one another about the various systems—agriculture and urban—we might uncover potential for cooperative water sharing.



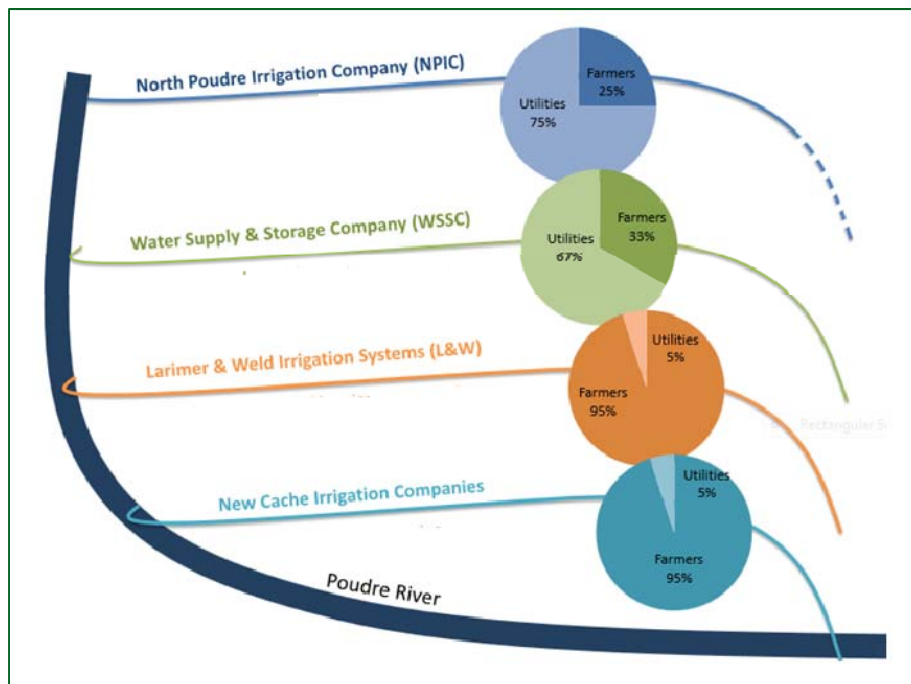
All the major water users on the Poudre River are members of the Poudre Water Sharing Working Group. North Poudre Irrigation Company, Water Supply and Storage Company, New Cache la Poudre Irrigating Company, and Larimer/Weld Irrigation Company are the agricultural members of the group. Domestic water providers include the City of Fort Collins Utilities, City of Greeley, and the Tri-Districts, which is a group of special districts who supply domestic water to customers outside the City of Fort Collins Utilities service area, some of which fall within the City of Fort Collins growth management area (see map below.) The Tri-Districts are made up of Fort Collins-Loveland Water District, East Larimer County Water District, and North Weld County Water District. Because of the importance of Colorado-Big Thompson water as a part of the water rights portfolio of the major water users, a representative from Northern Water is also part of the group.

Irrigation Companies

Two of the irrigation companies in our group are already largely owned by domestic water providers. North Poudre Irrigation Company and Water Supply and Storage Company were formed in the late 1800's to bring water to agriculture, but much of their respective stock in the past thirty years or so has transitioned to domestic water providers, either as those domestic providers purchased shares or as developers purchased shares to turn over to the domestic providers to supply water for their development projects.

North Poudre (NPIC) stock transitioned to urban ownership primarily for the Fort Collins area. Over the past 30 years, Thornton, Fort Collins Utilities, Greeley, East Larimer County Water District and North Weld County Water District have all acquired shares of Water Supply and Storage (WSSC), and have or plan to convert the consumable portion of those shares from agricultural to municipal use in water court. For both irrigation companies, municipalities or water districts owning shares are currently making most of that water available for agricultural use via a variety of methods, including short term rental agreements and sometimes leases. In some cases this has been termed "purchase/leaseback." Agreements vary from long term to year-to-year. NPIC owns 40,000 units of C-BT split as a portion of its 10,000 shares and consequently domestic water supplier ownership provides access to C-BT "multi-use" water without changing the agricultural shares. The other two

irrigation companies, New Cache and Larimer/Weld are still largely farmer-owned.



IRRIGATION COMPANY OWNERSHIP

prepared by Kim Frick for one of the Poudre Water Sharing Working Group Meetings

All of the irrigation companies utilize direct diversion rights on the Poudre supplemented with water from a network of storage reservoirs, some of which were constructed over a century ago. Funding to maintain and enhance reservoirs and other infrastructure is limited by assessments paid by irrigation company shareholders. Impacts of drought and flooding provide ongoing challenges for the companies. The infrastructure in the basin is optimized by using exchanges to move water from storage to irrigators. For example, the NPIC Fossil Creek Reservoir is below NPIC's service area and therefore NPIC must exchange for water stored in the reservoir. Longstanding operating agreements between companies have allowed the irrigation companies in the Poudre to make optimal use of water supplies.

Domestic Water Providers

The City of Fort Collins Utilities, the City of Greeley, and the Tri-Districts supply domestic water to the major urban and adjacent areas in the Poudre Basin. The Tri-Districts includes the special districts of Fort Collins-Loveland Water District, East Larimer County Water District, and North Weld Water District. Special districts are created for a single purpose, in this case to supply water to a specific region not served by municipalities.

The City of Fort Collins Utilities' water service area includes mostly the central portion of the growth management area of Fort Collins. Much of the southern portion of the city's growth management area is served by Fort Collins-Loveland Water District. Much of the northern portion of the Fort Collins growth management area is served by East Larimer County Water District. The City of Fort Collins Utilities' water service area is expected to grow to serve approximately 178,000 customers by the year 2065, with the rest of the future growth being provided water by the other districts.

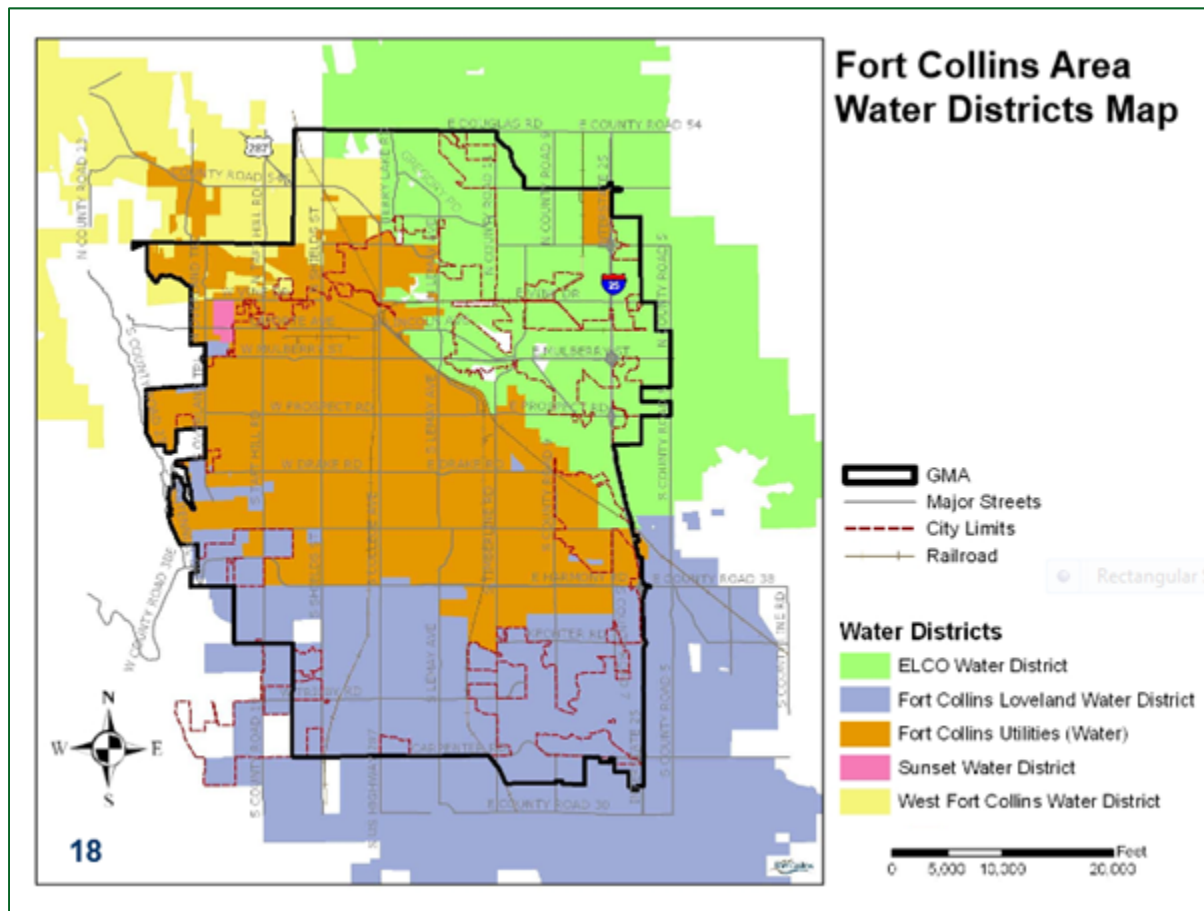
The City of Fort Collins Utilities has a comfortable portfolio of Poudre River water rights and C-BT units to serve the anticipated build out, but is constrained operationally by its low storage capacity. The City of Fort Collins Utilities is capped and unable to directly purchase additional C-BT units, although developers can turn in C-BT units to meet water requirements. The City of Fort Collins Utilities is pursuing expansion of the Halligan Reservoir on the North Fork of the Cache la Poudre River to provide drought reserve and operational flexibility, with an Environmental Impact Statement in progress. Recent wildfires in the Poudre watershed, concerns about reliance on the C-BT system, and potential for climate change are also concerns.

Consequently, while the City of Fort Collins Utilities supports water sharing strategies that strengthen agriculture, as per its Water Supply and Demand Management Policy and values of its customers, the City of Fort Collins Utilities currently has limited ability to store its existing water supplies or water that might be provided by a temporary transfer from agriculture. Water that is stored must be in a location such that it can be delivered to the City of Fort Collins Utilities water treatment plant located east of Horsetooth Reservoir with water supplied by Horsetooth or the Poudre River. The sharing of infrastructure (mostly storage) and possible land and water banking are aspects of the water sharing dialogue the City of Fort Collins Utilities is most interested in. The City of Fort Collins Utilities has been willing to consider ways to strengthen irrigated agriculture as it rents back the agricultural water it owns by virtue of its North Poudre and other stock. The idea is that formalizing agreements might make agricultural producers who are dependent on rental water more secure and less likely to sell their owned water outright in "buy and dry" deals. The City of Fort Collins Utilities decided to limit surplus water rentals in recent years because of fires on the Poudre and drought, coupled with a lack of storage. This highlights the difficulty in entering long-term agreements.

The City of Fort Collins Natural Areas department also owns some water rights and is pursuing efforts that will encourage agricultural land and water preservation by helping to put easements on farms in community separator zones and other target areas.

In 2014, Larimer County citizens approved by 82% to extend the open space tax. The .25% tax extension will start in 2019 and extends for 25 years, with the ability to fund programs related to water and working lands. In addition to renting surplus water to NPIC farmers, The City of Fort Collins Utilities partnered with the City of Fort Collins Natural Areas to ensure that the Maxwell Farm north of Fort Collins remained in agriculture through exchange of NPIC C-BT units and agricultural use shares. This project, similar to the ATM we will later refer to in this report as “Buy and Supply” illustrates the willingness of Fort Collins to support agricultural preservation, but each opportunity is unique and can require extensive resources.

Much of the future growth in the Fort Collins area is likely to take place in areas served by Fort Collins-Loveland Water District as well as the East Larimer County Water District. The Tri-Districts treat water at their Soldier Canyon facility east of Horsetooth Reservoir, near the City of Fort Collins Utilities’ water treatment plant. Their customer base is anticipated to grow significantly, and Tri-Districts is actively seeking water to meet the demand anticipated for build-out.



FORT COLLINS AREA WATER UTILITIES AND SPECIAL DISTRICTS

Fort Collins-Loveland Water District relies significantly on C-BT water and also is one of the participants in the [Northern Integrated Supply Project](#) (NISP.) Like the City of Fort Collins Water Utilities, they support water sharing strategies but they too lack storage space and could only accept transferred water at a place such that it can be delivered to their water treatment plant. Each of these entities supplying domestic water to the Fort Collins area has unique needs, water portfolios, and storage requirements.

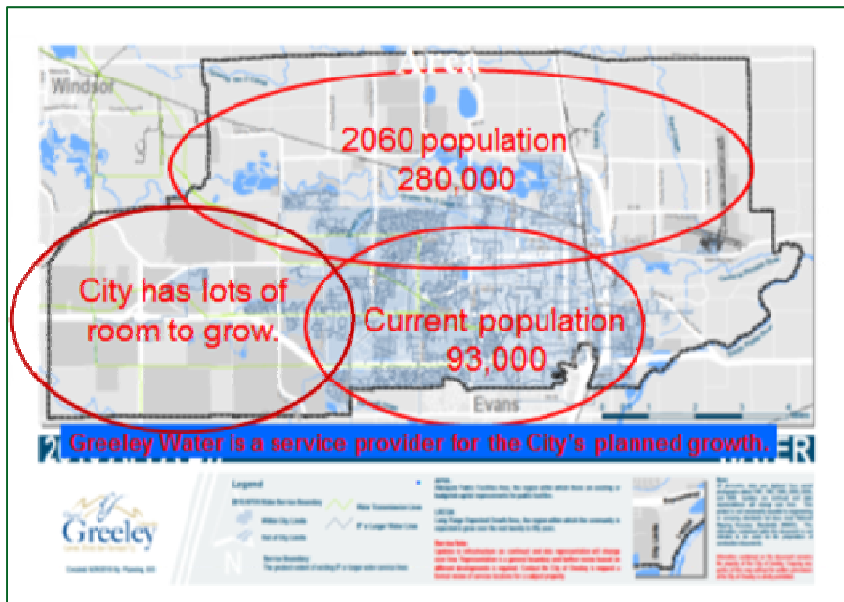
The City of Greeley recognizes that much of its cultural and economic strength comes from its agriculture base and therefore has motivation to keep agriculture strong. On the other hand, the city requires reliable supplies to provide water for new growth within a large urban growth area. Greeley is home to a number of industries that depend on water, including the new Leprino Foods cheese factory that requires certain water supplies and feed for dairy cows. Irrigated agriculture must now be able to supply feed, most of it irrigated, to more than 60,000 additional dairy cattle that have recently arrived in the region to supply milk to Leprino.

Like the City of Fort Collins and the City of Thornton, the City of Greeley currently utilizes purchase/leaseback arrangements, whereby the city purchases agricultural water or has obtained such water from developers. They then lease it back to agriculture for the near future until city growth requires it be transferred from agricultural use. City of Greeley Water and Sewer Department staff and its water board president have made clear that while they value the preservation of agricultural lands, at this point any water sharing agreements would have to provide reliability and an ability to deliver water to its water treatment plants (located near Bellvue north of Fort Collins and Boyd Lake near Loveland), something that temporary transfers may not provide unless through some sort of conservation easement/water banking arrangement.

Like Fort Collins-Loveland Water District, the City of Greeley is seeking additional water supplies for its portfolio to meet the needs of future growth. Greeley owns multiple reservoirs and has the benefit of water supplies from the Poudre and Big Thompson basins as well as C-BT water. Greeley is also a participant in the Windy Gap Firming project and will be able to utilize storage in the new Chimney Hollow Reservoir. The City of Greeley is pursuing expansion of the Seaman Reservoir on the North Fork of the Cache la Poudre River to provide drought reserve and operational flexibility, with an Environmental Impact Statement in progress. Unlike Fort Collins, which relies on multiple municipal

water providers, the Greeley Water and Sewer Department serves the entire city and consequently policies and consideration of its citizen's values are uniform.

Weld County, where Greeley is located, currently does not have an open space tax that could be utilized for agricultural land and water conservation. However, Weld County has seen extensive benefits from the oil and gas industry. On one hand oil and gas revenues provide opportunities to support agriculture, including paying for temporarily transferred



LONG RANGE EXPECTED GROWTH FOR CITY OF GREELEY

water used in operations. On the other hand, the prices paid by oil and gas developers for water skews the market for other opportunities, such as ATMs involving municipalities and irrigation companies. North Weld Water District serves customers in Weld County as well with a sizable geographic area.

WHAT WE SET OUT TO DO

With the assistance of a facilitator from the Colorado Water Institute at Colorado State University, the Poudre Water Sharing Working Group has met monthly for two years to learn about each other's systems, gain perspective, build trust and begin identifying water sharing opportunities and challenges. Early on, it became obvious that the building of trust that came from group dialogue and interaction at the meetings was key to the formulation of any eventual water sharing strategies or agreements and would constitute one of the main outcomes from the group. Such learning and trust building require significant time before trying to propose "solutions."

The Colorado Water Conservation Board (CWCB) knows that water used in agriculture is under pressure to meet the future gap between water supply and demand throughout Colorado. Because they want to keep agricultural and rural communities sustainable, they support temporary transfers of water from agriculture in lieu of "buy and dry" through their [Alternative Agriculture Water Transfer Methods Grant](#) program. The purpose of the ATM Grant Program is "to assist in developing and implementing creative alternatives to the traditional purchase and transfer of agricultural water."

In 2013 PWS members teaming with the Colorado Water Institute staff, applied for and received a CWCB ATM grant to:

- Gather data about the member entities and their infrastructure to understand water sharing potential
- Develop descriptions of alternative transfer methods deemed workable in the Poudre
- Conduct a survey of irrigation company shareholders to assess appropriateness of methods described and the likelihood that they would participate in them
- Develop prototype agreements that could be used to employ such methods and encourage implementation of actual agreements.

The research team, part of PWS, is made up of a water policy and collaboration specialist from the Colorado Water Institute; a water attorney active in promoting legislature to encourage alternatives to "buy and dry"; CSU researchers specializing in the human dimensions of natural resources; the founder of a new non-profit to promote water data transparency to promote collaborative water solutions; and an agricultural producer representative from the Larimer Agricultural Advisory Board that initially planted the seed for the Poudre Water Sharing Working Group.

WHAT WE ACCOMPLISHED

Database

The first task of our funded research project was to gather data about the member entities to understand water sharing potential. When preparing our proposal for CWCB funding, the idea of entities providing data on their respective entities met with some resistance because of confidentiality concerns. We addressed the issue by specifying that each entity could make its own decision about how much it would share, and to use publicly-available data such as from the State's HydroBase database and public documents as much as possible. It was also determined that most participants preferred data stored in Microsoft Excel, with maps in Google Earth or similar format. Ultimately we found that PWS participants expressed a spectrum of opinions on data sharing, ranging from being

okay with sharing compilations of public data, preferring use of existing planning documents, to being opposed to most data sharing.

During our monthly meetings, each of our member water users presented basic information about their current and future service areas, customers or stakeholders, policies, and infrastructure, typically in the form of a PowerPoint presentation to the group. With the exception of one irrigation company, the entities allowed us to put those presentations on our website.

We were able to gather additional data from each of the entities, some through interviews with group members and some of it already publicly available in various pieces through sources such as South Platte Decision Support System (SPDSS) memoranda about each provider's system, and data from the Division of Water Resources HydroBase database. The data and information for each organization were compiled in stand-alone interactive web pages containing graphs of historical data, with links to documents, maps and Excel workbooks with the data. The data gathered can be used to better understand the commonalities, differences, and potential for cooperation between the entities, including helping the CWCB understand water supply issues at the regional and state level. Group participants have voiced that they find the data useful and appreciate the way it has been compiled and displayed; however, concerns about misinterpretation of the data were respected and the raw data is not included in this report. PWS participants were made aware of publicly-available data about their systems, which resulted in discussions about reviewing and addressing data issues. In one case, the engineer and attorney of an irrigation company PWS participant asked to insert a broad disclaimer about the data in this report pertinent to their irrigation company because they did not have time and resources to check whether the publicly available data we used is accurate.

Description of Alternative Transfer Methods

The second task of our funded research project was to investigate and describe the most promising water sharing mechanisms that would be appropriate for the Poudre Basin and which might serve some or all of the participating entities. The mechanisms originally put forward for discussion by the group were interruptible supply agreements, decree swaps, and short-term leases. (See Appendix)

- Interruptible supply agreements allow water decreed for agricultural use to be used for a non-agricultural purpose for as many as three out of ten years without a change of use water court decree.
- Water swapping allows farmers to make available to domestic water providers some of their "multiple use water" (typically C-BT) in exchange for some of the domestic providers' "agricultural use only" water. This allows the domestic water provider flexibility without having to go to water court for a change of use water court decree. This is especially applicable in a place like the Poudre Basin where a great deal of water decreed for agricultural use has been transferred to domestic water providers as they have purchased or received irrigation company stock from developers.
- Short-term leases of agricultural water for domestic use allow farmers to lease water to domestic water providers on a short term basis to meet short term needs such as that caused by severe drought, infrastructure failure or watershed damage by fire or other natural disaster. An example is the use of a Substitute Water Supply Plan as authorized by the state engineer.

Later, the group added a fourth ATM which is still being investigated but which was partially tested with irrigators in our survey. We are preliminarily using the name "Buy and Supply."

- Buy and Supply is a hybrid ATM where land and water that a farmer needs/wants to sell is purchased by a conservation entity (typically with multiple partners) that places a conservation easement on the farm or ranch and leases or sells it back to an agricultural

producer. A portion of the water is reserved for lease to domestic water providers for drought firming, recovery 3 years in 10, or even for base supply where possible.

In the case of interruptible supply agreements, two alternatives were originally described. The first involves the lease of water owned by a farmer to a domestic water provider via fallowing, planned deficit irrigation or crops needing less water. The second involves a deal under which a farmer foregoes taking rental water from a domestic water provider and enables a utility to utilize the agricultural water it owns as the farmer provides the dry up and recharge of return flows in return for compensation. The second alternative was seen to be of particular interest to shareholders of irrigation companies who are largely dependent on renting water from domestic water providers for their operations, and who could provide value to municipalities (such as recharge) in exchange for more certain guarantee of rental water.

The wording of these transfer methods was vetted and finalized as part of the process of developing the irrigation company stakeholders' survey. The Buy and Supply ATM emerged just in time to be included in the survey.

Survey

Another task of our funded research project was to conduct a survey to determine the perceptions of irrigators toward water sharing in general, the water sharing mechanisms identified, and the likelihood of their participating in them.

Irrigation company members of the group varied in their enthusiasm for the survey, both in concept and the specifics of the survey. In the end the two irrigation companies with major domestic water provider ownership agreed to send the survey to their shareholders. Though supportive of the goals of the PWS group, representatives from the other two irrigation companies were not able to garner board support for the survey. This was primarily because of the belief that the survey was too long and too confusing and because of the belief that their shareholders are less likely to enter water sharing agreements or sell their water because they are enjoying the profit of growing high value crops and have had fewer dealings with municipal providers.

Despite efforts to improve the survey to counter those objections, in the end the survey went out to the stakeholders of the two irrigation companies. Though not enabled by his board to distribute the survey to his shareholders, the manager of one of the non-participating irrigation companies took a handful of the surveys to the board, asking them to complete it.

The manager of the other irrigation company not participating in the survey expressed that his board would support a one page survey that poses the primary question—if farmers get to the point that they want to sell in the future, would they entertain alternative, temporary transfer methods in lieu of buy and dry.

Survey invitations were sent out to 676 North Poudre Irrigation Company and Water Supply and Storage Company shareholders. To date 155 surveys have been returned. This represents an adjusted response rate of 23%, approximating the response rate of most mail back surveys. A basic summary of survey responses received to date is provided below. Detailed responses for each survey question, including open-ended comments are included in the survey frequency report in an appendix to this report.

The majority of survey respondents (>80%) were active irrigators of agricultural lands in Northern Colorado. Most irrigators (71%) reported that their operations were taking place on 100 or fewer acres. However, 33 irrigators (farming from 100—2000 acres) responded, which is in all likelihood a majority of large farmers under these two irrigation service areas. This is positive in that water sharing needs the participation of only a few larger irrigators to be viable. Respondents had farmed or

ranching in Northern Colorado for an average of 42 years and about one fourth reported farming or ranching as their primary occupation. The most predominant crop types reported by irrigators were hay or other forage crops (66%), alfalfa (43%), and corn (31%).

Respondents were asked to evaluate three different ATM approaches (Short Term Lease, Interruptible Supply, and Water Swaps) after reading a description of each approach (for descriptions, see the survey frequency report in the Appendix.) ATM approaches were evaluated on 1) “appropriateness” as a water sharing mechanism for irrigators/water shareholders; 2) the likelihood of participation in a water sharing program using the ATM approach; and 3) the factors which would influence an irrigator/shareholder’s decision to participate. Results of these evaluations are summarized below for each ATM. It is worth noting that smaller irrigators made a number of open ended comments that they didn’t think they owned enough land and water to be considered for water sharing. This may have accounted for them seeing ATMs as less appropriate and that they were less likely to participate in the future.

Short Term Lease

Approximately 68% of respondents felt that Short Term Leases were an appropriate ATM approach. About half (52%) indicated that they would be likely to participate in a short term lease program if one were offered in the future. Several decision factors were rated as at least “somewhat important” by a majority of respondents when making a decision about participation in a short term lease program. These included reducing the pressure for “buy and dry” of irrigation water, dry year security, additional income, providing a beneficial service to the community, and improving urban-rural relationships. Reducing pressure for “buy and dry” was rated as the most important decision factor with 54% of respondents rating it “very important” or “extremely important.”

Interruptible Supply

Approximately 39% of respondents felt that Interruptible Supply was an appropriate ATM approach and about one fourth (23.7%) indicated that they would be likely to participate in a future interruptible supply program. Several decision factors were rated as at least “somewhat important” by a majority of respondents when making a decision about an interruptible supply program. These included reducing the pressure for “buy and dry” of irrigation water, rental water security, dry year security, additional income, providing a beneficial service to the community, and improving urban-rural relationships. Reducing pressure for “buy and dry” and rental water security were rated as the most important decision factors with 37% and 33% (respectively) of respondents rating these factors “very important” or “extremely important.”

Water Swaps

Among the 52% of respondents who reported owning shares which included trans-basin water (e.g. Colorado Big Thompson), approximately 72% felt that Water Swaps were an appropriate ATM approach. Three fourths (75%) indicated that they would be likely to participate in a “short term” water swap program if one were offered in the future and about half (49%) said they would participate in a “longer term” water swap program. Several decision factors were rated as at least “somewhat important” by a majority of respondents when making a decision about participation in a water swap program. These included rental water security, reducing the pressure for “buy and dry” of irrigation water, dry year security, additional income, providing a beneficial service to the community, and improving urban-rural relationships. Rental water security was rated as the most important decision factor with 42% of respondents rating it “very important” or “extremely important.”

Buy and Supply Concept

In addition to the ATM approaches described above, respondents were asked to rate their likelihood of participation in a future “Buy and Supply” or regional land and water bank arrangement. Overall, about one third (37%) indicated they would be “somewhat likely” or “very likely” to participate in this sort of program. Respondents who reported operations of greater than 100 acres were more likely to participate in “Buy and Supply” than smaller acreage irrigators. Approximately 57% of the larger acreage irrigators indicated that they would be “somewhat” or “very” likely to participate.

Irrigator/Shareholder Views on “Big Picture” Issues Related to Agricultural Land and Water in Northern Colorado

A section of the survey asked a series of questions designed to gauge irrigator/water shareholder views on big picture issues related to agricultural land and water in the region. Results indicate that most respondents (69%) believe irrigated agriculture has a strong future in the Poudre Basin. Nearly two thirds of respondents (62%) agreed that water sharing could be a “win-win” for both agricultural producers and water utilities. However, many respondents (54%) also indicated that entering into a water sharing agreement would cause disruptions to farming operations (e.g., labor costs, contracts) and most (73%) indicated a general reluctance to enter into any agreements that would prevent them from selling their water during a given time period. At the same time, large majorities felt alternatives to “buy and dry” are essential to maintaining the sustainability of agriculture in the area (76%) and that current irrigators/shareholders would only be able to resist market pressure on water if they could make a good living using that water for agricultural purposes (83%).

Prototype Agreements

The final task of our funded project was to develop prototype agreements for the selected alternative transfer methods and attempt to move toward actually utilizing one or more of such prototype agreements to pin down a deal between parties. Prototypes are found in an Appendix to this report.

