Prepared for the Colorado Water Conservation Board

FLEX Market Model Project Completion Report

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Project Sponsors

- Colorado Water Conservation Board
- Colorado Corn Growers Association
- City of Aurora
- Ducks Unlimited
- Regenesis Management Group

Project Contractors

- Lawrence Jones Custer Grasmick LLP
- Brown and Caldwell

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List of Abbreviations

ACWWA	Arapahoe County Water and Wastewater Authority
AF	acre-feet
Ag	agricultural
ATM	alternative transfer method
AWAS	Alluvial Water Accounting System
CCGA	Colorado Corn Growers Association
cfs	cubic feet per second
CSU	Colorado State University
CU	Consumptive Use
CWCB	Colorado Water Conservation Board
DU	Ducks Unlimited
EC	environmental/conservation
ECCV	East Cherry Creek Valley
FRICO	Farmers Reservoir and Irrigation Company
HCU	historical consumptive use
IDS	Integrated Decision Support
IDSCU	Integrated Decision Support Consumptive Use
M&I	municipal and industrial
PAG	PVIC Augmentation Group
PVIC	Platte Valley Irrigation Company
LLDC	Lower Latham Ditch Company
LLRC	Lower Latham Reservoir Company
OTC	“Over the Counter”
SACWSD	South Adams County Water and Sanitation District
SWSP	Substitute Water Supply Plan
WCR	Weld County Road

Executive Summary

The purpose of this study was to explore an alternative transfer method (ATM) market mechanism labeled by the study sponsors as the "FLEX Market." For the purposes of the study, a FLEX Market is simply defined as a voluntary agreement between one or more municipal and industrial water users (M&I), one or more agricultural (Ag) water users, and one or more environmental/conservation (EC) water users to change the use of a senior irrigation right to include multiple end uses in addition to irrigation, and to establish a trading platform facilitating uses by all participants. The goal of the FLEX Market approach is to permit a portion of the senior right to be used for M&I and EC uses pursuant to voluntary contractual arrangements, to maintain the economic benefit of the senior water right in its region of origin, and to retain sufficient agricultural water supply to sustain commercially viable farming activities.

The study team explored the FLEX Market using both collaborative and research based approaches. Groups of M&I Users, Ag Users, EC Users and attorneys/engineers were convened to discuss the FLEX concept in general, to identify the key contractual elements of potential FLEX Market agreements, and to identify critical issues that must be addressed from a water rights administration standpoint to prevent injury to other water users. These group discussions led to the development of a Model FLEX Agreement and Model Water Court Terms and Conditions, as set forth in Appendices C, D and E.

Simultaneously, the study team explored the technical and practical aspects of potential FLEX Market implementation on two major ditch systems on the South Platte River, the Lower Latham Ditch Company and the Platte Valley Irrigation Company. Drawing together existing data, and supplementing with original research and analysis, the study team examined overall diversions, estimated consumptive use and return flows, infrastructure, potential end users for consumptive uses, and delivery mechanisms. In both cases, the study team concluded that substantial amounts of transferrable consumptive use was potentially available under the systems using a FLEX approach and that delivery to likely end users was feasible.

Section 1

Introduction

The study summarized in this report is a continuation of the previously funded study performed by the same project team in which the team explored alternative transfer mechanisms, barriers to wide-scale implementation of ATM projects, and potential strategies to overcome existing barriers. In its May, 2011 report entitled "Completion Report: Development of Practical Alternative Agricultural Water Transfer Measures for Preservation of Colorado Irrigated Agriculture," the project team described a concept labeled the "FLEX Market" – a voluntary, market-based water sharing approach in which existing senior irrigation rights are used for M&I and EC uses in addition to the existing irrigation (Ag) use.

As set forth in the 2011 report, the project team envisioned that an M&I User and EC User would partner to change the use of senior irrigation rights to include M&I and EC uses in addition to the existing irrigation rights. Once this change in use had been approved, either administratively or via the water court process, the participants would be free to enter into agreements regarding the deliver y of the consumptive use (CU) attributable to the senior right on a periodic basis, in accordance with market conditions. Ownership of the right would stay largely with the Ag user, with the possibility that an M&I or EC user might purchase a small percentage of the right outright as a means of funding the change in use case and giving those users an identifiable "stake" in the water right.

The project team submitted a proposal for a second grant, with a plan to convene groups of M&I Users, EC Users, Ag Users, and water professionals to discuss the FLEX Market concept. Specifically, the team's goal was to develop, using a consensus model, a Model FLEX Agreement to serve as a guide to parties seeking to implement the FLEX Market concept. In addition, in response to questions about whether the FLEX Market concept could survive water court scrutiny, the team wanted to work with experienced water attorneys and engineers to develop model water right decree terms and conditions necessary to implement a FLEX Market. Finally, in a continued effort to drive towards practical implementation, the team proposed to perform a survey level analysis of three major South Platte Ditch companies, including an assessment of consumptive use potentially available for FLEX Market implementation, existing and needed infrastructure, and delivery mechanisms to likely M&I and EC. This report summarizes the results of the team's investigation on these three issues.

1.1 Project Objectives

- Create model water court terms and conditions for ATM Transfers
- Provide a survey level summary of three major water rights on the South Platte River, including total CU available and potential for delivery to M&I and EC partners
- Create a FLEX Market contract template, applicable to a wide variety of ATM conditions

1.2 The Study Team

The Colorado Corn Growers Association (CCGA), Ducks Unlimited (DU), and the City of Aurora (Aurora) were the applicants for the ATM grant that funded this project. The ATM grant program is administered and funded by the Colorado Water Conservation Board (CWCB). CCGA, Aurora, DU and Regenesis Management Group, LLC provided matching funds and in kind services in support of the project. The applicants contracted with Brown and Caldwell (engineering), Lawrence Jones Custer Grasmick LLP (legal, project

administration), and Regenesis Management Group, LLC (engineering and technical support) in furtherance of the project. Individuals from the sponsor and contractor organizations made up the study team.

Section 2

Questions Presented

The study team identified four key questions that needed to be answered during the course of the project. This section describes these questions.

2.1 Can the FLEX model help overcome identified barriers to ATM implementation?

Alternative transfer method concepts are not new to Colorado's water policy discussion. Section 3 of the 2007 Statewide Water Supply Initiative Study outlined five concepts meriting further investigation:

- Interruptible Supply Agreements
- Long-Term Rotational Fallowing
- Water Banks
- Reduced agricultural consumptive use through efficiency or cropping while maintaining historic return flows.
- Purchase by an end user with leaseback under defined conditions.

"Colorado's Water Supply Future, Statewide Water Supply Initiative" – Phase 2, November 2007, §3, Alternative Agricultural Water Transfer Methods to Traditional Purchase and Transfer. Fifteen projects funded by the CWCB Alternative Agricultural Water Transfer Methods Grant Program have explored these concepts since 2007, significantly advancing the State's knowledge regarding the legal, institutional, social, economic and technical components of alternative transfer methods. Despite this progress, relatively few alternative transfer projects are in operation. Various reasons have been posited for the discrepancy between the high level of interest and approval at the policy level and the low level of on-the-ground implementation. Barriers identified in the project team's 2011 report titled "Development of Practical Alternative Agricultural Water Transfer Measures for Preservation of Colorado Irrigated Agriculture" (CCGA, et al., 2011) include:

- High transaction cost
- Risk, uncertainty, and excessive complexity
- Lack of delivery capability
- Need for permanent supply/reluctance to commit
- Power imbalances, mistrust, and poor communication

CDM's 2011 "Alternative Agricultural Water Transfer Grant Program Summary" summarizes the obstacles similarly:

- Potential high transaction costs associated with water rights transfers
- Water rights administration uncertainties and water rights accounting questions
- Certainty of long-term supply and desire for water providers to have permanence of long term supply
- Infrastructure needs and water quality issues

Id. at Section 4.

The FLEX approach is designed to overcome these obstacles. The study team wanted to further develop and test FLEX Market concepts in the context of a collaborative process to determine if they effectively mitigate critical concerns, making implementation more likely. In the process, the study team hoped to refine the concepts based on water user input, molding the FLEX Market concept into a realistic avenue for implementation.

2.2 What are the principal elements of an agreement for multiple end uses of a senior water right?

The contractual arrangement among participating parties is critical to the implementation of an ATM project. After working with a number of Ag, M&I and EC water users in phase one of the study, the study team began to recognize common themes in the discussions. The team wanted to work with Ag, M&I and EC users in a collaborative setting to identify key contractual elements and to develop a contract template that would give parties seeking to implement a FLEX Market or other ATM project a "head-start" on the negotiation process.

2.3 What are the key issues that must be resolved to prevent injury to other water users?

Nearly all of the ATMs identified for study involve a change in use of senior agricultural water rights, either in a water court or administrative setting. Participants in ATM discussions have frequently identified concerns over whether an ATM project could survive water court scrutiny, and reported uncertainty and a lack of precedent regarding decree terms and conditions necessary to administer fallowing, reduced consumptive use, and regulated deficit irrigation strategies in a manner that maintains historical return flows and protects existing water rights from injury. The study team wanted to assemble a group of experienced engineers and attorneys and to develop model decree terms and conditions to serve as a guide for future change in use cases, whether at the water court or administrative level.

2.4 How would the FLEX Market operate?

As described in Section 2.1, alternative water transfers have not yet become commonplace in Colorado despite recent interest and research. The study team proposed that three "demonstration projects" be conducted as a part of the overall FLEX Market study to help water right owners and potential end users understand how alternative water transfers could be conducted within the market. The overall objective of the demonstration projects is to answer some basic and specific questions related to the operation of the FLEX Market using outside funding as a means to better position the participants to implement the market.

Three ditch companies expressed interest in exploring the FLEX Market and participating in the demonstration projects: the Platte Valley Irrigation Company (PVIC), the Lower Latham Ditch Company (LLDC) and Lower Latham Reservoir Company (LLRC), and the Lupton Bottoms Ditch Company. The Lupton Bottoms Ditch Company, after much consideration, determined that the timing for participation in the demonstration project was not right, and they decided to withdraw from the project. As a result, two demonstration projects were completed as a part of the FLEX Market study.

The basic questions that the study team sought to answer on behalf of the potential FLEX Market participants included the following:

- Who are the potential users of FLEX water under the Platte Valley Irrigation Company, Lower Latham Ditch Company and Lower Latham Reservoir Company?
- When do the end users need water and how does that compare to the availability of the agricultural water right?
- How much water would be available through the FLEX Market?

- How would historical return flows associated with the agricultural water right be maintained?
- What infrastructure is currently in place and available to make deliveries?
- What additional infrastructure is necessary or desirable?
- What are the costs for participating in the FLEX Market?
- How can environmental or conservation interests participate in the FLEX Market?

Many of the above questions were anticipated at the beginning of the study. However, through the collaboration process with Ag owners, M&I water providers, EC interests, and water engineers/attorneys, additional questions were identified, and the importance of certain questions was highlighted. For example, the cost of new infrastructure necessary for participating in the FLEX Market was an important consideration for agricultural water owners. Municipal water providers described interesting perspectives on the uses to which FLEX water might be put. These discussions will be described in subsequent sections of the report.

Section 3

Process

The Model FLEX Agreement and Model Terms and Conditions drafts were developed using a collaborative process. Initially, the study team had two meetings with the Division One Engineer and his staff. Four water user groups were then recruited- an M&I Users group, an Ag Users group, an EC Users group, and a "Water Users" group, consisting of engineers and attorneys. Each group met three times to discuss iterative drafts of the Model FLEX Agreement and Model Terms and Conditions. Finally, all of the user groups and approximately 80 additional invitees from the water community attended the FLEX Summit, a gathering organized by the study team to present preliminary results of the study and provide a forum for discussion of ATM concepts.

The study team's intent was to explore principles that are applicable on a state-wide basis. However, because of the collaborative approach and necessity to organize multiple meetings, the Team decided to focus on District 2 in the South Platte River Basin. This reach of the South Plate River (from Denver to Greeley) has a very high concentration of municipal demand, large scale agricultural use, and high potential for buy-and-dry transfers, making it the most probable location for implementation. In addition, it is one of the most heavily litigated reaches of river in the State, presenting an ideal context for substantive review. The Denver Metro area is home to a large number of experts needed to populate the Water User discussion group. Demonstration projects, discussed below, were also selected from this region.

3.1 Group Selection

The study team populated the user groups by invitation. Based on personal experience and supplemental research, the team developed lists of water users from each category located in South Platte Basin from the Denver metro area to Greeley and prioritized invitations to ensure good distribution regarding geographical location and water demand. The Water User group was filled by invitation with attorneys and engineers who have significant water court experience. An effort was made to keep the groups small (less than 15 members) to provide the opportunity for active participation by all parties. The size of the groups proved effective for discussion but had the limitation of a relatively small sample size that may not be reflective of the user category as a whole. With the exception of the Water User group, participants were volunteers and were not paid for attendance. Attorneys and engineers in the Water User group were offered a stipend for attendance and participation, which some accepted, while others attended on a pro-bono basis. Membership lists for each of the four groups are attached hereto as Appendix A.

3.2 Meetings

Each group met three times. The meetings were attended by the group members, contractors for the study, and one or more Applicants. Each study applicant hosted the meetings for its water user type—the CCGA hosted the Ag user meetings in Greeley, Aurora hosted the M&I user meetings in Aurora, and DU hosted the EC meetings in Fort Collins. Study counsel hosted the Water User meetings in Johnstown. Each meeting lasted two hours. Notes of discussion were recorded by the study team.

In each meeting, study counsel reported on meetings by other water user groups and facilitated discussion on FLEX Market concepts using progressive drafts of the Model Agreement and Terms and Conditions.

3.3 Agreement Terms and Conditions Drafts

Study counsel was primarily responsible for generating and revising progressive drafts of the Model Agreement and Terms and Conditions. Initial drafts were created in consultation with the study team, refined in the initial meetings with the Division One Engineer and his staff, and then presented to the user groups. After each round of user group meetings, counsel assimilated the comments and made changes to the Agreement and Terms and Conditions, which were then circulated to the groups in anticipation of the next meeting.

3.4 Summit

Originally, the study team had intended to host a larger meeting of all the user groups at the conclusion of the study to receive comments on the final Agreement and Terms and Conditions Drafts and to provide an opportunity for the user groups to interact. As the study progressed, the team decided that it would be useful to circulate the study results to a wider audience and to seek additional input from water users that had not been a part of the user groups. To implement this vision, the study team hosted a FLEX Market Summit in February 2013 at The Ranch, Larimer County's Fairgrounds. The Summit was attended by members of the user groups and by invitation by a wider audience of water users, water professionals and policy makers. At the Summit, the study team presented the Model Agreement and Terms and Conditions and other study results, provided an opportunity to explore the FLEX Market concepts with an interactive negotiation exercise, polled attendees on FLEX Market concepts using immediate feedback technology, and generally provided a forum for promoting ATMs and an environment for networking and interaction between M&I, Ag and EC water users.

An interactive negotiation exercise was created by the study group to engage attendees and simulate how a FLEX Market negotiation might occur in a real-life scenario. Eight groups of individuals representing Ag, M&I, EC and water professionals were randomly grouped together and given a scenario including negotiation parameters. The task given was to negotiate a FLEX Market Agreement based upon six key elements: Participants, Ownership, Water Court Application, Infrastructure, Administration and Term of the agreement. Each group's responses were recorded using immediate feedback technology.

In cooperation with Martin Carcasson with Colorado State University's Center for Public Deliberation, the study group developed questions and used immediate feedback technology ("clickers") to record the results of the negotiation exercise and to gather information about the audience, their respective backgrounds, and interest in entering into a FLEX Market Agreement. Each audience member was given a small keypad which allowed them to vote for one of the multiple-choice responses to a specific question projected on a screen at the front of the room. Audience keypad votes were wirelessly transmitted and recorded by computer software. Because the software was integrated with the Summit's PowerPoint presentation, the audience was able to instantaneously see feedback by attendee demographic (Ag, M&I, EC or attorney/engineer) or by response popularity. The immediate feedback technology was a useful tool as it effectively engaged the audience and allowed representatives of diverse backgrounds to instantaneously see how their peers responded on a particular issue. Eighty four percent of Summit attendees responding found the immediate feedback clickers to be helpful.

3.5 Demonstration Projects

The process for studying and developing the demonstration projects included listening to the perspectives of Ag water owners, M&I water users, and EC water users, review of existing studies and information on participating ditch companies, technical analyses, discussions with participants, and reporting. The specific steps are described below.

3.5.1 Collaboration

During the collaborative meetings with Ag water owners, M&I water users, EC users, and water engineers/attorneys, a number of questions were asked regarding the operation of the FLEX Market, opinions and preferences were expressed regarding the importance of various terms in the FLEX Market contract and terms and conditions, etc. All of these discussions were valuable in verifying or adding to the questions to answer and scope of study for the demonstration projects.

3.5.2 Research

Existing information on PVIC, LLDC, and LLRC was assembled and reviewed for this project. Some sources of information were developed during prior studies of alternative water transfers conducted by the study team. These are described below:

- Exchange capacity analysis tool: A spreadsheet-based tool for analyzing exchange capacity was developed as a part of the study entitled "Development of Practical Alternative Agricultural Water Transfers Measures for Preservation of Colorado Irrigated Agriculture" that was conducted by the study team. The tool is described in detail in the report associated with the prior project. In general, the tool uses a daily point flow analysis and daily call records over the October 1, 1999 to September 30, 2010 time period to assess the exchange capacity between surface water diversion points on the South Platte River from the Burlington Ditch headgate to the Colorado-Nebraska state line. The tool allows for the assessment of exchange capacity between any two diversion points along the river. The tool was used in this project to evaluate the potential to exchange water from locations on the South Platte River where agricultural water owners could provide supply to locations where potential end users could take delivery of water.
- Mapping of aquifer lagging characteristics: During the study team's prior research into alternative water transfers, a mapping coverage showing alluvial aquifer lagging characteristics was developed. The mapping coverage provided an efficient means to quickly evaluate the approximate lagging time that historical return flows or recharge would take to return to the South Platte River. The mapping coverage was used in this study to quickly provide general information and help strategize on the location of recharge facilities that could be used to attenuate the timing of FLEX water, provide historical return flows, etc.
- Historical use analysis for Platte Valley Irrigation Company shares: As a part of prior study team research on alternative water transfers, the study team conducted a FLEX Market demonstration project examining alternative water transfers between a group of Platte Valley Irrigation Company shareholders (the PVIC Augmentation Group, or PAG) and Aurora (the demonstration project involving PVIC described in this report will take a broader look at implementing the FLEX Market than had been researched previously). The PAG changed the use of their PVIC shares and developed an augmentation plan in Water Court Case No. 08CW071. The Engineering Report for Case No. 08CW071 provided information on historical consumptive use, return flow obligations, etc. The information from the Engineering Report was used for the purposes of this project.