- Interruptible Supply with Owned Water. Because PWS participants and the irrigators surveyed had less interest in and less likelihood of participating in interruptible supply than other ATMs, it was difficult to go much beyond a standard interruptible water supply agreement in developing a prototype.
- Interruptible Supply Foregoing Rental Water Owned by a Utility. This variant on interruptible supply was brought forward by one of our members who has considerable ground under irrigation, much of it dependent on rental water. He was willing to provide the dry up and return flow recharge that the utility would have to satisfy in order to use their agricultural water. This farmer has adopted irrigation efficiencies that have allowed him to rent less water over time. In the course of our research project, this farmer gained the interest of the Fort Collins-Loveland Water District in the “foregoing rental water” variant of interruptible supply. Using funds from our research project for the legal investigation of his idea, and using funds from another CWCB funded research project for the engineering investigation of his idea, we were able to “try out” the concept to see if we could come up with not only a prototype agreement but an actual agreement. In the long run, both the NPIC shareholder and the Fort Collins-Loveland Water District determined that the scenario was not feasible based on the calculation used for the exercise. From the perspective of the water district, not enough water could be transferred to make the deal worth the effort (and the engineering/legal expense.) From the perspective of the NPIC shareholder, the currently accepted methods for calculating consumptive use was the reason the scenario would not yield enough water to be feasible.

- He said: “Agriculture is adding new technology and becoming more efficient with its use of water. The engineering methods used by Colorado’s state engineer do not recognize these new efficiencies. They use the same formula as for buy and dry which does not work for interruptible supply because it does not allow the farmer to get full credit for the consumptive use of the crops.”

Further, this shareholder is concerned that a farmer entering into this kind of agreement might be opening himself up to a devaluation of his water right given the state’s formula. He concluded that irrigation company shareholders are motivated to continue holding the status of their water rights close to the chest, which is not conducive to water sharing arrangements.

One possible improvement recommended by some in our group is that a change be made in the IWSA statute such that the state engineer only look back to a period of record for the previous 10 years. This would enable a farmer to continue to increase his efficiency and not be locked into a certain CU, while providing more realistic yield in the sharing agreement.

- Water Swapping. The trading of C-BT water decreed for multiple use and native river water decreed for agricultural use is an ATM that is unique to the basin and has been utilized in the past, most recently between the City of Fort Collins Utilities and shareholders of North Poudre Irrigation Company when the High Park Fire caused high carbon loading contamination of native water from the Poudre River complicating water pre-treatment for domestic uses. We discussed with the city and the irrigation company the idea of developing a prototype agreement that could be used in the future to formalize a longer term agreement that might provide more certainty and less administrative cost than the year to year arrangements that have been used in the past. Such a prototype agreement was not developed, however.
- Short Term Leases of Owned Water. In some years like 2002 domestic water utilities leased owned water from irrigators but later complained about having to scramble and then to pay high prices for that water. Short term leases could be agreed upon ahead of time in some cases so that participants are standing by and that the process for arriving at a fair price is also clear.

WHAT WE LEARNED

Yeah, But

Our members, both domestic water providers and irrigation companies, are philosophically receptive to the concept of alternatives to buy and dry. They want to see irrigated agriculture and the multiple values it provides survive despite urban growth. However, for most of them the obstacles still seem to loom larger than the potential at this point.

We learned that there are fundamental issues with temporary transfers that must be considered by any option. In drought years, there may simply not be enough water to warrant a temporary transfer to municipalities and determining the timing of a deal is critical to farmers who must buy crop insurance, plan for planting, and factor in contracts with buyers. Making such decisions on high-value crops is different than for irrigated pasture so not all irrigators will consider ATMs in the same light. If a transfer occurs for drought recovery, it is difficult to know what conditions will be in the 2nd and later years. If a wet year follows a drought, why would a city need drought recovery water from agriculture?

Farmers also indicated that temporarily fallowing a field or a lateral may result in physical and economic conditions that cannot be compensated for in one year. Restoring soil moisture may take multiple years and maintaining adequate funds for farm labor and operations must occur even if

lands are fallowed. Compensation for water sharing will have to include these costs. In addition, some farmers have multi-year commodity contracts or participate in federal programs that could be affected by fallowing.

For domestic water providers, the need for reliable supply delivered to water treatment plants is largely interpreted to mean permanent supply. They have accomplished this objective by means of what is called “purchase/leaseback.” Some call it “slow motion buy and dry” and point out that we will not understand the negative effect on agriculture until the cities begin to grow to a point that they need this ag water and can no longer rent it back to farms.

Municipal providers purchase agricultural water as an insurance policy against short-term drought and disasters, and as a long-term water supply that they can grow into. The urgency of acquiring water depends on the amount of existing supplies, storage, and growth projections. Municipal providers often compete against each other (and providers outside the basin) for remaining water supplies. However, they are limited against speculation and constraints such as caps on direct purchases of C-BT water. Proposed regional storage projects allow those participating to benefit, but not all entities in the basin are project participants. Further, project permitting is a long process.

Irrigation company members of our group fall into two categories. One category is made up of companies whose shareholders are still largely agricultural and still own most of their water rights. They have seen increased profits in recent years due to good commodity prices and because some of them raise high value crops. The latter say that even in drought years they will continue to farm with the water that is available, so interruptible supply agreements do not interest them. They say that their shareholders are not tempted to sell out because they are serious farmers and they want to stay in farming. However, there has been enough sales activity that one of the irrigation companies has recently said to its shareholders, “If you are going to sell, let us be the buyer.”

Some limited leasing of certain types of water for oil and gas development is occurring in these irrigation companies, at prices that far exceed the ability of potential environmental or urban players to compete if they wished to. This market does reveal that agricultural water owners can have multiple ways of realizing the equity in their water, making it somewhat less likely that they will want to sell that water permanently.

The second category into which our irrigation company members fall is made up of irrigation companies whose shares are largely owned by domestic water utilities. One of the irrigation company’s stock is two thirds owned by domestic water utilities and another three-quarters owned by domestic water utilities. Even large farms that own considerable water under these systems are often rental water dependent, smaller shareholders even more so. Under these systems, the unsecured year to year rental arrangements seem to be fulfilling the current need but irrigators surveyed indicated that rental water security would be a strong incentive to enter into water sharing agreements if they become a reality.

These ongoing arrangements are threatened by drought, wildfires, and other short-term crises that result in utilities curtailing their rental programs to hold back supply for their own needs. Also, degradation of ditch systems as water is incrementally removed may ultimately render the system unable to deliver to the remaining customers. Understanding system interactions may be needed to fully understand impacts and options related to rental/leasing of municipally owned water.

There is also the matter that sometimes decisions are made by individual farmers and at other times with irrigation companies. It is resource-intensive for domestic water providers to put in place water sharing agreements with individual farmers which does point out the need for piloting longer-term agreements that stay in place.

While neither the farmers nor the domestic water providers in our group see a clear or integrated strategy for using ATMs in the Poudre Basin at this point, our survey shows support for continuing to investigate the potential. There is concern that shareholders of irrigation companies are being pursued by developers and water brokers to sell their water without knowing about other alternatives. Some believe that the lack of security in their water supply year to year may influence those who are being pursued to sell—to get out of farming altogether if successful ATM approaches are not in place.

Getting to Know You

It is easy to undervalue the benefit of relationships in laying the groundwork for change. Outsiders to our process may not appreciate the value of two years' of meetings in fostering relationships. However, we have learned that building trust does not happen overnight. It requires openness on the part of the participants, and willingness to learn about one another's circumstances. Familiarity in this case has led to understanding and several "aha" moments. For these relationships and this learning to result in action to avoid buy and dry by adopting alternative transfer methods, the time has to be ripe and we don't seem to be done yet. Through the building of these relationships and this cross-entity learning we have constructed a foundation that will serve us going forward. One member said "The relationships built in the process will likely bear fruit in a number of ways. Those new relationships are one of the most valuable aspects of our effort."

It's All So Entity Specific

The fact that each entity in the basin, whether domestic water provider or irrigation company, is so unique makes it very difficult for a regional solution to surface. Each entity is busy focusing on its own situation and its own current and future needs. Each entity's mission or focus, its mix of water rights, its unique infrastructure, the demographics of its water users, its geographical location, its political environment, its staff capabilities and personalities, all factor into how interested it is in the water sharing potential we have been discussing. Our members have an appreciation for what we have learned about each other and about the potential for water sharing, but in the end, each falls back to their own specific needs and the responsibilities they have been assigned by their governing bodies.

Some of our utility members have good supplies but need storage; others have storage and need additional drought security and base supply. Some now have the potential to work with open space programs willing to invest in conserving agricultural land and water and some do not have such programs. Some irrigation companies have a considerable number of non-agricultural shareholders and others have mostly agricultural shareholders. In some parts of the basin, irrigators still own much of the water they use, while in other parts irrigators own some water but are more dependent on rental water. Some companies have a history of working with utilities and others do not.

Some entities have more C-BT water than others and therefore have more flexibility regarding some water sharing mechanisms.

Local governments are typically engaged in land use planning efforts, some with growth management areas that limit build out and reduce pressure on supply. Municipal governments are mandated to participate in a broad based planning process involving multiple entities in which elected officials must respond to a wide range of community values including minimizing the loss of agricultural land and water. The special districts within our group serve areas with the greatest development pressure and build out potential, but as special districts they are created to provide water to their customers. Water sharing concepts do not necessarily provide the reliable base supply they must provide. They may be interested in interruptible supply concepts that provide drought year or drought year recovery supplies, however.

For additional base supplies, all our member utilities currently depend to some degree on purchasing agricultural water or asking developers to transfer agricultural water. The option of using the water in

emergencies, eventually changing the water to municipal use, provides a cushion and some flexibility. Several members have pointed out that, ironically, this cushion disappears and is converted to an inflexible hard demand as more and more water is taken out of agriculture and converted to municipal use.

The historical operations within the Poudre have relied upon cooperation between irrigation companies, allowing for flexibility in the basin. Exchanges and shared use of infrastructure are common. There is an underlying question of whether such cooperation and shared and maintained infrastructure will continue to be possible as water is taken out of the basin and held in storage for drought reserve rather than being distributed on the land through systems actively maintained by irrigators. Perhaps there will be a tipping point beyond which some systems will not be able to contribute to the shared operations of the basin.

Storage Has To Be Part of the Equation

The need for more storage, so that additional and current native supplies in wet years can be set aside for dry years is the calling cry of virtually all the members of our group, whether domestic water providers or irrigation companies. Particularly among the shareholders of those irrigation companies still largely owned by farmers, this need has seemed to overshadow the interest in water sharing. We have heard more than once “We wouldn’t need water sharing if we had storage.” Several of the entities in our group are directly involved in proposed new storage or storage enhancement projects. Those entities likely felt constrained to share data as openly as they might have given their involvement in the federal and state permitting process for those projects. In the case of the City of Fort Collins Utilities, lack of storage to set aside water it owns and has access to in wet periods is a major constraint. Their water portfolio is strong; their ability to store that water for times of drought or drought recovery is weak. Water sharing is also constrained by lack of storage, since shared agricultural water has to be stored so that it can be delivered year round, not just in the summer irrigating season. Some have indicated that the basin is approaching pre C-BT years given that much C-BT water is now reserved for municipal use and supplemental supplies for agriculture are limited.

Knowing that large new projects are very difficult to permit, and notwithstanding the status of the projects currently in the permitting process, the group has discussed the potential for additional “small buckets” and the cooperative management of existing storage and infrastructure that might make water sharing more feasible. An additional interest that has been brought up is the potential for increased irrigation efficiency to provide greater flexibility to open up water sharing opportunities. Return flow constraints have to be considered, but some believe this is an area needing further investigation.

The Pros and Cons of Interruptible Supply

We learned that interruptible supply would be better done with willing producers who own water that could be shared, than with producers who are rental water dependent but willing to share by foregoing rental water (and providing dry up and return flow recharge.) Whether rental water or owned water the issue of how the proportion of consumptive use to return flows is calculated is problematic. Our irrigator survey showed support for interruptible supply in general but a low likelihood of participation by the respondents. PWS members from irrigation companies that did not take the survey have stated that high value crop producers and those for whom their crop is not conducive to season to season fallowing are not interested in interruptible supply under any circumstance. Additionally, it seems that interruptible supply might be most suitable for drought year recovery instead of actual drought years because in drought years there is little water to share. Some group members are skeptical of interruptible supply because they believe it would be difficult to implement even if agreement drafts are in place given the short time window between an early spring

decision to implement and preparation for spring planting. High transaction costs and administrative effort relative to the amount of water to be transferred are another obstacle to interruptible supply agreements.

Swaps and Short Term Leases -- Making Them More Permanent?

Swaps based on different types of decrees will and have worked for the part of the basin where utilities and irrigators have C-BT and agricultural water that is more easily swapped. Short term leases—the renting or leasing of water from urban back to agriculture is also quite prevalent (and required since municipalities cannot use water decreed for irrigation until and if they change the use in water court.)

What is missing in both of these circumstances is a more permanent arrangement that recognizes an interest in preserving agriculture while ensuring that cities can use water to offset drought. What is missing is a more permanent list of irrigators/shareholders who agree to participate in swaps with, or leasing to utilities over the longer term and have signed an agreement to do so. In the case of farmers renting water back from domestic water providers, the idea of moving toward longer term leases or rental guarantees in place of annual rentals would be one type of compensation that was seen as an important factor that would make entering into water sharing more likely for them. This was noted among those taking the survey.

Presumably, the domestic water providers prefer the additional security provided by farms that have easements to ensure that the agreements continue over time, but our domestic water provider members have not yet shown much interest in making the year to year rental arrangements with farmers more permanent. One issue that has been brought up is how to determine which farmers get to participate in such long term agreements and perhaps receive rental water security as compensation given that there is usually more rental water desired by farmers than is available.

The Impact of Transfers Out of Basin

There is strong agreement that transfer of water outside of the Poudre Basin will have more profound impacts than agricultural transfers to municipalities in the basin. Pressure from outside the basin (without the internal message that there are options to selling) is seen as perhaps the biggest challenge and opportunity to some group members. A few, however, cite the irony of the Poudre Basin finding itself in the position of benefitting from transmountain water from the Colorado Basin, but wanting to prevent the transfer of Poudre basin water to other basins. Water owned in the basin supports the values of citizens in the basin, including agriculture, municipal, and environmental water uses, and is used in the basin multiple times. For example, City of Fort Collins Utilities diverts nearly 25,000 acre-feet per year, about half from C-BT and half from the Poudre; however, nearly 65% is returned to the system. Other municipalities are similar.

Despite these negative impacts, there is a migration of water to the south as the Front Range population increases. Such permanent movement of water away from high producing agricultural lands in Larimer and Weld counties precludes Interbasin sharing of the water and is a lost opportunity.

We Don't Trust What We Don't Understand

Our survey found that most irrigators want to retain the right to sell their water in order to reap the financial benefits of their water asset, but most of them do not like to see agriculture undergoing buy and dry. This dichotomy shows the need for those promoting alternatives to buy and dry to clearly express that their goal is not to take away a given water rights owner's choice to market their water however they wish, but to give them additional alternatives to choose from. Anecdotal accounts have led us to believe that some are selling their water who would consider alternative transfer methods if

they knew about them, but information about these alternatives and where they are being utilized is not reaching them.

A Bright Idea that Generates Lots of Questions

As previously mentioned, during the last six months of our meetings, as we were finalizing the survey, the “Buy and Supply” concept (a term offered by the water attorney on our research team) began to gel and garnered more interest by both domestic water providers and irrigation companies than anything we had previously discussed. The idea came to us from multiple sources, including a presentation that we had heard during one of our very first meetings in 2013.

The idea seemed particularly conducive to making farming affordable via long term leases for young farmers who want to get into farming but do not have a family farm to inherit or capital to invest. The concept attracted the interest of both the City of Fort Collins Natural Areas and Larimer County Open Space programs. Whether leased or sold to a producer, such land and water preserved for agriculture could provide a buffer around cities between communities or simply to protect the multiple values provided by the irrigated landscape which such programs seek to protect.

The Poudre Water Sharing Working Group hosted in January 2015 a meeting of a variety of individuals and groups who had expressed interest in this concept as it had been discussed not only the group, but by others. Those attending the meeting included:

- A representative and former county commissioner from a group in Weld County considering ways to buy water to keep in the basin, especially for agriculture.
- Representatives from a group that has applied for a grant from the South Platte Basin Roundtable to work with Colorado Open Lands and others to determine what would have to be changed in typical conservation easement language to facilitate the incorporation of ag/urban water sharing into those agreements, especially how to meet IRS charitable donation requirements for receiving tax incentives.
- Representatives from the Larimer County Open Lands Program and City of Fort Collins Natural Areas Program as well as a board member of Legacy Land Trust, all entities who are interested in the concept. It was noted that Larimer County voters recently voted overwhelmingly (82%) to continue a quarter cent sales tax to protect and manage open space. This effort has and will continue to include agricultural land and water purchases and the establishment of easements on working farms and ranches. One instance where a variation of the “Buy and Supply” ATM concept has already been applied in the Poudre Basin with both a water utility and an open space/natural area program collaborating was described by participants in that transaction.
- A recently retired state legislator who has been instrumental in promoting alternative transfer research and pilot studies as a means of reducing pressure on agricultural water to meet the future water supply/demand gap in Colorado.
- Three water attorneys, two of whom have been active in promoting legislation to facilitate alternatives to buy and dry and the third who has been active in a local group of Poudre ag/urban/environmental/business/recreation interests who are collaborating on ways to improve the health of the Poudre while respecting private property rights.
- The manager of a major water conservancy district that provides C-BT water to Poudre irrigators, who reiterated details about an attempt he was involved in a decade ago to keep water in the Poudre Basin by means of a Larimer/Weld conservancy district that would buy water that otherwise might be sold to out of basin entities, and lease it back to entities within the basin.

The fact that a concept like this is now being considered by multiple parties coming from different angles and with multiple values, makes this meeting important. Multiple perspective and values means that more resources can be brought to bear on this strategy. Of course the meeting generated many questions as to how the concept might be developed. What everyone had in common was the desire to keep water in the Poudre Basin and to prevent it from being sold to entities outside the Basin. Most of those in attendance also had the additional goal of keeping land and water in agriculture while making a portion of it available in a non-permanent way through agriculture/other use water sharing arrangements.

This concept would require exactly what the other transfer methods were struggling with, the buy in by multiple entities with multiple values. The flexibility provided by having one entity that both landowners and water utilities could deal with is seen to make it easier to adapt to individual circumstances. It is a concept heavily dependent on partnerships to repay the entity, which is the only way the considerable financial resources required could ever be secured.

At a subsequent meeting of the Poudre Water Sharing Working Group, a number of concerns about the “buy and supply” concept surfaced. Many who like the concept are grappling with how it could actually be accomplished in the Poudre Basin. Others are satisfied with the efforts of their individual entities and do not want another layer of bureaucracy to deal with. A couple are concerned that if public monies were spent to fund the market entity that would be “double dipping” since citizens already pay for their water. Another concern raised was whether a new public entity should compete with existing public entities and private entities buying and selling agricultural water. Some saw it as providing a welcome market option for those owning land and water that need to sell but prefer to see some of their water stay in agriculture and/or in the Poudre Basin. The group agreed that this report should state that although there is interest in the concept, many questions will have to be answered as it is explored further.

Whether or not the concept evolves, either via agreements between specific partners (some being currently explored) or implemented by a regional entity yet to be created, it is clear that development pressure and attempts to purchase and move water out of the basin/out of agriculture continues. We seem to agree that letting the current water market take its course will lead to more buy and dry, which is not sustainable in the long run if irrigation agriculture is to survive. Many, but not all, members of the group believe that an institutional intervention with a new view of water markets seems to be indicated.

WHAT WE THINK COULD/SHOULD HAPPEN NEXT

Explore Buy and Supply/Land and Water Conservation Entity

As per the discussion above, those members of the group who are supportive of further exploration and development of Buy and Supply will continue work on this concept. The potential exists to a) work on specific projects that pilot the approach (now in process) as well as b) form a broader based group that will develop the concept in greater detail and test support for it with key stakeholders.

One of our members said; “The timing seems right to take a step in exploring the buy and supply idea. We should organize a committee that has access and is willing to talk with decision makers in irrigation companies and broaden the discussion with the cities. As someone said at our meeting, we need to act quickly or the discussion will be moot. I also agree with someone else’s conclusion that the effort to create an alternative transfers method/conservation based Poudre water market will be on the order of the C-BT project, but potentially as significant. Speaking as a native, we are the right ones to pioneer this in the state, and I believe it is vital to our future. Colorado water law has its origins in the Poudre Basin —it is only appropriate that another major advance originates here.”

Water Swap Formalized

Domestic water providers and irrigation companies, especially NPIC and the City of Fort Collins Utilities, but also others, should be encouraged to pilot a formal water swap agreement that would facilitate such sharing of water when the next crisis requiring it occurs. Large-scale swaps would require investigating the effects on the NPIC system, as it may be harder to distribute water to certain parts of the system when the C-BT water has been removed through these swaps.

Outreach and Education with Agricultural Producers

Throughout this process, it has become obvious that many agricultural producers owning irrigation company shares are not familiar with the concept of alternative transfer methods although those participating in the survey are among those who have had exposure to ATMs. For a considerable period of time, land and water owners thinking about selling have been aware of few options other than selling to a water broker or a utility. Time is of the essence to develop new options, build support for them and as they become a reality, to put them in front of those who might be wishing to sell land and/or water. Since there is already one example and additional interest among utilities, open space programs and others to use a “buy and supply” approach, it is not too early to indicate to those desiring to sell that it might be worth their time to approach some of these entities.

What is needed now is ongoing outreach to agricultural producers who own irrigation company stock in the Poudre Basin to talk about the implications of buy and dry, ATMs, and the findings of PWS. Such outreach could take a variety of forms.

- Focus groups. A series of focus groups could be staged in which our report and the results of our survey are shared with groups of irrigation company shareholders. The purpose of such focus groups would be not only to inform agricultural producers about the availability of alternatives to buy and dry, but to gain valuable input from them and build on that. Most advantageous would be to garner support from individuals in these groups leading to their becoming involved in next steps.
- Meetings with irrigation company boards. Irrigation company boards could be convened for the same purpose as the focus groups. In addition, the data base information pertaining to that company could be used to update them on ways of using and displaying water information and the potential to solve problems together in the future.
- Presentations at irrigation company annual shareholder meetings could be made, such as the one given by PWS members at the February 2015 annual meeting of the NPIC to present preliminary survey results. This was an initial effort to do the outreach necessary to stimulate and share the opinions and dialogue about ATMs among key stakeholders.
- Irrigation company summit. An irrigation company summit could be organized to which all shareholders of all Poudre Basin irrigation companies would be invited, for the same purpose as the focus groups.
- Websites. Our report, including survey results, could be placed on appropriate websites and irrigation companies asked to notify their shareholders that they can access the information there. Appropriate websites might include those of the Colorado Water Institute, Ditch and Reservoir Company Alliance, Open Water Foundation, Colorado Farm Bureau, Rocky Mountain Farmers Union, Colorado Agriculture Water Alliance, Western Water Partnerships, Colorado Water Conservation Board and websites of the irrigation companies themselves.
- Brochure. A brief, eye-catching brochure could be prepared giving the highlights of our report and survey. Each of the irrigation companies could be asked to mail the brochure to their shareholders.

Whatever form the outreach takes, content to be covered might include:

- First hand reports of existing beneficial municipal water sharing efforts such as rental programs to accommodate purchase/leaseback contracts, swaps tied to the High Park Fire contamination of supplies, and the City of Fort Collins' Maxwell farm agreement
- Results from the survey of irrigators regarding ATMs
- Basic data about the systems of key domestic water providers and irrigation companies, to provide context in which future water sharing might be considered.
- Summary of what various projects funded through CWCB's ATM grant program have investigated, what they found, and what if anything they are leading to
- Data about the pressure on agricultural water rights owners to sell. How much and where has agricultural land and water been transferred to other uses? How much and where is it due to development spreading over agricultural land? How much and where has it been immediate buy and dry? How much and where has it been purchase/leaseback? What are the future plans of those who have engaged in purchase/leaseback, for instance plans for the Thornton pipeline?
- Information about options that farmers have as they consider succession planning
- Dialogue about the inherent conflict between the free market right to sell water and the desire to keep water in agriculture—a chance for agricultural producers to voice values and realities and listen to those of their fellow agricultural producers
- Dialogue about the pros and cons of water sharing as opposed to buy and dry
- Update on the proposed storage projects and issues related to them that affect irrigation companies and could have potential effects on water sharing.

These outreach meetings would offer an opportunity to gather further input from agricultural producers and irrigators such as was provided by our survey of agricultural producers.

In addition, ways to reach local government decision makers, community leaders and citizens about these issues should be considered as well.

Promotion of Cooperation in Optimization of Storage and Infrastructure/Better Understanding of Regionally Important Factors

Promotion of and funding for a regional system-wide analysis of domestic water provider and irrigation company infrastructure and regional water management factors should be pursued. Such could lead to optimization, storage, conveyance and exchanges of water resources for multiple benefit including not only agricultural and urban but also environmental. Such analysis would have to have the backing of the entities involved, and would need to have a broad perspective, with adoption of alternatives to buy and dry being only one potential outcome under consideration. Reservoir improvement prioritization and a recommendation for sharing of new or existing storage and/or conveyance infrastructure could be another potential outcome. The analysis could include evaluation of how irrigation efficiency improvements, both irrigation company-wide and on-farm, could lead to optimization of water use and consideration of return flows.

Existing data available from the South Platte Decision Support System (SPDSS), and that collected in our current project should be used to assist in the system analysis. The SPDSS model data sets should be enhanced to evaluate the potential for use of alternative transfer mechanisms as part of normal DSS analysis, not as an after-thought.

As part of the analysis, focus should be put on trends that might influence how domestic water providers and irrigators think about water sharing. For instance, what effect might increasing assessments for C-BT water have on the cost of rental water? If new storage is built and domestic

water provider water use increases, how do wastewater return and outdoor irrigation returns benefit agriculture? In general, will second-use water go to agriculture or be transferred out of basin?

Analysis and comparison should be conducted of what might be the impact of Chimney Hollow, Halligan, Seaman, and NISP on agriculture and water rentals. Does a given project take pressure off permanent transfer of water from agriculture or increase it? How do trends of C-BT water moving south impact agriculture in the Poudre (and increase impacts of “native” water transfers?)

Passing the Baton to the Poudre Runs Through It Study/Action Work Group

The recommendations above all require time and money. Some of them require political will. Where will those elements come from? The Poudre Water Sharing Working Group has spent the grant money it had available to support the work of our group to date and to see our research project through to the end and deliver our report to the CWCB.

On May 8, 2015, the Poudre Water Sharing Working Group presented its work to the Poudre Runs Through It Study/Action Work Group (PRTI) and proposed that PRTI adopt an initiative to carry on the work started by the group. Because the PRTI understands the need to address the issues brought out by the PWS efforts, it agreed unanimously to adopt such an initiative. A committee will be established made up of interested Poudre Runs Through It members, those Poudre Water Sharing members interested in continuing, and others in the community who have expressed interest in the buy and supply concept. As one of our members said, “This seems ideal, given that the Poudre Runs Through It Study/Action Work Group is actively pursuing ways to bring together divergent interests in the Poudre Basin to optimize water supplies and water management to meet both ‘working river’ and ‘healthy river’ goals.”

A Message to the CWCB

We very much appreciate the funding that the CWCB provided that made possible all that we have accomplished and all that we have learned. We believe the funding has fueled thinking that has a good chance of resulting in some real action that could preserve water for agriculture in the Poudre Basin. That thinking led to the building of strong ag/urban relationships and a promising concept some in the group are ready to investigate further, specifically that of a buy and supply approach based on a publically funded land and water marketing entity.

We are encouraged that the Colorado Water Plan draft places heavy emphasis on the need to find other ways of meeting future water supply/demand gaps in the state other than through the drying up of agriculture. However, we believe that simply talking about preservation of agricultural lands and water will not result in positive results. If we stand by and allow market forces to prevail, agricultural land and water will be transferred to uses that have higher economic value. This will not only decimate agriculture but will have harmful societal and environmental effects. Our appendix Values/Benefits Provided by Irrigated Agriculture details what will be lost under those circumstances.

In a conversation with CWCB staff in September, we were told that CWCB is reconsidering where it wants to go next with its ATM program. Though it may seem discouraging to the CWCB that its ATM Grant Program has not led to much if any “wet water alternative transfers” we encourage the board and staff to consider that working against market forces is an uphill battle and this fight will not be easily won. The studies that have been conducted, the legislation that has been proposed, and even more importantly the bridges that have been built across earlier divides between agriculture and urban are important and they should not be undervalued.

There is no magic wand. If there were willing water sharing buyers and willing water sharing sellers just waiting out there to act on their own, it would already have happened. If the state of Colorado is

serious about promoting methods whereby agriculture can stay viable while participating in “water sharing” for other statewide needs, many of us believe institutional innovations will be required. Relying on market forces to do the job without such institutional innovation could result in lost opportunities for collaboration between agriculture and other sectors. In addition to funding grants for action steps such as those we are recommending we believe the CWCB should invest internally not just in a person to manage those grants but a person or persons to work actively with those of us throughout the state who are trying to change the status quo in order to meet the spirit of the Colorado Water Plan—to keep Colorado agriculture healthy and thriving.

Our Research Team

- Alan Bright, Department of Human Dimensions of Natural Resources, Colorado State University
- Andrew don Carlos, Department of Human Dimensions of Natural Resources, Colorado State University
- Andy Jones, Lawrence, Jones, Custer and Grasmick Law Firm
- Steve Malers, Open Water Foundation
- MaryLou Smith, Colorado Water Institute, Colorado State University
- George Wallace, Larimer County Ag Advisory Board and North Poudre Irrigation Company irrigator

Our Research Funding

Primary funding for this project was provided by Colorado Water Conservation Board through its ATM Grants Program, supplemented by funds from

- City of Greeley Water and Sewer
- City of Fort Collins Water Utilities
- Fort Collins-Loveland Water District
- Seaworth Farms
- Soldias Farms
- West Fort Collins Water District
- Water Supply and Storage Company

For more information, contact: MaryLou Smith, MaryLouSmith@colostate.edu

APPENDIX A: VALUES/BENEFITS PROVIDED BY IRRIGATED AGRICULTURE

One of the main motivations for working to minimize the “buy and dry” approach to water transfers is because multiple values and benefits are lost as the irrigated landscape diminishes and the associated management and infrastructure are weakened. Some of the values provided by irrigated agriculture include:

Economic diversity: Irrigated agriculture produces wealth from renewable resources like soil, sunlight, water, and CO₂ year after year unlike other more volatile and less sustainable economic sectors.

Locally grown food and fiber: The local food and “sustainable food shed” movements continue to gain momentum because of concerns about knowing where food comes from, food quality, food safety, lowering the carbon footprint of food production. Even the Pentagon has acknowledged that decentralized food production in the US is and will continue to be an important part of homeland security in the future. The demand for food will only increase over time.

Open Space: irrigated agriculture provides pastoral landscapes that reside deeply in the American psyche and at less cost than other types of open space parcels managed by local governments.

Community Separators: Irrigated landscapes often serve as separators that preserve community integrity and prevent the documented costs associated with unchecked exurban development.

Wildlife Habitat: the irrigated landscape provides considerable wildlife habitat near ditches, reservoirs, associated wetlands, field borders, as well as State, Farm Bill, private initiated habitat areas. These provide food and critical habitat to migrating waterfowl, songbirds, as well as many resident wildlife species.

The Potential for Water Sharing: the extensive system of diversion structures, reservoirs, canals, ditches and a history of cooperation among irrigators and other water users makes the sharing of water conveyance structures and storage possible. The irrigated landscape is in essence a reservoir of water that can provide a buffer for drought, drought recovery, emergencies and the firming of urban water supplies. This flexibility disappears once irrigation water is permanently transferred to domestic use.

Ground Water Recharge: irrigated agriculture is an important source for the recharging of wells and aquifers that have come to depend on it.

Flood Surge Control: During recent floods, irrigation canals and reservoirs were able to help absorb the shock of flooding rivers and reduce damage to urban infrastructure.

Climate Change Mitigation: Western, snow melt, gravity fed agriculture is often able to provide food and fiber when rain-fed agricultural areas experience drought and other climate extremes.

Recreation and Tourism: Mid and late summer boating and recreational flows are maintained by releases needed by irrigators from mountain reservoirs. Irrigation

reservoirs are used for boating and camping. Agri-tourism (including corn mazes, pick your own events, farm tours, museums, equestrian facilities, brewery tours etc.) depend on irrigated agriculture directly or indirectly

Intergenerational Knowledge Base: Generations of experience and knowledge are lost when land and water pass out of irrigated agriculture. Such knowledge is extremely difficult to replace once lost. Many traditions, cultural values and cooperative associations are maintained within irrigated agriculture

APPENDIX B— SYSTEM DATA

Prepared by the Open Water Foundation

Introduction

This appendix provides a summary of data collected about the systems of participants in the Poudre Water Sharing Working Group (PWS.). The goals of this effort were to provide baseline data to help the group understand individual systems and enhance opportunities for collaboration (water sharing) in the Poudre Basin. Core questions included:

- What general data are available about the systems?
- Are data available to illustrate water ownership, water rentals, and trends in such data?
- What themes or stories need to be illustrated to understand challenges and opportunities?

This effort was performed with a budget of 125 hours of labor and is a reconnaissance level effort. It is hoped that the effort can be leveraged for future projects and by the participants. This data collection effort raised a number of issues about data sharing and collaboration.

The task of collecting data from PWS participants and sharing among the group proved challenging from the start. Within the water sector there is always the potential for legal action related to injury, abandonment, improper use of water, etc., and there is significant trepidation about providing one's own data to anyone that might lead to scrutiny. The pressure on irrigation companies from water brokers, land developers, municipal, and industrial water seekers is also prevalent and intensifying and consequently there is concern about providing data to those that might use it to their advantage and counter to the desires of the data provider.

Some participants, including irrigation companies and special districts, are private organizations with little or no obligation to provide data publicly, other than to meet statutory reporting obligations to the State. On the other hand, city water utilities and other public entities with commitment to transparency often publish annual reports, board meeting minutes, studies, and some even have data portals on their websites (e.g., Northern Water). This project is funded by the Colorado Water Conservation Board (CWCB), which has an interest in publishing the data and results to facilitate education and learning applied to other ATM projects; however, no formal standard has been defined for publishing data related to projects.

With the above issues in mind, a decision was made early in the project to focus on publicly-available data sources and non-sensitive data provided by participants. It was also decided to wait on providing integrated data displays for the basin in order to allow each participate to feel comfortable with data shared with the group. Ultimately, this

resulted in little integrated data sharing with the group within the timeline of the project although significant data were provided individually to participants for review. The information presented in this report focuses on key data items and findings that support collaboration and water sharing. More detailed data for each respective entity has been collected in an interactive website format available only to that respective entity. This project by no means provided enough interaction to understand all the complexities of each participant's organization. However, it did reveal a number of challenges related to data and information that can be barriers to innovation within each organization and collaboration among organizations. A basic challenge is that organizations may not understand what data are already publicly available for their organization, and consequently, how might the data be used to encourage innovation and opportunities. A second challenge is that each organization tends to focus on its own data (as expected) and consequently, integrated data sets at a basin level are not available and perhaps have not been of interest to a specific organization. Consequently, a new goal for the project was to elevate the level of understanding of data availability for PWS group participants. The initial sections of this appendix below focus on general data accessibility as a backdrop for later discussions about the individual systems. It is hoped that this information will facilitate organizations' efforts to use such data and ultimately collaborate on solutions within the basin. It should be noted that in one case, the engineer and attorney of an irrigation company PWS participant asked to insert a broad disclaimer about the data in this report pertinent to their irrigation company because they did not have time and resources to check whether the publicly available data we used is accurate.

Finally, PWS participants prepared and presented to the group information about their systems, typically as a PowerPoint presentation or verbal presentation accompanied by an outline. These presentations are available on the Poudre Water Sharing Working Group website and provide a useful resource for all participants. The information from those presentations is included in varying degree in the data websites prepared for participant systems but is not repeated here.

The Open Data Movement

The "open data movement" involves making public data available in easily accessible formats so that such data can support research, commerce, policy, collaboration, innovation and other activities. Earlier government policies such as federal Freedom of Information Act (FOIA)ⁱ and Colorado Open Records Act (CORA)ⁱⁱ provide access to public information that may not otherwise be accessible. More recently, the advent of internet technologies such as cloud hosting (data storage on computer servers maintained by third parties such as Google and Amazon) and web services (interfaces that allow software to access data over the internet) have provided the technological foundation to make possible data sharing on a large scale. Transparency and open data have also become government mandates. For example, the Obama administration has implemented new requirements for open data for federal agencies (see data.gov), as described in the memorandum "Open Data Policy – Managing Information as an

Asset”, addressed to heads of executive departments and agenciesⁱⁱⁱ. Research grants also often require open data plans.

The State of Colorado has long been a proponent of open data and provides access to water rights, structure data, diversion records, real-time and historical streamflow, and other data on Colorado’s Decision Support Systems (CDSS) website (cdss.state.co.us)^{iv}, CWCB website (cwcb.state.co.us)^v, and Division of Water Resources (DWR) websites (water.state.co.us)^{vi}. More recently, technology improvements have allowed the State to enhance open data access. The Colorado Information Marketplace (data.colorado.gov)^{vii} is Colorado’s open data portal, and water data made available on this website is one of the most popular downloads. In general, the State’s philosophy is that the data have been collected through government programs and should be available, and many eyes scrutinizing data will increase the quality of the data. The following efforts currently or may provide in the future data for the Poudre Basin:

- Colorado Information Marketplace (<http://data.colorado.gov>)
- Colorado’s Decision Support Systems (<http://cdss.state.co.us>) – South Platte Decision Support System (SPDSS) modeling currently excludes the Poudre but will likely include the Poudre after Environmental Impact Statements (EIS) in the basin are completed
- CDSS map viewer (<http://cdss.state.co.us/onlineTools/Pages/MapView.aspx>)
- Colorado Division of Water Resources (<http://water.state.co.us>)
- Water Efficiency Portal (<http://www.cowaterefficiency.com>)
- Pending EIS report publication for Halligan and Northern Integrated Supply Project (NISP)

Using Data to Tell Stories and Achieve Impact

The previous section indicates that open access to water resources data is available in multiple forms and open data will increasingly be available. Utilizing public data can reduce costs, increase consistency, and facilitate collaboration. It also can increase scrutiny on every organization that is a water user/provider. For public entities like city utilities, public scrutiny is one aspect of public service, and it can lead to better service and higher efficiency. Data providers such as the CWCB and DWR typically do not interpret the data – the data are provided in basic form such as maps, graphs, tables, and standard reports. Model data sets do reflect decisions made by modelers in preparing data sets, but the intent is to implement simulations that accurately reflect basin conditions or “what if” scenarios of interest. Users of modeling data are typically responsible for processing data into products that are more useful to those users.

For the Poudre Water Sharing Working Group, the consulting team hoped to be able to help the group tell stories with the data, for example to illustrate challenges of individual organizations and opportunities to overcome those challenges. It was also hoped that broader stories could be told for the basin. However, in the end, there was limited interest in leveraging data sources to tell stories that illustrate challenges and

opportunities with water sharing. Instead, a spectrum of feedback on data products was received, from “it is ok to include that in the report” to “we prefer that you reference existing documents and do not try to summarize or integrate content” (paraphrased).

Several examples are included below to illustrate the value of data in telling compelling stories for education and impact. These visualizations were prepared for projects outside of the Poudre Water Sharing Working Group but are illustrative to this discussion.

The Most Common Jobs in Each State

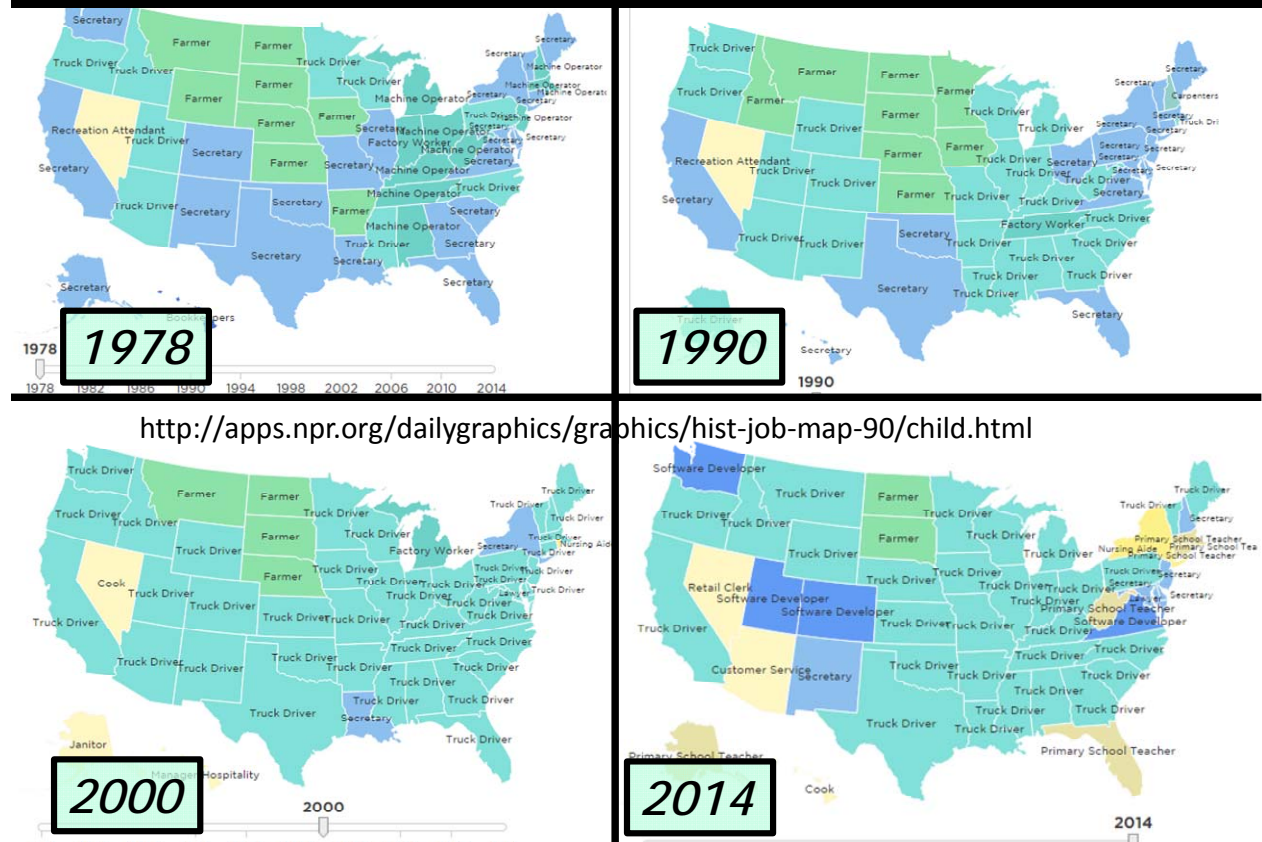


Figure B-1 The Most Common Jobs in Each State

Figure B-1 uses US Census data to illustrate the most common jobs in each state over time. Perhaps not surprisingly, farmers are a smaller and smaller percentage of the population, with truck drivers increasing and software developers gaining in high-tech states (one of which is Colorado). Such macro-level data illustrates large-scale challenges for farmers. What is not evident is that even though a lower percentage of the population farmers have produced higher yields with lower inputs, and this need will continue as population grows. Other economic studies of agriculture in the region could be used to illustrate challenges to agriculture as an industry and connections to the local economy.

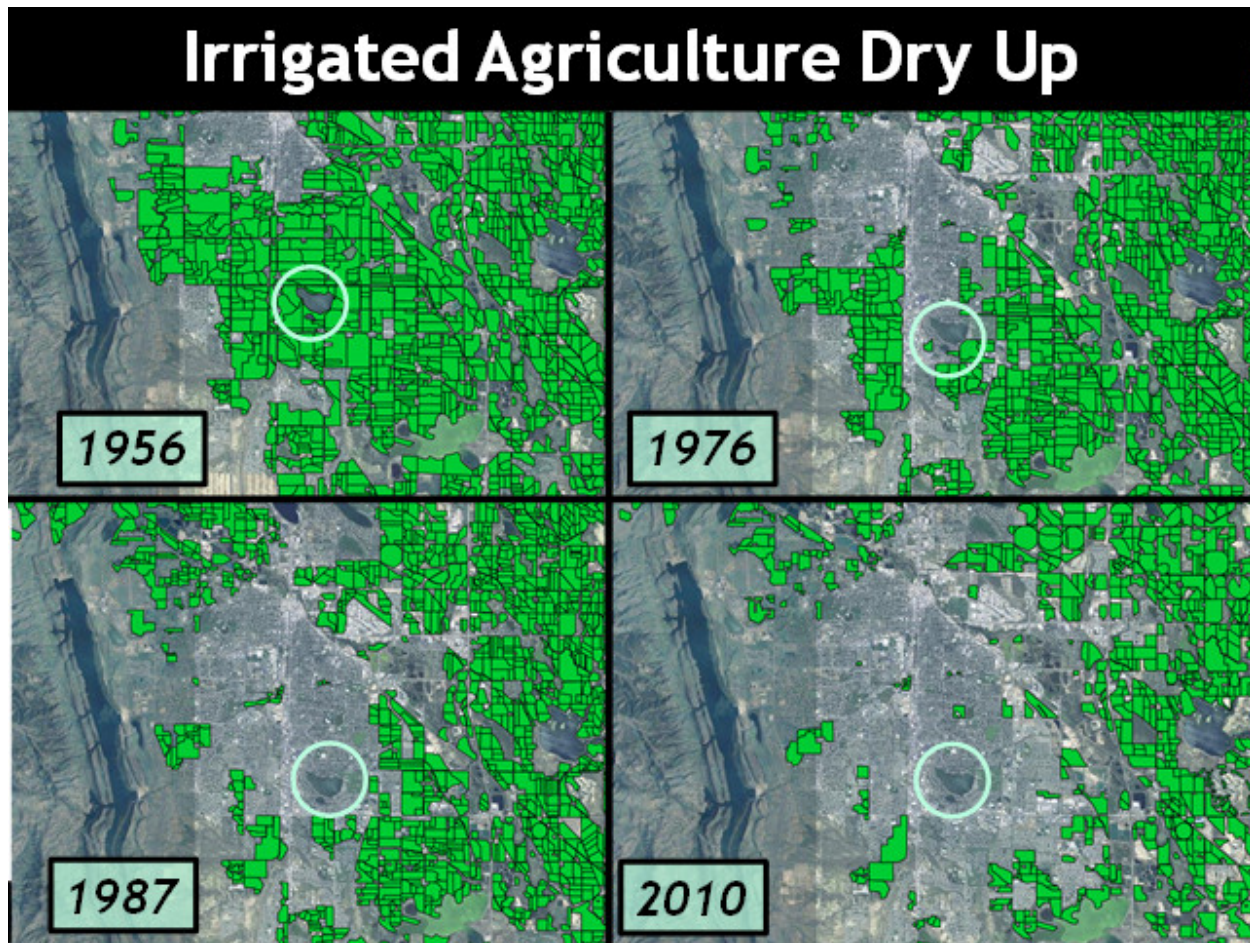


Figure B-2 Irrigated Lands Dry-Up near Fort Collins

The series of images in Figure B-2 shows how irrigated parcels in Fort Collins have been converted to urban land uses. The data are from SPDSS and the circle indicates Warren Lake, near the intersection of Horsetooth Road and Lemay Avenues in Fort Collins. An animation of the data is available at <http://mapstory.org/maps/2164>. Similar dry-up is evident in other areas of the Poudre Basin. The story in this case is that agriculture lands and water are being converted to other uses, sometimes through local urban growth and in other cases due to transfers out of the basin. It is likely that these transfers truly are from agriculture to municipal use. However, it requires additional digging to understand that some of the water is being taken at an alternate point of diversion higher in the basin so that it can be treated at the water treatment plant, and that some of the water is used to irrigate parks in the urban environment. Additionally, water that is diverted for municipal use (rather than agriculture) is consumed at a lower rate. Much of the treated water that is used indoors is returned to the system via the wastewater treatment plant returns, and this water is available to the next downstream user that is in priority, including agriculture. Consequently, some agricultural transfers actually benefit other agricultural producers in the region.

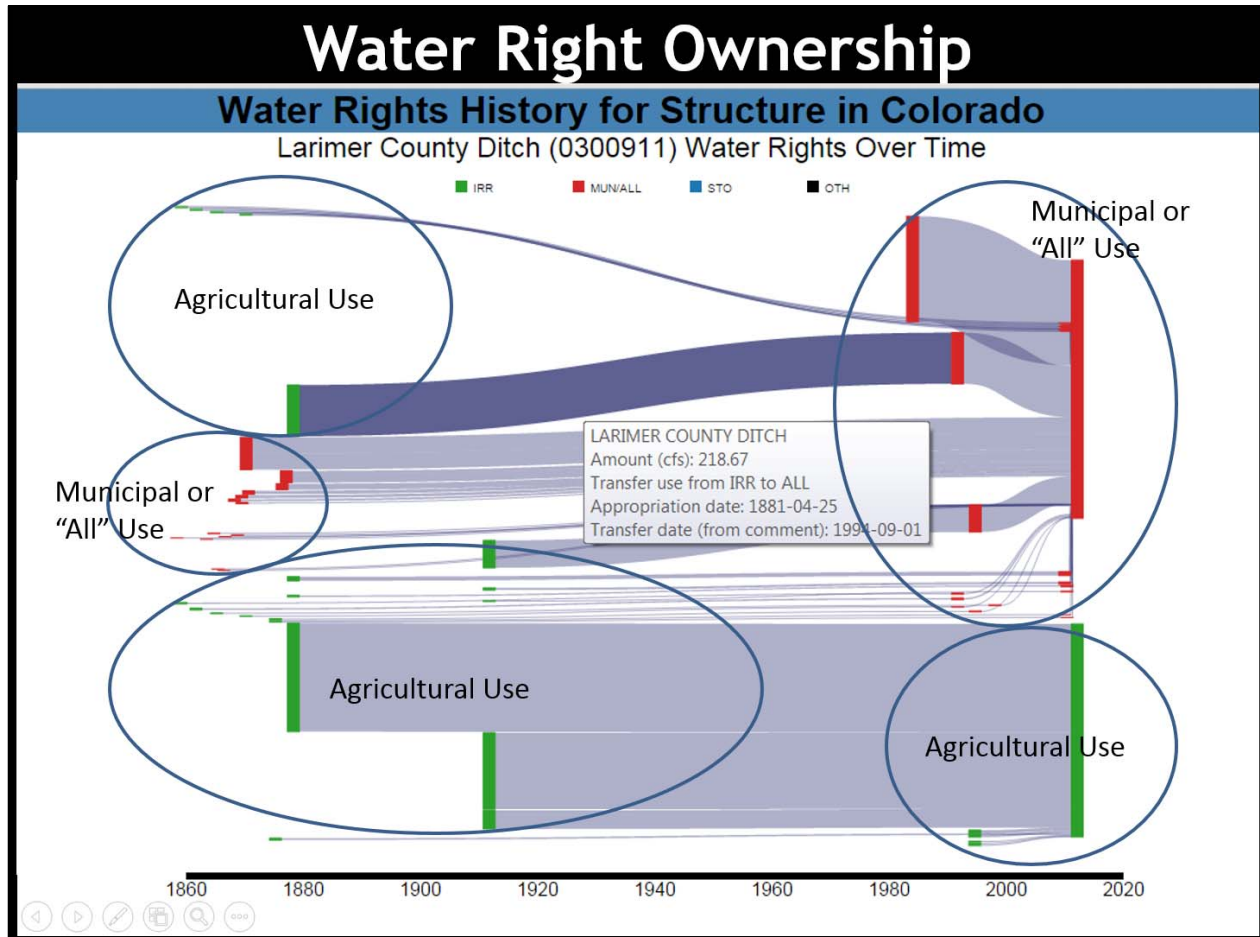


Figure B-3. Example of Changing Water Right Ownership Over Time

The visualization illustrated in Figure B-3 (<https://s3-us-west-2.amazonaws.com/owf-proj/Visualizations/CWCB-DSS/WaterRightHistory/WaterRightsViz/SankeyTime.htm>) shows water right decrees transferred from irrigation use to municipal/all over time for the Larimer County Ditch, which is the Water Supply & Storage Company ditch. The bars on the left represent decrees for irrigation and the red are municipal/all (the ovals have been added for illustration in black and white printouts). The dark band and text box in the middle of the figure is a single water right that has been transferred, in this case as part of the Thornton case. The data used to create this visualization are complex and the on-line documentation for the tool describes limitations. However, the story is generally clear – water ownership is being transferred from agriculture to municipal and other uses. Additional questions might be “how much of the municipally-owned water is actually used by the municipality each year versus rentals to agriculture?” and “how does this example illustrate purchase-leaseback (rentals), buy and dry, and buy and supply (FLEX)?” The resources available for this project could not answer all of these questions, but an attempt was made to collect data to serve as a basis for these types of evaluations.

Poudre Water Sharing Working Group Participant Data – Overview

The data collection effort for the project heavily utilized CDSS work products and HydroBase database, as well as referencing public documents where available. The following table lists CDSS memoranda that were consulted. OWF did not update any information in these memoranda, although clarifications from participants were included in this report and data analysis. Information from these memoranda, PWS member presentations, other available documents, and correspondence with stakeholders, were used to create integrated interactive web-based summaries of each system. These summaries were made available to each participant for review but concerns about data interpretation by some participants limited sharing of the summaries.

CDSS Memoranda about Poudre Basin Systems

Subject	Date	URL to Memorandum
Task 3 Summary – Key Diversion Structures	Apr, 2008	http://cwcbweblink.state.co.us/WebLink/0/doc/124940/Page1.aspx
Task 5 – Key Municipal User, City of Fort Collins	Jan, 2005	http://cwcbweblink.state.co.us/WebLink/0/doc/125041/Page1.aspx
Task 5 – Key Municipal User, City of Greeley	Mar, 2006	http://cwcbweblink.state.co.us/WebLink/0/doc/125044/Page1.aspx
Task 5 – Key Structure, Northern Colorado Water Conservancy District and Colorado-Big Thompson Project	Jul, 2006	http://cwcbweblink.state.co.us/WebLink/0/doc/125077/Page1.aspx
Task 5 – Key Structure, North Poudre Irrigation Company	Mar, 2005	http://cwcbweblink.state.co.us/WebLink/0/doc/125080/Page1.aspx DISCLAIMER OF NORTH POUFRE IRRIGATION COMPANY With regard to this Poudre Water Sharing Working Group Report (“Report”), including all data, information, appendices, exhibits and information of any type or nature, North Poudre Irrigation Company (“NPIC”) has not examined originals, copies or otherwise identified or verified anything in the Report. NPIC has not investigated historical information, claims or data for accuracy, nor has NPIC provided any

Subject	Date	URL to Memorandum
		data for inclusion in the Report. Accordingly, NPIC does not accept, agree with or confirm any data, summaries, statements or information contained in the Report. NPIC assumes no responsibility or liability for the accuracy, completeness or validity of any information regarding NPIC in the Report including, but not limited to, statistical data, forecast, numbers, charts, estimates, projections, assumptions, statements, interviews or expressions of opinion. NPIC therefore expresses no opinion, belief or view of the data or any material claim contained therein. The Report has been solely prepared by the Poudre Water Sharing Working Group and its research team, including Open Water Foundation, and is not approved or accepted by NPIC.
Task 5 – Key Structure, Water Supply and Storage Company	Mar, 2005	http://cwcbweblink.state.co.us/WebLink/0/doc/125103/Page1.aspx
Task 5 – Key Structure, Larimer and Weld Irrigation Company	Mar, 2005	http://cwcbweblink.state.co.us/WebLink/0/doc/125068/Page1.aspx
Task 5 – Key Structure, New Cache la Poudre Irrigating Company and Cache la Poudre Reservoir Company	Mar, 2005	http://cwcbweblink.state.co.us/WebLink/0/doc/125079/Page1.aspx

The information presented below illustrates the spectrum of participants willing to share data and create content that represents thematic stories related to water sharing. In some cases there is a recognition that data are publicly available and can be integrated in new ways. In other cases, there is little desire to leverage public data and the preference is to refer to existing documents prepared by the stakeholder.

Poudre Water Sharing Working Group Participant Data – Municipal – Fort Collins Utilities

Fort Collins Utilities website: <http://www.fcgov.com/utilities/what-we-do/water>

The Fort Collins Utilities water rights portfolio is diverse and consequently, diversions are historically taken from multiple sources. Fully understanding these operations was beyond the scope of this project; however, data available for diversion and storage structures is included in the data website developed in this project. A good overview of the system is described in the 2009 Water Conservation Plan (<http://www.fcgov.com/utilities/residential/conservation/water-conservation-plan>)^{viii}, which will be updated by Fort Collins Utilities in the next year or so. Figure B-4 from this plan illustrates how per-capita water use has decreased significantly, and ongoing efforts to improve efficiency are ongoing. Estimates for a 2065 population of 178,000, 150 gallons per capita per day (GPCD) and large contractual use total to a future demand of about 38,400 acre feet annually, where the current system firm yield is approximately 31,000 acre feet (from Donnie Dustin).