To supplement information developed during previous alternative water transfer research conducted by the study team, additional data and information were obtained and reviewed for this study including the following:

- Historical use analysis for LLDC shares: The LLRC recently completed an augmentation plan and change of water rights case in Water Court Case No. 03CW047/06CW291. In Case No. 03CW047/06CW291, LLRC sought to augment depletions from their irrigation wells using LLDC shares as an augmentation supply. The Engineering Report for this case, written by Clearwater Solutions (September 2011), described the historical consumptive use associated with the LLDC shares, return

flow obligations associated with the use of the shares, locations where water could be returned to the South Platte River from the Lower Latham service area, etc.

- Available information describing potential end users for water from the Lower Latham and PVIC systems. This information was derived from a variety of sources including the internet and interviews with people knowledgeable of various water providers and water needs in the South Platte River.

3.5.3 Analysis

The analyses conducted for this study included:

- Mapping of specific locations where water could be returned to the South Platte River by the participating ditch companies.
- Statistical analyses of historical diversions by participating ditch companies.
- Quantification of historical use and return flows associated with ditch company shares.
  - Existing data and information was used for this task.
  - No new analysis of historical consumptive use or return flow obligations was conducted.
- Identification of water supply reliability requirements from end users of FLEX water.
  - Some specific end users for FLEX water were identified for the demonstration projects. However, the demonstration projects also considered a broader range of potential end users and reliability requirements.
- Analysis of exchange potential between agricultural water owner and end users.
  - Because a broad range of potential end users was considered under the demonstration projects, the exchange analysis did not focus on one specific point of delivery. Rather, some specific points, but also some more generalized locations of upstream delivery were considered using the exchange analysis tool. In addition, downstream and local delivery locations were also considered.
- Identification of potential locations where recharge wetlands could be constructed to help provide historical return flows and to retime deliveries of transferable consumptive use.

3.5.4 Discussion with Participants and Revision of Analyses

Once the analysis was conducted and preliminary thoughts on operation of the FLEX Market were developed, members of the study team met with representatives of participating ditch companies to discuss the analysis and FLEX Market operations. Feedback from the participating ditch companies was incorporated into the analysis and into this report.

Section 4

The FLEX Scale

As the discussions in the Ag, M&I and EC groups regarding the FLEX Agreement issues progressed, the study team observed six specific themes or elements emerging in every group, independently of the other groups. These elements were clearly critical to the development of any successful alternative transfer arrangement, whether it is configured as FLEX Agreement or another variation. Further, the study team observed that these elements did not exist in a static or binary mode in the discussion, but that each element was capable of resolution at multiple points along a scale. All six identified elements were capable of flexibility of expression, creating a high degree of variability in potential FLEX Agreements, which could be tailored to the specific needs of the parties. The diagram below identifies the six key elements. A description of each element follows.

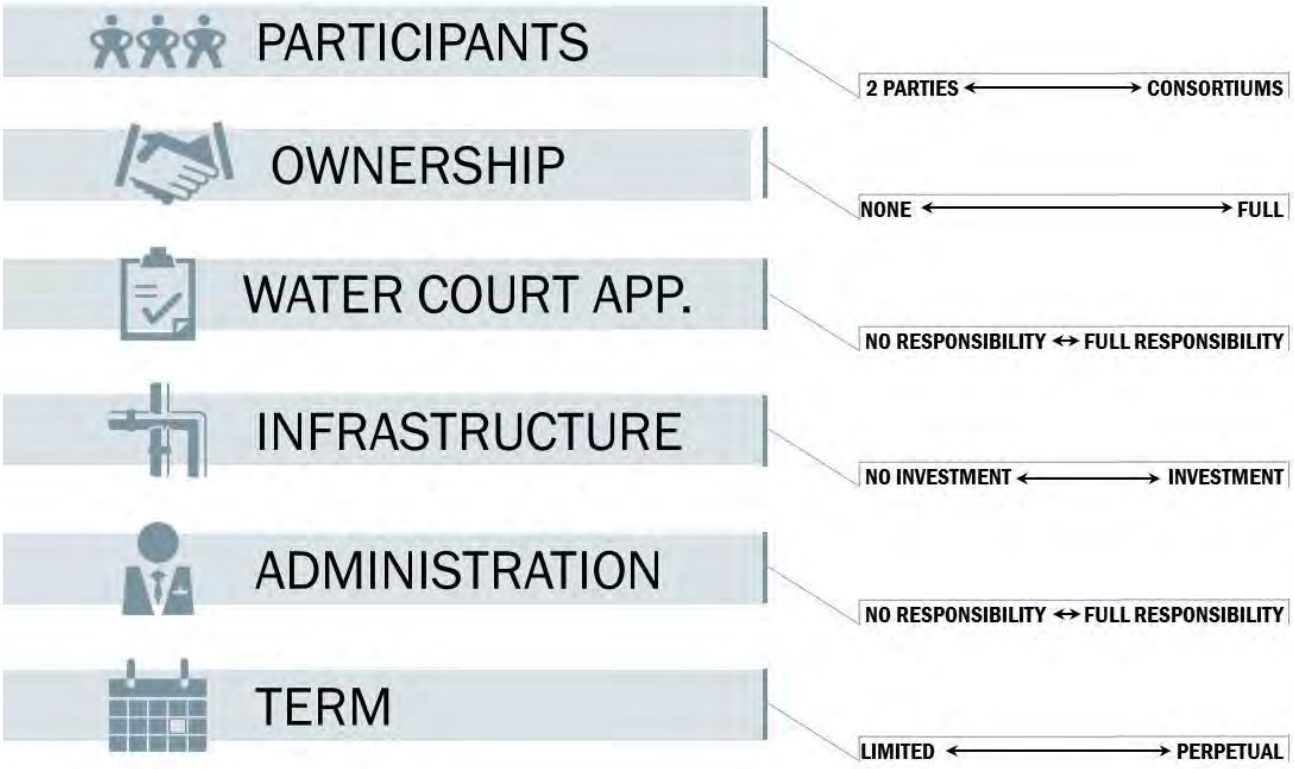

Figure 4-1. FLEX Scale Diagram

4.1 Participants: Who are the participants in the FLEX Market?

Since the FLEX Market forms by consent and contract between the parties, it is scalable. On one end of the spectrum (fewer participants), it is possible to have a FLEX Market with one Ag user and one M&I user. On

the other end, the user groups envisioned a FLEX Market consisting of multiple ditch companies, multiple M&I users, and multiple EC users who come together to seek approval of additional end uses of the senior irrigation right. It is possible that participants could be added and removed using a process set forth in the initial agreement. By way of comparison, an opt-in/opt-out contractual strategy was utilized in the formation of The Super Ditch in the Arkansas Valley.

4.2 Ownership: Who owns the underlying senior water rights?

Any group seeking to form a FLEX Market must determine how the ownership interests associated with the underlying senior right will be distributed. The elements or constituents of real property ownership have traditionally been described as a "bundle of sticks." In the context of decreed Colorado water rights, they include:

- Legal title
- Right to alienate
  - Sale
  - Lease
- Right to possession and use
- Diversion and application to beneficial use
- Right to exclude others
  - Priority administration
- Right to change use

Each of these elements or "sticks" could be the subject of terms in the FLEX Market. Examples of how sticks might be distributed include:

- **One Party Holds All Ownership Rights.** In the simplest arrangement, all the sticks remain with one party (For example, a situation where the Ag User retains all ownership rights, and leases the supplies to M&I and EC Users. A traditional leaseback provision is another example, where an M&I User buys all ownership rights then leases shares back the Ag User.
- **Several Parties Hold All Ownership Rights.** In this scenario, all the "sticks" remain in one bundle, but portions of the rights are owned by each party. For example, if 100 mutual ditch company shares are involved, the Ag User might retain all ownership rights on 80 shares, while the M&I User buys all ownership rights on 20 shares. Each party owns the shares outright and enjoys all ownership rights.
- **Ownership Rights Are Unbundled and Held by Different Parties.** For example, an Ag User could hold the majority of the ownership rights, but the right to possession and use could be divided between other parties on the basis of:
  - Time
    - The Ag User retains the right of use in 8 out of every 10 years. The M&I User has the right of possession and use in 2 out of every 10 years, subject to the terms and conditions of the agreement.
  - Drought Indicators
    - Reservoir Levels: The Ag User could retain the right of possession and use except when the level(s) in identified storage vessel(s) are at or below a specified mark. When triggered, the consumptive use associated with the senior right could be delivered to the identified reservoirs until target levels are achieved.
    - Snowpack levels.

    - Climate Data: Precipitation, temperature and related measurements.
    - River flows at identified locations.
    - Yields of other water rights owned by the parties, such as Colorado-Big Thompson units.
    - Drought Indicator publications and services.
  - Priority. The parties could divide the right to possession and use based upon river call. For example, the Ag User could possess and use the water when the call is senior to 1870, and EC User when call is junior to 1870.
- Other examples of unbundling involve the right to alienate:
  - The Ag user could retain legal title and right to alienate (lease or sell) the rights, subject to a right of first refusal or option to purchase given to the M&I or EC User.
  - The M&I User could obtain legal title and the right to alienate, subject to a right of first refusal or option to lease given to the Ag User and EC User.
  - The Ag User could retain legal title, but give the right to alienate to the M&I User, subject to identified terms and conditions, such as payment of proceeds for leases.

4.3 Water Court/Administrative Application: Who is responsible for the water court or administrative change in use application necessary to deliver the senior water right to new uses?

Any change in use of a senior water right decreed for irrigation will require a water court or administrative process. Water User group participants frequently expressed concerns over the cost and risk associated with these processes and identified them as a major negotiating item in the development of an alternative transfer. The FLEX Scale envisions that the parties will discuss this matter specifically and allocate the relative burdens and responsibilities among them, identifying who among them will pay attorneys and consultants, direct the course of the case, and make decisions.

4.4 Infrastructure: Who is responsible for installation of infrastructure necessary to effectuate the transaction?

Frequently, additional infrastructure will be necessary to facilitate the delivery of the identified senior water right for the desired end uses. "Bypass" or "augmentation" structures that deliver water from the ditch to the river may need to be installed or improved. Recharge sites (shallow infiltration basins used to deliver water to the alluvial aquifer) may be needed to replace return flows or deliver the transferrable portion of the senior right to the aquifer as augmentation credit. Automated or improved measuring structures may be needed on delivery headgates. These structures and improvements should be identified, and the parties should determine who will pay for their installation and upkeep.

4.5 Administration: Who will administer the plan once it is decreed by the water court or approved by the State Engineer?

Following the initial approval by the water court or State Engineer, a plan calling for the delivery of a portion of a senior irrigation right for M&I or EC uses will have to be administered in accordance with the approved terms and conditions. These duties, likely to include measurement, reporting, affirmation of operations, and interaction with mutual ditch company personnel and the Division Engineer and his or her staff, could be assigned to one of the parties in the FLEX Market. In many cases, it may make sense for the party that retains the controlling ownership interest in the senior right to perform these duties. The parties will need to

decide how the cost of administration will be divided, which may affect other terms of the agreement such as the price of delivered water.

Because of the high level of complexity and reporting requirements likely to be encountered in a change of use of this type, the user groups also identified the potential for an unbiased third party administrator, paid by the parties, to administer the plan in accordance with the approved terms and conditions and report to the State and Division Engineer.

4.6 Term: How will the market agreement last?

The term of the FLEX Agreement could vary depending upon the level of capital investment by the parties, the ownership structure of the underlying water rights, the intended purpose for the senior water rights, and the desire of the parties to re-negotiate the terms of the FLEX platform at a date certain. Many variations are possible, but the key concepts are best understood when described as two variants. In reality, these options exist as poles on a scale, with variations available along the scale as the needs of the parties dictate.

Project Specific Market

Shorter term FLEX Market platforms could be established to meet specific, time limited needs. For example, an M&I User may have a need to refill reservoirs following a drought. The M&I User could enter into a FLEX Agreement with an Ag User to temporarily change the use of Ag User's senior right using an administrative process that does not require a water court application. The M&I User would not purchase any of the senior right; rather, the deal would consist of all FLEX leasing whereby the Ag User agrees to deliver water it owns to the M&I User. Once the reservoirs are refilled, the FLEX Agreement would terminate, the administrative approval would expire, and the parties would return to their prior position.

A similar process could be followed by a self-supplied industrial user seeking water for power plant operation, an oil and gas exploration company needing water for drilling, or an EC user seeking irrigation supplies to establish habitat. The distinguishing characteristics of these scenarios is that they are term limited, intended to end at the conclusion of the term, and focused on FLEX leasing as opposed to shared ownership structures. In this scenario, the parties making use of the FLEX water are not likely to acquire ownership in the underlying water right.

In another variation, a group of users could come together in a term limited joint venture approach with the specific purpose of changing the use of the senior water right, installing infrastructure, and supplying water to identified needs during the term. In this scenario, change of water rights, installation of infrastructure, and term limited water supply are the "project." The term would be negotiated to be long enough to install necessary infrastructure, navigate the water court process, recoup investment costs and achieve a reasonable profit on the FLEX leases.

Open or Permanent Market

A second general type of FLEX Market Agreement could be framed with the intent of establishing a trading platform that is permanent. This application is desirable when one or more users are acquiring permanent base supply via alternative transfer methods. For example, an M&I User may acquire the ownership interest in shares of a local ditch company, subject to the retention of Ag User sellers of elements of the right of possession and use, such as an agreement that Ag Users have the right to possess and use the water right in 8 out of every 10 years. Conversely, Ag Users may retain the ownership interests in the water rights, but enter into an agreement with a local M&I provider to supply a specific amount of water annually via alternative transfer methods.

In either case, there is a base water supply at the foundation of the FLEX Water Market that is in intended to be permanent. The party with the ownership interest in the water right (specifically, the right to alienate)

could determine whether to take delivery of its portion of the right, or lease the interest to other parties in the FLEX Market. The use of the entire right would be changed so that in any given year, each owner could make economic decisions about how to allocate its portion of the supply.

Though an agreement of this type is likely intended to be permanent, there may still be a term described in the FLEX Agreement, with renewal options, to allow the parties to renegotiate the terms to reflect changing conditions. If this is the case, a long term - on the order of decades - would provide stability but would also provide a horizon for future adjustment. Each party would continue to have control of its owned supplies, regardless of whether the FLEX Market existed or not upon renegotiation. Hopefully, the flexibility the market provides is helpful to all the parties, creating an independent motivation to renew the market platform as an organized means of facilitating movement of water. The parties will need to decide how long the market structure is intended to last.

4.7 Interaction among Agreement Elements

While each of the six identified elements operates on its own "scale" of possibilities, discussions in the user groups revealed that they are mutually co-dependent. Adjusting any one of the elements is likely to affect the position of the others. For example, a party that has 100% ownership of the underlying senior rights is more likely to be willing to invest in infrastructure, water court/administrative approval, and administration. Conversely, if an M&I User has no ownership interest, and is purchasing water on a "spot market," there is little motivation to become deeply involved in water court processes or administration. In addition, if both an Ag User and an M&I User have ownership in the water right, it is possible that both parties will be motivated to share the costs of water court, administration, and infrastructure.

Like any negotiation, an effective process consists of identifying needs and exploring a number of potential avenues to meet them, a process of "trying on" different configurations to find the balance of risk management and benefit that suits all parties.

Section 5

Ag User, M&I, and EC User Group Meetings

Initially, all user groups were tasked with discussion of concepts and issues arising out of both the Model FLEX Agreement and the Model Terms and Conditions. However, due largely to the highly technical nature of the Terms and Conditions, the foci of the groups diverged. The Ag Users, M&I Users and EC Users groups were most interested in discussing issues related to the Model Agreement. This tendency is logical given the population of the Ag, M&I and EC groups by individuals responsible for contracting and operational issues in their respective entities. These groups were the impetus for the creation of the FLEX Scale described in Section 4, and made major substantive contributions to the Model FLEX Agreement draft described in Section 6.

5.1 Summary of Key Themes

As a whole, the **Ag User Group** expressed a strong interest in the FLEX Market process, and a willingness to participate a FLEX Market if the terms were right, including the investment of private capital to create a market if payouts were assured. Consistent concerns expressed included the cost and risk associated with the water court process, the burdensome nature of administration under a complex change of water rights, and the application of the anti-speculation doctrine to changes in use.

The **M&I User Group** discussed both short and long terms applications of the FLEX Market approach. With regard to short term or temporary supplies, the group concluded that a FLEX "spot" or "over-the-counter" (OTC) market could be useful for drought recovery or to provide interim supplies while permanent supplies are acquired. The discussion of longer term applications centered on addressing the M&I user's need for permanence, and the necessity of making ATMs attractive to M&I users by offering supply solutions at a lower transactional or overall cost.

The **EC User Group** expressed a high level of interest in developing the FLEX Market concept to support environmental and conservation goals. Discussions included the potential for partnerships and interaction between Colorado's in-stream flow program, M&I Users, and Ag Users, possible uses of a FLEX program to hedge against environmental risks to habitat, and the direct applicability of the FLEX model to agricultural water rights used in hay production in mountain areas.

5.2 Summary of FLEX Elements

The following is a summary of each user groups' views on each element of the FLEX scale. These results are also presented in the table in Appendix B.

5.2.1 Participants

Ag User Group

The Ag User Group felt that FLEX type agreements could best be executed and administered on the basis of mutual ditch companies, as opposed to individual shareholders or at a larger, multi-ditch company level. Though individual shareholders would be given the ability to participate, and, as owners of the water rights, would make the ultimate decision about whether to participate, the framework for participation would rest at

the mutual ditch company level to ensure economies of scale and fairness to all shareholders. Though the group left open the possibility of a FLEX Market involving two or more mutual ditch companies, the group's frank assessment was that it would be very difficult for South Platte ditches to cooperate to the level of finalizing an agreement of this type.

With regard to the nature and composition of the M&I and EC User participant groups, Ag Users expressed a strong preference for multiple M&I and EC participants, with the rationale that more purchasers or lessees in the market would bring more favorable results in terms of pricing and other terms. The potential for being "tied" to a single or a small number of M&I or EC users was not attractive. The Ag Users Group struggled with the necessity to name the end users in the FLEX Agreement to satisfy Colorado's anti-speculation doctrine, and spent considerable time discussing potential solutions to this issue.