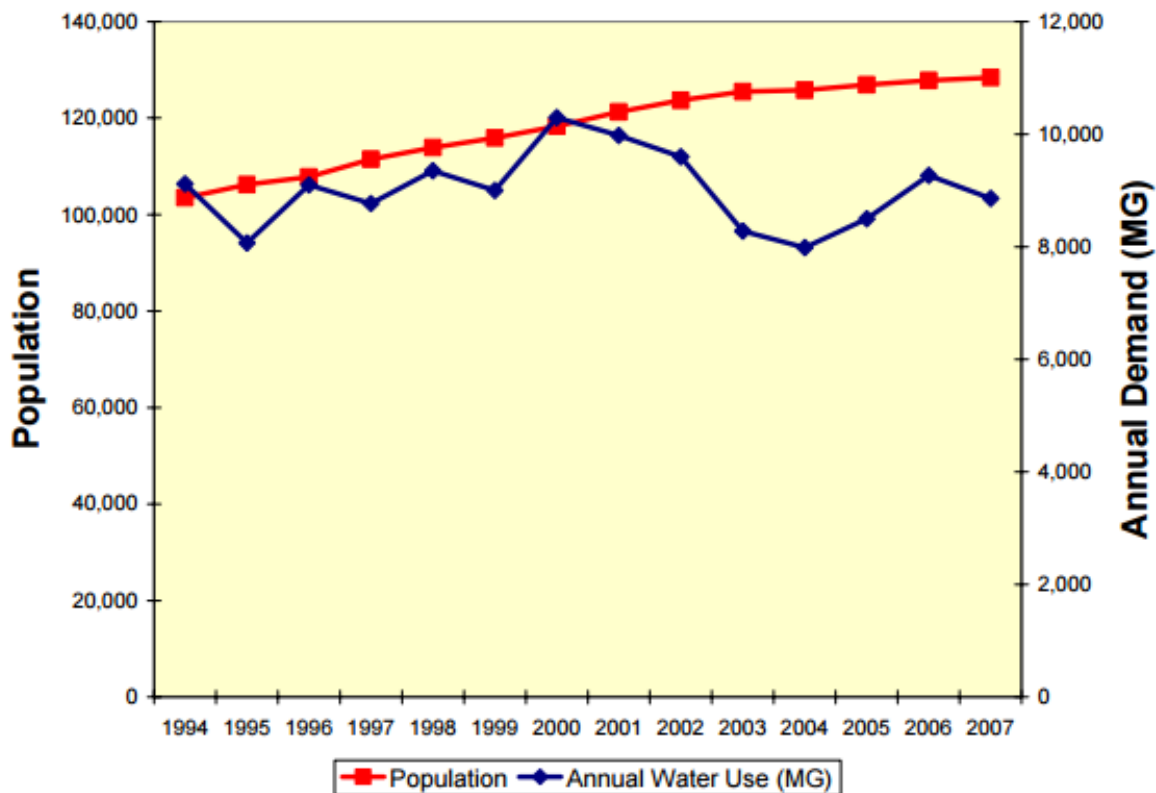


Figure B-4. Fort Collins Utilities Annual Water Use (source Water Conservation Plan)

Fort Collins Utilities' water rights portfolio provides a reliable supply in most years. However, those water rights yield significantly less in drought years. One of the

fundamental issues faced by Fort Collins is a lack of storage, as illustrated in Figure B-5.

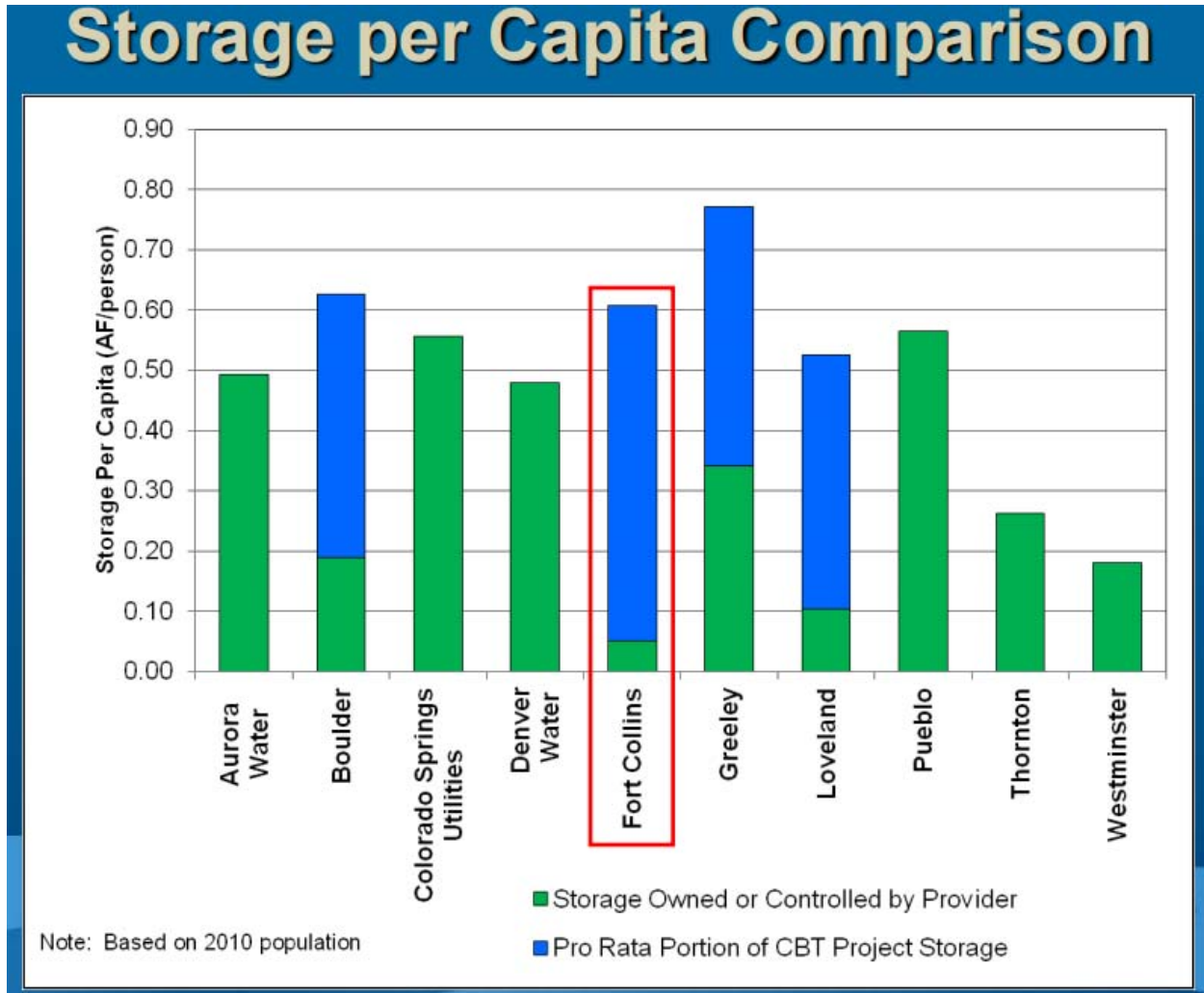


Figure B-5. Fort Collins Utilities Storage Ownership (source: Donnie Dustin Presentation to PWS)

In addition to meeting demands through drought years, additional storage would provide Utilities with necessary operational storage (to meet return flow obligations) and a storage reserve for emergency situations (e.g., CBT outage). This situation limits the water sharing agreements that Fort Collins Utilities can participate in, since most of the water rights that would be provided through water sharing also yield significantly less in drought years when Utilities would need it the most. This is why the “paper swaps” of NPIC agricultural water owned by Fort Collins Utilities with NPIC “multiple use” (CBT) water owned by farmers is a workable solution but other options are not.

Fort Collins is served by multiple water providers as shown in the Figure B-6.

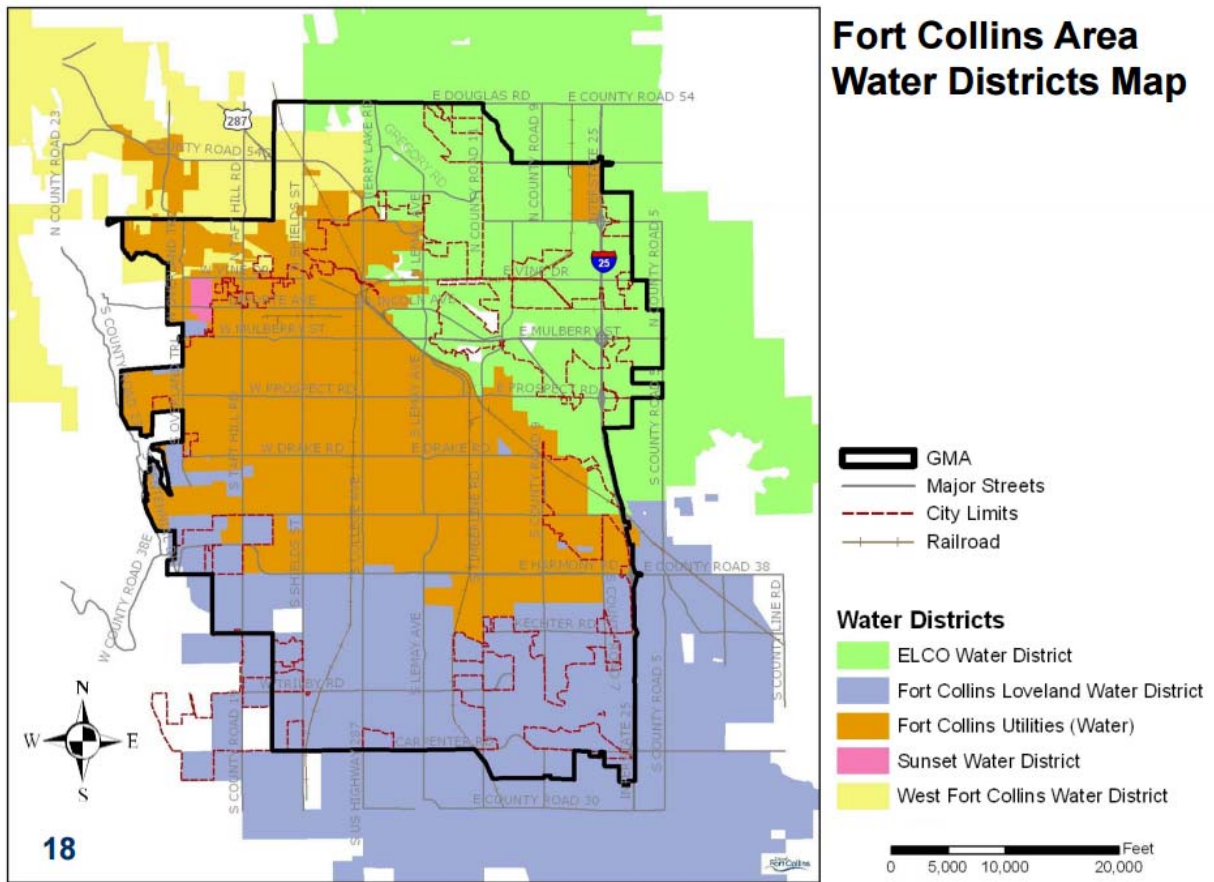
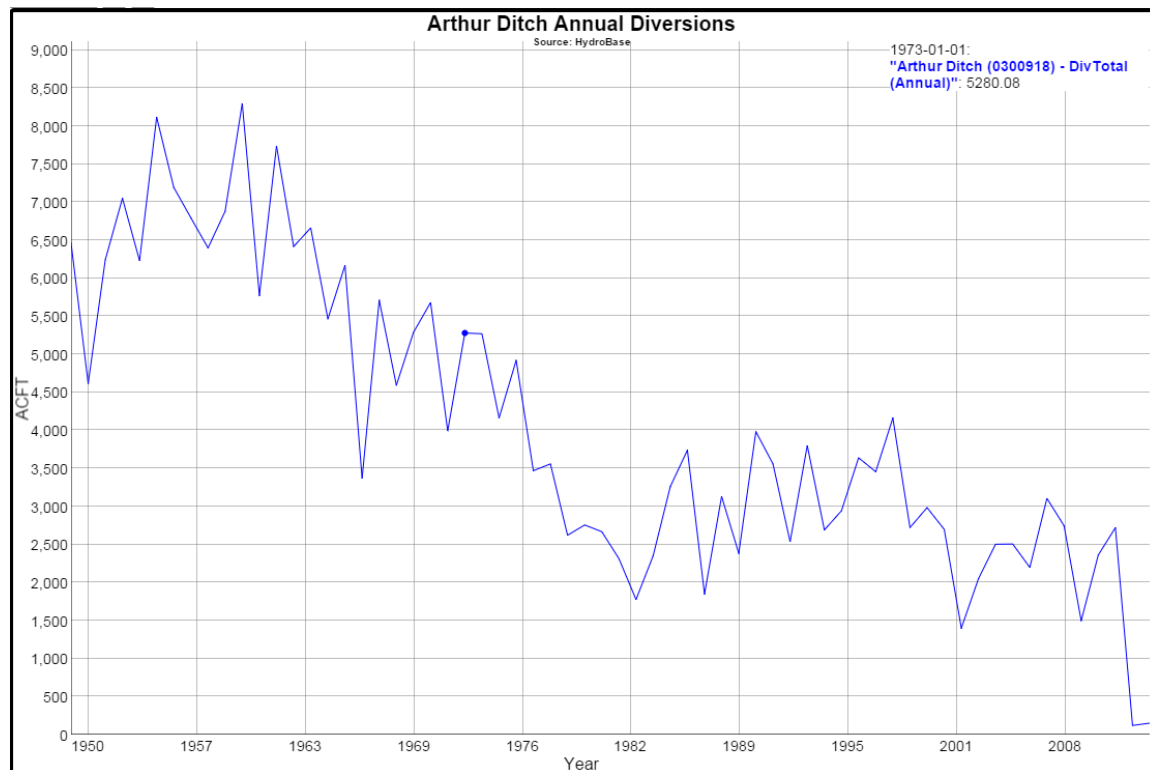


Figure B-6. Fort Collins Area Water Districts (source: Donnie Dustin presentation to PWS)

The East Larimer County (ELCO) Water District, Fort Collins Loveland Water District, and North Weld County Water District (not shown on the above map) are collectively known as the Tri-Districts. Whereas the Fort Collins Utilities service area is land-locked with relatively certain population and water demand projections, the Tri-Districts boundaries will continue to experience growth. See the section below on the Tri-Districts. Multiple water providers complicates the “City of Fort Collins” water discussion.

Another story is the trend of taking “south side ditch” (those on the south side of the Poudre River) water higher in the basin so that it can be delivered to the water treatment plant via the Fort Collins Utilities Pipeline and Pleasant Valley Pipeline. These ditches (such as Arthur Ditch) have service areas that have been significantly converted from agriculture to urban areas and water rights have been transferred in water court. The consumptive use portion of the water rights can be delivered to the Fort Collins Utilities water treatment plant, and operations must ensure return flows to match average historical ditch operations. The requirement to meet return flows places another burden on Fort Collins Utilities’ limited reservoir storage, which will be alleviated with the addition of Rigden Reservoir. Figure B-7 illustrates the migration of water from urban ditch service areas.



B-7. Arthur Ditch Annual Diversions (source: DWR HydroBase)

Figure B-8 shows a corresponding increase in diversions to the Fort Collins Utilities Pipeline as water from south side ditches and other sources is taken higher in the basin for delivery to the water treatment plant. Fires on the Poudre have limited use of Poudre supplies in recent years, although the situation has improved.

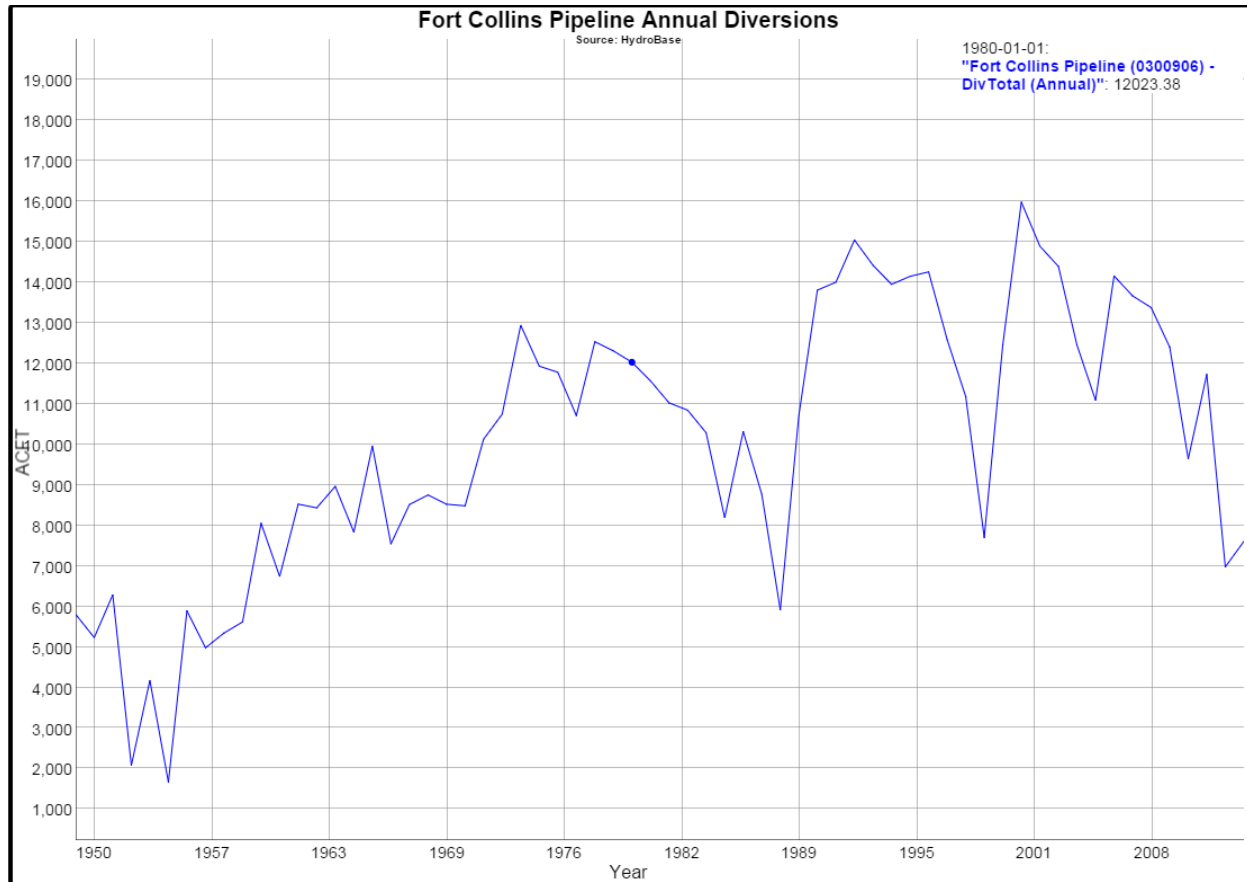


Figure B-8. Fort Collins Utilities Pipeline Annual Diversions (source: DWR HydroBase)

The shared use of infrastructure in the Poudre Basin is also important. Besides the use of its own pipeline, Fort Collins Utilities can also divert water off the Poudre River through the North Poudre Irrigation Company (NPIC) Munroe Gravity Canal and then divert into the Pleasant Valley Pipeline (PVP), which delivers water to the water treatment plant below Horsetooth Reservoir. The PVP is also used by the Tri-Districts for deliveries to their Soldier Canyon Treatment Plant. Greeley also uses the PVP in the winter to run water the opposite direction, in order to deliver CBT water to their Bellvue Treatment Plant.

Figure B-9 illustrates the high annual variability in diversions through the Munroe Gravity canal. Study of the DWR diversion records to understand the split of the total diversions by owner and use was beyond the scope of this project but will be key to better understanding how much of NPIC's diversions are used for agriculture and municipal uses. Clearly, ditch company infrastructure is being utilized to the benefit of agriculture and municipal entities and the shared use of infrastructure will likely continue and expand as municipal ownership of ditch companies expands.

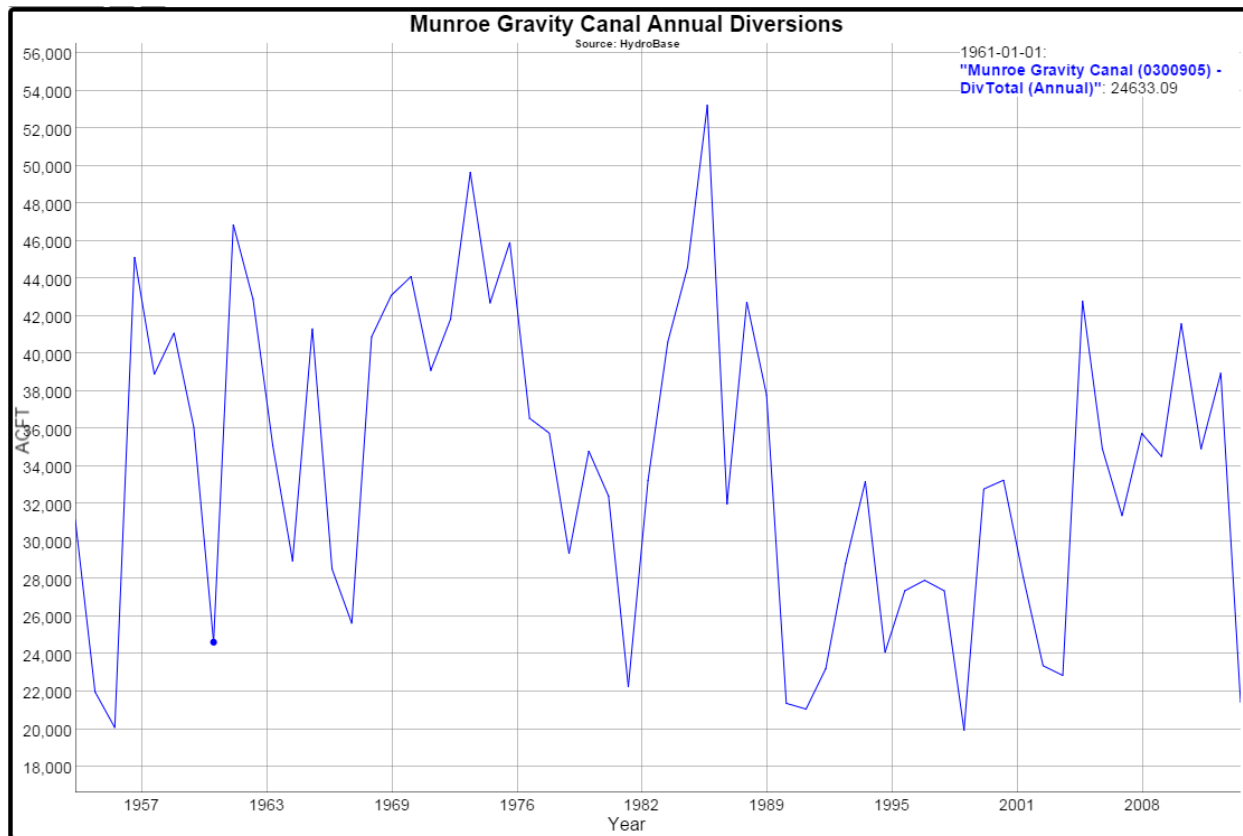


Figure B-9. Munroe Gravity Canal Annual Diversions (source: DWR HydroBase)

An important question to understand for agriculture water leasing is “how much municipally-owned water is actually used for municipal supply and agriculture”? Fort Collins Utilities has ownership in multiple ditch companies, in some cases because of a large purchase initiated by Fort Collins Utilities and in other cases because developers have turned over water rights. The following table summarizes ownership in the major ditch companies that are participants in the group. Fort Collins Utilities has not acquired large numbers of shares (or CBT units) in the recent past. The North Poudre Irrigation Company (NPIC) shares represent 35.64% (3,564 of 10,000 shares) of the company and Water Supply and Storage Company (WSSC) shares represent 4.5% (27 of 600 shares) of the company.

Fort Collins Utilities Raw Water and Stock Ownership in Major Poudre Basin Sources (source: Fort Collins Utilities Raw Water and Stock Spreadsheet)

Source	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
NPIC	3,553	3,553	3,553	3,553	3,553	3,553	3,553	3,553	3,553	3,553	3,553	3,553	3,564	3,564
WSSC	26	26	26	26	27	27	27	27	27	27	27	27	27	27
Larimer Weld	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Cache	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CBT	18,801	18,801	18,801	18,855	18,855	18,855	18,855	18,855	18,855	18,855	18,855	18,855	18,855	18,855

Figure B-10 illustrates that Fort Collins Utilities generally rents substantial amounts of surplus water to agriculture each year. Exceptions are drought years and recent water supply shortages due to impacts of wildfires. It is in the best interest of Fort Collins Utilities to rent water to agriculture in cases where the decreed use of the water is irrigation and has not been changed to municipal or other uses because this offsets Fort Collins Utilities' assessments paid to ditch companies. CBT water can be used for any use and therefore can be used for municipal supply or leased to agriculture. Additional storage would likely allow for more flexibility in the rental program because Fort Collins Utilities would have additional drought reserves.

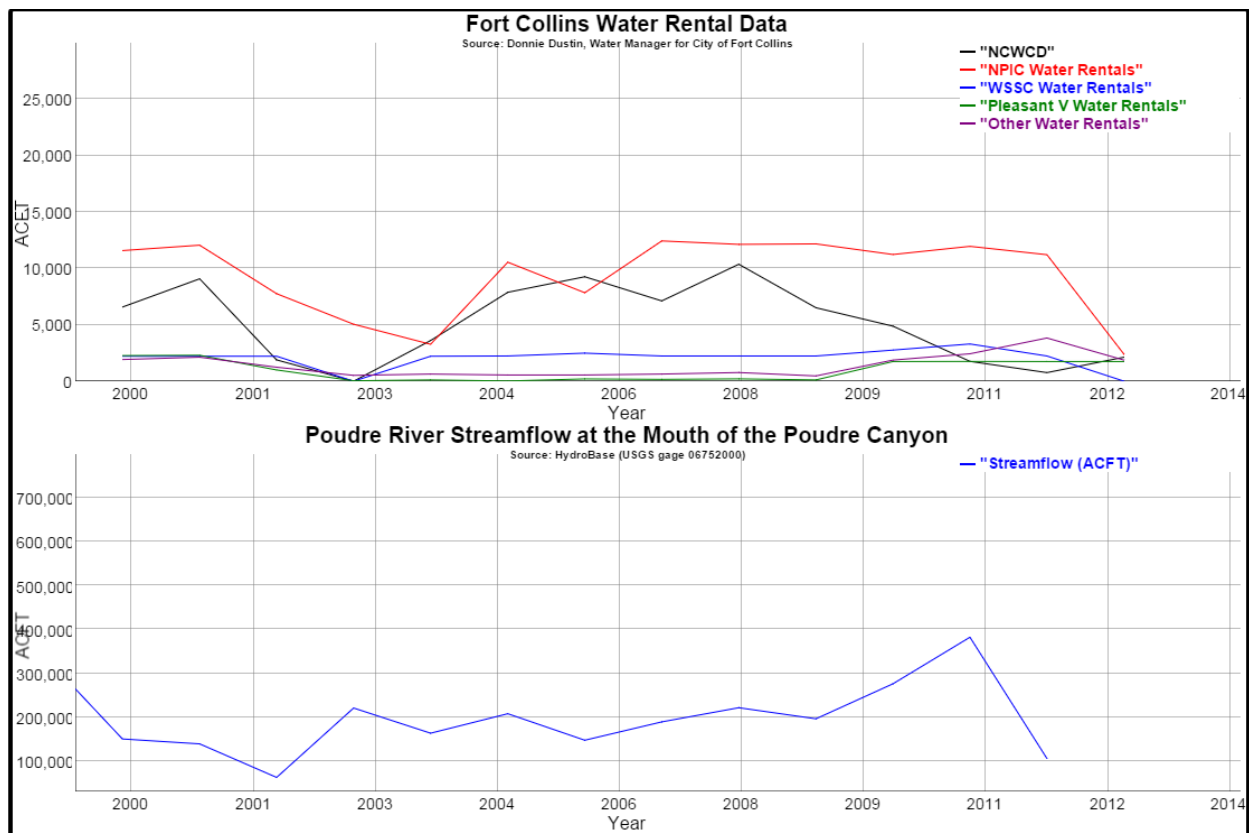


Figure B-10. Fort Collins Utilities Water Rental Data

Poudre Water Sharing Working Group Participant Data – Municipal – Greeley

Greeley Water website: <http://greeleygov.com/services/water>

Greeley requested that the following resources be used to summarize the Greeley water resources system:

- Master plan: <http://greeleygov.com/services/water/water-resources-planning>
- 2009 Water Conservation Plan (not available on-line)
- 2014 Water Conservation Plan (being finalized)

Poudre Water Sharing Working Group Participant Data – Raw Water – Northern Water

Northern Water website: <http://www.northernwater.org/>

Limited data were collected from Northern Water since it was not the focus of this project. The following data are provided to help understand changes in the CBT system over time (source: spreadsheet provided by Andy Pineda, Northern Water):

- CBT M&I ownership has increased from 15.5% in 1957 to 66.6% in 2014.
- Horsetooth Reservoir M&I ownership has increased from 14% in 1957 to 53% in 2014.
- Horsetooth as a percentage of CBT has decreased from 48% in 1957 to 41.4% in 2014 (water is being stored farther south to facilitate southern system deliveries)
- CBT M&I deliveries have increased from 3.2% in 1957 to 44% in 2012, with 2013 and 2014 above 68% (fires played a role)
- CBT M&I supply minus CBT M&I delivery was 21,195 acre-feet in 2013 and 40,621 acre-feet in 2014 (there is generally limited CBT M&I surplus and consequently higher pressure on agriculture)

The main story is that CBT water is increasingly unavailable for purchase and is less and less an option to meet municipal demand. Consequently, there is more pressure to purchase water from agriculture.

Poudre Water Sharing Working Group Participant Data – Municipal – Tri-Districts

Fort Collins Loveland Water District website: <http://www.fclwd.com/resources/>

East Larimer County Water District website: <http://www.elcowater.org/>

North Weld County Water District website: <http://www.nwcwd.org/>

The Tri-Districts declined to provide data to the project consulting team related to operations of their system, such as diversions and rental program data. Data was collected from available public sources.



Figure B-12 illustrates the Tri-Districts annual demand.

2012 Demand

- East Larimer County Water District – 4,321 ac-ft
- Fort Collins – Loveland Water District -10,466 ac-ft
- North Weld County Water District - 8,468 ac-ft
- Total SCFP Demand = 23,256 ac-ft

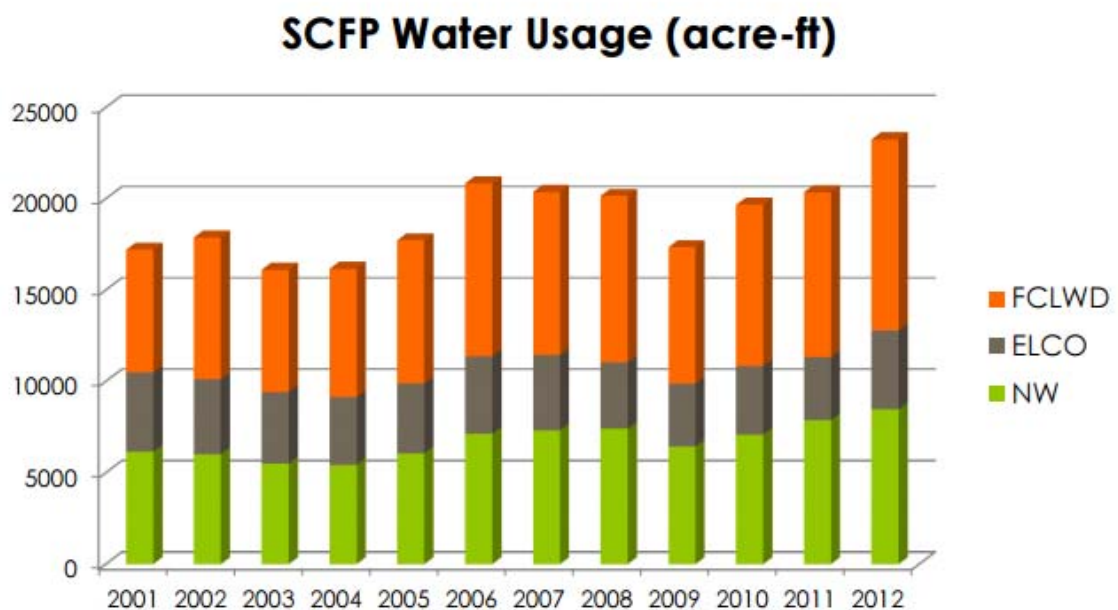


Figure B-12. Tri-Districts Annual Demand (source: Richard Raines presentation to PWS)

Water conservation plans as required by the CWCB are available for each district and provide additional information:

- FCLWC: <https://d1li5256ypm7oi.cloudfront.net/fclwd/2014/07/Conservation-2008.pdf>
- ELCO: http://media.wix.com/ugd/242076_aa94c977f0894656a98e5f8865256bd8.pdf
- NWCWD: http://www.nwcwd.org/nwcwd_wcp_public.pdf

Poudre Water Sharing Working Group Participant Data – Agricultural – North Poudre Irrigation Company

NPIC website: None

NPIC did not provide specific review comments on the following content or system data but requested that the following disclaimer be inserted into this appendix.

DISCLAIMER OF NORTH POUFRE IRRIGATION COMPANY

With regard to this Poudre Water Sharing Working Group Report (“Report”), including all data, information, appendices, exhibits and information of any type or nature, North Poudre Irrigation Company (“NPIC”) has not examined originals, copies or otherwise identified or verified anything in the Report. NPIC has not investigated historical information, claims or data for accuracy, nor has NPIC provided any data for inclusion in the Report. Accordingly, NPIC does not accept, agree with or confirm any data, summaries, statements or information contained in the Report. NPIC assumes no responsibility or liability for the accuracy, completeness or validity of any information regarding NPIC in the Report including, but not limited to, statistical data, forecast, numbers, charts, estimates, projections, assumptions, statements, interviews or expressions of opinion. NPIC therefore expresses no opinion, belief or view of the data or any material claim contained therein. The Report has been solely prepared by the Poudre Water Sharing Working Group and its research team, including Open Water Foundation, and is not approved or accepted by NPIC.

A story for NPIC is its transition from agricultural to municipal ownership and the unique opportunities within this system provided by 40,000 CBT units (4 units per NPIC share). This allows Fort Collins Utilities to swap its agricultural share water (native Poudre water) for CBT units (multi-use water) within the NPIC system to acquire additional supply when needed. This flexibility also has resulted in water transfers not being made permanent in water court – CBT units and water swaps minimize the need for permanent transfers.

The following system information summary was taken from the NPIC PWS presentation:

- irrigates approximately 22,500 to 24,800 acres north of the Poudre River
- 10,000 shares and approximately 600 shareholders
- 2 diversion points
- 19 reservoirs
- Fort Collins Utilities is currently waiting for the draft EIS to expand Halligan Reservoir, which is owned by Utilities but storage capacity is owned by NPIC for current water rights.
- 40,000 CBT units
- approximately 75% municipal ownership, 13% full-time agriculture producers, 12% part-time agriculture producers
- Average annual diversions: 79,500 acre-feet
- Decreed storage: 63,400 acre-feet

Figures B-13 and B-14 illustrate annual diversions for the two NPIC diversion structures.

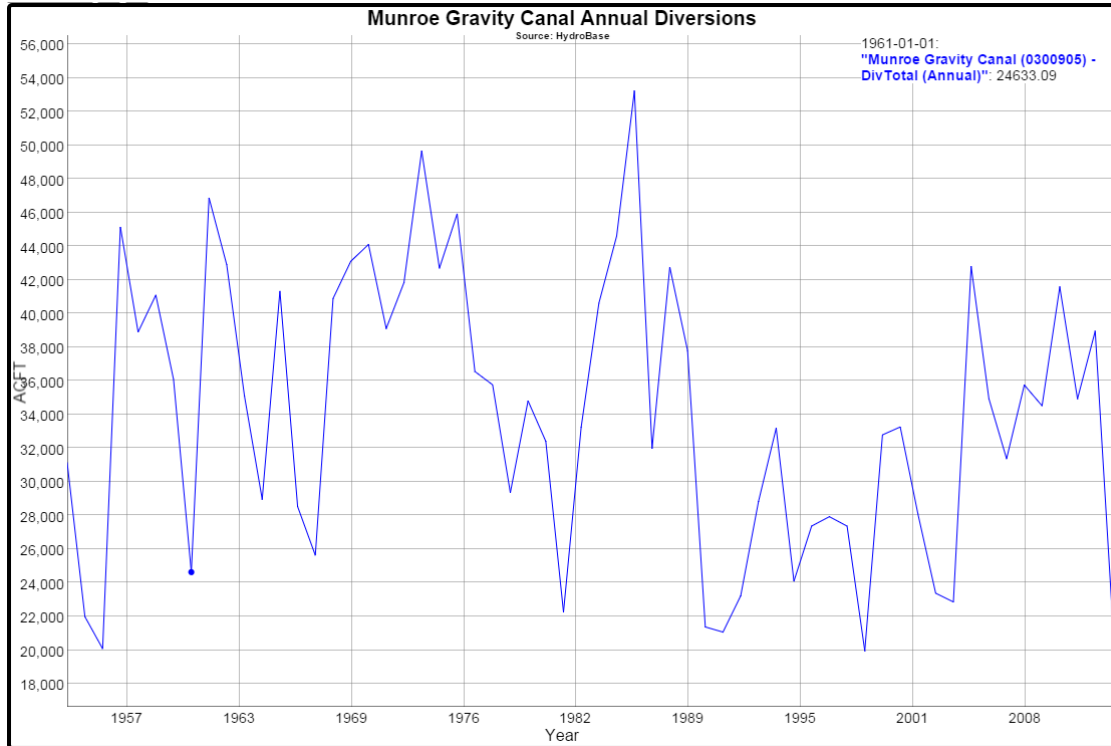


Figure B-13. Munroe Gravity Canal Annual Diversions (source: DWR HydroBase)

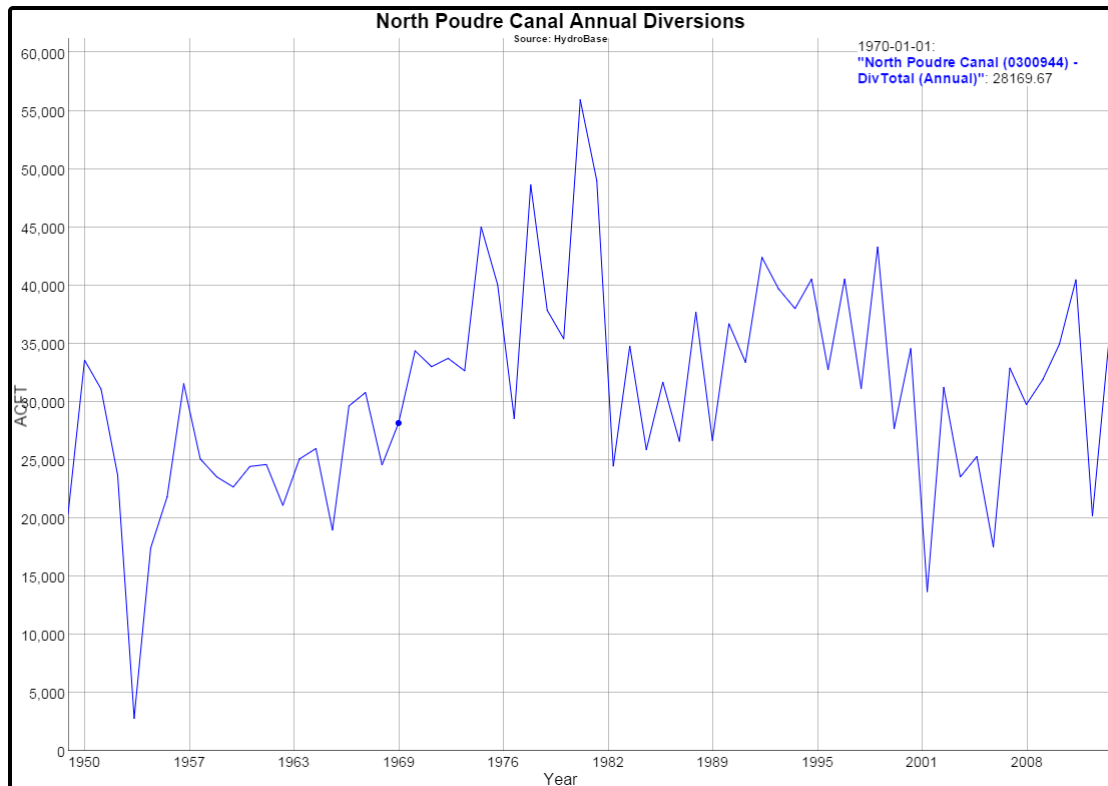


Figure B-14. North Poudre Canal Annual Diversions (source: DWR HydroBase)

The story illustrated by the above data is the extreme variability in diversions, which illustrates the need for and importance of the NPIC reservoirs and ability to exchange with others in the basin. A portion of the Munroe Gravity Canal diversions is diverted into the Pleasant Valley Pipeline for delivery to Fort Collins Utilities and Tri-Districts water treatment plants. Additionally, some of the annual diversions are carried to NPIC storage reservoirs.

Another story is the use of NPIC's Fossil Creek Reservoir (see Figure B-15) for exchanges and timing deliveries. This reservoir is below the lands that can be irrigated by NPIC's ditches and reservoirs and consequently NPIC can only benefit by exchanging water from other entities with Fossil Creek Reservoir water. The location of Fossil Creek Reservoir can capture native Poudre water, releases from Horsetooth, Fort Collins Utilities wastewater returns, and other water sources to be timed to benefit multiple users in the Poudre Basin.

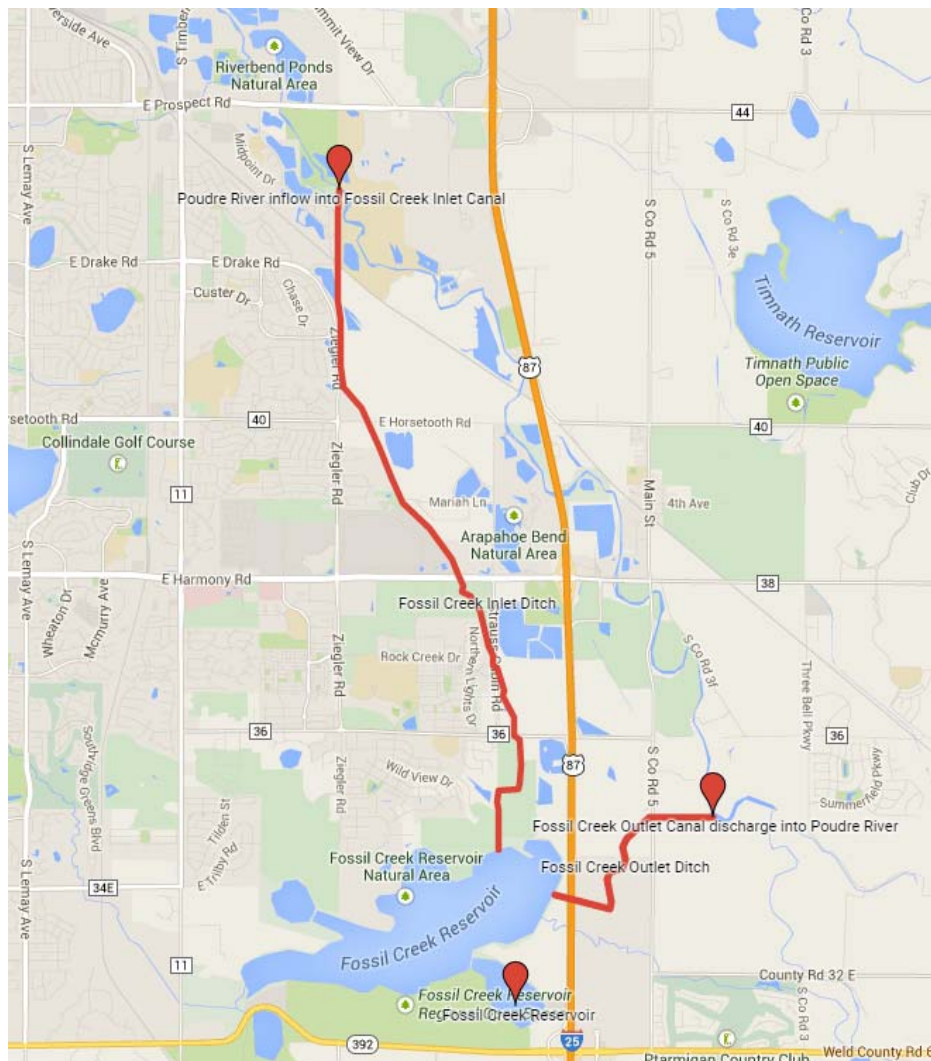


Figure B-15. Fossil Creek Reservoir

The inlet diversion dam sustained significant damage during the 2013 floods. The inlet does not have a real-time measuring device and could benefit from a DWR recorder, in particular to help track water from various entities that enters the reservoir. Figure B-16 illustrates how prior to 2010 the water commissioner diverted Poudre flows into Fossil Creek reservoir to help with operations but 2010 and later this action was not taken by the water commissioner. This change in administration and operations may have large impacts in the basin depending on the year.

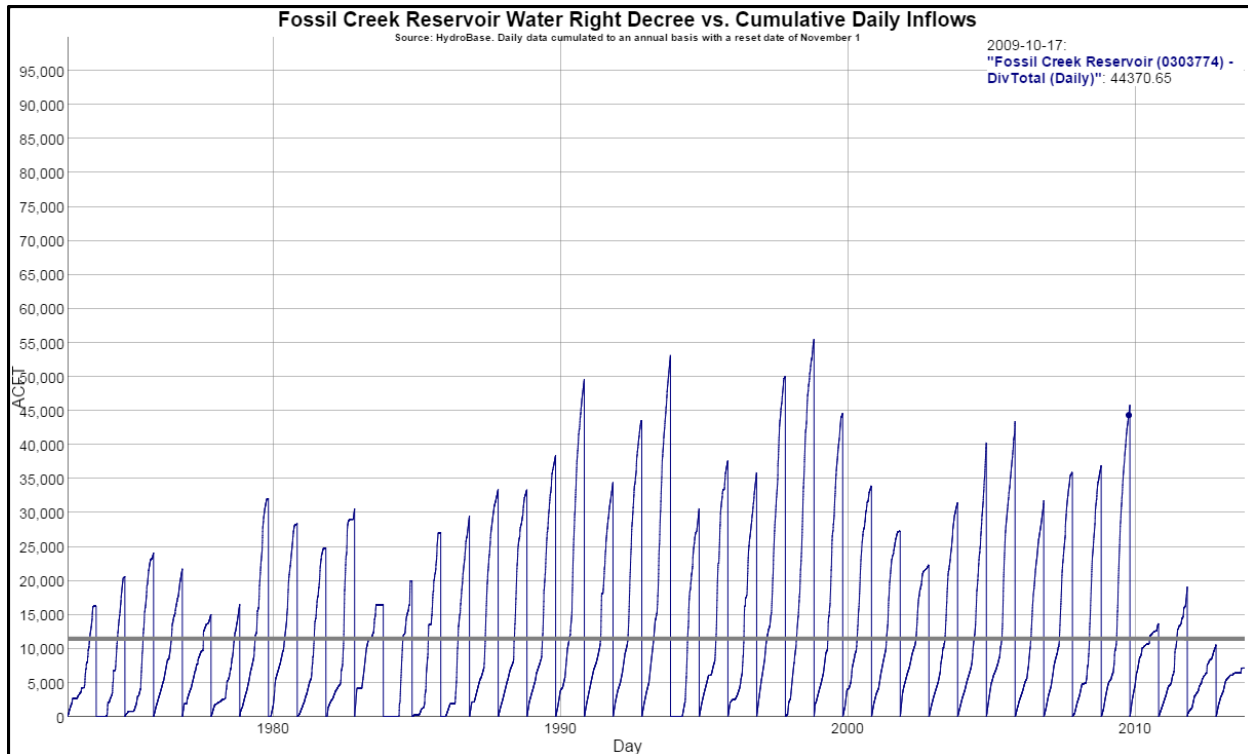


Figure B-16. Fossil Creek Reservoir Inflows (source: DWR HydroBase)

Poudre Water Sharing Working Group Participant Data – Agricultural – Water Supply Storage Company

WSSC website: None

The following information was provided at a presentation to PWS:

- 600 shares, approximately 160 shareholders
- Approximately 2/3 owned by three cities and two water districts
- Remainder are mostly family farmers, dairies, and some home owner associations
- All but 39 shares are still distributed for agricultural use in 2013 (cities usually rent the majority of the shares to farmers under the system)
- Municipal shares are in various stages of transfer to approve municipal use

- 1425 units of CBT
- On average 54,600 acre feet is delivered

HydroBase irrigated lands indicate that approximately 44,000 acres are irrigated. Figure B-17 illustrates the annual diversions for the Larimer County Canal, which is the WSSC's single diversion structure.

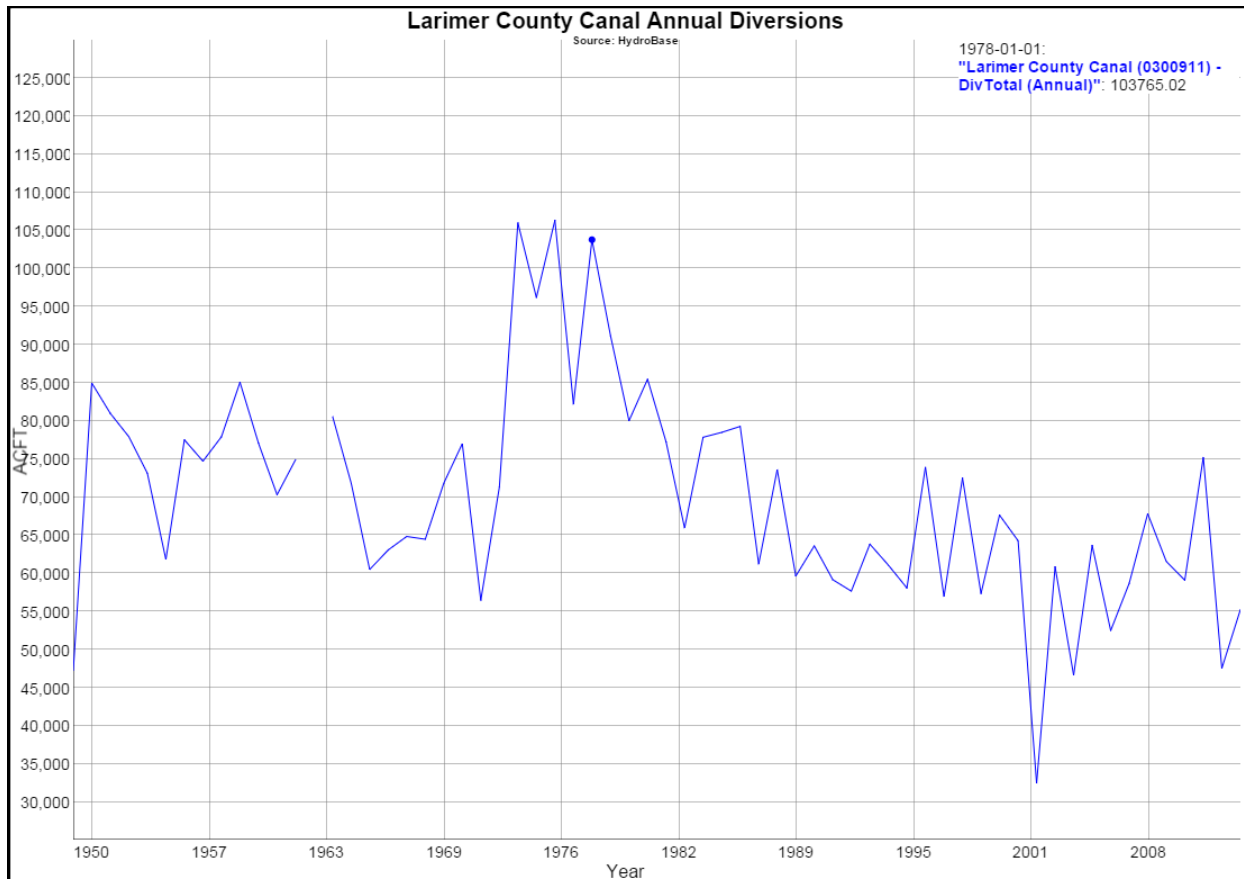


Figure B-17. Larimer County Canal Annual Diversions (source: DWR HydroBase)

The story of the WSSC system is that, similar to NPIC, it has significant municipal ownership. However, NPIC has significant CBT water that allows flexibility in municipal use, and therefore no NPIC shares have had a change in use in water court. In contrast, WSSC shares are in various stages of change in use.

Water rental information was not provided by WSSC for this project and consequently rental data must be determined from city utility data that was provided.

Poudre Water Sharing Working Group Participant Data – Agricultural – Larimer Weld Company

Larimer and Weld website: None

The Larimer Weld Irrigation presentation to PWS was not provided as a PowerPoint or other document and is unavailable for use in this report. The following information is a summary of the presentation:

- The Larimer Weld Company is comprised of multiple ditch and reservoir companies irrigating 40,000 to 50,000 acres per year
- Reservoir capacity is approximately 63,000 acre-feet, although reservoirs are not optimally located and require exchanges with other entities
- Approximately 3,200 CBT units are owned by shareholders; consequently there is little potential for leasing to municipalities
- Shareholders consist of part-time farmers on approximately 10 acres, shareholders that own more than one farm up to 2,500 acres or more, and those with smaller farms of approximately 160 acres (the latter have a more difficult time farming)
- Most of the shares are still in agricultural production and have not been transferred to other uses; however, sales of farms to in-basin and out-of-basin interests are occurring.

The Larimer Weld Irrigation Canal (AKA Eaton Ditch) serving as the main diversion off the Poudre River. Figure B-18 illustrates the annual diversions for the Larimer Weld Irrigation Canal, which diverts from the Poudre on the north side of Fort Collins and is the largest direct diversion in the system.

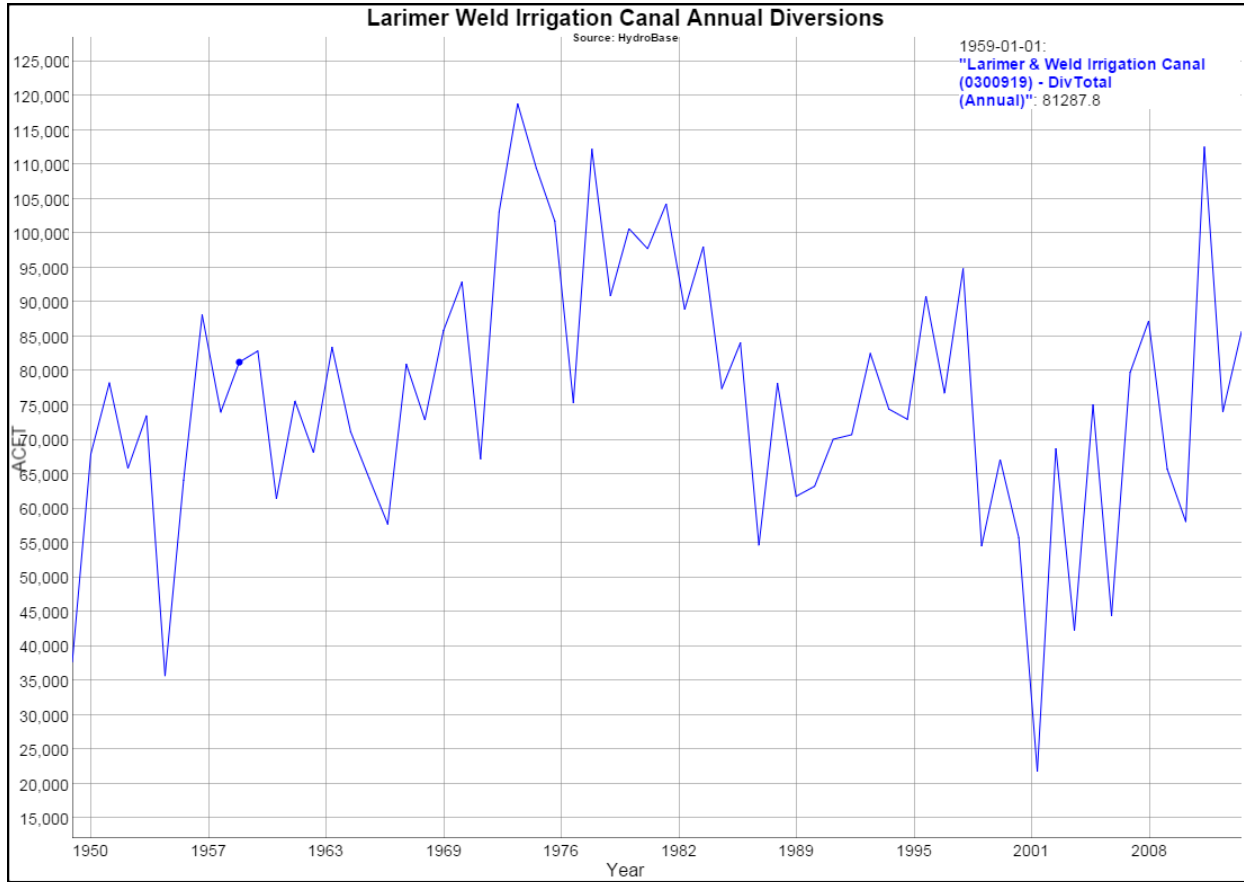


Figure B-18. Larimer Weld Irrigation Canal Annual Diversions (source: DWR HydroBase)

Figure B-19 illustrates diversions of the Little Cache la Poudre Canal, which diverts water into Terry Lake.