One suggestion that was endorsed by the group was a statutory change that identified certain defined "Use Types" for FLEX Agreements that were pre-approved in the statute (e.g. "Municipal and Industrial Use" or "Environmental/Conservation Use"), and would substitute for named end uses or users in the water court application. Once a right is changed for "Municipal and Industrial Use," the consumptive use quantified in the change case could be leased to any user that met the statutory definition of a "Municipal and Industrial User." The Ag Users felt that opening the markets in this way would encourage investment in the legal, engineering and infrastructure costs necessary to change the use of senior water rights and make them available in a FLEX context.

M&I User Group

M&I User Group members' comments on the number and makeup of FLEX Market participants were the converse of Ag User comments. As a whole, M&I Users did not favor entering into voluntary market structures including other M&I providers. Like the Ag Users, M&I Users had concerns about whether the relevant entities could achieve the level of parity and cooperation necessary for voluntary participation. In addition, there was a reluctance to invest in a water supply with the inherent potential to be outbid by other participants, unless the supply was used purely on a spot basis and the cost of entry was low.

Conversely, the M&I User Group favored the concept of a large number of Ag Users in a FLEX Market. This was perceived as beneficial in the sense that it would create a greater amount and diversity of water supplies available for FLEX leasing and would create beneficial competition between FLEX Market lessors.

EC User Group

The EC User Group members were interested in discussing multi-party agreements that offered the broadest possible application of the senior right. Because the EC uses are often intermittent by nature (e.g. in-stream flows, supplies for duck habitat) in comparison to the demands of Ag and M&I Users, EC Users had a relatively high level of comfort for the participation of multiple parties of different types that could make use of the water when needed.

5.2.2 Ownership

Ag User Group

Ag Users in this study group expressed a strong preference for maintaining ownership of the underlying senior water rights. They did not see a great deal of utility in selling a small portion of the senior right to M&I or EC partners, as described in the FLEX Market concept summary. Some of this preference can be attributed to the makeup of the group, which consisted of individuals who tended to be well capitalized, established landowners under their respective ditch systems with a long term history of survival in the agricultural economy. They did not need an influx of capital for retirement purposes or to support their farming operations. These water rights owners clearly presented a business-like approach to their farming operations and perceived the FLEX Market concept as business opportunity to be evaluated under its own

terms. As such, they were willing to consider providing their own investment capital to fund the FLEX Market, if there was a guaranteed payout (a 'take or pay' contract) upon successful establishment of the market.

M&I User Group

M&I User discussion varied depending upon the type of FLEX Market application under discussion. In a spot market application used for drought recovery and interim supply, M&I Users were not interested in obtaining any ownership interest in the underlying water rights. Instead, the expectation was that the Ag User owners of the rights would retain ownership of the rights, perform all of the activities necessary to free the water for M&I use, and then offer it to M&I Users at a price reflecting the cost of these activities. It was also emphasized that the price would have to be significantly lower than the amortized cost of acquiring the water rights outright in order to entice M&I Users to lease the supplies.

When discussing potential FLEX Market applications to supplement base supplies, the group was in favor of owning the underlying water rights. This conclusion has been uniformly expressed in ATM studies to date. The reasons for this conclusion include: 1) necessity of permanent supply; 2) uncertainty associated with long term leasing; 3) high acquisition and transactional cost associated with ATM methods, equivalent to purchase.

EC User Group

The EC User Group was the most flexible of all the groups regarding underlying ownership of the water rights. All options were discussed, from Ag User ownership and a "spot market" similar to the M&I User scheme, to EC ownership of the underlying rights. Blended ownership schemes were also discussed, including interruptible supply agreements, leaseback provisions, and multiple uses of in-stream flows.

5.2.3 Water Court/Administrative Application

Ag User Group

In an ideal agreement, the Ag User Group expressed a preference for controlling the water court application or administrative process necessary to change the use of the senior water right. Because they intended to maintain ownership of the right, the process, terms and conditions for the change of right were important to them and they wanted to be principally involved in the process.

The Ag User Group was significantly concerned about the cost and risks associated with a water court application. The potential for a negative water court outcome affecting shareholders in the ditch who were not pursuing the FLEX concept was of particular concern.

M&I User Group

As is the case with many of the FLEX Scale issues, the M&I User Group's views varied depending upon the FLEX Market application begin discussed. For short term "spot markets" used to meet drought recovery and interim supply needs, the group was not interested in being involved in any water court or administrative process. Rather, the vision was that this burden would be carried by the Ag Users and reflected in the price of contracted water supplies.

For longer term base supply agreements, M&I Users' desire to remain principally responsible for the water court or administrative process paralleled their desire to obtain ownership of the water rights. Because the supplies were envisioned as a part of the M&I Users' permanent supplies, M&I Users were willing to take on the costs and risks associated with these processes

EC User Group

Most of the FLEX Market scenarios discussed in the EC User Group assumed EC participation in a water court or administrative change process led by an M&I or Ag user, however, not all of them. One possible

FLEX Market outcome was for EC users to own the underlying water rights and finance the change in use and administrative processes via leaseback to M&I and Ag Users.

5.2.4 Infrastructure

Ag User Group

Several scenarios for financing necessary infrastructure were discussed in the Ag User Group. Most involved a financial commitment from M&I User and/or EC participants to invest in ditch company infrastructure as a part of the compensation for use of the senior water right. This commitment was expressed variously as a commitment to directly finance infrastructure at the outset of the agreement or to advance funds to Ag Users to construct the necessary infrastructure to be repaid from lease proceeds upon water delivery. The potential for Ag Users to assemble private capital to install necessary infrastructure was also discussed, in association with a "take or pay" commitment on the part of M&I Users that would repay the investment. Finally, the potential for state investment in key infrastructure in the forms of loans, grants or direct construction, was discussed, particularly with regards to exchanges.

M&I User Group

M&I User Group thoughts on infrastructure investment varied along the lines already discussed. For a "spot market" application, the group was not in favor of capital investment. Rather, it was expected that Ag User Groups would make necessary improvements as a cost of FLEX Market start-up, and re-coup these costs in the charge for water delivered. In contrast, when long term base supplies are acquired, the M&I User Group was willing to consider infrastructure investment to facilitate delivery.

EC User Group

The EC User Group identified infrastructure development as a potential area where EC Users could contribute to FLEX Market development. Many of the EC entities have grant funds available for habitat development. In many cases, installation of infrastructure necessary to improve habitat (diversion structures, recharge sites) benefits M&I and Ag Users, installation can improve the viability of the FLEX Market for end users. EC users expressed a willingness to help develop infrastructure in the context of a FLEX Market.

5.2.5 Administration

Ag User Group

Consistent with its vision for FLEX Market operation in other key agreement elements, the Ag Users Group was in favor of Ag User administration of the change in use and FLEX Market, either directly or via the use of a hired third party administrator.

M&I User Group

The M&I User Group discussed the concept of Ag User administration of the FLEX Market in the "spot market" scenario. Conversely, if the agreement is for long term or permanent base supply, the M&I User Group expressed a desire to administer the FLEX Agreement itself.

EC User Group

This issue was not discussed in detail in the EC Users Group. To the extent it was discussed, the EC User Group expressed flexibility on the issue.

5.2.6 Term

Ag User Group

As set forth in the preceding sections, the Ag User Group favored the concept of establishing the FLEX Market themselves and was interested in opening the market to as many end users as possible. As such, the group's discussion of terms focused on the necessity of a term long enough to recoup initial investment, but short enough to allow timely readjustment of pricing and the potential for additional participants to enter the market. The vision was that the market platform would be permanent, while terms for agreements to deliver water would be variable and dependent upon the needs of the parties.

M&I User Group

The M&I User Group's "spot market" vision was characterized by a permanent market platform, populated by multiple Ag user suppliers, with leases of varying length depending upon the needs of the parties. A different vision emerged with regard to acquisition of permanent base supply via ATMs (leaseback, rotational fallowing). In that case, the 'term' was assumed to be perpetual in the sense that once acquired, the CU produced using alternative methods would be available indefinitely on an annual basis.

EC User Group

The EC User Group was interested in long term solutions. Whether on the basis of a permanent market platform and intermittent "spot leases" or permanent water sharing agreements, the emphasis was on establishing mechanisms that would meet EC needs indefinitely.

Section 6

Model FLEX Agreement

As described earlier in the report, the various user groups reviewed and commented on successive versions of the Model FLEX Agreement during the course of their meetings. The final version of the Model FLEX Agreement is framed by the six FLEX Agreement elements described in prior sections. The contents of the Model FLEX Agreement are described in this section. A copy of the Model Agreement is provided in Appendix C.

6.1 Participants

This section of the draft agreement permits the parties to identify the parties contracting to establish the FLEX Market. The identification of participants is significant because the participants agree to serve as co-applicants in the water court or administrative application necessary to change the use of the underlying senior water right to include M&I and EC uses. These named participants are the sole parties entitled to make use of the senior water right once changed, unless the decree specifies otherwise. This section also addresses assignment of FLEX Market memberships, and addition and removal of FLEX participants after the initiation of the agreement. The Model FLEX Agreement gives the existing participants substantial authority and discretion on each of these issues, and envisions a democratic governance structure.

An optional provision makes the FLEX Agreement contingent upon the participation of an identified number of additional parties. A provision of this nature may be helpful where an M&I User and/or EC User has negotiated terms of a FLEX Agreement with a mutual ditch company board of directors and offered the chance to participate to shareholders, and the contracting parties wish to assure economy of scale prior to additional investment.

6.2 Ownership

This section of the FLEX Agreement provides a place for the participants to record their agreed-upon distribution and treatment of various "sticks" in the water rights ownership "bundle." As described in Section 4.2 above, there are three basic ways these sticks can be distributed.

It is possible that the Ag User could continue to maintain 100% ownership of the underlying right. In this scenario, the Ag User would retain complete control over the right, including the right of alienation to third parties, subject only to FLEX leases given in favor of the M&I User or the EC User. This is generally considered favorable to the Ag User, but may raise questions of permanence for the M&I and EC Users.

It is also possible that portions of the underlying right could be sold outright to the participating M&I and/or EC Users, giving these users a "stake" in the underlying right and permanent source of supply. In order to effectuate the CWCB's intent and desire to maintain viable irrigated agriculture, this ownership stake would presumably need to remain small in relation to the overall right, unless further arrangements were made that gave the Ag User assurance of stable supply for Ag purposes.

A third scenario emerged in the study team's discussions with user groups. Blended or hybrid ownership models would separate different elements of water rights ownership and distribute them by agreement between the parties. As these hybrids are created, monetary value would change hands in an amount agreed upon by the parties to reflect the relative value of the "stick" of the water rights ownership "bundle" being transferred. For example, an M&I User might pay the Ag User value in exchange for a perpetual

commitment to deliver the senior right to reservoirs during drought conditions, or an Ag User might assign all ownership interests to an EC User except the right to receive delivery of the water right when the call on the river is junior to a specified priority date.

6.3 Water Court/Administrative Application

This section provides a template for the parties to address issues arising out of the water court or administrative application needed to change the use of the senior water right to multiple end uses. It describes the new uses the parties desire to make, in addition to the existing irrigation use, and identifies a "Lead Applicant"— one of the parties who is tasked with piloting the application. It addresses the hiring of counsel and consultants and the sharing of costs associated with application.

6.4 Infrastructure

This section identifies anticipated delivery locations, the intent of the parties with regard to installation of new infrastructure needed to facilitate the delivery of water to the parties, and the division of costs for the improvements between the parties. It identifies who will own and maintain the new structures.

6.5 Administration

This section addresses operation of the FLEX Market. The Agreement anticipates that the parties will, subject to their discretion, lease portions of the water each is entitled to under ownership rights to one another under additional "FLEX Leases." Unlike water delivered pursuant to ownership interests, to which the users have a perpetual right to delivery, FLEX Leases are for specified terms. The ownership interests are a part of the permanent base supply for each party, while the FLEX Leases allow the water to be moved pursuant to demand and market conditions to maximize use and economic return.

The Model FLEX Agreement identifies an "Administrator" to serve as a facilitator of the market and to perform the day to day tasks required under the change in use decree or administrative approval. The Administrator could be one of the parties, or could be a hired third party administrator paid by the parties. The Administrator is responsible for facilitating the development of an annual Water Use Plan developed prior to diversion of the senior right in the spring, in which the parties identify uses, delivery points, and FLEX Leasing. The FLEX Agreement provides a placeholder for the allocation of costs of administration between the parties.

Finally, this section contemplates that the Ag User, who is in control of the infrastructure necessary to deliver water (ditch, storage, recharge sites) might contract with the M&I and EC User to deliver these parties' their owned CU for a specified annual rate.

6.6 Term

The intent of the FLEX Agreement is to create a trading platform. Though in most cases it is likely that the parties investing in the FLEX Agreement would want the trading platform to exist indefinitely, the option remains open for a time limited market, as described in Section 4.6 above. For example, a self-supplied industrial user may be able to calculate the useful life of a power plant, and limit the term of the FLEX Agreement accordingly. Or, an M&I user may enter into a short term FLEX Agreement in the years following a severe drought to refill its reservoirs.

Section 7

Attorney and Engineers Meetings

The Water Users group, populated with attorneys and engineers responsible for navigating the water court process, was interested almost exclusively in the Model Terms and Conditions. Key elements of the Water User Group discussion are set forth in this section. This group guided the development of the Model Terms and Conditions set forth in Section 8.

The Water User group engaged in extended technical discussions regarding the terms and conditions necessary to prevent injury to other water users in the context of a water court case changing the use of a decreed irrigation right to add M&I and EC uses. For the purposes of developing the Model Terms and Conditions, the group assumed that consumptive use would be produced for the M&I and EC uses using a wide range of alternative methods, including fallowing, reduced consumptive use cropping and regulated deficit irrigation, and that the decree would permit the right to be delivered to any of the uses in any given year, moving between them as agreed upon by the parties. The Group's key findings are summarized below.

7.1 Return flow maintenance is the key to preventing injury.

The purpose of the water court change in use proceeding and the change in use decree is to ensure that river conditions before and after the proposed change in use are not altered in a manner that is injurious to any existing water right user. So long as return flows are maintained in the time, place and amounts equivalent to historical operation, injury is prevented.

7.2 Ditch-wide changes in use are preferable for ATM applications.

Managing a change in use including alternative transfer methods would be substantially simplified if the historical use of the entire senior irrigation right has been quantified, and standardized consumptive use and return flow terms and conditions developed that are applicable to sections of the ditch. Parcel specific changes in use and accompanying parcel specific terms and conditions are possible, but less efficient.

7.3 Estimating "real time" return flows using existing consumptive use models is not widely accepted.

While using consumptive use models such as Integrated Decision Support Consumptive Use (IDSCU) or State CU to estimate historical consumptive use and return flows has generally been accepted in the water court and administrative context, use of these models in a real-time or forward looking mode to estimate CU and return flows in alternative transfer context is not widely accepted.

7.4 Increases in efficiency over time present a challenge in the administration of changes of use involving continued irrigation.

Historically, farms were almost exclusively flood or furrow irrigated, but many farms have converted to center pivot or other means of sprinkler irrigation. As a result, use of the irrigation rights was less efficient through large parts of the study period than it is today. During these time periods, more return flows were generated, though consumptive use was equivalent. As a rule, change in use decrees require that the right continue to

generate return flows in an amount equivalent to the historical average. When a farmer irrigates today using the more efficient sprinkler methods, the return flows generated are less than the historical average. In order to maintain historical conditions following a change in use case, the farmer would have to supplement return flows, even when irrigating.

7.5 Soil moisture is a concern if fields are fallowed.

Fallowed fields will have a different soil moisture profile after the fallow period than continuously irrigated fields. Most of the group members felt that the soil moisture reserve would be less following fallowing, while members of the Ag User Group believed the opposite based on experience—that soil moisture increases during fallowing. Either way, this issue will have to be accounted for in a decree permitting long term rotational fallowing.

7.6 Two versions of the model terms should prepared - a "simple" and a "complex" model.

The group discussed high level of variability in the factual situations surrounding decreed irrigation rights and ditch systems. While some water users may desire to seek a relatively complex decree addressing multiple alternative transfer methods and a high level of flexibility in operation, others may have a specific, single application in mind and do not need the complexities. The group also discussed the problems associated with excessive complexity and the desirability of simplified terms and conditions whenever possible. The result of these discussions was the creation of two versions of the Model Terms and Conditions—a simplified model ("Pay As You Go") and a more complex model ("Return Flow Accounting").

7.7 Simplified, conservative terms and conditions could facilitate entry of the initial ATM decrees.

The group observed that while it may be possible to measure and account for every element of the water balance for a farm, and thereby establish 'real-time' measurements or estimates of consumptive use and return flows, the research and technology supporting the real-time concept is under development and may not be widely accepted enough to ensure entry of a water court decree without time consuming and expensive litigation. The general consensus was that the highest likelihood of successful and efficient resolution in water court could be achieved through the development of simplified assumptions which, by definition, were inherently conservative enough to provide the court and opposers a comfort level with the novel concepts involved in ATM administration. Building in this reasonable 'margin of error' in the initial ATM applications would allow the initial decrees to be entered and facilitate initiation of ATM practices.

7.8 Study provisions coupled with retained jurisdiction could allow refinement of terms and conditions.

Once the ATM process is in place and operating under the initial decree, the group saw value in providing the applicants the opportunity to use the initial implementation sites to measure and document on-farm conditions, with the potential to amend the terms and conditions to be more reflective of on-farm findings under retained jurisdiction. This would allow the applicants to test and trouble-shoot monitoring and reporting technologies on the ground. The Model Terms and Conditions propose a ten year study period and the option for the applicants to request additional review by the court should they desire different terms and conditions based on research results.

7.9 Identification of specific mechanisms of "re-use" are necessary to assess potential of injury.

Once consumptive use is quantified, ATM applicants will want to use and re-use these supplies to extinction. The group felt that broad claims of "re-use" could not be supported in the initial decree without details about the location and mechanism of re-use. The Model Terms and Conditions provide the opportunity for the applicants to describe the re-use proposed, if known at the time of the decree, or the opportunity to file an additional water court application in the future if re-use plans are developed after the entry of the initial decree. The concept of re-use is accepted, but the details need to be examined in each case.

7.10 Identification of specific end users is generally necessary to assess issues presented by implied limitation, anti-speculation and non-injury doctrines.

The group discussed the concerns raised by the Ag Users Group regarding the necessity of naming end users for the changed water rights in the application, and concluded that it is generally recognized that end uses and users in a change in use case must be described with sufficient particularity to allow other water users to determine whether the potential for injury is present, and to satisfy anti-speculation concerns. Three legal doctrines were discussed that tend to require this result. First, the doctrine of "implied limitation" is centered on the principle that the extent of a water right is prescribed by the scope of the uses intended upon the entry of the decree. If a water user does not know the uses intended with particularity, it raises questions about how this doctrine would be applied to interpret the decree. Second, Colorado's "anti-speculation" doctrine prohibits the development of water rights merely for the purpose of marketing them to others. Third, Colorado's general doctrine requiring proof of non-injury in a change of water rights may be difficult to satisfy if the applicants cannot identify specific end uses and users.

7.11 Identification of specific type of use and specific point of delivery of consumptive use of changed water right may help mitigate concerns arising from implied limitation, anti-speculation and non-injury doctrines and allow deliveries to a broader range of end users not identified in change of use decree.

While the group recognized the import of the implied limitation, anti-speculation, and non-injury doctrines in the context of an ATM application seeking approval for broad M&I and EC uses, it observed that these concerns are mitigated to some extent if the applicants propose to deliver only amounts identified as consumptive use to the M&I and EC uses. This amount, decreed on the basis of an historical consumptive use analysis, was lost to the river system in years past, unavailable to other water users. As such, it could be considered the 'limitation' of the water right to address the implied limitation concern. If a specific delivery point is identified on the river, this may provide the water court and opposers enough information to assess injury issues. Once the CU water is delivered to the river, delivery to end users is a matter of river administration, arguably outside the scope of the change in use decree (but potentially subject to other decrees, e.g. exchange). Applicants may be able to overcome anti-speculation issues, to the extent they exist in change in use cases (there was some discussion in the group on this issue), by demonstrating M&I and EC demand at the delivery point.

Section 8

Model Terms and Condition Drafts

Two versions of Model Water Court Terms and Conditions were developed, one with a simpler approach—the "Pay As You Go" model (Appendix D), and a more complex model, the "Return Flow Accounting" model (Appendix E). The attorneys and engineers group discussed the concepts set forth in the drafts and achieved a consensus at the conceptual level. Some, but not all, group members took the additional step of reviewing and approving the written drafts.

Both model drafts assume the following set of facts:

- Change of water rights of shares in mutual ditch company decreed for irrigation
- Change in use to add broad range of M&I and EC uses to existing irrigation use
- Applicants: Ag User, M&I User and EC User
- 100 of 500 outstanding shares in mutual ditch company changed
- Deliveries of water to:
  - Historical farms
  - Recharge Sites served by ditch
  - Augmentation Stations installed in ditch that return water to river

Both models allow the consumptive use associated with the decreed senior right to be delivered to M&I, EC or Ag uses in any given year. Each year, the applicants agree upon a "Share Dedication" and identify the location(s) of delivery for consumptive use and return flows.

Both decrees require replacement of return flows in a manner consistent with historical use, though they differ in the manner in which return flow replacement is accomplished. The "Pay As You Go" decree requires replacement of return flows as the right is diverted by delivery to the river (surface returns) or to recharge sites served by the ditch (subsurface return flows). The Applicants in the "Pay As You Go" model do not have any choice but to meet return flow obligations concurrent with share diversions each year, thereby ensuring that historical return flow patterns are maintained. Credit for return flows occurring as a result of irrigation uses are permitted using factors identified in the decree. No long term accounting of return flows needs to be maintained because surface return flow obligations are met in the month when they occur, and subsurface return flow obligations each month/year are delivered to a recharge facility that mimics historical lagging and provides return flows at the historical location when they accrue to the river.

The "Return Flow Accounting Model" provides additional flexibility with regard to meeting return flow obligations. As the water right is diverted for any use, return flow obligations based on historical factors accrue as a "debit" in the accounting – an obligation that the Applicants must meet now and in the future. This obligation can be met using a number of methods, including direct delivery of a portion of the shares to the river, delivery of the shares to recharge sites served by the ditch, irrigation return flow credits resulting from irrigation uses, or the delivery of other water supplies owned by the applicants. The decree requires a "Return Flow Projection," similar to an augmentation plan projection, be used to demonstrate that Applicant will have sufficient supplies necessary to meet present and future return flow requirements when assigning shares to various uses. The Return Flow Projection doubles as the accounting - estimated values are replaced with actual values as they become available.

The "Pay As You Go" and "Return Flow Accounting" drafts share a large number of provisions, which are described in described in 8.1. The unique provisions of the "Pay As You Go" draft are described in 8.2, and those unique to the "Return Flow Accounting" draft are set forth in 8.3. Paragraph references are to paragraphs in the model decrees.

8.1 Shared Terms and Conditions

8.1.1 New Uses

The model decrees seek approval for use of fully consumptive water yielded from the decreed senior right (¶3):

- For a broad range of M&I and EC uses in addition to the existing irrigation right
- In decreed augmentation plans and State Engineer approved substitute water supply plans, subject to the terms and conditions of the decree
- To extinction; provided, however that re-use plans must be specifically described in the decree or approved by the court in a subsequent decree
- Return flows appropriated, subject to call senior to date of application.

8.1.2 Quantification of Historical Consumptive Use and Return Flows

The model decrees call for quantification of the right on a parcel specific (as opposed to ditch wide) basis (¶4). Despite the fact that the Water Users' group concluded that ATMs would best be implemented in the context of a ditch wide change in use, this provision was included in acknowledgment of mutual ditch company's current reticence to engage in or approve ditch wide changes in use. The decrees could easily be altered to reflect ditch-wide methodology.

The decrees apply a widely accepted approach to quantifying historical consumptive use and return flows, including the selection of a representative study period, identification of crops, ditch loss and maximum irrigation efficiencies, and calculation of average annual consumptive use and return flows using a standardized model (¶5). Information from this analysis is used to generate the volumetric limitations and return flow factors set forth in portions of the model decrees that establish terms and conditions for future diversions of the right. The historical location of return flows is identified in this section of the model decrees.

8.1.3 Seasonal Limitation

Diversions are limited to the historical season of use (¶6.1).

8.1.4 Point of Diversion

The point of diversion is limited to the historical mutual ditch company ditch headgate (¶6.2).

8.1.5 Ditch Company Regulation

The decrees require that the applicants' shares be assessed same amount of ditch loss as all other shareholders. (¶6.4)

8.1.6 Points of Delivery

The model decrees identify two types of delivery points (¶6.5). In an actual decree, legal descriptions and other details would be provided.

- Mutual ditch company farm headgates, whether for irrigation or delivery to recharge sites served by the ditch.

- Mutual ditch company bypass structures. Augmentation stations that deliver water to the river.

8.1.7 Volumetric Limitations

The model decrees establish per share monthly maximum, per share annual maximum, and per share twenty year rolling average volumetric limits on deliveries of the water right (¶6.6). These limits apply to all future uses of the right, including irrigation.

8.1.8 Return Flow Credit for Irrigation Uses

Under both decrees, the Applicants are required to replace historical return flows in time, place and amount (¶6.8). Credits are given for subsurface return flows accruing to the aquifer during irrigation use. The amount of the credit given depends upon the total water supply to the farm (water short farms are likely to have little or no return flow) and the efficiency of the irrigation practice.

- Full Irrigation. For farms with a water supply anticipated to be adequate, as defined by a comparison of a conservative estimate of supplies and projected net crop water irrigation requirement, Applicants are credited 30% of farm headgate deliveries for flood irrigation, and 20% of deliveries for sprinkler irrigation.
- Deficit Irrigation. For farms with a water supply anticipated to be less than adequate, Applicants receive no credit for return flows. The farm is assumed to be in regulated deficit irrigation status. As such, application rates are likely to be very controlled, and return flows kept to a minimum. For the purposes of the decree, it is assumed that 100% of the water applied is consumed.

8.1.9 Zero Delivery

The model decrees go beyond 'fallowing' to introduce the concept of "Zero Delivery" (¶6.9). Fallowing implies cessation of irrigation, whereas the model decree permits continued irrigation of lands historically irrigated by the shares using sources other than the changed water rights. The term "Zero Delivery" is intended to convey more precisely the intent that the changed water rights will not be delivered to the historic farm, but will be used for other uses. The model decrees set forth terms for "Zero Delivery" including:

- For shares declared "Zero Delivery," prohibition on irrigation with the changed shares or any other portion of the underlying senior irrigation right
- Irrigation of Zero Delivery acreages is permitted by augmented wells, contractual supplies, municipal supplies, change of water right, or re-use of fully consumable portion of changed shares following initial M&I or EC use (if separately decreed)
- All crop and forage types permitted on Zero Delivery acreages. Monitoring wells and reductions in consumptive use required if 1) Zero Delivery Acreage is to receive no water from any source; and 2) alfalfa or other deep rooted crops remain in place. It may be possible to forgo monitoring well requirements if it is conclusively established that ground water levels are below the root zone of deep rooted crops.
- Annual notice, inspection and approval of Zero Delivery Acreages by Division Engineer.

8.1.10 Share Dedication

The decree drafts require Applicants to declare the use for each FLEX share no later than April 1 each year (¶6.10). Uses may change from year to year, provided applicant meets all return flow obligations.

8.1.11 Recharge Ponds

The decree drafts provide standard Division One terms and conditions governing deliveries of water to recharge sites and accounting for same (¶7 Pay As You Go, ¶8 Return Flow Accounting).

8.1.12 Retained Jurisdiction-Farm Specific Return Flows

Under the terms of the draft decrees, Applicants are permitted to install measuring devices, monitor the water balance on participating farms for a period of no less than 3 years, and return to water court under retained jurisdiction to establish revised return flow factors governing credits given for subsurface return flows generated by irrigation use of the changed shares (¶11 Pay As You Go, ¶12 Return Flow Accounting). These revised factors would be farm specific, and may be less conservative (allow more credit for return flows) if this result is supported by the research findings.

8.2 Pay As You Go Version

The unique provisions of the "Pay As You Go" Model Decree Draft are described below.

8.2.1 Return Flow Obligations

Under the "Pay As You Go Model," Applicants are required to meet return flow obligations immediately upon diversion of the changed shares by 1) delivering water through an augmentation station back to the river to replace surface return flows; and/or 2) delivering water to an approved recharge site to mimic the timing and location of historical subsurface returns; and/or 3) delivering water to the historic farms for irrigation, thereby generating return flow credits (¶6.7).

8.2.2 Accounting

Accounting in the "Pay As You Go" model is relatively straightforward (¶10). Diversions are recorded, and allocated to meet the return flow obligation or as consumptive use for delivery to Applicants. Because Applicants meet return flow obligations on a real-time basis, no detailed or multi-year tracking of return flow obligations is required.

8.3 Return Flow Accounting Version

The unique provisions of the "Return Flow Accounting" Model Decree Draft are described below.

8.3.1 Return Flow Obligation

Under the "Return Flow Accounting Model," diversions of the changed right trigger return flow obligations in accordance with factors set forth in the decree; these are reflected on the accounting as a "debit" and are owed by the Applicants (¶6.7). Applicants may create "credits" to offset the return flow debits in the accounting by: 1) delivering water to the river via an augmentation structure; 2) delivering water to approved recharge sites; 3) delivering water for irrigation of historic farms, thereby generating an irrigation return flow credit pursuant to the Decree; or 4) by delivering other sources of supply to the river, such as municipal effluent or other fully consumable supplies.

8.3.2 Return Flow Projection

Because the Applicants are not immediately meeting return flow obligations with the changed shares themselves, it is necessary to track the return flow obligation over time to ensure that Applicant maintains sufficient supplies to offset subsurface return flow obligations in future years (¶7). A conservative projection of planned deliveries of the changed shares, return flow obligations and firm sources to replace return flows is required. The length of the projection is intended to be commensurate with lagged return flows from the subject farms. Terms and conditions governing the projection include:

- Assumption of year-round call, return flow replacement constant
- Dry year yields projected for changed shares

- Return flows projected based upon status of farms as Fully Irrigated (30% flood, 20% sprinkler) or Regulated Deficit Irrigated (no return flow credit generated, 100% consumptive)

8.3.3 Accounting

The Return Flow Projection folds into the accounting (¶11). Initially populated with projected values, measured values replace the projected values as the water year progresses.

8.3.4 Retained Jurisdiction: Measured Return Flow Accounting

In addition to the option to establish new return flow factors based upon on the ground measurement, the Return Flow Accounting decree permits the Applicant, after a period of study and troubleshooting, to propose an accounting system based upon actual on-farm measurement of water balance components (¶13). If approved by the court, actual measurements of return flow credit would replace standardized factors.

Section 9

Summit

The FLEX Summit took place on February 13, 2013 in Loveland. Hosted by the study team, it was attended by approximately 80 water professionals representing a wide range of interests, including M&I, Ag, EC, local, state and federal government. This section summarizes the results of the Summit. A list of individuals who RSVP'd for the Summit is attached hereto as Appendix F.

9.1 FLEX Market Presentation

The first portion of the Summit was dedicated to a presentation summarizing study results to date. The major sections of the presentation included a discussion of the history, goals, process and preliminary results of the FLEX Study, as well as an overview of initial engineering results for the demonstration projects. A copy of the complete PowerPoint from the Summit presentation is attached as Appendix G.

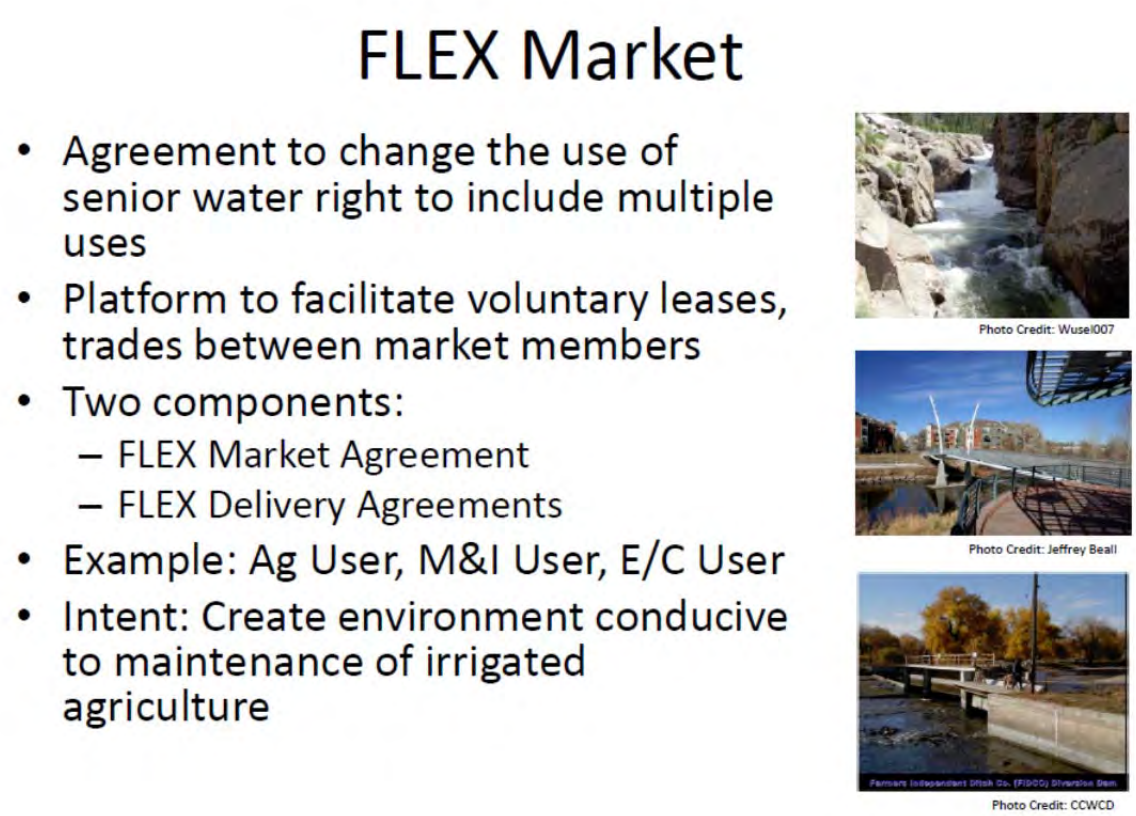

Figure 9-1. FLEX Summit Presentation

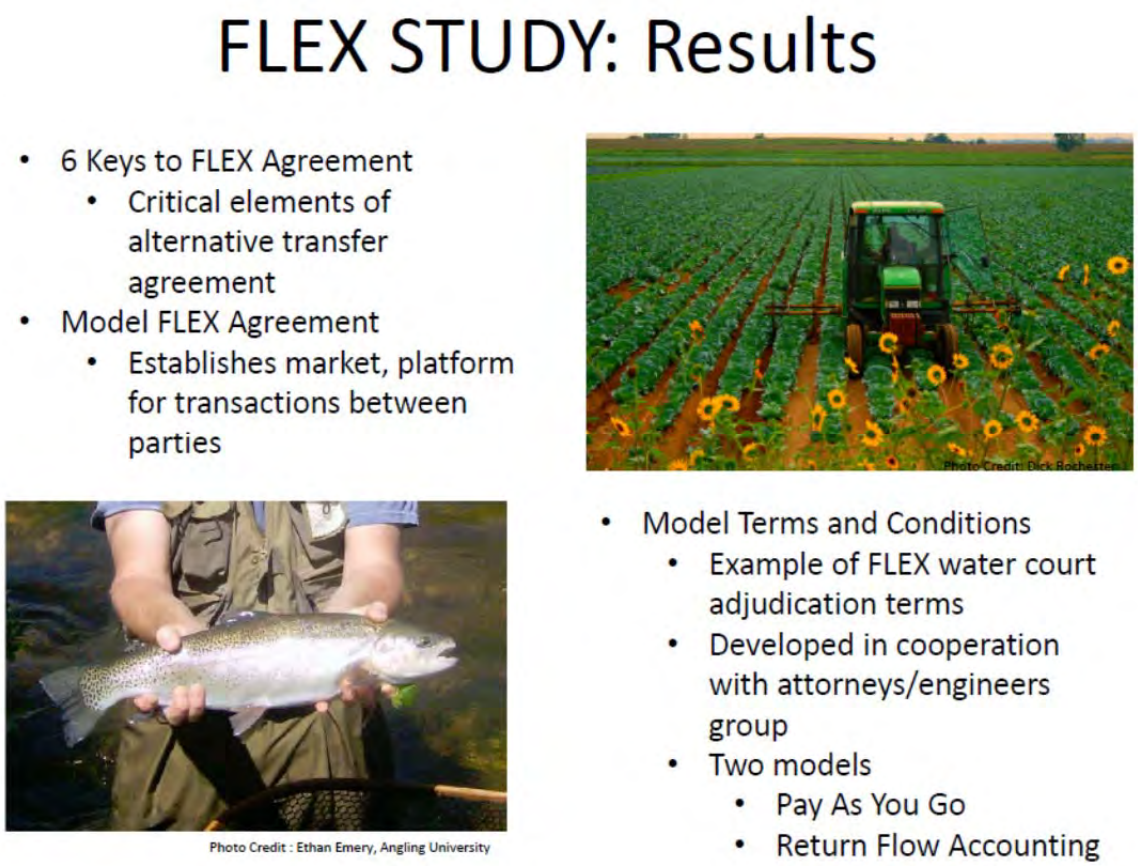

Figure 9-2. FLEX Summit Presentation

9.2 FLEX Market Negotiation

As the summit attendees arrived and received name tags, each was identified for the purposes of the afternoon as one of four types: "Ag User," "M&I User," "EC User," or "Water Rights Professional" and these types were given specific table assignments. When it was time for the negotiation, the attendees were asked to move to the assigned tables, ensuring that each table had at least one of each of the four types present. The tables were then asked to engage in a negotiation assuming that an M&I User, Environmental/Conservation User and Ag User wanted to explore the potential for a FLEX Agreement. Parameters for the negotiation that were given to participants are summarized in Table 9-1 below.