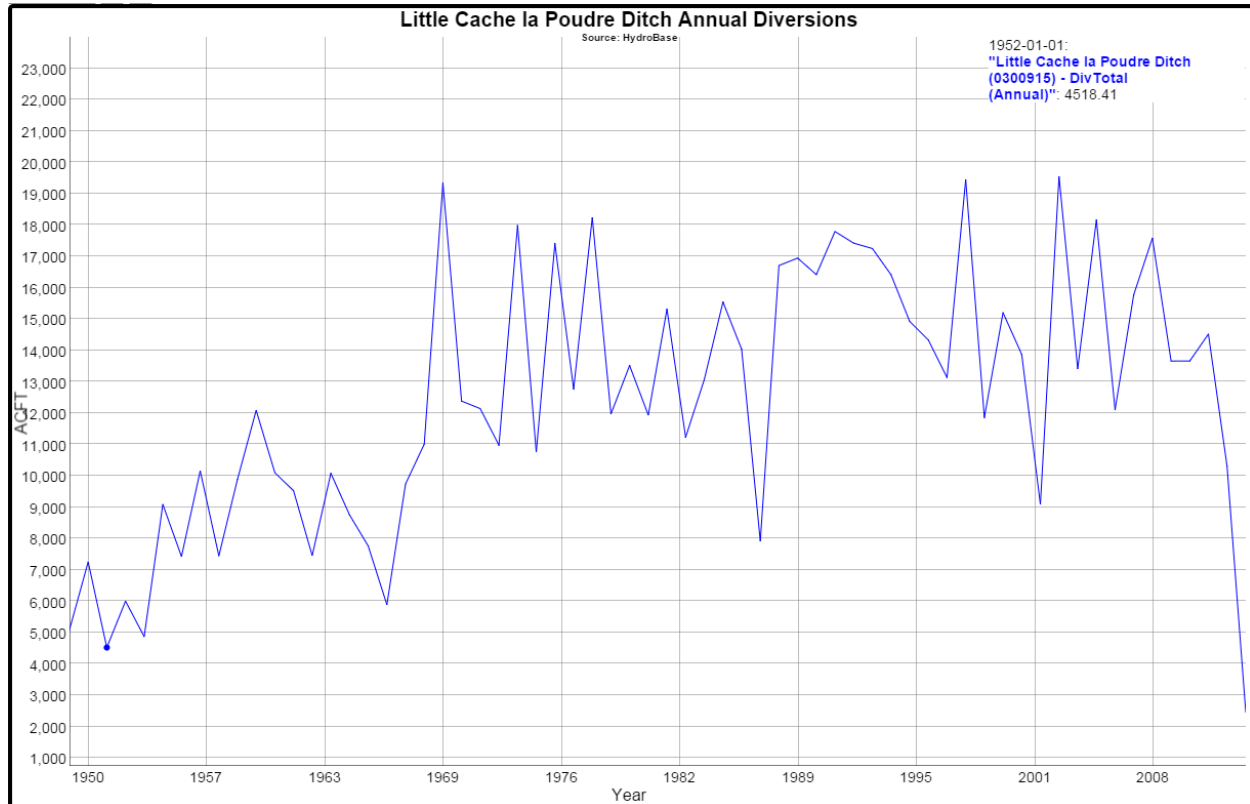


Figure B-19 Little Cache la Poudre Annual Diversions (source: DWR HydroBase)

Figure B-20 illustrates the annual diversions from the Poudre into the Poudre Valley Canal, which diverts from the Poudre approximately two miles downstream from the confluence of the North Fork of the Poudre with the mainstem. This canal delivers water into Douglas Reservoir, Little Windsor Reservoir, Cobb Lake, and other reservoirs.

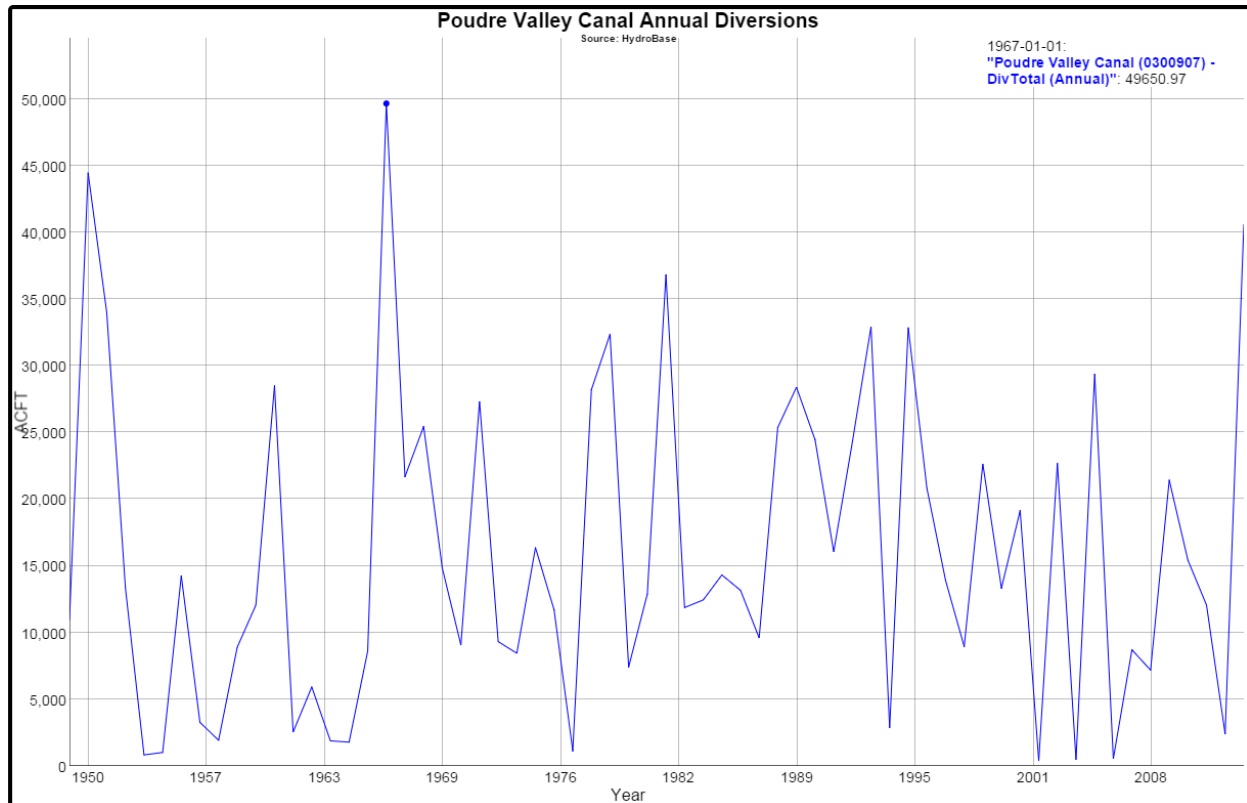


Figure B-20. Poudre Valley Canal Annual Diversions (source: DWR HydroBase)

The story of the Larimer Weld system is that, similar to New Cache, it remains primarily in agricultural production; however, there is increasing pressure for farmers to sell their water. The above graphs illustrate the variability of water supply and consequently the need to utilize reservoir storage and collaborate with other companies to exchange water.

A discussion of the group focused on the fact that during dry years, there is little water to share because remaining water will be used by shareholders. It may be possible to temporarily transfer water in years following a drought to help with drought recovery and fill municipal reservoirs. However, there may be sufficient water in the basin in those years that the transfer is not needed. This issue requires additional analysis.

Poudre Water Sharing Working Group Participant Data – Agricultural – New Cache la Poudre Irrigation Company

New Cache website: <http://www.newcache.com/>



Figure B-21. New Cache la Poudre System Location (source: New Cache website)

Information about the New Cache la Poudre Irrigation Company was not provided in a PowerPoint file available to PWS. The following is a summary of the presentation:

- The New Cache la Poudre Ditch, also known as the Greeley Number 2, was one of the original ditches constructed to supply water to the Union Colony (Greeley). Consequently, it has senior water rights.
- The majority of shares are still owned by agricultural producers.
- Less than 5,000 units of CBT units are owned by the system.
- Because it is lower in the basin water quality is not as high as diversions higher in the basin.
- New Cache utilizes exchanges within the Poudre to help with deliveries.
- The company has been active in investing in infrastructure and real-time control systems.

Feedback from New Cache to the group is that most farmers will continue farming, even when water is limited in a year, and temporarily leasing water to municipalities may not be pursued by many farmers, especially if commodity prices are good and there is uncertainty about impacts of leasing on farm production. Leasing CBT water to oil and gas developers has occurred in recent years, in particular because of the high lease price.

Figure B-22 shows the annual diversions of the Greeley Number 2 Ditch. Data from HydroBase indicate that an average of approximately 47,000 acre-feet is diverted annually, irrigating approximately 35,000 acres.

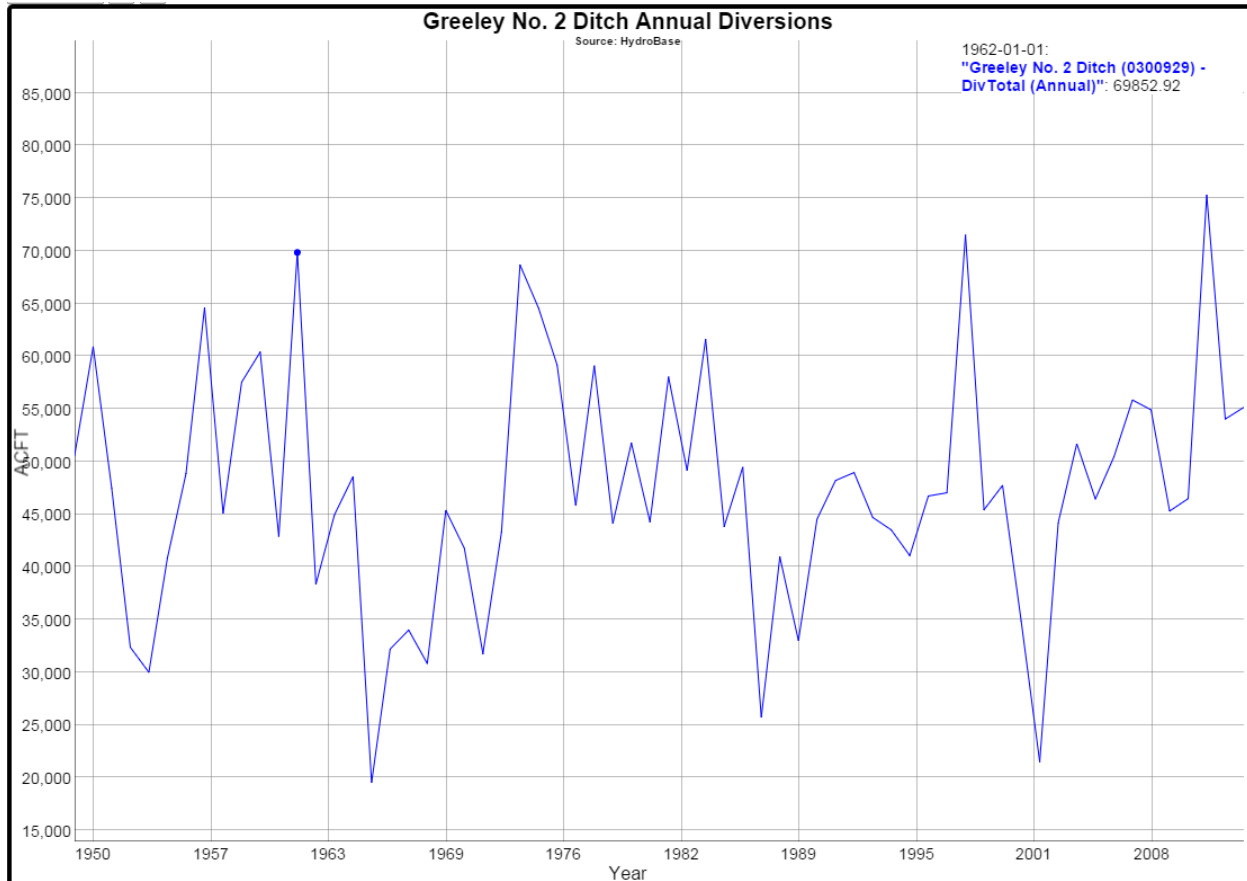


Figure B-22. Greeley No. 2 Ditch Annual Diversions (source: DWR HydroBase)

The Cache la Poudre Reservoir Company and associated companies including the New Cache la Poudre Irrigation Company owns several reservoirs that help with dry years, including Timnath Reservoir and the Cornish Plains Reservoir. Additionally, exchanges occur with other ditch companies in the basin.

Conclusions and Recommendations

More extensive and detailed data than has been shown in this report was formatted into entity-specific websites that could be viewed individually for each participant organization, with links to supporting information. This format was chosen because it facilitates navigation of data and allows creation of an integrated visualization that includes all the systems and can be improved over time. Data for each system was provided to group participants for their system in order to solicit comments and gain approval to share with the group. Although feedback was provided by some participants as to the technical accuracy of the information, only the City of Fort Collins has to date approved sharing this more extensive data with the group and public.

Because the system websites were not shared between participants it is not clear if such data sharing would have led to richer discussion or more opportunities in the interest of the participants.

The information in this appendix focuses on stories and themes that are relevant to the water sharing discussion. Each entity in the group has unique challenges and opportunities.

The following recommendations are offered:

1. Organizations in the Poudre Basin should collaborate with Colorado Division of Water Resources to ensure that real-time measuring devices are installed at locations that benefit administration and operation of water provider systems. The data that are collected can also benefit the overall operation of the basin.
2. SPDSS resources such as the Task Memoranda for each system should be used as resources and reviewed for accuracy. Model data sets will be available as SPDSS moves forward in the Poudre (likely after EIS permitting processes are completed). Data from HydroBase should be proactively reviewed to address any data quality and other issues.
3. Additional publicly available data will be the norm. Entities in the basin should use such resources to their benefit, both for internal operations, and to tell stories externally that will benefit their organizations and shareholders. Ditch companies should consider creating basic websites to provide appropriate information to their shareholders and public.
4. Data resources can be utilized to further evaluate regional options for water sharing and operations. For example, the following topics may be appropriate of analysis to understand impacts throughout the basin:
 - a. impacts of change in operations of Fossil Creek Reservoir
 - b. impacts of changes in basin to exchanges
 - c. impacts of WSSC transfers out of basin to operations of the WSSC system
 - d. opportunities for sharing storage and other infrastructure, perhaps with shared investment in such infrastructure
 - e. impacts of climate change such as earlier start and longer length of growing season, with higher evapotranspiration
 - f. changes in irrigation efficiency (conveyance and on-farm)
 - g. impacts of land use change

ⁱ Freedom of Information Act (FOIA), <http://www.foia.gov>

ⁱⁱ Colorado Open Records Act (CORA), http://www.sos.state.co.us/pubs/info_center/cora.html

ⁱⁱⁱ "Open Data Policy – Managing Information as an Asset," Memorandum for the Heads of Executive Departments and Agencies from the Executive Office of the President, May 9, 2013.

^{iv} Colorado's Decision Support Systems (CDSS) website, <http://cdss.state.co.us>

^v Colorado Water Conservation Board website, <http://cwcb.state.co.us>

^{vi} Colorado Division of Water Resources website, <http://water.state.co.us>

^{vii} Colorado Information Marketplace website, <https://data.colorado.gov>

^{viii} Fort Collins Utilities Water Conservation Plan, 2009, <http://www.fcgov.com/utilities/residential/conserve/water-efficiency/water-conservation-plan>

APPENDIX C: WATER SHARING MECHANISMS

Four water sharing mechanisms or alternative transfer methods (ATMs) are described below. These descriptions can be generalized for use in other basins or regions but are described in a way that fits the Cache La Poudre basin and the entities that deal with water in that basin. The first two (interruptible supply and short-term leases) are mentioned by those dealing with ATMs in other parts of Colorado and the West. The third ATM (decree swaps – a type of interruptible supply) is specific to particular entities in the Poudre Basin but could have applicability elsewhere and the fourth (“buy and supply”) is as far as we know, an ATM originating with our working group and one had broad support regarding its potential as an alternative to “buy and dry”. Prototype agreements for the first three ATMs below can be found in Appendix E.

Interruptible Supply

Agricultural producers who own mutual ditch company shares agree to lease some of those shares to a domestic water provider for drought firming or drought recovery agrees to do so for a period of X years (no less than 10 for example). If drought firming is needed, the irrigator would be notified by the domestic water provider (date TBD and based on snow pack and reservoir levels) in the spring when either drought firming or recovery is needed.

Under the agreement the irrigator would be required to modify their farming operation by either fallowing some ground, planting crops that are less water intensive or by using deficit irrigation on existing crops thereby freeing up X amount of consumptive use water for use by the water provider – both water decreed for multiple or agricultural use may be used under CRS 37-92-309 for three years in a ten year period. Such an agreement may be renewed for two additional 10 year periods for a total of 30 years.

The water (usufruct right) is owned by the producer who retains title. No change of use in State Water Court is required but there are administrative requirements for return flows under the above statute for the portion of the water right that is not foreign water and which was created from native agricultural decrees. The domestic provider wishing to utilize agricultural water under CRS 37-92-309 would be responsible for meeting the state’s application and approval requirements. The costs for constructing the recharge or infiltration basins needed to satisfy return flows however, could be shared by both parties or needed infrastructure could be constructed by one party with adjustments made to the lease price that would compensate the party who develops this infrastructure. Incentives for entering into this type of agreement could be solely the monetary compensation specified in the agreement but in addition, agricultural producers entering into a long-term lease agreement who also rent water owned by the water provider might also be given priority access to rental water during years with normal precipitation or following drought recovery.

Administration of the agreement would likely follow existing arrangements (often shared responsibility) between the mutual ditch company and the urban water providers if they already have existing transactions for exchanges or for dealing with water ownership and rental. If necessary, a fee could be used for transaction costs, the payment of which

would also be reflected in the price of each share of water leased. This type of market is specific to drought firming and is not a permanent market used to add to base supply.

In a variation of interruptible supply proposed by one of our group members, instead of providing water owned by the producer, agricultural users might agree to *forgo rental water* historically used on a parcel and to help the water utility owning the native agricultural water that they normally rent to meet state requirements for using that water for domestic supply under the three year in ten provision (CRS-37-92-309). Such a temporary change in use by the utility would require such actions as the dry up of acres normally using that water, creation of a recharge basin for return flows, and planting a cover crop to prevent erosion. The producer foregoing water historically rented from the utility would provide these things in return for some combination of monetary compensation and rental water security during normal water years. This engineering for this approach was tested by an irrigator and one of the special district water providers using the return flow and consumptive use calculations currently employed by the state of Colorado. The results were not acceptable to either the utility or the producer. The producer had become more efficient replacing flood irrigation with pivot sprinkler irrigation in recent years but the calculations were based on a time period that included flood irrigation and higher return flows and lower consumptive use. The water utility was not satisfied with the consumptive use water yield they would have gotten using those calculations when weighed against the cost of entering into the agreement.

Short-Term Leases

Short-term leases of agricultural water for domestic use allow farmers to lease water to domestic water providers on a short term basis to meet needs such as those caused by severe drought, drought firming, infrastructure failure, watershed damage by fire or other natural disaster or in some cases for augmentation purposes. Such a lease would use a Substitute Water Supply Plan (SWSP) as specified by CRS 37-92-308(5) as authorized by the state engineer. Such agreements are for one year but applicants (water utility) may apply subsequent years for a maximum of five years.

The irrigator creates transferrable consumptive use water by fallowing historically irrigated acres, planting lower consumptive use crops or by deficit irrigation. Return flows required by the state engineer are provided by either the irrigator or the water utility. Compensation is provided to the agricultural user for each acre foot of consumable water delivered. The state approval of a SWSP under this statute is only good for one year but applicants can re-apply up to a maximum of five years. Water utilities participating in PWS had used this approach during the drought of 2002/2003 but complained that irrigators asked for compensation that was unreasonable when they saw that utilities had few choices. Group participants wondered if there was some institutional arrangement that could be used to maintain reasonable pricing – although none was agreed upon.

Swapping of Multiple Use for Agricultural Water

This ATM can be considered another type of interruptible supply but one that involves the swapping of trans-basin multiple use water that is not subject to return flow

requirements for native agricultural water among entities that own shares having both types of water. This ATM could be used for drought firming and recovery; emergencies affecting domestic supply water quality (forest fires, mass wasting etc.); or potentially as a permanent market transaction that has the effect of adding to base supplies. This type of water transfer can be done administratively and does not require a change case or approval under Colorado statutes. Participants would be irrigators and domestic water providers such as municipalities or special districts that own water shares having both types of decrees. In the Poudre Basin specifically, this opportunity exists for North Poudre Irrigation Company shareholder/stockholders, the City of Fort Collins, and several nearby special water districts which in addition to having both types of water, also have the infrastructure that enables such a swap. North Poudre irrigators entered into short-term agreement of this type with the City of Fort Collins in 2013 to help the city deal with post-fire carbon loading in the Poudre River that would have been costly to treat. The multiple-use water provided by irrigators was Colorado Big Thompson (CBT) water stored in Horsetooth Reservoir and unaffected by carbon loading from the recent fires.

Parties under this type of ATM would sign an agreement allowing the utility to use/store some amount of their multiple-use water in return for some amount of agricultural water owned by the water utility. Typically, the amount of agricultural water provided would be somewhat greater than the multiple use water provided by irrigators. Both parties would retain ownership of the water being swapped/exchanged.

Advantages to the domestic water provider might have to do with access or where the multiple-use water is stored, the quality of the water, the temporary loss of other sources of treatable water. For the agricultural producer, the biggest incentive might be the increase amount of water they would have available during the irrigation season the year of the swap or permanently if the swap is itself permanent. Longer term agreements could provide more certainty and fewer administrative costs. Permanent decree swaps/exchanges could add to a utilities base supply without a change case but would likely need the approval of the irrigation company and be reflected in the company's bylaws.

No decrees, points of diversion etc. are being changed and no infrastructure additions or changes are anticipated since both parties already utilize both types of water. Adequate storage allowing the delivery of multiple-use water throughout the year and the delivery of ag water towards the end of the growing season and after run-off is needed to make this type of ATM market work well. The administrative responsibilities would likely fall to both parties and presumably require transaction oversight by both the ditch company/association and the water utility. As the exchange likely being sought by the domestic water provider, they would seemingly need to assume the lion's share of the administrative responsibility.

It is reasonable to expect that most water swaps of this sort would be term limited either as project specific, emergency specific or with agricultural shareholders agreeing to be "on standby" to do swaps as needed for x number of years. The value of multiple-use water is considerably higher than the value of agricultural water and although there may be some producers such as those with conservation easements on their farms

interested in a permanent swap that would provide the farm or ranch with more water, it seems likely that most swaps would be term limited.

“Buy and Supply”

Although not mentioned in our proposal to CWCB as and ATM The Poudre Basin Water Sharing Working Group would study, the “Buy and Supply” concept has evolved out of our discussions and interactions with other local entities as well as ideas from members of our research team. We add it here as additional ATM mechanism and product of our group.

The buy and supply concept is one where a farm or ranch having water rights is purchased from a willing seller. A conservation easement is placed on the property and it is then either leased back or sold to an agricultural producer. Conditions are placed on the easement (which encumber any future lease or sale) that enable a domestic water provider to then have continued and reliable access to a portion of the water which could be used for drought firming, drought recovery or emergency situations. It is also possible on farms that have ample water and/or farms that increase irrigation efficiency, that a portion of the water could be passed to the water utility partner(s) as new base supply without compromising the long-term viability of the farm or ranch. Because of the security of the additional water supply provided for water utilities by this mechanism, and the protection of open space and the multiple values provided by a protected farm or ranch (scenic, wildlife, cultural, buffering, community separation, food shed sustainability, ground water recharge, flood surge control etc.) it is anticipated that the purchase of the farm or ranch could involve multiple participants such as open an space program, a water utility, and environmental organization, a land trust, Great Outdoors Colorado matching funds, or federal farmland protection/Farm Bill funds, as well as agricultural businesses that depend on a sustainable farm base.

Once purchased and conserved with an easement, water sharing could include ATMs discussed above depending on the type of water rights owned and rented. These include:

- 1) An interruptible supply agreement that would make agricultural water available to the utility three years in 10 under State statutes. After several farms are conserved using the buy and supply mechanism, rotational fallowing might be used among those farms.
- 2) A decree swap where the farm would provide water decreed for multiple-use in return for a guarantee of agricultural water needed to replace it (one example of this already exists in the basin and partners include an open space program and a water utility);
- 3) Improvements in irrigation efficiency, deficit irrigation, rotational fallowing or use of crops requiring less water – any of which could enable the farm to conserve water that would then be used for base supply

It is also possible to see the “Buy and Supply” mechanism being carried out via different collaborative arrangements involving: 1-2 entities; multiple entities, or facilitated by a

land and water conservation district/bank which makes the purchase while partnerships are developed. Partners would then repay the umbrella entity. Determining the exact nature and governance of such land and water conservation entity will be an important next step towards the use of ATMs in the Poudre Basin and elsewhere. The “buy and supply” mechanism comes the closest to providing long-term certainty for participating water utilities, for the continuation of production agriculture in a project area as well as the protection of the multiple values described in Appendix A by multiple participants each having a particular emphasis.

APPENDIX D

Water Sharing Between Agricultural Water Shareholders and Urban Utilities in Northern Colorado

SURVEY FREQUENCY REPORT



*Poudre Basin Water Sharing Working Group
&
Colorado Water Institute*



SURVEY ADMINISTRATION:

Surveys were sent to 708 Northern Colorado irrigation company customers in December, 2014:
 North Poudre Irrigation Company (563) Water Supply & Storage Company (144) Unknown (1)
 Addresses removed from sample (32) as non-deliverable.

SURVEY RESPONSE:

155 completed surveys (132 via mail and 23 online) were returned for an adjusted response rate of 23%.
 Sample size allows for population estimates within +/- 6.9% at the 95% confidence level.

Below is an example of a Short Term Lease that further illustrates how this type of water sharing agreement might work for individual irrigators and water shareholders.

An existing reservoir has been drawn down in order to make repairs and expand its capacity which will take 12 months. In order to replace the water that is lost from storage, a water utility wishes to enter into short-term lease agreements with irrigators who own water that is stored elsewhere. Under Colorado law, this can be done with the administrative approval of a Substitute Water Supply Agreement. Compensation would be pre-negotiated as part of the agreement.

1. Overall, do you think that short term lease is an appropriate water sharing mechanism for irrigators/water owners such as yourself? (Please circle one number from the list below.)

1	2	3	4	5	6	7
<u>Extremely Inappropriate</u>	<u>Moderately Inappropriate</u>	<u>Slightly Inappropriate</u>	<u>Neither</u>	<u>Slightly Appropriate</u>	<u>Moderately Appropriate</u>	<u>Extremely Appropriate</u>
8.4	7.7	4.9	11.2	19.6	32.2	16.1

MEAN	4.87
MEDIAN	5.00
MODE	6
STD. DEVIATION	1.820

2. Have you ever participated in a short term lease with an urban water utility (in 2002, 2003 or any other time) ?

<p>18.5% Yes 81.5% No</p> <p><i>If Yes, what year did you participate and with which utility?</i></p>	Years Listed:	Utilities Listed:
	2002 (2 respondents) 2003 (5 respondents) 2005 or so 2006-?? 2011-2014 2012 2013 2014 (3 respondents)	City of Ft Collins (7 respondents) Elco City of Windsor FCHWD Milliken N. Poudre Via water supply and storage Pierce Lateral

3. We are interested in knowing whether or not you would be likely to participate in a short term lease water sharing program if one were offered in your area in the future. (Please indicate how likely or unlikely you would be to participate by circling a number below.)

1	2	3	4	5
<u>Very Unlikely</u>	<u>Somewhat Unlikely</u>	<u>Neither</u>	<u>Somewhat Likely</u>	<u>Very Likely</u>
23.3	15.8	8.9	37.0	15.1

MEAN	3.05
MEDIAN	4.00
MODE	4
STD. DEVIATION	1.440

4. We'd also like to know what factors are important to you in making a decision about whether or not to participate in a short term lease water sharing program. (Please indicate how important each factor is by circling a number.)