Table 9-1. Given Information for the FLEX Agreement Negotiation Exercise		
Motivation for the Various Parties to the FLEX Agreement	M&I User	• Vulnerable to drought, needs 500 AF to refill storage • Demand is growing. Need for: 200 af of additional base supply immediately 500 af of additional base supply in 5 years 2000 af of additional base supply in 20 years
	Environmental/Conservation User	• Needs 200 af of base supply to consistently maintain reservoir/wetland levels • Vulnerable to drought and needs 500 af to protect habitat when water supplies are not plentiful
	Ag User	• Shareholders under the mutual ditch company have estimated that 2,000AF of consumptive use are associated with their shares, and they need a change in use to quantify and permit delivery to other uses • The water is deliverable to M&I and Environmental User
Additional Facts	Costs to establish and operate the FLEX Market	• Water Court adjudication (one time): $300,000 • Infrastructure (one time): $100,000 • Administration (annual): $20,000
	Value of Water	• $10,000 per consumptive use acre foot

The participants were instructed to:

- Negotiate a FLEX Agreement
  - Use 6 Keys Diagram to record attributes of agreement
- Negotiate an Initial FLEX Delivery Agreement that includes:
  - Price per acre foot (AF)
  - Term

The attendees were given 40 minutes to negotiate. Members of the study team circulated through the room, facilitating the discussions. At the conclusion of the discussion, results were gathered using the immediate feedback devices. The results of the immediate feedback devises are presented below in the same format presented to summit attendees.

Our group was able to reach agreement on

1. All six keys
2. 3-5 keys
3. 1-3 keys
4. No keys

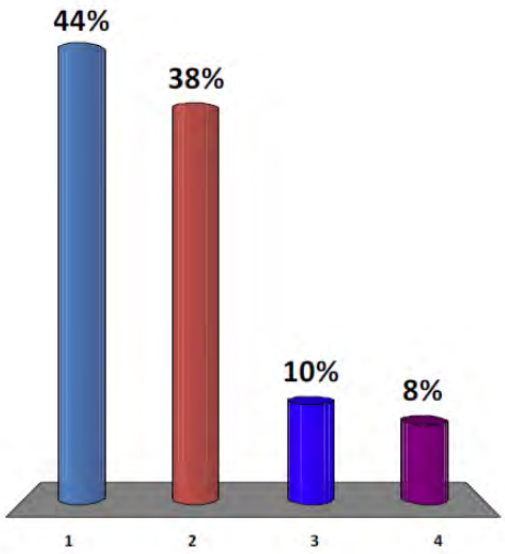

Figure 9-3. Summit Feedback

The price we negotiated for 1 acre foot of leased supply delivered to the river under our first delivery agreement was:

1. $100-$500 per acre foot
2. $500-$1000 per acre foot
3. $1000-$2000 per acre foot
4. More than $2000 per acre foot

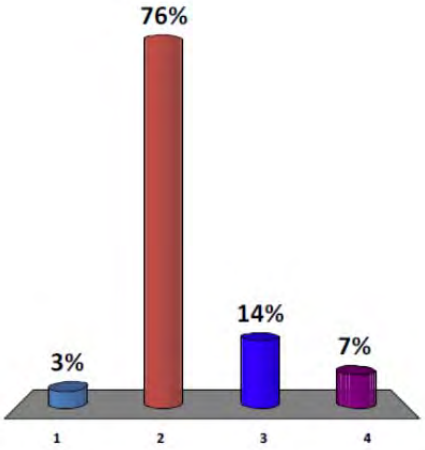

Figure 9-4. Summit Feedback

The number of participants (Ag, M&I and E/C) we envisioned for our FLEX market was

1. 1-3
2. 3-5
3. 5-10
4. More than 10

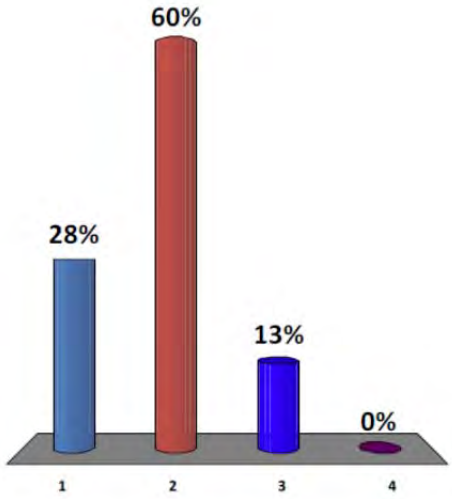

Figure 9-5. Summit Feedback

Ownership of the water rights in our agreement

1. Was to remain 100% with Ag Users
2. Was to remain largely with Ag Users, with less than 20% to M&I/E-C
3. Was to be 20%-50% M&I/E-C
4. Was to be 50% or more in M&I/E-C

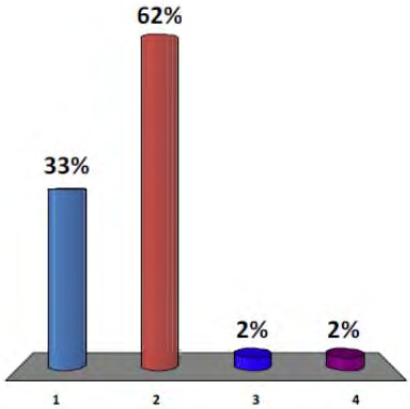

Figure 9-6. Summit Feedback

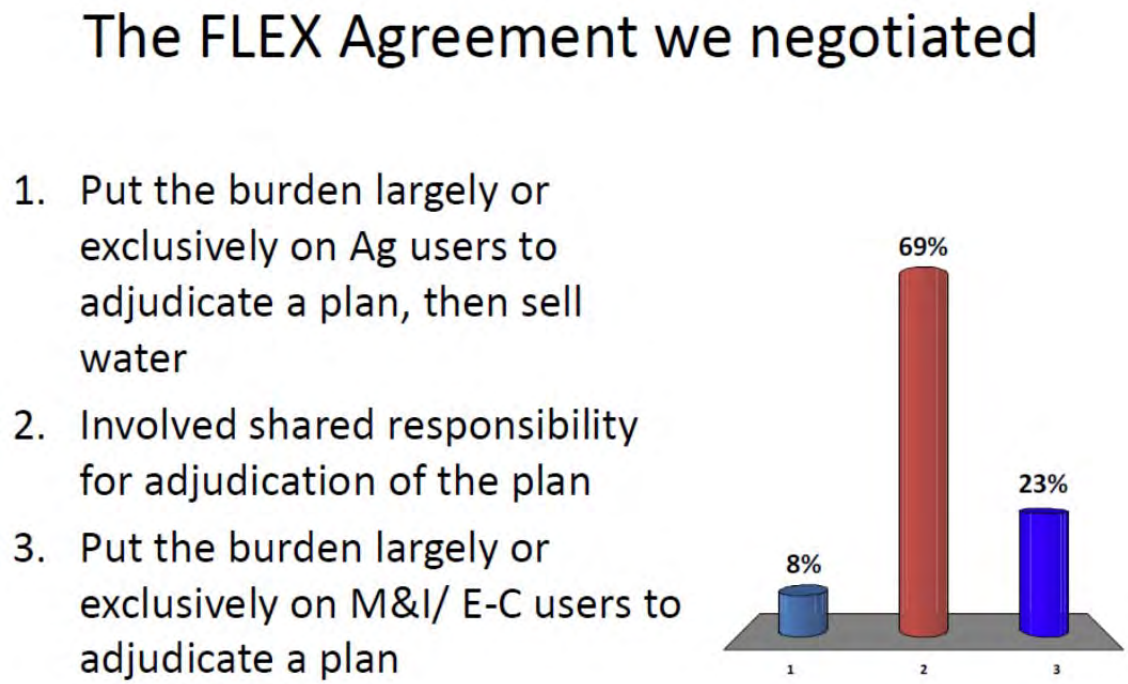

Figure 9-7. Summit Feedback

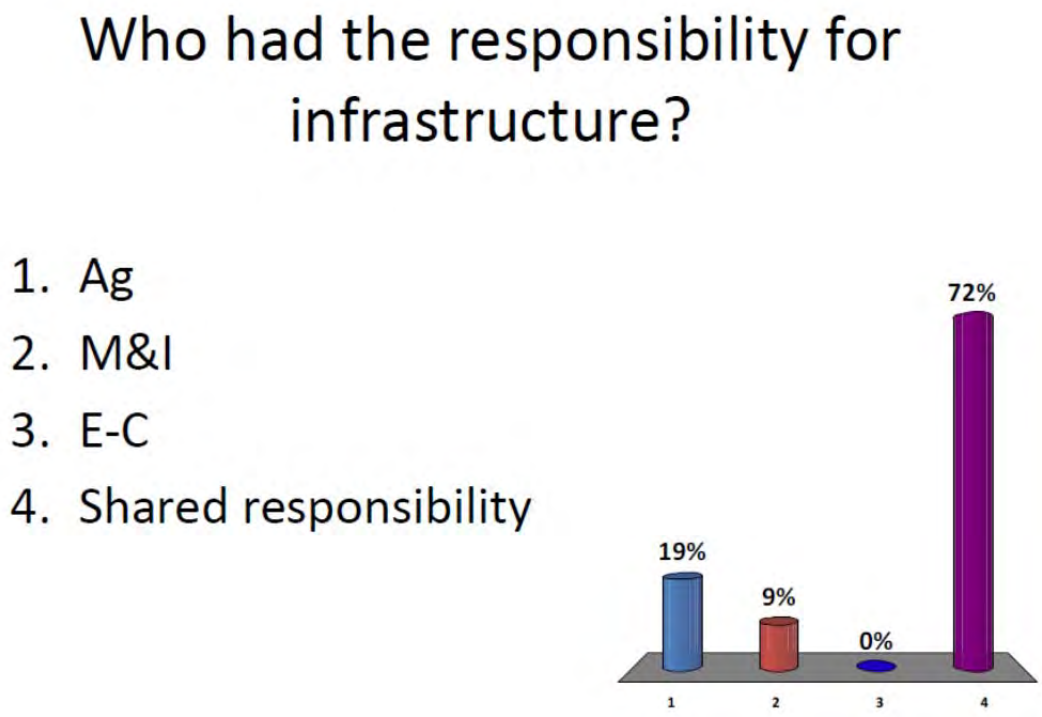

Figure 9-8. Summit Feedback

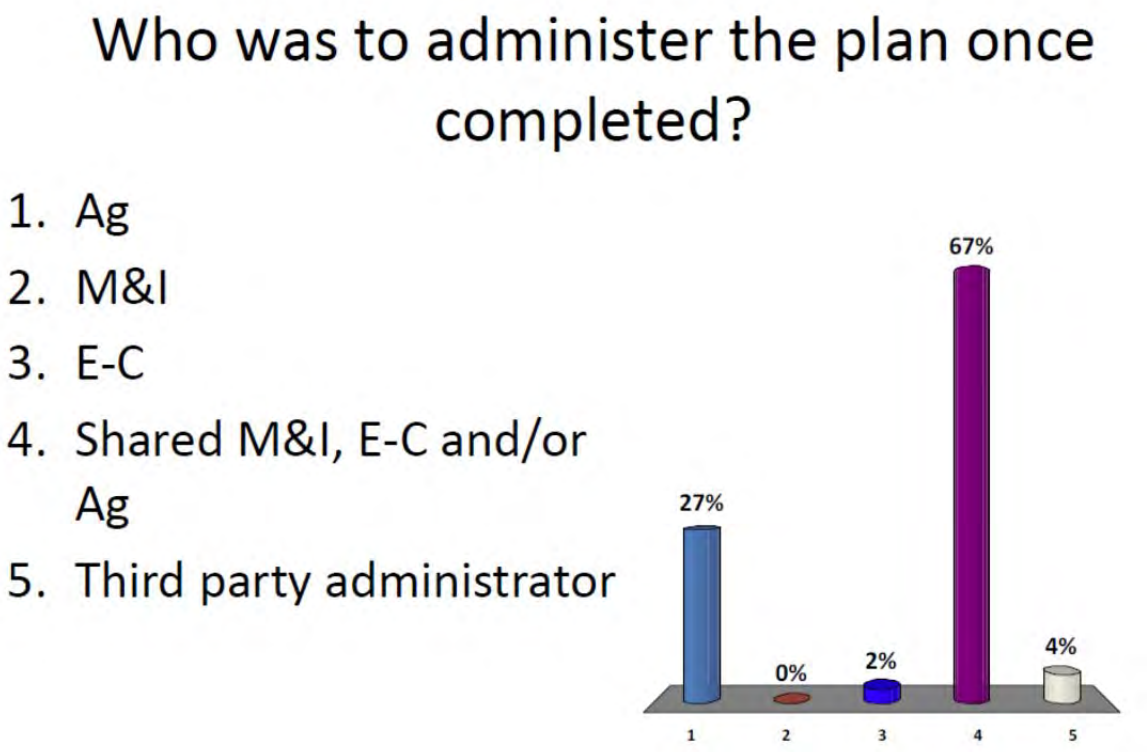

Figure 9-9. Summit Feedback

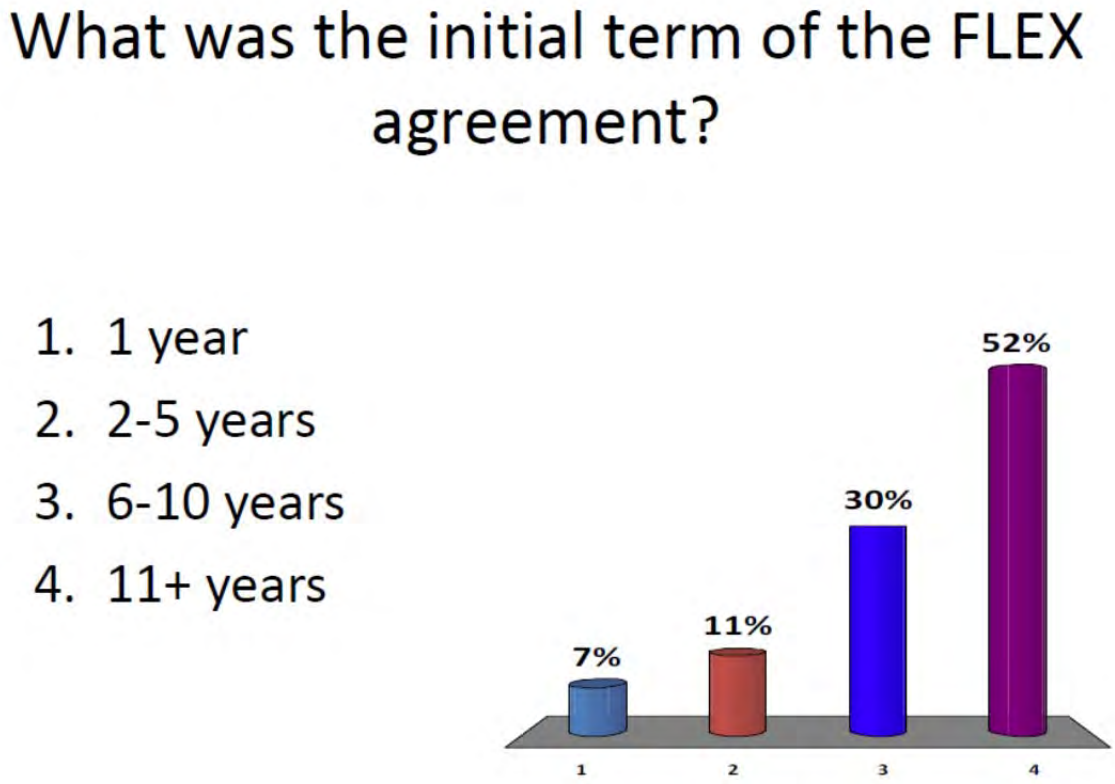

Figure 9-10. Summit Feedback

A summary of the results is provided below:

- Participants: 60% voted their FLEX Market include between 3-5 participants;
- Ownership: 62% voted that ownership of the water rights should remain largely with Agriculture, with less than 20% to M&I/Environmental and Conservation participants;
- Water Court Application: nearly 54% voted to share responsibility for adjudication of the plan;
- Infrastructure: 72% voted that responsibility for delivery infrastructure was shared;
- Administration: 67% voted that M&I, EC and Ag would share administration;
- Term: 52% voted that the term of the agreement was 11+ years.
- Price Point: 76% reported an annual price point of $500-$1000 per acre foot

The results of the FLEX Agreement negotiation exercise with respect to the six elements varied from the feedback garnered during the user group meetings with Ag, M&I, and EC Users. During the user group meetings, there seemed to be a general preference that water ownership remain with the Ag users and that water court, administration, infrastructure, etc. also be the responsibility of the Ag user. The M&I and EC Users would compensate the Ag User for water at a rate that allows the Ag User to recoup their costs for providing the water (as long as the price for water is competitive). However, the results of the FLEX Agreement negotiation exercise indicated significant interest in sharing of responsibilities and ownership.

There are several possible explanations for this divergence. The user groups were not negotiations. Each user type—M&I, EC and Ag – was segregated into groups of those sharing like interests. In contrast, the negotiation put all user types together, added attorneys and engineers, and forced a discussion of potential terms. The negotiation environment may have been more conducive to understanding the positions of other user types and thereby encouraging compromise and collaborative behavior.

In another sense, the differing results tend to verify the study team's experience and anticipation that each FLEX Agreement will be unique, because potential parties to the agreement will likely differ on their position with respect to the six elements of the agreement. The Model FLEX Agreement was written with the flexibility to account for these differences.

9.3 Panel Discussion

The third portion of the FLEX Summit consisted of a panel discussion. The panelists who participated were:

- David Hunt, Agricultural Producer
- Mark Sponsler, Colorado Corn Growers Association
- Lisa Darling, City of Aurora
- John Stokes, City of Fort Collins
- Greg Kernohan, Ducks Unlimited
- Alan Curtis, White and Jankowski, LLP
- Ed Armbruster, Leonard Rice Engineers
- Ted Buderus, Agricultural Producer

The panelists engaged in an interactive discussion regarding various topics related to the FLEX Market, including:

- What are the most promising applications of the FLEX concept?
- What are the biggest challenges to implementation of the FLEX concept?
- How did your views of alternative transfer methods change as a result of participation in the FLEX user groups?

- Do you believe the creation of FLEX type markets would tend to slow the progress of buy and dry? Why or why not?
- Why did you participate in/sponsor the FLEX study?

9.4 Interactive Questions

The interactive "clicker" questions during the summit proved to be very effective, both in terms of audience participation and substantive input. Several major trends in this data are reported in this section. The PowerPoint slides reflecting all questions and responses and additional analysis performed following the Summit are included as Appendix H.

9.4.1 A broad cross section of water users and water professionals attended the summit

The attendees were categorized by the type of water user they represented: Ag, M&I, EC or Attorney/Engineer and asked to respond to the interactive questions accordingly. The interactive question feedback is based upon responses of approximately 55 attendees who participated using the immediate feedback clickers. The composition of this group is described below:

Seventeen **Ag Users** attended the Summit (31%). They irrigated farms ranging in size from less than 160 acres (26%) to more than 1920 acres (42%), with these two farm sizes- the very small and the very large—accounting for 68% of those responding. Eighty-eight percent identified the South Platte as their primary basin.

Sixteen **M&I Users** attended the Summit (27%). The majority (68%) of the M&I Users were from municipalities exceeding 100,000 in population. Of the remaining 32%, one-half (16%) represented cities ranging in size from 5000 to 50,000 in total population, and one-half were from cities with population totals on the order of 50,000-100,000. All of the M&I Users indicated that the South Platte was their primary basin.

Eight **EC Users** attended the Summit (11%). These users reported a desire to secure water supplies for habitat creation and maintenance, maintaining agriculture and open space, sustaining in-stream flow and natural lake levels, and, to a lesser degree, for recreation. All of the EC Users indicated that the South Platte was their primary basin, though many of the entities operate on a state-wide basis.

9.4.2 Water users would participate in a FLEX Market if available

- 80% of Ag Users reported that they would "lease consumptive use and adjust my farming operation if the price was right."
- 89% of M&I Users reported that they would "lease water supplies from FLEX deliverable to my integrated system if the price was right."
- 100% of EC Users stated that they "would lease water supplies from FLEX deliverable for conservation and environmental uses if the price was right."

The principal uses Ag, M&I and EC Users envisioned for the FLEX supply included (in order of statistical significance):

- Drought Recovery
- Temporary Supply While Acquiring Permanent Supply
- Permanent Supply
- Sustaining Open Space
- Other

9.4.3 Legal issues are the single greatest barrier to ATM implementation

Summit attendees were very concerned about legal issues:

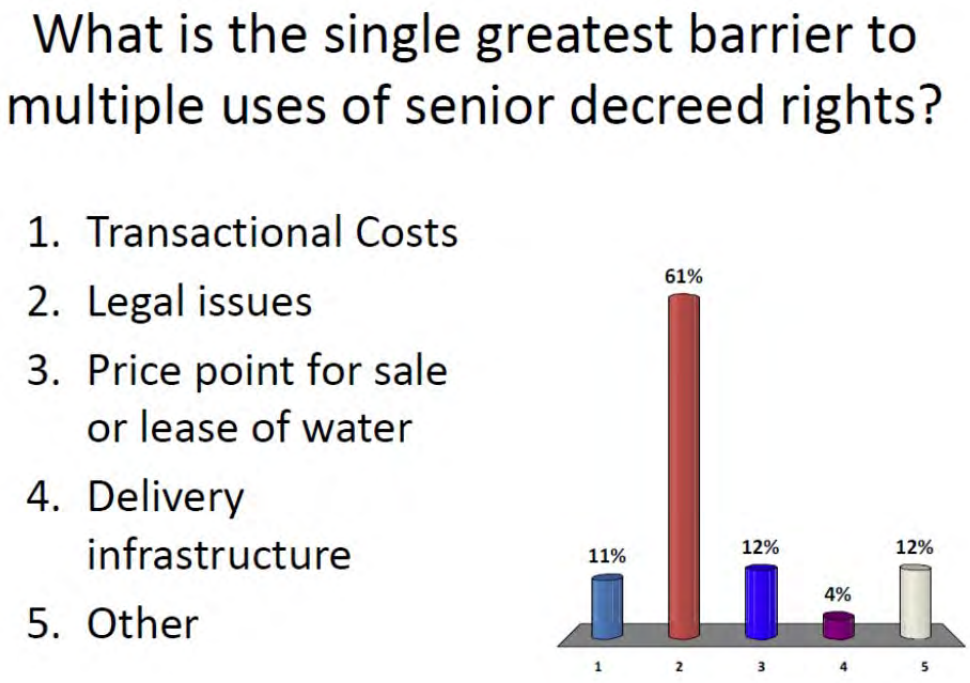

Figure 9-11. Summit Feedback

Identifying legal issues as the principal barrier to implementation of ATM approaches was common to Ag Users (53%), M&I Users (66%) and EC Users (100%). Attorneys and engineers also identified legal issues as the most significant, but by a lower margin (47%).

Transactional costs were viewed as a "substantial barrier."

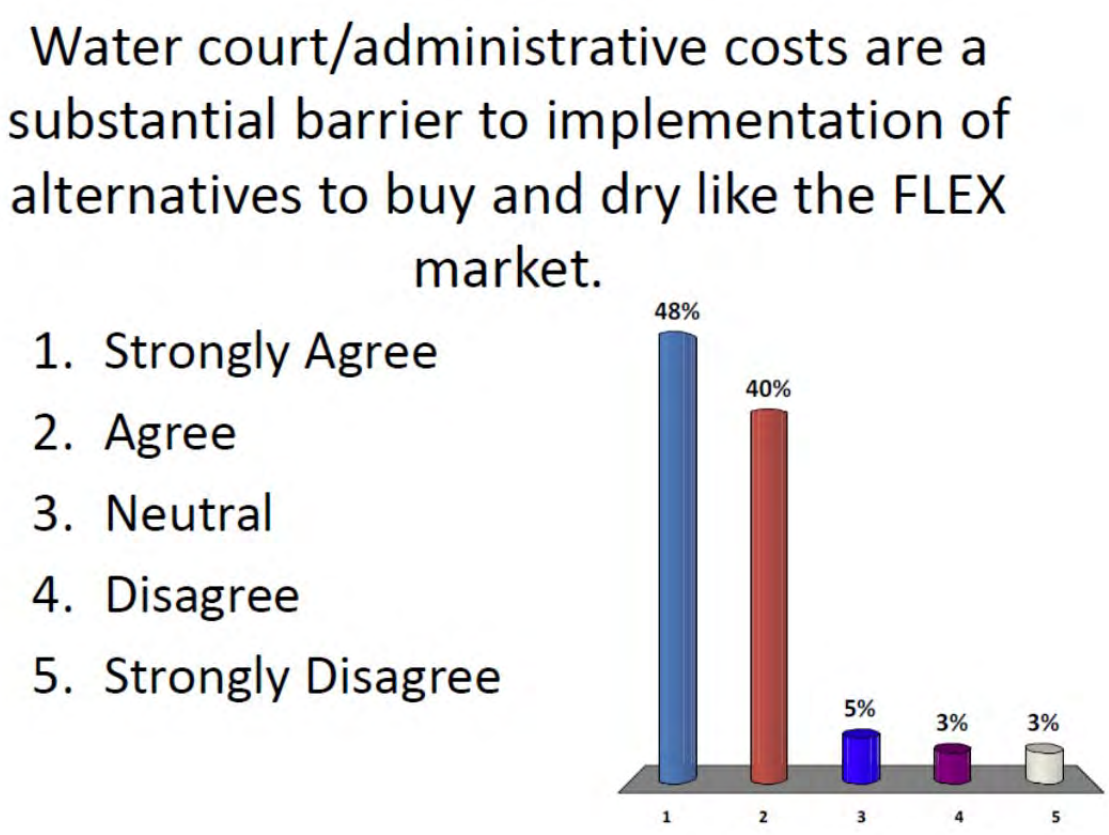

Figure 9-12. Summit Feedback

This result held across M&I Users (86% agree with the statement), Ag Users (92%), EC Users (83%), and attorneys/engineers (81%). Those attending the Summit communicated clearly that legal issues and transactional cost were principal factors inhibiting ATM implementation.

Section 10

Lower Latham Demonstration Project

The Lower Latham demonstration project focused on the establishment of a FLEX Market to provide water to unspecified end users either upstream (via exchange), locally, or downstream via direct delivery. The description of the Lower Latham demonstration project provides an overview of the amount of water available for temporary transfer, strategies for delivering water, and recommendations on new infrastructure that could potentially be useful in efficiently operating a FLEX Market on the Lower Latham system.

10.1 Description of the Lower Latham System and Water Supplies

Irrigators on the Lower Latham Ditch hold shares in the LLDC and/or LLRC. In addition, other supplies from the Union Ditch Company, Farmers Reservoir and Irrigation Company (FRICO), Colorado-Big Thompson, and the Boxelder Waste Ditch No. 2 have historically been delivered to irrigators under the Lower Latham system to supplement supplies from the LLDC and LLRC.

The Lower Latham Ditch diverts water from the South Platte River just south of Greeley, Colorado near the town of LaSalle. The configuration of the Lower Latham Ditch and other important features are shown in Figure 10-1. Irrigated fields under the Lower Latham Ditch are generally east of the Lower Latham diversion. The Lower Latham Ditch terminates south of Hardin, Colorado.

The Lower Latham Reservoir is located on the Morrison Seepage Ditch (at the northern end of Beebe Draw) and to the south and west of irrigated lands on the Lower Latham system. The reservoir can be filled via a lateral off of the Union Ditch or by capturing flows in Morrison Seepage Ditch. Releases from Lower Latham Reservoir are conveyed via a lateral running north from the reservoir to the Lower Latham Ditch.

The Lower Latham system can directly return water to the South Platte River at four locations. Each of these return locations are shown on Figure 10-1 and are described below:

- The Gibbs Spillway is located just downstream of the Lower Latham headgate and can return water to the South Platte River at a location midway between the Lower Latham and Patterson Ditch headgates.
- The Powell Spillway is the next return location downstream of the Gibbs Spillway. The Powell Spillway returns water to the South Plate River at a location midway between the Patterson Ditch and Highland Ditch headgates and just upstream of the confluence of the Cache la Poudre and South Platte Rivers. The Powell Spillway is located on the Lower Latham Ditch just downstream of where the Lower Latham Outlet discharges into the Lower Latham Ditch. The Powell Spillway can be used to deliver water from the Lower Latham Reservoir directly to the South Platte River.
- The Box Elder Creek Return Structure is the next downstream location where water could potentially be delivered from the Lower Latham system to the South Platte River. The Box Elder Creek Return Structure discharges water into Box Elder Creek, which eventually discharges into the Empire Reservoir fill ditch. Use of this return location would require coordination with the Bijou Irrigation District to release water from the fill ditch to the South Platte River. Water returned to the South Platte River would be discharged just downstream of the Riverside Canal headgate and upstream of the Illinois Ditch headgate.
- The Weld County Road (WCR) 69 Spillway is located at the end of the Lower Latham Ditch. The WCR 69 Spillway returns water to the South Platte River at a point midway between the Illinois Ditch and Bijou Ditch headgates.

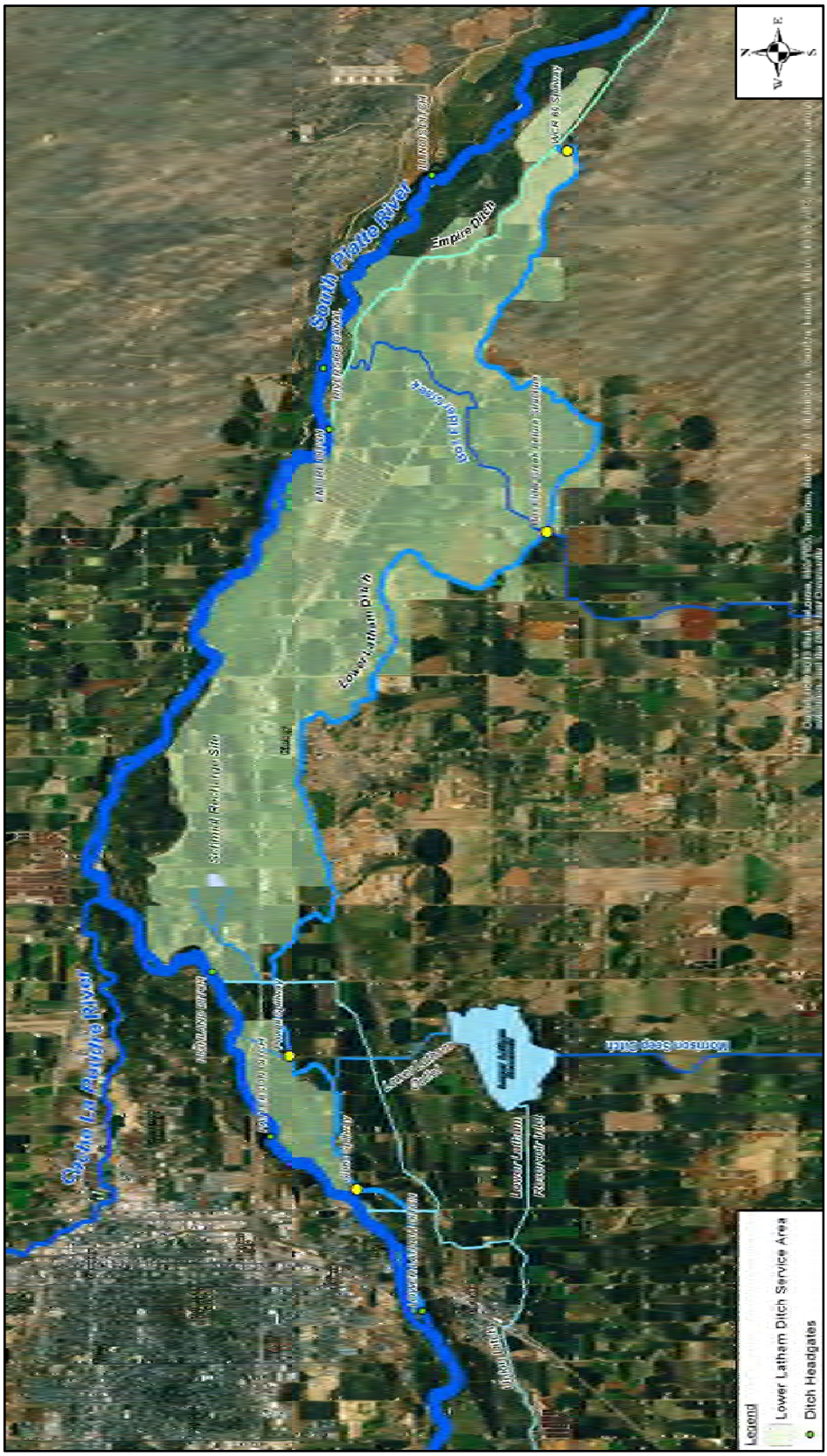

Figure 10-1. Overview of the Lower Latham System

The LLDC has four water rights that are decreed for irrigation use. They are described in Table 10-1 below. There are 200 outstanding shares in the LLDC.

Table 10-1. Description of LLDC Direct Flow Water Rights

Priority Number	Appropriation Date	Adjudication Date	Case No.	Decreed Diversion Rate (cfs)
15	May 12, 1869	April 28, 1883	CA6009	20.40
37	December 12, 1874	April 28, 1883	CA6009	35.77
46	November 14, 1877	April 28, 1883	CA6009	97.68
53	October 24, 1881	April 28, 1883	CA6009	133.88

The LLRC has three storage rights Lower Latham Reservoir. The storage rights are described in Table 10-2. There are 156 outstanding shares in the LLRC.

Table 10-2. Description of LLRC Storage Rights

Priority Number		Appropriation Date	Adjudication Date	Case No.	Decreed Amount (cubic feet)	Decreed Amount (AF)
14	Original Construction	June 23, 1898	August 2, 1918	CA54658	188,400,000	4,325
17	First Enlargement	June 24, 1900	August 2, 1918	CA54658	62,300,000	1,430
56	Enlargement	August 7, 1915	November 12, 1924	CA54658	95,000,000	2,181

10.2 Historical Direct Flow Diversions

The Lower Latham demonstration project focused on the use of the LLDC's direct flow rights as the source of supply for a FLEX Market. An analysis of LLDC's direct flow diversions was conducted to obtain an understanding of the historical variability of diversions associated with the LLDC direct flow rights.

Monthly diversion data associated with the LLDC direct flow irrigation right were obtained from Hydrobase. The diversion data spanned the 1950 to 2010 time period. The diversion data were analyzed to evaluate the variability of diversions. The evaluations are described below:

- Annual diversions: Figure 10-2 shows the annual diversion amounts associated with the Lower Latham direct flow right for the period 1950 to 2010. Diversions were generally in the 30,000 to 40,000 AF/yr range with a few years falling above and below this range. In the drought years of the mid-1950s and the early 2000s, as well as in 1966 and 1979, annual diversions dropped below 30,000 AF. Since the mid-1980s, annual diversions have been above 40,000 AF/yr in most years. On average, diversions associated with the LLDC direct flow right were approximately 38,000 AF/yr over the 1950 to 2010 time period.
- Monthly diversions: Figure 10-3 shows the average monthly distribution of diversions associated with the direct flow irrigation right. Diversions generally start in April, peak in July and August, and cease at the end of October. Average July diversions have been approximately 10,000 AF, and average August diversions have been approximately 9,000 AF over the period of record, which combined represent approximately half of the total annual diversions of the direct flow right.