		1	2	3	4	5
		Not at all Important	Somewhat Important	Important	Very Important	Extremely Important
It is an additional source of income helping us realize the equity we have in water without selling.						
MEAN	2.80	22.4	18.9	28.7	16.1	14.0
MEDIAN	3.00					
MODE	3					
STD. DEVIATION	1.334					
It's beneficial to the community.		17.9	21.4	37.1	18.6	5.0
MEAN	2.71					
MEDIAN	3.00					
MODE	3					
STD. DEVIATION	1.114					
It improves urban-rural relationships.		27.7	19.9	35.5	14.2	2.8
MEAN	2.45					
MEDIAN	3.00					
MODE	3					
STD. DEVIATION	1.124					
It is an attractive option in a dry year when farming may be more difficult, especially on marginal soils.		18.3	20.4	33.1	20.4	7.7
MEAN	2.79					
MEDIAN	3.00					
MODE	3					
STD. DEVIATION	1.190					
It may reduce the pressure for permanent sale ("Buy & Dry") of irrigation water or the change of ag. decrees in water court.		14.3	10.0	22.1	28.6	25.0
MEAN	3.40					
MEDIAN	4.00					
MODE	4					
STD. DEVIATION	1.345					
Other decision factor 1		25.0	0	14.3	25.0	35.7
MEAN	3.46					
MEDIAN	4.00					
MODE	5					
STD. DEVIATION	1.598					
Other decision factor		50.0	0	10.0	20.0	20.0
MEAN	2.60					
MEDIAN	2.00					
MODE	1					
STD. DEVIATION	1.776					

Other Decision factors listed for short term lease:

Ag water should always be Ag water
Am I planning to use the H2O that year
availability of water on other ditch system and current cropping pattern
cost offset for crop loss
How conservative urban users are
If water is not needed by me
Just another way for liberals to move us towards socialism. I will fight every time government tries this crap.
lease amount \$
Limited ability to make water available
must be voluntary
Need the water for irrigating
Rental Price
The real answer that could benefit both urban and rural interests is to build more storage. It is extremely frustrating to the Agricultural community for the "Green Lobby" to prevent the logical and most reasonable solutions which include additional water storage facilities.
water leased short term is VERY hard to get back or "un-lease" when the farmer needs it
We need their water
What action would city folks take to conserve water
Whether the water is needed or not
would this affect small operations
crop planted (long term or not)
fair pricing
Is the city issuing permits to build more homes and lawns and parks?
small amount of water owned
Who makes the rules of H2O split
It seems that agriculture should have the option of water usage first. Green lawns are not important compared to a person's livelihood. Trees are a consideration for urban dwellers, but lawns should not be included. We are an arid climate and people should be planting accordingly, not water sapping non-natives.

5. Please use the space below to provide any additional thoughts/comments or concerns that you may have about *short term lease* as an agriculture/urban water sharing mechanism.

clear definitions of time duration of "short term" - clarifying risks of transitioning from short term into interruptible agreements without choice
Farmers will help out other farmers or urban folks in time of need. However, this option places the burden for water supply on farmers who did not cause a shortage. Nothing is stated about the actions to conserve non-agricultural first. This option seems to state that food production will somehow happen, regardless of the presence of water or not.
I have only 7 shares of water. I use two on my leased property and rent the other 5. I'm not interested in short term lease.
I own only 1 share of water and count on renting what I need (~4 shares) so it is not very attractive to lease my only share - And let my hay fields deteriorate
I think the utility companies should operate within the confines of an arid climate. They've managed in the past. Maybe should restrict building beyond the capacity of the environment. Why should farmers have to give up their water. Their system has worked in the past also. The utilities get their foot in the door and they will take everything.
If there is a severe drought, and a farmer will be unable to produce a crop and survive, we would be open- but our ditch would have to agree in order to really make a difference. We would want to help a farmer get through a bad year. What about city water users learning how to use less water and contributing water for agricultural use also?
In ag we need more water now less available at affordable rates
It is difficult to determine the effect of water sharing on a small operation such as mine which only irrigates approximately 15 acres with owning only 1/2 share of water.
It keeps an "open market". Neither party is "forced" to do anything by a government entity. Government is not good at business, has huge waste and only grows regulation later down the road- historically proven.
It's for irrigation- realtors want it to build, make money
May of seem avenues for someone or entity to control my water use even farther.
More dams need to be added to help in both urban and rural settings. Both settings are required. Both sides to give when there is a drought. We have a hard time as farmers and ranchers. When you see lots of lawns with sprinklers running water down the street it's real hard to try to imagine reducing Ag water for that.
More difficult to make longer term plans. Very often crops cannot be switched out in short term notice and not irrigating some crops can be devastating.
Most years I need all my water, so would not have any to lease.
None - We are small users
Not interested
Nothing bothers us more than to see nice lush lawns in city and brown crops in the fields. Food should be of concern to the urbanites as

well.
Price should be lower to accommodate the small acreages 4-10 ac 10-20 ac to justify growing unique crops.
See comment letter
short term lease is the only program that I would be interested in. In 2002 & 2012 when I left land fallow it took 2 additional years to bring land back to full irrigation production from one year of no irrigation. Long term non irrigation will not work
Short term solution. Scenarios like these can often times be rectified through fall or spring run-off rather than water diversion. I would not be interested unless circumstances were such that depleted stores could not be replenished through surplus run-off. Rental rates should be tied to a \$/acre of production rather than per unit of water.
Some of these terms would also depend on crop values.
The #1 factor is can I make more \$ using this water for my crops or by using the short term lease option. This may sound selfish or harsh but it is what most or all farmers feel.
The profession I have chosen requires water. It is only possible to operate my business with water delivered to my farms. The investment in land and water is a long term decision and a commitment is made when you enter into the agricultural business.
Urban development may expand while short term leasing and really feel the effects of denial to that water when it returns for ag. use
Urban use of water is so inappropriate in our semi arid desert that there would have to be remarkable danger in city water use (lawn, excessive water use for city plantings) before any burden or thought of taking away ag use water is our option. Changing cities policies of water use to match the availability is a must. Taking ag water is myopic and will cause fewer people to farm.
Allows small acreage residents to keep grass for animals and the environment
Although it says "short term", is there any risk that the lease arrangement could become permanent and the irrigator could lose his/her right to the water? If a irrigator would commit to this, is there a minimum number of shares needed to participate? If I only own 1 share, could I participate? Can I rent other water if I lease out my 1 share? Without additional rental water, my property would become a desert.
I don't like having to make 'sales' calls off that list to see if someone would want to lease my water. I would like to see an ongoing source for leasing whose price wasn't set but fluctuated with the true value of the water or overtime, distrust would overcome the desire to do it. Rule of thumb - a little more than what it's worth.
From ag perspective and to make sure that the short term lease can work in conjunction with Drought/Disaster Insurance
I own only 12 shares of NPIC water (for about 38 years now) but believe it's very important to have compromising understandings with the municipalities that have become so dependent on water that was originally developed for agricultural needs. It's a reality. I expect comperable understandings on their part when they have plenty of water and ag needs more.
If the agriculture community has the option to lease from an urban source during dry years this seems like a viable option. However, it seems in the past pretty lawns have been more of a consideration than food grown for consumption and the farmer's livelihood.
If the anticipated amount of water, of the water owned and rented is so low the crop yield will be a net loss (\$) might as well rent out the water owned that year.
In response to the above questions.... 1. In the past, as utilities and municipalities have approached our farm to rent water, they did not offer an adequate amount of money that would replace the loss/no production from renting water. ie: they do not replace the income of the commodity that we produce. 2. What community is it beneficial for? Ag or urban. This question does not specify. I do not feel it is appropriate for agriculture to rent/sell water and then see urban water use decisions that are wasteful. Please look at Northern Colorado communities where water has been purchased by municipalities and the effect that it has had on the community. ie: Pierce and Ault Colorado have had devastating effects to the community while Thornton, the municipality that purchased the water, has grown uncontrolled. Farms (food production and rural income) have been dried up while urban landscapes are irrigated. 3. See above question 2. Does the urban mass understand the consequences of water in Colorado and the effects on rural communities or does the rural community have the burden of water sharing program. 4. While dry year farming is difficult and yield is low there is still production. Leaving land fallow for a dry year lowers the production value into the future. The effects of a dry year are accumulative over several years beyond the dry year. Additionally, pulling water from the system also affects more than the farm. Less water in the system also means less recharge of aquifers and decline in wet land ecosystems that rely upon the irrigation system for recharge. 5. While it reduces the pressure of permanent sale does it create a precedent for permanent lease as urban populations grow and rural populations lose influence.
its more economical for us as small acreage land owners to be able to short time lease water rather than try to buy any.
Need another holdpond up in mountains for all new people coming in also
water is personal property and up to each owner.
Thanks
We have a water agreement with the Town of Ault for our water. We have to use our water to irrigate the lawns in our mobile home community and if we ever sold it they would have "first right of refusal to buy the water." For a few years we have had an agreement with the Water Supply and Storage Co. where they rent our water out for a fee
We use our water every year. Without water, we can't grow feed (hay). Without feed we can't feed livestock. And if livestock isn't fed, people don't eat. Is green grass and clean cars more important than food for human consumption?
We would be unlikely to participate in a short-term lease as we only own 1 share of NP. Wouldn't be financially advantageous - but would make a difference in maintaining our pasture & landscape
Not interested

Below is an example of **Interruptible Supply** that further illustrates how this type of water sharing agreement might work for individual irrigators and water shareholders.

Potential Interruptible Supply Agreement

An urban water utility is planning for longer term water supply security during drought and drought recovery or unforeseen events in the watershed that has much beetle-killed forest prone to wildfire impacts. To gain that security, they approach farmers and ranchers who own water seeking those who might be willing to enter into a longer term agreement (10 years or more) to make water available to the utility when agreed upon indicators of need are triggered. Irrigators would make that water available by fallowing, using deficit irrigation, or planting crops that need less water. Compensation would be pre-negotiated and collaborators would be given rental water security during years of normal precipitation while the agreement was in effect.

1. Overall, do you think that **interruptible supply** is an appropriate water sharing mechanism for irrigators/water owners such as yourself? (Please circle one number from the list below.)

1	2	3	4	5	6	7
<u>Extremely Inappropriate</u>	<u>Moderately Inappropriate</u>	<u>Slightly Inappropriate</u>	<u>Neither</u>	<u>Slightly Appropriate</u>	<u>Moderately Appropriate</u>	<u>Extremely Appropriate</u>
25.5	8.8	8.0	19.0	18.2	17.5	2.9

MEAN	3.60
MEDIAN	4.00
MODE	1
STD. DEVIATION	1.934

2. We are interested in knowing whether or not you would be likely to participate in an **interruptible supply** water sharing program if one were offered in your area in the future. (Please indicate how likely or unlikely you would be to participate by circling a number below.)

1	2	3	4	5
<u>Very Unlikely</u>	<u>Somewhat Unlikely</u>	<u>Neither</u>	<u>Somewhat Likely</u>	<u>Very Likely</u>
37.4	25.2	13.7	21.6	2.1

MEAN	2.27
MEDIAN	2.00
MODE	1
STD. DEVIATION	1.273

3. We'd also like to know what factors are important to you in making a decision about whether or not to participate in an *interruptible supply* water sharing program. (Please indicate how important each factor is by circling a number.)

		1	2	3	4	5
		<u>Not at all</u> <u>Important</u>	<u>Somewhat</u> <u>Important</u>	<u>Important</u>	<u>Very</u> <u>Important</u>	<u>Extremely</u> <u>Important</u>
It is an additional source of income helping us realize the equity we have in water without selling.		29.5	25.0	22.0	12.1	11.4
MEAN	2.51					
MEDIAN	2.00					
MODE	1					
STD. DEVIATION	1.334					
Rental water security for my operation.		23.3	20.9	23.3	18.6	14.0
MEAN	2.79					
MEDIAN	3.00					
MODE	1					
STD. DEVIATION	1.362					
It's beneficial to the community.		24.2	30.3	29.5	11.4	4.5
MEAN	2.42					
MEDIAN	2.00					
MODE	2					
STD. DEVIATION	1.112					
It improves urban-rural relationships.		30.5	30.5	27.5	7.6	3.8
MEAN	2.24					
MEDIAN	2.00					
MODE	1					
STD. DEVIATION	1.087					
It is an attractive option in a dry year when farming may be more difficult, especially on marginal soils.		24.2	23.5	26.5	17.4	8.3
MEAN	2.62					
MEDIAN	3.00					
MODE	3					
STD. DEVIATION	1.257					
It may reduce the pressure for permanent sale ("Buy & Dry") of irrigation water or the change of ag. decrees in water court.		20.7	15.7	26.4	19.0	18.2
MEAN	2.98					
MEDIAN	3.00					
MODE	3					
STD. DEVIATION	1.384					
Other decision factor 1		33.3	0	14.3	28.6	23.8
MEAN	3.10					
MEDIAN	4.00					
MODE	1					
STD. DEVIATION	1.640					
Other decision factor 2		50.0	0	16.7	16.7	16.7
MEAN	2.50					
MEDIAN	2.00					
MODE	1					
STD. DEVIATION	1.761					

Other Decision factors listed for interruptible supply:

Ag water should always be Ag water
10 year term?
Amount of reimbursement
City needs to conserve their water! Teach them.
cost offset for crop loss
decisions about future cropping patterns
Distance of main canal to form
Feed for livestock
How far ahead will the farmer know?
how would it affect a very small operation
Increase steeling
Limited ability to make water available
Long term leave effect on water delivery to ag.
must be voluntary
Need irrigation water ourselves to sustain operation.
Not an irrigator
Rental Price
Am I planning to use the H2O that year
Duration of interruption
fair pricing - enough to cover crops foregone and fallowing or other costs
is the amount of water owned significant
May want to sell shares before 10 years.
Maybe our water supply is max out- and city needs to limit growth now- water in balance with population.
Too long term

4. Please use the space below to provide any additional thoughts/comments or concerns that you may have about *interruptible supply* as an agriculture/urban water sharing mechanism.

* Ten years is a long period of time for a person or persons who rely on water to make their living to be without that resource. *
Expansion of permanent water storage would help reduce the impact on agriculture. (GLADE RES.)
10 years NO i.e. fine print, loopholes no way out of potentially bad situation. Sounds like annuities and the attorneys advertising that they can help for \$ of course.
A big downside for me is being locked into a lease for 10+ years
Again, we own so little water that the financial benefit wouldn't be important. It would be more important to us to use the little water we have to maintain our property
Any long term is not acceptable if it exceeds 1 year. As Cost of water changes annually based on current year snow/rain.
Farmers must plan years in advance for capital expenditures, crop rotation, pest control, and normal financial planning in the operation. This option pulls the rug out from under the operation. Would the utility fully reimburse the farmer for his lost opportunity, lost profit...I doubt it. The problem with this option is that there is no upside for the farmer- only downside. When water is plentiful, it's generally plentiful for everyone and the farmer can't use the extra water in dry periods, the farmer is cut off and the city uses are not curtailed.
From what I have heard from people going to the water meetings (irrigation), the utility people are already using the portion of their shares of water designed for Ag use for utilities and were pretty outspoken about doing so. I don't see any long term benefit for farmers who should remain keepers of the water they have, but legislative theft will probably happen anyway. It usually does.
how to know when the water is needed 10 years in the future?
I don't know many shares so extended years of use isn't really possible if I need to support my cattle.
I have concerns that abandonment might be field on right, given extended alternate usage of water.
I have no problem in providing long-term water for urban interruptions, just so there is accompanying understanding that in this of urban water "access" (how might that happen, over ??? ????). Will conservation practices that are not yet in place) The cities "give back" to ag water that can protectively keep the rural areas "green." We see more and more "browning" of the core area because urban "take" but I would cooperate if it's a "win-win"
I own a small 114 acre farm that I lease along w/ 10 shares of North Poudre water. I am dependent on the larger farmers calling for their water, to get my water. If they can't make a living farming and sell their land/water, then I am in a difficult position. Being able to lease or share their water seems like a good solution for them, and hence for me.
Irrigation water is personal property just as the land is !!!
It may not be an attractive option in a dry year. Access to extra water in normal years as an incentive would mean the water, for the most part, has already been sold off this farm. Also would require utilities to own ag water and be able to deliver it (rent it) to the particular farm, in sufficient quantity and at a cost that can earn the farm a profit in normal years. The NPIC is a very unique situation of owning 40000 CBT contracts and being +/- 80% of the 10000 shares owned by municipalities. So this has some chance here of being attractive to the remaining +/- 20% of owners
More than one or two years will not work
My business services with long term agreements and contracts with end users of the products I produce. These end users will not tolerate

inconsistency in production and delivery of the products they expect.
not interested
Please see comment on previous answers. While in interruptible supply seems like an appropriate option for farmers/ranchers there is possibility that "drought" conditions could last for the entire lease agreement. Weather/climate is hard to predict.
Reusing hay and forage for our operations is very important for us to survive.
See comment letter
See comments in previous question about short term leases.
Seem like a logical approach. An agreement of this nature needs objective means that trigger a need for water. I can see knee jerk reactions and needs pulling water into the utility unnecessarily without harm to the ability and with great harm to agriculture. Rental rates need to be tied to Ag production. \$/acre not to water shares.
Some farms are a mile and a half from main canal supply
The 10 year lease term is too demanding
The line item "It may reduce the pressure for permanent sale ("Buy & Dry") of irrigation water or the change of ag decrees in water court" really says it all. What you are saying is "wouldn't you rather participate voluntarily so the government doesn't have to take it from you by force. Pure socialism.
This option (in my opinion) would be worse than Buy & Dry. It would encourage investors to buy farms and put the water in a 10 year lease. This would take water from farms !
This option allows for somewhat more feasibility over longer terms.
This option does not promote urban water conservation rather provides safety net.
This option sounds longer term. Long term solutions should be considered if this is the case -Like more storage capacity. Again I only own 1 share and would not be able to lease it and sustain my land.
We are such a small operation this scarcely applies to us.
We highly rely on water for sustainability of our acreage.
Will it help to keep aquifers and not use other water
Would small operations with very little water owned (1/2 to 1 acre) even be considered & what would happen to us on being able to rent water - would we be left with no way to rent & be without compensation?

1. Do you or your irrigation company own any shares of Colorado-Big Thompson Project water or other water that comes from outside the Poudre River Basin? **52.3% Yes 47.7% No**

Below are some examples of Water Swap that further illustrate how this type of water sharing agreement might work for individual irrigators and water shareholders. If you don't own multi-use water, you may skip this section.

Option A

To cope with poor water quality caused by a fire and then ash laden runoff affecting the river water they own, an urban water utility puts out a call to see if those owning multiple use water stored elsewhere and less affected by the fire, would be willing to enter into a short term or longer term agreement to swap that water for agricultural water from the river. Those who participate in a **short-term** swap will be given 1.5 acre feet of ag water for every acre foot of multiple-use water they are willing to provide the utility that year.

Option B

Later, in order to anticipate similar unforeseen events and avoid a rushed procedure, the utility proposes that those entering into **longer term** agreements (10 or more years) to swap water when needed during the time of the agreement are guaranteed 1.5 acre feet of water for each acre foot of multiple use and put on a list of those who will have access to rental water during normal years when swaps are not needed.

1. Overall, do you think that water swaps are an appropriate water sharing mechanism for irrigators/water owners such as yourself? (Please circle one number from the list below.)

1	2	3	4	5	6	7
<u>Extremely Inappropriate</u>	<u>Moderately Inappropriate</u>	<u>Slightly Inappropriate</u>	<u>Neither</u>	<u>Slightly Appropriate</u>	<u>Moderately Appropriate</u>	<u>Extremely Appropriate</u>
5.1	6.3	3.8	12.7	11.4	36.7	24.1

MEAN	5.25
MEDIAN	6.00
MODE	6
STD. DEVIATION	1.721

2. We are interested in knowing whether or not you would be likely to participate in a short term water swaps (Option A) water sharing program if one were offered in your area in the future. (Please indicate how likely or unlikely you would be to participate by circling a number)

1	2	3	4	5
<u>Very Unlikely</u>	<u>Somewhat Unlikely</u>	<u>Neither</u>	<u>Somewhat Likely</u>	<u>Very Likely</u>
12.7	2.5	10.1	44.3	30.4

MEAN	3.77
MEDIAN	4.00
MODE	4
STD. DEVIATION	1.270

3. We are interested in knowing whether or not you would be likely to participate in a long term water swaps (Option B) water sharing program if one were offered in your area in the future. (Please indicate how likely or unlikely you would be to participate by circling a number)

1	2	3	4	5
<u>Very Unlikely</u>	<u>Somewhat Unlikely</u>	<u>Neither</u>	<u>Somewhat Likely</u>	<u>Very Likely</u>
25.6	14.1	11.5	34.6	14.1

MEAN	2.97
MEDIAN	3.00
MODE	4
STD. DEVIATION	1.450

4. We'd also like to know what factors are important to you in making a decision about whether or not to participate in a water swaps water sharing program. (Please indicate how important each factor is by circling a number.)

	1	2	3	4	5
	<u>Not at all Important</u>	<u>Somewhat Important</u>	<u>Important</u>	<u>Very Important</u>	<u>Extremely Important</u>
It is an additional source of income helping us realize the equity we have in water without selling.	26.7	21.3	21.3	16.0	14.7

MEAN	2.71
MEDIAN	3.00
MODE	1
STD. DEVIATION	1.402

Rental water security for my operation.		14.9	12.2	31.1	17.6	24.3
MEAN	3.24					
MEDIAN	3.00					
MODE	3					
STD. DEVIATION	1.353					
It's beneficial to the community.		17.8	27.4	35.6	13.7	5.5
MEAN	2.62					
MEDIAN	3.00					
MODE	3					
STD. DEVIATION	1.101					
It improves urban-rural relationships.		28.8	20.5	38.4	5.5	6.8
MEAN	2.41					
MEDIAN	3.00					
MODE	3					
STD. DEVIATION	1.165					
It is an attractive option in a dry year when farming may be more difficult, especially on marginal soils.		13.5	21.6	33.8	17.6	13.5
MEAN	2.96					
MEDIAN	3.00					
MODE	3					
STD. DEVIATION	1.221					
It may reduce the pressure for permanent sale ("Buy & Dry") of irrigation water or the change of ag. decrees in water court.		14.9	16.4	25.4	23.9	19.4
MEAN	3.16					
MEDIAN	3.00					
MODE	3					
STD. DEVIATION	1.333					
Other decision factor 1		46.2	0	7.7	7.7	7.7
MEAN	2.85					
MEDIAN	3.00					
MODE	1					
STD. DEVIATION	1.864					
Other decision factor 2		80.0	0	0	0	20.0
MEAN	1.80					
MEDIAN	1.00					
MODE	1					
STD. DEVIATION	1.789					

Other Decision factors listed for water swaps:

Ag water should always be Ag water
\$
Increased water for my use
It gives *** ** water
Long term leave impacts
source of extra water for those w/ barely enough
water quality (sediment, temperature etc.) amount of ag water offered in return
What's the timing of water delivery?
Are volumes equivalent?

5. Please use the space below to provide any additional thoughts/comments or concerns that you may have about water swaps as an agriculture/urban water sharing mechanism.

Agriculture in Northern Colorado is sustainable because of forward thinking and construction of storage and delivery systems. The urban community should acknowledge and model their needs after what the ag industry has accomplished. The answer is clear for urban water needs. Do the same thing that has been proven valuable in the ag sector. Develop and build storage and delivery systems.
Because of the low level of ownership in Big Thompson we find it easier to just lease it yearly to at least get financial returns. If we had delivery to use as irrigation water it would be very marginal.
Best idea, but the water being swapped would have to be guaranteed to be clean & usable water.
Could be okay provided the same acreage of crops can be grown. The alternative transfer methods really hurt the urban person. Fewer crops will be grown, the price of food rise or maybe the food just isn't available. The farmer gives in every case and the city folks take. Intention deficit irrigation is biologically stupid because a plant will first stop reproduction of its seed before vegetative growth. Therefore, a farmer may have growing plants, but no seed. Try making bread from wheat stalks!
Do not agree with water swaps
I'm "all for" swaps, especially long-term. But "long term" should exceed 10 years. My concern is the City of Fort Collins owns more and more NPIC shares. I have my ag water but the city owns a majority interest and could "vote" to shut down Ditch #3. If they do, all my ag water dies "zero" for me. Anything I could do to engage the city in an understanding that my farm operations will have water for decades in the future. They assure us that you can continue to operate is important - and I will do my part to help the city through long term ??????
It has worked in the past
NEED another "holding pond" up the Poudre to keep enough water for us all!
Of the three options, this is the win-win. We should not impact feed production to improve water security. This is essentially robbing Peter to pay Paul. Both are critical and need maintained and this approach does that by providing the necessary water quality to one entity and the necessary water volume to the other.
Small acreage farmers (these are not hobby farmers) usually work two+ jobs for income if water is unavailable for rent they dial back on cropping and may be interested in a trade on their one share of 1/2 share
This option helps us to maximize our available water to maintain our property
Water swaps if done right can be very effective
Water swaps would allow a farmer to keep water in agriculture while still helping the community. The ecological effects to the cropland would need to be assessed. Also, damage to infrastructure would need to be looked into. Would additional silt/ash be harmful to irrigation equipment.
we have had multiple use water DENIED for the last 2 years even though it was GUARANTEED by NPIC
We offered to do a swap with City of FC but they didn't need our water

North Poudre Irrigation Co. Shareholders ONLY please answer question number 6 below.

6. Did you participate in the water swap with the City of Fort Collins in 2013? **29.5% Yes**
70.5% No

Rankings of Different Water Sharing Mechanisms

1. Please rank the three water sharing mechanisms based on your likelihood to participate if a program was offered in your area. (Please write a "1" next to your first choice, a "2" next to your second choice, a "3" next to your third choice. If you would never consider participation in a particular mechanism, write "NA")

Short Term Lease:	56%	1st	34%	2nd	10%	3rd
Interruptible Supply:	5%	1st	34%	2nd	61%	3rd
Water Swaps:	47%	1st	30%	2nd	23%	3rd

2. If you were to enter into either a short term lease or an interruptible supply agreement with an urban utility, which of the following methods would you be most likely to use in order to free up some water for municipal use during a dry year? (Please check one.)

33% Fallowing 44% Deficit Irrigation 23% Planting crops that use less water

3. If you were to enter into a water sharing agreement with your own water, what is the minimum amount you would accept as compensation for an acre foot of water this year?

MEAN: \$ 1360	MEDIAN: \$ 100	MODE: \$ 100	STD. DEVIATION: \$ 3903
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Finally, there is talk about forming a regional land/water bank where local government open space programs, water utilities, & other partners would purchase land with water rights at market value from those wishing to sell. The water bank would put a conservation easement on the land and sell or lease it to agricultural producers to offset the cost of purchase. A portion of the ag water would be made available for the water utilities during drought or to firm up base supplies no more than 1 - 3 years in 10. This approach has been referred to as ***“buy and supply.”*** **If this option were to become a reality at a time when you needed to sell land and water how likely would you be to participate in a buy and supply arrangement as described above.** (Please indicate how likely or unlikely you would be to participate by circling a number below.)

1	2	3	4	5
Very Unlikely	Somewhat Unlikely	Neither	Somewhat Likely	Very Likely
36.4	10.6	15.9	30.3	6.8
MEAN	2.61			
MEDIAN	3.00			
MODE	1			
STD. DEVIATION	1.413			

Please use the space below to describe, in your own words, the reasons why you would or would not participate in a “buy and supply” arrangement like the one described above.

Agricultural land and water market values are important elements in individual estates. Conservations easements albeit would allow the farming operation to continue could also reduce the potential value especially as it relates to farmland close to metropolitan areas.
As previously said, this seems to benefit the urban dwellers and not the farmers.
Cities need to implement a very aggressive water conservation attitude. It is disheartening to see the green lawns & golf courses and parks when we are in a severe drought and water supplies are tight. I also hate to see cities dictate to farmers, such as happened with Water Supply & Storage participating in the Fort Collins and Lonetree ditches. They control the boards on both ditches.
Depends on the price!
Don't fully understand how such an arrangement would work in my situation
Don't know enough.
Don't like to lose control of decisions on land
Don't own land
I can't imagine a developer that is most likely who would buy my land would buy without the water to transfer into taps.
I don't understand the numerics of this well enough to have an opinion, but my experience with public/private collaborations has not been positive and any description that includes a phrase "other partners" is highly suspicious.
I have only 1 share of water and feel unqualified to answer these questions. We need to take more conservation in urban landscapes. As practiced in Mexico we need to consider bigger paved patios with small saturated planting areas.
I like the idea of maintaining open space and lease for agriculture; however, I would not agree to the selling of the land without strict terms of land use. Also, we are small acreage and easement may not be conducive to maximizing our real value not the water board's.
I only irrigate 1 acre of land with water I own and need all the water I have.
I only own 1 share and 18 acre of land. It wouldn't make sense for that amount
I own 30 ac of land and 2 homes are on that land. Land and homes are worth over \$1000000 and water and additional \$50000 or a little more. No one would come in and pay over a million for one share of N. Poudre water
I purchased CE credits to pay my Colorado state taxes and got screwed. HD-1155 did not work. It hurt landowners, and people that bought the credits !!!
I think conservation easements with the community water are very important for keeping our area "green" and maintaining agricultural land use.
I would not use a conservation easement nor recommend that to anyone. The come in all shapes and sizes and you need a doctor of Juris Prudence to read the fine print and understand the pros and cons. My view is they are aimed at misleading desperate or idealistic owners. There are better things: 40 year deed restrictions (tie water to the land), right of first refusal, or limit on escalation of sale price and who can buy. Go research how the Aspen Housing Authority limits resale of units regardless of how the housing market goes in Aspen
I would receive money capitol and will have water (some years-known in advance) to irrigate.