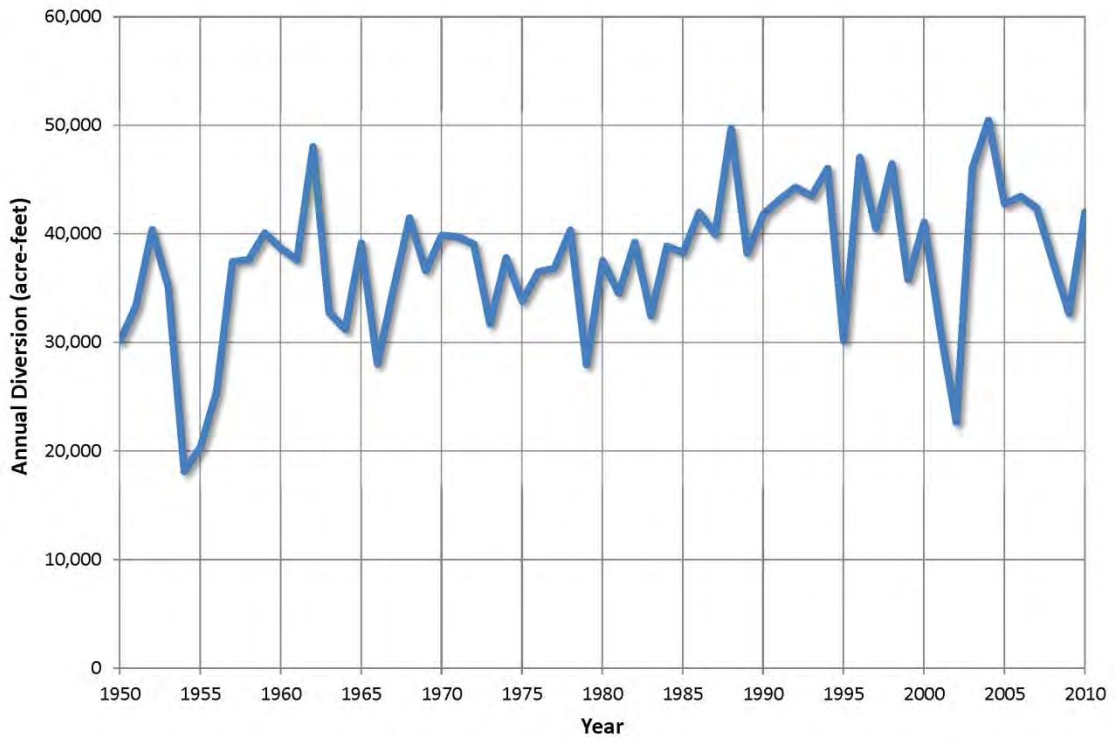

Figure 10-2. Annual Diversions of the Lower Latham Ditch Direct Flow Right

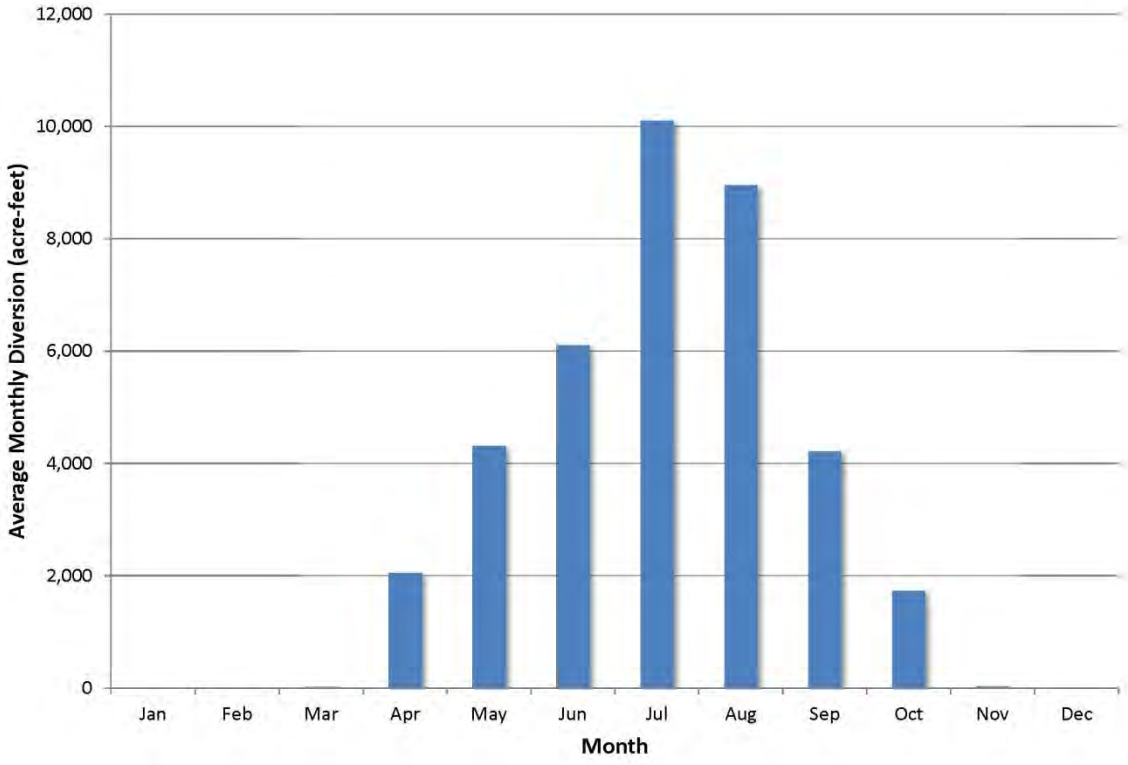

Figure 10-3. Average Monthly Diversion of the Lower Latham Direct Flow Water Right

10.3 Historical Use and Return Flows Associated with the LLDC Direct Flow Right

The historical consumptive use (HCU) analysis conducted by Clearwater Solutions formed the basis of the consumptive use and return flow data used for this demonstration project. As described previously, the Clearwater Solutions analysis was conducted in Water Court Case No. 03CW047/06CW291. The Engineering Report associated with this analysis was released in September of 2011.

The Clearwater HCU analysis was conducted on the LLDC direct flow right, and it involved 29.5 of the 200 outstanding shares in the LLDC or approximately 15% of the total shares in the company. Because it only included a subset of the total shares in the company, it is not a comprehensive assessment of historical use of the LLDC direct flow right. However, for the purposes of this demonstration project, the Clearwater historical use analysis was assumed to be sufficiently representative to develop a preliminary understanding of the transferrable consumptive use and return flow obligation associated with shares in the LLDC.

The HCU analysis was conducted over the 1950 to 2000 timeframe and considered a crop mix on the subject farms that included alfalfa, corn-grain, corn-silage, sugar beets, dry beans, onions, spring grains, winter wheat, and grass pasture. Total irrigated acreage fluctuated over the period of record but averaged 1,486 acres. Irrigation methods used on the various farms included furrow, surface (non-furrow), and controlled flood. On-farm irrigation efficiencies ranged from 46% to 64%.

The Clearwater HCU analysis estimated that the LLDC shares would yield 61 AF of transferrable consumptive use per share. Return flows occurring as surface runoff totaled 21 AF/share, and subsurface return flows were estimated to be 76 AF/share. Total surface and subsurface return flows totaled 97 AF/share. Again, these estimates were based on an analysis of approximately 15% of the total outstanding shares in the LLDC. For the purposes of the demonstration project, it was assumed that the HCU analysis results for these shares are representative of all of the ditch shares. Future HCU analyses may show different results.

Assuming that the results of the Clearwater HCU analysis are representative of the ditch as a whole, it is possible that the total consumptive use associated with the 200 outstanding LLDC shares is approximately 12,000 AF/year (200 shares at 61 AF of average annual consumptive use per share). It follows that total return flows occurring under the ditch as a whole have been approximately 19,000 AF/yr. It should be noted that available aerial photography indicates that center pivots have been installed on some fields in the Lower Latham system. Future historical use analyses may suggest different HCU and return flows on these fields because of higher irrigation efficiencies associated with center pivots.

10.4 Reliability Requirements of End Users

Specific end users were not identified under this demonstration project. However, the study team is aware of a wide variety of potential end users that would potentially benefit from establishing a FLEX Market with the LLDC. Potential end users were grouped into upstream, local, and downstream categories. It should be noted that none of these entities were contacted to gauge their interest in participating in this specific demonstration project.

Upstream end users may include a variety of municipal water providers. The newly formed WISE Partnership, which involves the City of Aurora, Denver Water, and the South Metro Water Supply Authority, opens up the potential to involve a wide range of potential municipal FLEX Market participants by exchanging supplies to the Prairie Waters well field. In addition, water suppliers such as the City of Brighton, East Cherry Creek Valley Water and Sanitation District, Arapahoe County Water and Wastewater District, South Adams County Water and Sanitation District, etc. are potential end users of supplies from a FLEX Market.

Local end users may include the City of Greeley, City of Fort Collins, Northern Colorado Water Conservancy District, water suppliers for oil and gas exploration, agricultural water users with augmentation plans, United Water and Sanitation District, or smaller municipalities. In addition, the LLRC recently established an augmentation plan using LLDC shares for augmentation supply. The LLRC's augmentation plan could potentially be a participant in a FLEX Market.

Downstream end users may include the potential Lower South Platte Water Cooperative, augmentation plans, municipal water suppliers, and water suppliers for oil and gas exploration.

Reliability requirements of end users will vary depending on the type and amount of water supplies that have already been acquired by the end users. If a water provider has already acquired sufficient "base" supplies to meet their needs in normal years, FLEX water may be more useful to the water supplier as a dry year or firming supply. During the collaborative FLEX Market meetings with municipal suppliers, a strong preference was expressed for using FLEX water periodically for drought recovery or for firming supplies as opposed to using FLEX water for base supply that would be used in every year. Other potential end users such as augmentation plans or municipalities that are increasing their base water supplies may need water on a yearly or more regular basis.

Reliability requirements of end users should be a key discussion point during future negotiations of a FLEX Market contract. The reliability and required delivery schedule of water supplies will greatly affect how the water market operates. For example, if a water provider needs FLEX water to rebuild storage supplies at the conclusion of a drought, water could potentially be delivered during the irrigation season and/or when exchange capacity is available. However, if a municipal water supplier needs water on a regular basis and throughout the year, additional infrastructure may be needed to convey water to the end user or to recharge and retime supplies so that water is available at times outside of the irrigation season. These types of strategies will be discussed with respect to the Lower Latham system in a subsequent section of this report.

10.5 Delivery Strategies

Specific water delivery strategies for a FLEX Market involving the Lower Latham system will be dependent on the location and type of end users and the timing and reliability requirements of delivery. Because actual end users were not defined for this demonstration project, delivery strategies evaluated for this report are more general in nature. The intent of these strategies will be to provide an overview of potential ways to deliver water that will need to be refined when actual end users are identified and their points of delivery and timing and reliability requirements are defined. Delivery strategies for upstream, local, and downstream uses are described below.

10.5.1 Upstream Delivery

Water delivered to upstream water users such as the Aurora or Brighton would need to be exchanged or delivered via pipeline. Given the high costs of pipeline construction, exchange strategies were evaluated for the purposes of this study. Note that if enough entities participate in a FLEX Market and enough water was made available via the market, projects such as a pipeline may at some point be economically viable.

FLEX water supplies diverted into the Lower Latham Ditch could be returned to the river through the spillways described earlier in this report. If water is to be exchanged to upstream users, it would make the most sense to return diverted water to the South Platte River through the Gibbs Spillway. This water could then be exchanged upstream to the Prairie Waters well field, storage facilities, or into other ditches for delivery to recharge facilities owned and operated by upstream water users or ditch companies.

Several ditch headgates divert water from the South Platte River in locations that are between the Gibbs Spillway and upstream points of potential delivery (see Figure 10-4). Some of these ditches call for water during the irrigation season or water storage season. When a ditch located between the exchange "from"

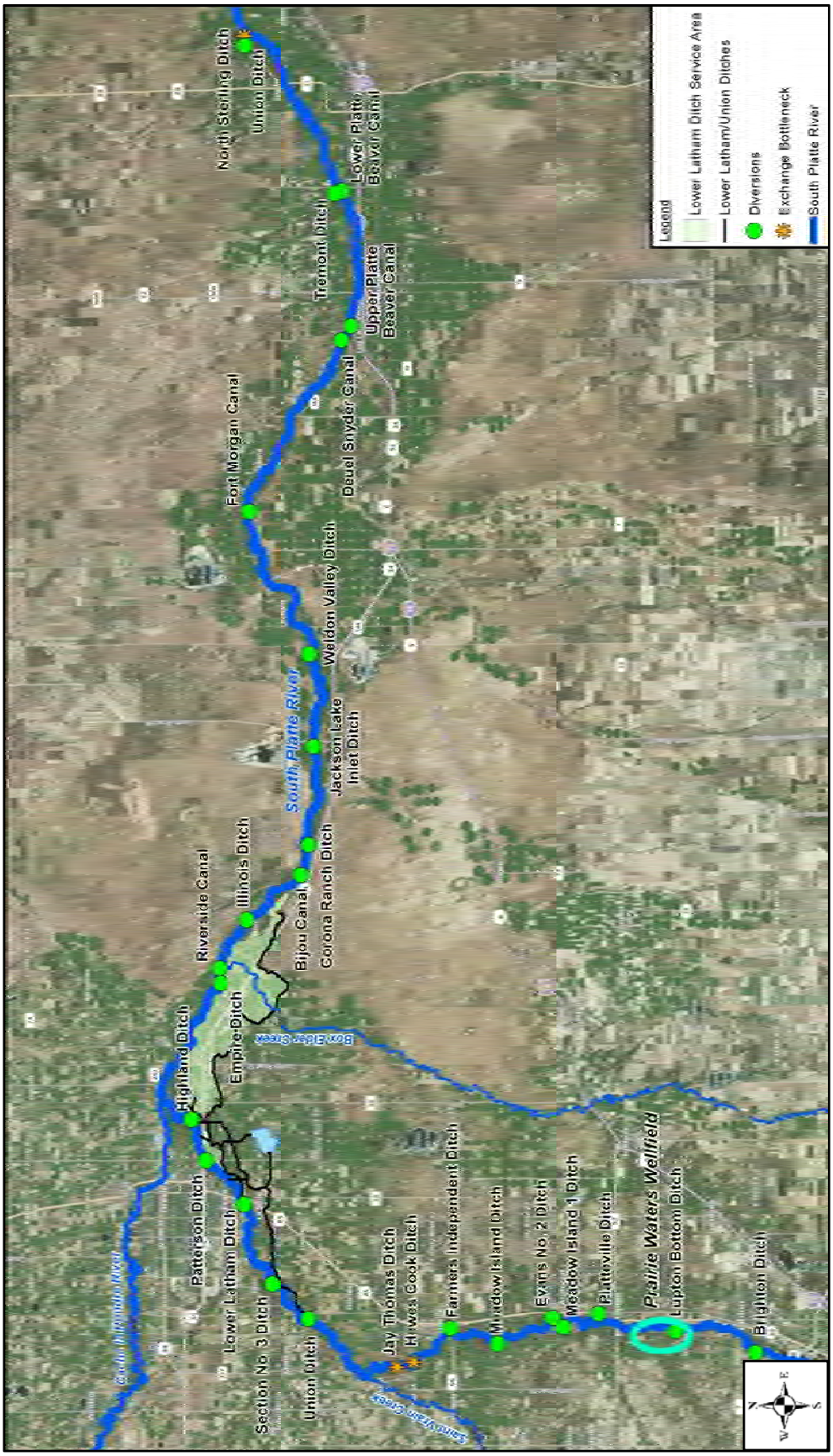

Figure 10-4. Ditch Headgates and Exchange Bottlenecks on the South Platte River

the exchange capacity available in the South Platte River between the Gibbs Spillway and upstream end user locations (see Section 3.5.2 for a description of the tool).

Figure 10-5 summarizes the average number of days per month in recent years that various ditches have called for water. The most frequent calling rights are the Hewes Cook and Burlington Ditches. The Hewes Cook, calls primarily during the peak irrigation season, but also in the spring and late irrigation season (September). The Burlington calls in nearly every month of the year. The Hewes Cook calls were the focus of this demonstration project, because it is between the Lowe Latham system and end user facilities such as the Prairie Waters Project. The data in Figure 10-5 shows average number of call days for various ditches during various months and suggests that, on average, the Hewes Cook calls from 10 to 13 days each month during July and August in a typical year. However, the records show that in recent years, the Hewes Cook placed calls that lasted entire months. It should be noted that prior to 2007, the Jay Thomas Ditch frequently placed calls on the river that lasted most or all of the peak months of irrigation (July and August), and the Hewes Cook did not place calls as frequently. From 2007 to 2010, there were no Jay Thomas calls placed, and the Hewes Cook became the primary calling right upstream of the Lower Latham system. In the future, it is likely that the Hewes Cook call will prevent exchange from the Lower Latham system to upstream locations during the much of the irrigation season. Other calling ditches that would periodically impact the ability to exchange water upstream from the Lower Latham system include the Farmers Independent, Union, and Section No. 3 ditches.

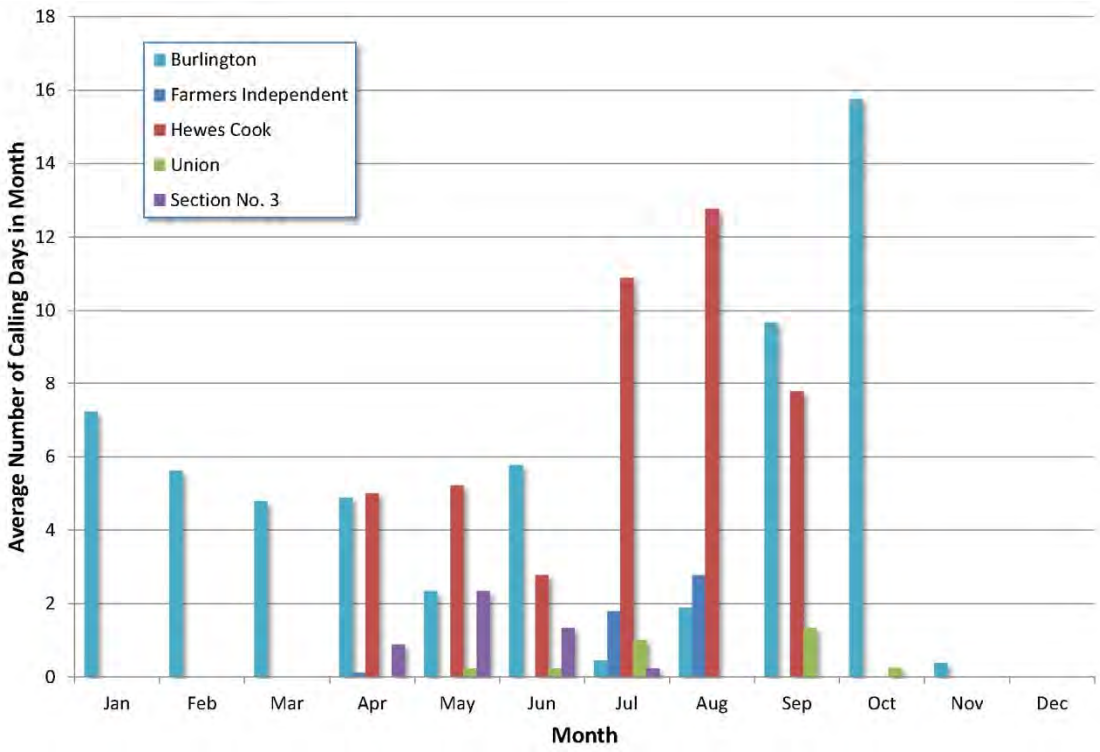

Figure 10-5. Average Number of Calling Days per Month for Various Ditches Upstream of the Lower Latham System (2002 to 2010)

In addition to calls, physical river flow can sometimes be a limiting factor in exchanging water, because the Division Engineer limits exchange capacity to the minimum physical flow in an exchange reach. The exchange capacity tool was used to analyze potential physical flow limitations on exchange with a focus on

the Hewes Cook diversion. Figure 10-6 shows the results of a frequency analysis used to quantify the magnitude and variability of exchange capacity through the Hewes Cook diversion. Approximately 78% of the time, there was some amount of exchange capacity through the diversion because the Hewes Cook was not calling for water and there was flow running past the diversion structure. Approximately 75% of the time, there was at least 100 cfs of exchange capacity. During 3% of days in the analysis, there was a small amount of flow in the river (less than 100 cfs) on which to exchange through the Hewes Cook.