If somebody wanted to sell their farm I would rather see it continued to be used for ag production rather than housing developments.
If the land with water rights is purchased at market value - it seems fair. If forced to sell this land at a value predetermined by the regional bank, I would question the fairness.
Important to preserve access to water in Northern CO for agricultural purpose/use.
In the event of being forced to sell land or water, being able to tie it to agriculture as much as possible would be the best approach for our property.
increased flexibility of water use without loss of land to development
It would be important to learn more detail.
It would probably go to develop more homes! Need to have a town that has a water source and only builds to what the water supply will support-like Boulder.
My farm is next to main supply canal and water is easily available.
My operation is so small it wouldn't be beneficial
My participation would depend on the determined "market value" of my property.
not enough land or water
Plan to develop the farm @ some point want to be flexible & w/out cons. Easement @ this time
PRO - Preserve agricultural land; CON - Depends on "market price" interpretation
Refer to previous comments
The government is pushing everyone out of business. Take a look at the constitution this is not the governments job.
The key word is "needed to sell" - otherwise no
The only issue I have is that large buying groups (the government) would own the majority of the water and set the rules in the future. This is already happening in a smaller scale with the North Poudre. The city is buying all the shares and it is not available to smaller farmers. All is good in wet years but in dry years all the water goes to the city. In addition they will control the board because they are the largest shareholder.
The socialist might pay more than my neighbor
This all looks like a government rip off (long term) it'll be great at first
This decimates communities as cities do not send kids to school or support local business. Adds to depopulation and consolidation.
This is an option for the farmer planning to retire.
This is ridiculous
This seems a reasonable transaction without coercion and has the advantage of maintaining the land in agricultural production. It could minimize urban sprawl.
to keep ag land and water in production and help out water utility at the same time.
To maintain ag water on the land in the long run
We do not own land under the North Poudre system, we only own the water shares. The water shares were inherited and we feel a good investment at this time as water share price is on the increase.
we grow ONE crop that renews every year. with no water, NO CROP NO MONEY
We have only 1/2 of a share of water and use it to grow hay for our horses. It's doubtful we would sell any water.
We have such a small amount of water if would not effect the whole system and would seriously damage our crops.
We only own 1 share of NP - financially insignificant. May be more appropriate for larger shareholders
We only own 15 acres with 10 in pasture and 1 share of water. Would we qualify for buy and supply?
We own so little that it probably is too small to get into the game.
What about those that do not want to sell?
When selling land/water price is by far the biggest factor. If all offers are equal then it would be the best option to sell to this type of program
Wishing to sell is the key statement: no government force.

To wrap up, we'd like to know how you feel about some of the bigger picture issues related to agricultural land and water (including water sharing) in Northern Colorado? To what extent do you agree or disagree with the following statements (Please circle one number for each statement)

	1	2	3	4	5	6	7
	<u>Strongly Disagree</u>	<u>Moderately Disagree</u>	<u>Slightly Disagree</u>	<u>Neither</u>	<u>Slightly Agree</u>	<u>Moderately Agree</u>	<u>Strongly Agree</u>
I am not willing to enter into any agreements that might prevent me from selling my water during a given time period	5.6	6.9	4.9	9.7	18.8	17.4	36.8
MEAN	5.28						
MEDIAN	6.00						
MODE	7						
STD. DEVIATION	1.842						

For agriculture to remain sustainable in our area, alternatives to permanent sale of water (“buy & dry”) are essential.

4.3 5.8 2.2 12.2 10.1 21.6 43.9

MEAN	5.58
MEDIAN	6.00
MODE	7
STD. DEVIATION	1.752

There is little future for irrigated agriculture in our area.

44.0 16.3 8.5 5.0 14.2 6.4 5.7

MEAN	2.71
MEDIAN	2.00
MODE	1
STD. DEVIATION	1.991

The constant market pressure on agricultural water will only be resisted if irrigators can make a good living using that water.

.7 5.1 4.4 6.6 13.9 29.2 40.1

MEAN	5.76
MEDIAN	6.00
MODE	7
STD. DEVIATION	1.468

Water utilities will be more reluctant than agricultural producers to enter into water sharing agreements.

12.9 12.9 10.1 33.1 10.1 11.5 9.4

MEAN	3.86
MEDIAN	4.00
MODE	4
STD. DEVIATION	1.786

Water sharing could be a win-win for both producers and water utilities.

8.6 5.7 5.0 18.6 21.4 25.7 15.0

MEAN	4.76
MEDIAN	5.00
MODE	6
STD. DEVIATION	1.758

Water sharing would cause a disruption of my farming operation, labor costs, contracts, that would not be easily offset by the revenue or rental water security it could provide.

8.0 6.6 8.8 22.6 18.2 14.6 21.2

MEAN	4.65
MEDIAN	5.00
MODE	4
STD. DEVIATION	1.829

Operation Characteristics

Section A: Questions for Active Irrigators ONLY

1. Are you a member of any of the following irrigation entities? (Please check all that apply.)

72% North Poudre Irrigation Company

34% Water Supply & Storage Company

9% Larimer & Weld Irrigation Systems

3% New Cache Irrigation Companies

6% Other (*Please describe.*)

Others mentioned: **Box Elder, CBT, FARCO, Central, Shamrock**

2. In a typical year, about how many acres do you irrigate? (Please check one)

19.1 % 1 – 9 acres

35.7% 10 – 49 acres

15.7% 50 – 99 acres

13.9% 100 – 199 acres

6.1% 200 – 499 acres

4.3% 500 – 999 acres

1.7% 1000 – 1999 acres

3.5% 2000 acres or more

3. In a typical year, do you generally irrigate with water that you own or water that you rent from another source? (*Please circle the number that best represents your operation*)

I irrigate exclusively with water I own

I irrigate mostly with water I own

I irrigate with about equal amounts of owned and rented water

I irrigate mostly with rented water

32.1%

25.9%

20.5%

21.4%

4. What types of crops do you typically grow? (Please check all that apply.)

43.1% Alfalfa

15.5% Wheat

31% Corn

13.8% Beans

66.4% Hay or other forage crops

5.2% Vegetables

21.6% Other crops

Other crops listed: Trees (7), Sugar beets (7), Sod/Turf (4), Orchards (2), Barley, Oats, Lawn & Garden

5. Is farming/ranching your primary occupation?

23.9% Yes 76.1% No

6. How long have you or your family farmed/ranched in Larimer or Weld Counties? years

MEAN: 41.57	MEDIAN: 33	MODE: 20	STD. DEVIATION: 31.496
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7. Is any of your land enrolled in a conservation easement?

11.1% Yes

number of acres enrolled :

MEAN: 644.58	MEDIAN: 97	MODE: 60	STD. DEVIATION: 1432.20
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8. What would you be willing to pay to own 1 acre foot of water for agricultural purposes? \$ per acre foot :

MEAN: \$ 3708.93	MEDIAN: \$ 65.00	MODE: \$ 0	STD. DEVIATION: \$ 7818.58
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9. Do you see water ownership primarily as an investment? 33.0% Yes 56.6% No 10.4% Not Sure

10. Do you plan to eventually sell your water? 14.8% Yes 52.2% No 33.0% Not Sure

11. Do you think that water sharing options would give you cause to retain ownership of your water for a longer period of time?
 30.4% Yes 33.0% No 36.6%
 Not Sure

Operation Characteristics **Section B: Questions for water shareholders who are NOT active irrigators**

1. Are you a member of any of the following irrigation entities? (Please check all that apply.)

83.7% North Poudre Irrigation Company
 21.4% Water Supply & Storage Company

2.6% Larimer & Weld Irrigation Systems
 2.6% New Cache Irrigation Companies
 13% Other

2. Do you rent water to other operators who irrigate? 76% Yes, I rent out about _____ acre feet in a typical year:

MEAN: 53.09	MEDIAN: 7.00	MODE: 6	STD. DEVIATION: 105.94
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3. What would you be willing to pay to own 1 acre foot of water for agricultural purposes ? \$_____ per acre foot:

MEAN: \$ 6016.25	MEDIAN: \$ 3000.00	MODE: \$ 50	STD. DEVIATION: \$ 8489.02
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4. Do you see water ownership primarily as an investment? 69.0% Yes 28.6% No 2.4% Not Sure

5. Do you plan to eventually sell your water? 25.6% Yes 46.5% No 27.9% Not Sure

6. Do you think that water sharing options would give you cause to retain ownership of your water for a longer period of time?

31.8% Yes 29.5% No 38.6% Not Sure

Please use the remaining space below to provide any other comments you may have about agriculture/urban utility water sharing in Northern Colorado.

We would especially like to know if there are any major *barriers* you see to participating in water sharing agreements that were not expressed elsewhere on the survey.

GENERAL COMMENTS :

(GENERAL COMMENTS LISTED THROUGHOUT SURVEY): (Annual assessment/acre feet yield) = Annual cost out of pocket; Return on investment (Market value/acre ft yield per share); Rough example 2014 (\$130/5 acre ft \$26/acre foot) or (30000/5) 5%; 14000X.05=\$700/acre foot; Reuse municipal wastewater; small acreage will go; I don't have any hesitation about being associated with what I right (signed) George L. Reed)
A greater effort should be made for the development of (2) ??? Or reservoirs - In the past 2 years the new reservoirs would be full.
Feel free to call me if you wish at 970-482-1163. Here is what makes all these options (inside) unpalatable. There are no commitments by the city to reduce water usage. For example, why not require Xeriscaping on all front yards around city homes? Stop planting grass and provide a tax incentive for 5 years for a grass free yard. Will the city stop watering the parks- nothing is produced there but dog poop from dog walkers. Will the city reduce golf course watering? Will the city eliminate boulevard watering and/or planting? Will the city close the swimming pools? Golf courses, boulevards, and swimming pools or parks produce no food. Will the city suspend water park operation? Will the city reduce the number of new homes built during dry years? The key is to decide what the priority is- food, grass, entertainment, community, relations, a sustainable life style by farmers and city dwellers, or maybe just appearances. It seems reasonable that real basic question/goals/objectives be resolved. With the proposals stated herein, you're presenting unworkable solutions which are looking for a problem.
Going rate is needed for "Do you rent water to other operators who irrigate?" open answer.
I am concerned about the rapid growth in our county and the lack of support that the agriculture receives. We have had several issues that have impacted us over the last several years and most of them revolve around too much growth and the lack of resources or infrastructure to handle it. It seems to me that sustainable agriculture is not near as important to this community or City as urban development.
I am located in an area that has made it very physically difficult to get my water onto my ground. The cost to fix-create-maintain the necessary smaller ditches is not viable for me. I have considered selling a share of my water - for expenses & retaining the other share to allow me to rent the balance of water I would need. Over the past few years I have leased my water to allow hay production to be made elsewhere. thereby making sure the was put to use.
I own only 1/2 share of North Poudre water which came with this property. This property was part of a larger farm which was broken up into various sized pieces. I don't really know how to irrigate, but from the way the ditches run they are from the original farm and this property has not been irrigated. The neighbor tried to irrigate his property and ended up flooding the basements of the four homes the ditch runs behind. He has not tried since. To irrigate this property ditches would probably have to be rerouted, especially through the neighbors. These lands are and have been pasture. I turn the water back to N. Poudre to help pay for assessment fees. I will keep the 1/2 share as an investment for my children.
I understand that the municipalities need to be strong, but there needs to be debate of limiting population expansion to level reasonable for sustainability to be able to allow a productive irrigated agriculture in NE Colorado. Unlimited population growth puts strains on all natural resources to maintain sustainability!
It is hard for me to answer most of the survey questions based upon the wording of the questions. I want to respect your request for my thoughts and therefore have the following prefacing comments. The use of the word "appropriate" in some of the questions describes or implies "right or wrong". Today, all three of the different scenarios can be done according to Colorado law. If it is legal then society has deemed it to be appropriate and therefore these are rights that I have. "Considered" would have been a better measurement of my interest. As an irrigated farmer in the area, I see the asset components of my farm as: the raw land, the associated water right(s) and the minerals rights under it. Just like property owners in town, I want to see my assets appreciated. Most, if not all the options have the potential to interfere with free market price determination. These scenarios will lessen the demand for ownership of the right, thus impacting appreciation potential. Farmers spend a life time accumulating equity and at some point want to liquidate some or all of it to retire and/or pass on to their children. These options will impede full appreciation. Question 2 of the "bigger picture issues" is a very bias against buy and dry. The term "buy and dry" when used by many. infers that a city buying farms for the water rights is wrong. Wrong because the land will dry up and the economic impact to the area will be great. In this area that is not the case. The ownership of the irrigation companies in the Poudre Basin is moving toward municipal users. Most of the farms purchased are still being farmed as before. When the municipalities need water, the residents will consume it. When the water is not needed for domestic consumption it will again be applied to the farms. This is the same thing as the mentioned "buy and supply" option. The area is growing and prospering in spite of the ownership transition. Today the buy and dry practice is truly the same as the proposed lease options; the parties have just reversed their respective lessor/lessee positions. At some point the municipal owned rights will be used entirely for domestic consumption. When this happens some land may cease to be irrigated. Some of this non-irrigated land will find other uses or replacement water could be used to continue its historical use. This replacement water could come from the capture and storage of unappropriated water currently available. New water projects should be the highest priority to addressing future water needs. These water projects are the main component for long-term sustainability of agriculture int his area. Today more and more farmers engage in long term contracts to supply production to other end users such as the sugar beet industry and large-scale dairies. They may therefore be reluctant to commit water to other options that could affect their operation's long-term viability. Looking back at the 2002-2003-lease program, the compensation received was less than adequate and future leases will need to reflect a higher capitalization rate based upon the water right fair market value. It is my understanding that today municipalities generally own about twice their needs for a normal year. I believe that municipalities should own the water rights it needs to serve its residents, not lease them. If municipalities want more certainty then they should secure it through ownership with lease back provisions to agricultural users. The question about benefiting the community hits a nerve with me. It seems that the WSSC stockholders expend a lot of money to protect themselves from such things as the endangered species act, the clean water act, the national park and forest service administrators, and public trust doctrine legislation. These impacts are the result of the community desires and have very little, if any, benefit to me. It seems that water rights are being attacked all the time. How do these impacts motivate water users to work the community? How do they improve urban-rural relationships? In conclusion if a major event happens, such as 2002-2003 drought (300 year event), I am willing to help my city neighbor. I will however be reluctant to sign longer-

term lease agreements based upon the above comments and because doing so will encumber my water right during the term of the agreement.
My shares are used by my renter. My few shares of North Poudre Water are used by my renter each year. They are designated in my will to be divided as part of my estate.
No L.A. Calif (no more houses); stop building houses; Not Interested M.H. & D.H.
Only have one share of water and have to purchase additional water when the allotment is small.
Ranking of different water sharing mechanisms depend on particular circumstances.
Sec. A Q8: I'm not sure what is meant by "own" an AF, since most ownership is as a share and the AF vary from year to year. The cost of purchasing a share of NP is pretty much beyond the capability of a small acreage property owner, at this point; even making the cost of an AF prohibitive
Sharing agreements would need to offer a return comparable to other non-ag investments; otherwise, what is use of choosing a sharing agreement over outright sale.
Sharing water is like sharing your wife. Water is a personal property.
Survey too long
Swapping cleaner water for dirty water is a good alternative for me. When the fire came through, our irrigation water was BLACK with ash the following year and that was actually great for us. The ash in the water provided additional fertilizer for the fields. There is no reason I can think of why I wouldn't swap dirty water for cleaner water. The biggest worry I have is that large consumers (cities) will eventually buy all of the water available and control the water boards for their purposes. This will be the end of agriculture along the front range.
The real and only answer is to get glade - Seamon - and Halligan on line and quit listening to the save the poudre people, let's get real positive thoughts, because we have to use what we have and we're running out of options, and need to use some common sense in our decisions.
These are the only questions I feel comfortable answering. I am a shareholder that rents my water annually to farmers.
This survey 711 is also valid for 712. (same ownership)
Unless one is a multi millionaire, purchasing water for agricultural use is unaffordable!
Water in N. Colorado needs to be considered for preservation of wildlife habitat, rather than only urban/ag. uses. Fishing, hunting, recreation are big reasons people come to Colorado. We would like to see a way we could share our water shares to keep the North Poudre a healthy river.
water sharing is a JOKE for 2 years, municipalities have DENIED to rent ag water going against agreements
Water Swap (Banking): Sounds like if you don't do this option "B" Ag will not be allowed to rent water or put on the bottom of the rental list below those that sign up for the Banking. Fort Collins has been stuck holding water in past years A. They do not understand how farmers use water. (They offer their excess after Irrigation season is over) B. They are greedy and want to much compared to other utilities. I feel keep it simple. Banking system is such that you put your water share in and you can draw out equal amounts. So if you have municipal it could be traded for Ag and visa-versa. If you wanted to rent extra water there is a fee based on the annual average assessment of all water companies.
Water sharing appears to be a meddlesome process. We are almost to the point where the water has become too expensive to irrigate with. Differentiate between real farmers and the hobby, college, weekend ones. Do not like throwing everyone in the mix, too many chefs spoil the stew. Consider addressing people that own water stock as tock holders not sharing holders. Share holder is a term that has popped up in the last 10-15 years.
We also received survey code 698. The answers to that survey would be the same as this one.
We believe that water sharing would work as long as its fair. Our fear would be that it would always be to the side of municipalities as WSSC is now. The bond is heavily loaded to the municipalities. In years of drought all should conserve not just Ag. Someone outside the irrigation companies should determine the split.
We could all benefit from increased storage capacity. The amount of water (and damage) caused by the 2013 fall floods could have been captured and damage down stream reduced. Who knows how many years worth of water could have been stockpiled.
We primarily use our water to irrigate pasture for our horses. In years we have rented out our shares it was to help farmers during drought years. This is a priority, not urban use, to us.
While the survey asked for some demographic information at the end, I had the distinct impression the survey was targeting large scale agriculture. My 1 share of owned water does not sufficiently cover my pasture during the growing season based on the unpredictable annual allocation we receive. Hence, I need to rent the majority of water in addition to that I own. The reason I have retained ownership of my 1 share over the years is so I can rent additional water (a requirement of NPIC) and, of course, keep my pasture in a thriving condition. If I cannot supplement normal precipitation with irrigation water on an annual basis, will my pasture go dormant or die off? Getting compensated for sharing may not offset the loss of a well-established forage. I'm sure the aggregated survey results will be shared wide and far. However, who will propose and initiate any future actions? It is reasonable to assume someone like me with 1 share will not have the same level of input (standing?) as a farmer who may own 100 shares, or a municipality with thousands of shares. If this is true, then I question whether our input "is very important" compared to others with more clout. It appears to me everyone completing the current survey has equal input value but when the decision making may actually begin sometime down the road, it is hard to believe we will all be equals. Hopefully, I am wrong but time will tell. Regardless, I appreciate the opportunity to share my thoughts!

APPENDIX E: PROTOTYPE AGREEMENTS

INTERRUPTIBLE WATER SUPPLY AGREEMENT

THIS INTERRUPTIBLE WATER SUPPLY AGREEMENT (“IWSA”) is made and entered into by and between ----- (“AG USER”) and ----- (“M&I USER”).

RECITALS

WHEREAS Ag User and M&I User desire to enter into this IWSA under which Ag User will temporarily supply the historical consumptive use credit associated with --- shares of capital stock in the ----- (“Ditch Company”) to M&I User; and

WHEREAS Ag User, an (ENTITY TYPE), is the loaning water right owner; and

WHEREAS M&I User, a quasi-municipal corporation and political subdivision of the State of Colorado, is the borrowing water right owner; and

WHEREAS Ag User, the loaning water right owner, owns --- shares represented by Share Certificate No. --- of capital stock in Ditch Company (“Shares”); and

WHEREAS the ---- shares owned by Ag User were historically used to irrigate approximately --- acres on the ----- Farm, in a portion of the --- ¼ of the ---- ¼ of Section ----, Township --- North, Range --- West of the 6th P.M. in ----- County, Colorado. The historical use of the shares on the ----- Farm is described in more detail in section ---- of the engineering report prepared by -----, which is attached as Exhibit A; and

WHEREAS the historical consumptive use associated with the shares is estimated to be ---- acre feet per share, and

WHEREAS the purpose of this IWSA is to allow M&I User to temporarily change the type of use of the shares from irrigation to (DESCRIBE USES) for delivery at (DESCRIBE LOCATIONS); and

WHEREAS, A description of the historical consumptive use, return flow, and terms and conditions to prevent injury to other water rights is described in the engineering report prepared by -----, attached as Exhibit “---”.

AGREEMENT

NOW, THEREFORE for and in consideration of the mutual promises and other valuable consideration set forth in this Agreement, the sufficiency of which is hereby acknowledged, Ag User and M&I User agree as follows:

1. Term. The IWSA shall be effective on ----- and expire on ----- (“Term”).
2. Request for Water. M&I User may call for the use of the Shares in not more than three years during the Term, at its discretion. M&I User shall notify Ag User not later than (DATE) that the Shares will be used by M&I User in the ensuing irrigation season.

3. State Engineer Approval. The IWSA shall be subject to the State Engineer's approval pursuant to C.R.S. 37-92-309 and 2 C.C.R. 402-15. M&I User shall prepare and submit the appropriate IWSA application to the Office of the State Engineer, at its own cost.
4. Operation of the IWSA. Upon receipt of the State Engineer's approval, M&I User will take delivery of Ag User's --- shares at (DESCRIBE LOCATION). M&I User shall meet all return flow obligations associated with the temporary change in use.
5. Delivery and Use. The water will be delivered (DESCRIBE LOCATION). Once in the River, it will be re-diverted at (DESCRIBE LOCATIONS)) and delivered via the M&I User to the following locations for the following uses: (DESCRIBE USES AND LOCATION). The IWSA will be operated in accordance with any and all terms and conditions contained in the State's approval of the IWSA request.
6. Accounting. The use of the shares will be accounted for in the forms approved by the State Engineer's Office.
7. Compensation. M&I User shall pay Ag User (AMOUNT) per year in each year of the Term as consideration for this Agreement, payable not later than January 1. In addition, M&I User shall pay Ag User (AMOUNT) per acre foot of fully consumable water delivered at (DESCRIBE LOCATION), payable not later than the 15th day of the month following the delivery. Compensation under this Agreement shall be increased by (ESCALATOR OR INDEX) each year.
8. Option for Renewal. Nothing in this IWSA shall limit M&I User's option to lease Ag User's shares for temporary use in accordance with requirements contained in C.R.S. 37- 92-309(3)(c)-(d).

Ag User

By: _____

M&I User

By: _____

WATER LEASE AGREEMENT

THIS **WATER LEASE AGREEMENT** (“Agreement”) is entered into on this ____ day of ---- (“Effective Date”) by and between ----- (“Lessor”) and ----- (“Lessee”). Lessor and Lessee may individually be referred to as a “Party” or collectively as “Parties.”

RECITALS

WHEREAS, Lessor owns ----- shares of the Ditch Company (“Shares”); and

WHEREAS, Lessor has fallowed historically irrigated acreage AND/OR agreed to plant lower consumptive use crops AND/OR committed to program of intentional deficit irrigation to produce fully consumable water for the benefit of Lessee (the “CU”); and

WHEREAS, Lessee has the need for fully consumable water supplies (DESCRIBE LOCATIONS AND USES); and

WHEREAS, Lessor desires to lease the CU to Lessee under the terms and conditions defined herein; and

WHEREAS, A description of the historical consumptive use, return flow, and terms and conditions to prevent injury to other water rights is described in the engineering report prepared by ----, attached as Exhibit “---“.

NOW, THEREFORE, in consideration of the mutual promises and covenants contained herein, the Parties hereby agree as follows:

1. STATE ENGINEER AND DITCH COMPANY APPROVAL. This temporary change of water rights shall operate pursuant to substitute water supply plan approved by the State Engineer pursuant to 37-92-308(5), C.R.S. (the “SWSP”). Lessee shall apply for the SWSP at its sole cost. Lessor shall cooperate in seeking SWSP approval.
2. TERM OF LEASE. The term of this Agreement is one year from the effective date of this agreement. The Parties may agree to extend the terms and conditions of this Agreement for additional terms by an agreement in writing duly authorized and executed by both Parties.
3. DELIVERY AND USE. The water will be delivered by Ag User to M&I User at (DESCRIBE LOCATION). Once in the River, it will be re-diverted at (DESCRIBE LOCATIONS)) and delivered via the M&I User’s system to the following locations for the following uses: (DESCRIBE USES AND LOCATION). (M&I User) or (Ag User) will be responsible for replacing all return flows required by the SWSP approval. The SWSP will be operated in accordance with any and all terms and conditions contained in the State’s approval of the SWSP request.
4. ACCOUNTING. The use of the shares will be accounted for using forms approved by the State Engineer’s Office.
5. COMPENSATION. M&I User shall pay Ag User (AMOUNT) per acre foot of fully consumable water delivered at (DESCRIBE LOCATION), payable not later than the 15th day of the month following the delivery.

6. OPTION FOR RENEWAL. Nothing in this IWSA shall limit M&I User's option to lease Ag User's shares for temporary use in accordance with requirements contained in §37-92-308(5), C.R.S.

Lessor:

By _____
_____ (title)

Lessee:

By _____
_____ (title)

INTERRUPTIBLE WATER LEASE AGREEMENT

THIS INTERRUPTIBLE WATER LEASE AGREEMENT (“IWLA”) is made and entered into by and between ----- (“AG USER”) and ----- (“M&I USER”).

RECITALS

WHEREAS Ag User and M&I User both own shares in the North Poudre Irrigation Company (“NPIC”), which include native component (“Ag Water”) and a Colorado-Big Thompson component (“CBT Water”); and

WHEREAS Ag User owns --- NPIC shares, evidenced by certificate no. -----; and

WHEREAS M&I User owns ---- NPIC shares, evidenced by certificate no. -----; and

WHEREAS Ag User and M&I User desire to enter into this IWLA under which M&I User agrees to lease Ag User Ag Water in 7 of every 10 years, in exchange for the right to obtain the use of Ag User’s CBT Water in 3 out of every 10 years; and

AGREEMENT

NOW, THEREFORE for and in consideration of the mutual promises and other valuable consideration set forth in this Agreement, the sufficiency of which is hereby acknowledged, Ag User and M&I User agree as follows:

9. Term. The term of this Agreement is 10 years (“Term”).
10. Lease to Ag User. M&I User agrees to lease Ag User Ag Water in the amount of (AMOUNT) per year in no less than 7 out of the 10 years of the Term. Ag User shall pay M&I User (AMOUNT) per acre foot for the use of Ag Water, payable not later than January 1 of each year. This compensation shall be increased by (ESCALATOR or INDEX) in each year of the contract.
11. Request for CBT Water. M&I User may call for the use Ag User’s CBT Water in not more than three years during the Term, at its discretion. M&I User shall notify Ag User not later than (DATE) that the CBT Water will be used by M&I User in the ensuing irrigation season. In exchange for the use of Ag User’s CBT Water, M&I User shall assign additional M&I User Ag Water at the rate of ---- per acre foot of Ag User CBT Water. Ag User shall not pay any monetary compensation for the additional M&I Ag Water assigned pursuant to this provision.
12. Delivery and Use. All deliveries and use shall by Ag User and M&I User shall be consistent with the policies, rules and regulations of the North Poudre Irrigation Company and the Northern Colorado Water Conservancy District. M&I User Ag Water shall be delivered to Ag User at (DESCRIBE LOCATION). Ag User CBT Water delivered to M&I User shall be delivered at (DESCRIBE LOCATIONS).
13. Accounting. Deliveries of water under this Agreement will be accounted for pursuant to the accounting systems and protocols of North Poudre Irrigation Company and Northern Colorado Water Conservancy District, and M&I User.

Ag User

By: _____

M&I User

By: _____