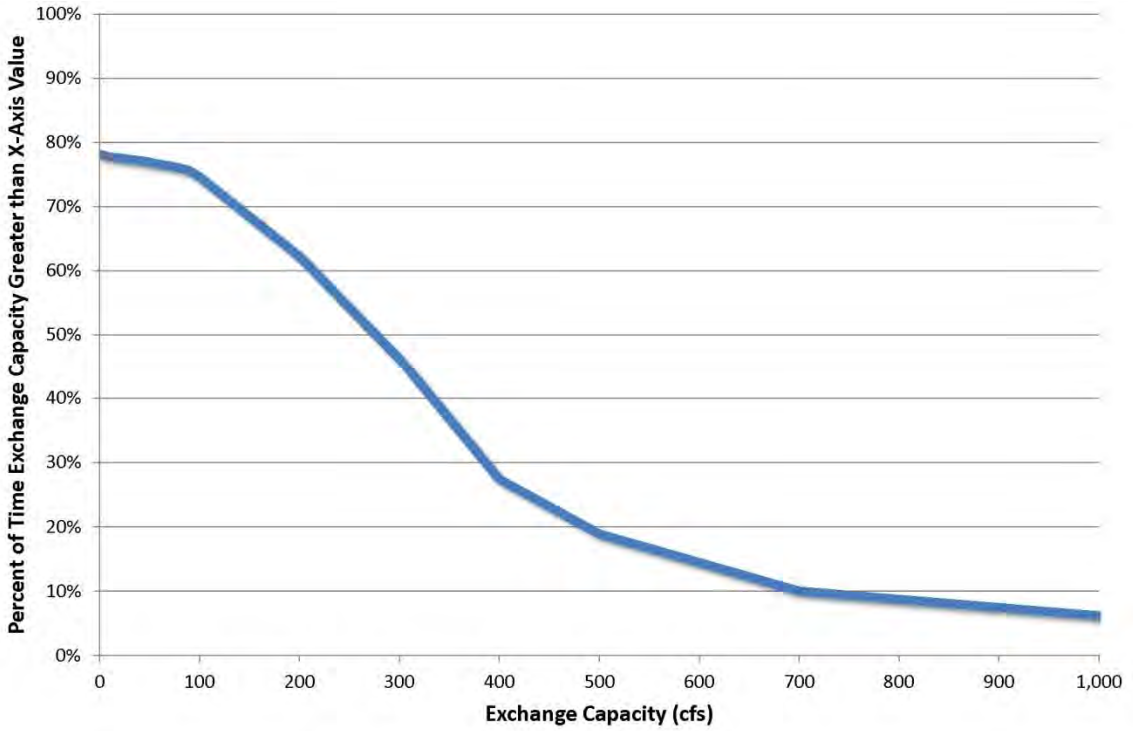

Figure 10-6. Frequency Analysis of Exchange Capacity through the Hewes Cook Diversion

The amount of water that would potentially be exchanged through the Hewes Cook diversion from the Lower Latham system would likely not be large in terms of cfs. As described earlier in the report, the total amount of transferrable consumptive use associated with LLDC shares may be around 12,000 AF/yr. Assuming that 15% of shareholders would participate in a temporary transfer in a particular year, the total amount of transfer would be 1,800 AF. Further, if approximately 30% of the annual transfer amount were available during July (the peak month for irrigation diversions), then the peak monthly amount of transferrable water would be approximately 540 AF. Reduced to a daily flow rate, the necessary rate of exchange would be approximately 9 cfs. Given the small amount of water that would need to be exchanged, it does not appear that exchange limitations based on physical flow availability will be a frequent occurrence. Table 10-3 tends to verify this conclusion. Table 10-3 describes the range of monthly exchange capacities that could be expected through the Hewes Cook Ditch headgate (when exchange is available). The data in Table 10-3 was developed using the exchange capacity tool and a statistical evaluation of tool output.

Table 10-3. 90% Confidence Interval for Exchange Capacity Through the Hewes Cook Ditch Headgate.		
Month	Lower Limit (cfs)	Upper Limit (cfs)
January	277	302
February	337	360
March	378	426
April	492	615
May	819	990
June	960	1135
July	486	561
August	503	607
September	211	247
October	321	363
November	408	435
December	301	324

While upstream calling rights may limit the potential to exchange water from the Lower Latham system during the irrigation season, calls during the non-irrigation season are very rare between the Lower Latham system and the Burlington Ditch headgate (information regarding exchange potential through the Burlington Ditch headgate is included in Section 11). On a few occasions during the period of record (a total of 13 days) the Platte Valley Canal called for water during the storage season. If exchanges could be limited to times outside of the irrigation season, they could be reliably conducted. However, transferrable consumptive use from LLDC shares is available during the irrigation season, which presents a timing issue. Strategies for retiming supplies within the Lower Latham system are discussed in a subsequent section of this report.

One particular strategy for overcoming exchange bottlenecks like the Hewes Cook could involve the construction of a pumping station on the South Platte River just downstream of the Hewes Cook headgate and the installation of a pipeline from the pumping station to the Hewes Cook Ditch. If, for example, the Lower Latham had 9 cfs to exchange upstream of the Hewes Cook when this ditch was calling for water, the pumping station could be used to supply 9 cfs of additional flow to the Hewes Cook from a location downstream of the Hewes Cook headgate. The provision of the additional 9 cfs would then potentially permit a 9 cfs diversion of water from the South Platte River upstream of the Hewes Cook. In other words, the Lower Latham could conduct the exchange based on the amount of additional water provided to the Hewes Cook via the pumping station. The pumping station would need to be constructed at a location downstream of the Hewes Cook headgate where at least 9 cfs of stream flow (or whatever amount is necessary) would be physically available to pump. The Hewes Cook parallels the South Platte River for a few miles downstream of the headgate, which provides options for locating a pumping station and relatively short pipeline. Opening up exchange capacity through the Hewes Cook would be of interest to other water users on the South Platte River, and it is likely that the Lower Latham could find interested parties to share the construction and maintenance costs and use of the infrastructure.

10.5.2 Local Delivery

Several alternatives are available for delivering water to meet demands that are near the Lower Latham system. The Gibbs and Powell spillways could be used to make direct deliveries of water to the South Platte River upstream of the confluence with the Cache la Poudre. Deliveries could also be made through the WCR 69 spillway at the end of the Lower Latham Ditch. Alternatively, water could be delivered via recharge accretions at nearly any point along the South Platte River where it parallels the Lower Latham system if transferrable consumptive use were placed into existing or new recharge facilities. Deliveries made via

recharge would, of course, only be available for rediversion or exchange by end users once the deliveries accrete to the river.

10.5.3 Downstream Delivery

Downstream deliveries could be made by returning water to the river through the various spillways on the Lower Latham system described previously. However, it may be most advantageous to make deliveries through the WCR 69 spillway to avoid transit losses associated with delivery of transferrable consumptive use through the Gibbs or Powell spillways and conveyance of the water down the South Platte River. The FLEX Market participants would need to work with the Division Engineer to make sure that deliveries are shepherded down the river past diversion headgates and to the intended end user.

10.5.4 Strategies for Managing Deliveries Out of the Lower Latham System

Actions may be necessary within the Lower Latham system to change the timing of availability for FLEX water to meet the reliability requirements of end users. For example, if an end user needs water throughout the year, transferrable supplies from the Lower Latham system may need to retimed via recharge or storage.

The Lower Latham system currently has one recharge pond, the Schmidt Recharge Site, located in the western part of the service area. FLEX Water could potentially be delivered to the Schmidt Recharge Site for retiming. Approximately half of the water recharged to the alluvial aquifer at this site will return to the South Platte River over 12 months, resulting in relatively short, but potentially useful attenuation of FLEX water. For example, Figure 10-7 shows the recharge accretion pattern from the Schmidt Recharge Site assuming that 10 AF are recharged into the site each month over the May to September time frame. Recharge accretions at the South Platte River peak in October and November and persist into the winter months. Approximately half of the recharge returns to the river by the following May. Given this accretion pattern, the Schmidt Recharge Site could be useful in providing FLEX water into the winter and spring when diversions of LLDC shares are not occurring. The data in Figure 10-7 were developed using the Alluvial Water Accounting System (AWAS) and Glover parameters shown in Table 10-4.

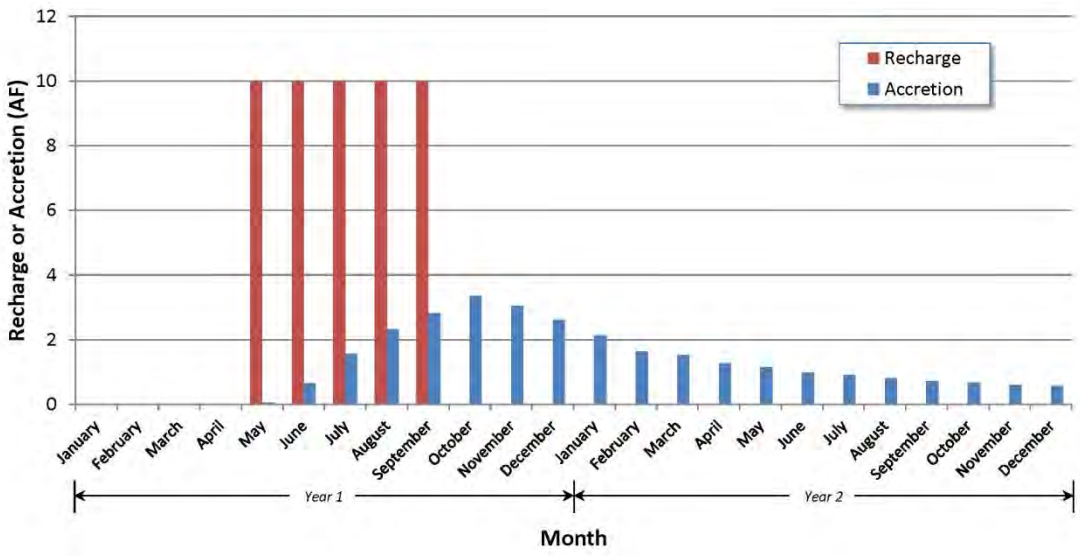

Figure 10-7. Recharge and Accretion Patterns for the Schmidt Recharge Site

Additional recharge sites could be constructed to help attenuate recharged FLEX water to meet firm demands. For example, if a recharge facility were constructed farther away from the South Platte River, and FLEX water was delivered to both the Schmidt Recharge Site and the new recharge facility, lagged recharge accretions could be generated relatively quickly (through the Schmidt Recharge Site) and could be attenuated over a bit longer period (using the new recharge facility) if recharge deliveries to the ponds were interrupted due to senior calls, extremely dry conditions or other factors. Figure 10-8 illustrates how this could occur. Recharge accretion patterns for both the Schmidt Recharge Site and a potential new facility and the combined accretion pattern for both sites are shown in Figure 10-8. The accretion patterns were developed using AWAS and the Glover Parameters shown in Table 10-4.

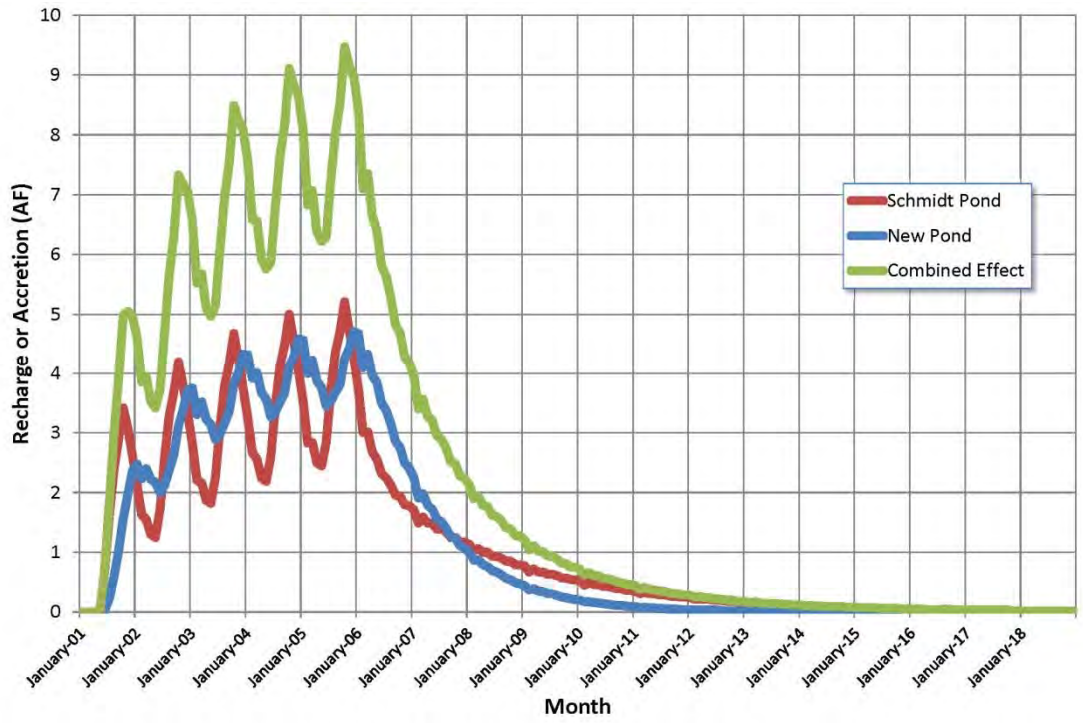

Figure 10-8. Accretion Patterns for Ponds that are Closer to and Farther Away from the South Platte River

Table 10-4. Glover Parameters for Lagging Analysis of Recharge Alternatives

Recharge Facility	Distance from river to alluvial boundary (feet)	Transmissivity (gpd/ft)	Specific Yield	Distance from river to farm (feet)
Schmidt Recharge Site	14,239	131,683	0.2	5,146
Potential New Recharge Site	11,298	175,467	0.2	9,972

The accretion patterns shown in Figure 10-8 assume that 10 AF/month are placed into recharge in each pond during the months of May through September for 5 consecutive years. In the 6th year (the first year after recharge deliveries cease) recharge accretions follow a decreasing trend, but a significant amount of recharge would still reach the South Platte River. Recharge accretions would continue to decline at a relatively rapid rate over the next 2 to 3 years if no water was delivered to recharge.

The Lower Latham system is located in relatively close proximity to the South Platte River, and recharge lag times for new recharge facilities would be somewhat short compared to other locations along the South Platte River. Figure 10-9 shows contours of lagging patterns for locations along the South Platte River. The contours were developed during previous work by the study team on alternative water transfers. The contours were generated using the Glover methodology and reflect the amount of time that it would take 50% of the water recharged in any particular location to accrete to the South Platte River. As shown in Figure 10-9, it would take 6 months to a little over 1 year for 50% of recharged water to reach the South Platte River in most of the Lower Latham service area. In some locations along Box Elder Creek, the lag times may be longer, but the contours reference the South Platte River as the water body to which lagged recharge accretions will return. Box Elder Creek may be the water body that would receive the lagged recharge, in which case the lag times would be shorter.

Historically, the Lower Latham Ditch has diverted a relatively consistent amount of water on an annual basis, and it is unlikely that deliveries of FLEX water would be interrupted for more than a year. Given the historical reliability of the water right, it is likely the use of multiple recharge sites with shorter and longer lags within the Lower Latham system would be sufficient to produce a relatively reliable supply of recharge accretions at the South Platte River.

It is possible that some temporary storage of FLEX water could be achieved in the Lower Latham Reservoir. The temporary storage might be accomplished via an internal trade of supplies using Lower Latham Reservoir Company shares. However, the FLEX water could only be stored until the reservoir fill season during which the FLEX water would need to be released to make room for LLRC storage supplies.

If FLEX water supplies are available at a time when either upstream exchange capacity is insufficient or no end users are in need of water, the available supplies could be exchanged back up to the Lower Latham ditch headgate for “redelivery” to a recharge facility. Alternatively, a pumping station and pipeline could be constructed to capture unused FLEX water from the South Platte River and deliver the water back up to a recharge facility.

10.5.5 Maintenance of Historical Return Flows

When FLEX water is transferred out of the Lower Latham system, the historical return flows will need to be provided in the proper amount, time, and location. The example decree terms and conditions described in this report contemplate “pay-as-you-go” or return flow accounting strategies for meeting return flow obligations.

Under the pay-as-you-go system, it is likely that smaller recharge basins would need to be constructed on the Lower Latham farms that participate in the FLEX Market. When the water from a particular farm is being transferred the subsurface historical return flows associated with the shares on that farm could be delivered to a recharge basin on the farm. In this way, the historical timing of return flows would be matched. Surface return flows could be delivered to the South Platte River via one of the spillways described earlier in this report. The pay-as-you-go system would offer the advantage of only needing to deliver and manage the subsurface historical return flows for one year. Once the subsurface historical return flows are delivered to recharge at the place of historical use, they are essentially “on their way” to the South Platte River and would not need to be dealt with in future years.

In the return flow accounting methodology, historical return flows could be made using a variety of water supplies. Return flow obligations would be calculated and could be met using whatever water supplies are legally and physically available. The ability to use a variety of water supplies could offer some advantages in terms of flexibility. However, because return flow obligations from one year of water transfer could last several years into the future, the return flow accounting method would require a long term plan and commitment to manage water supplies and provide for future historical return flow obligations.

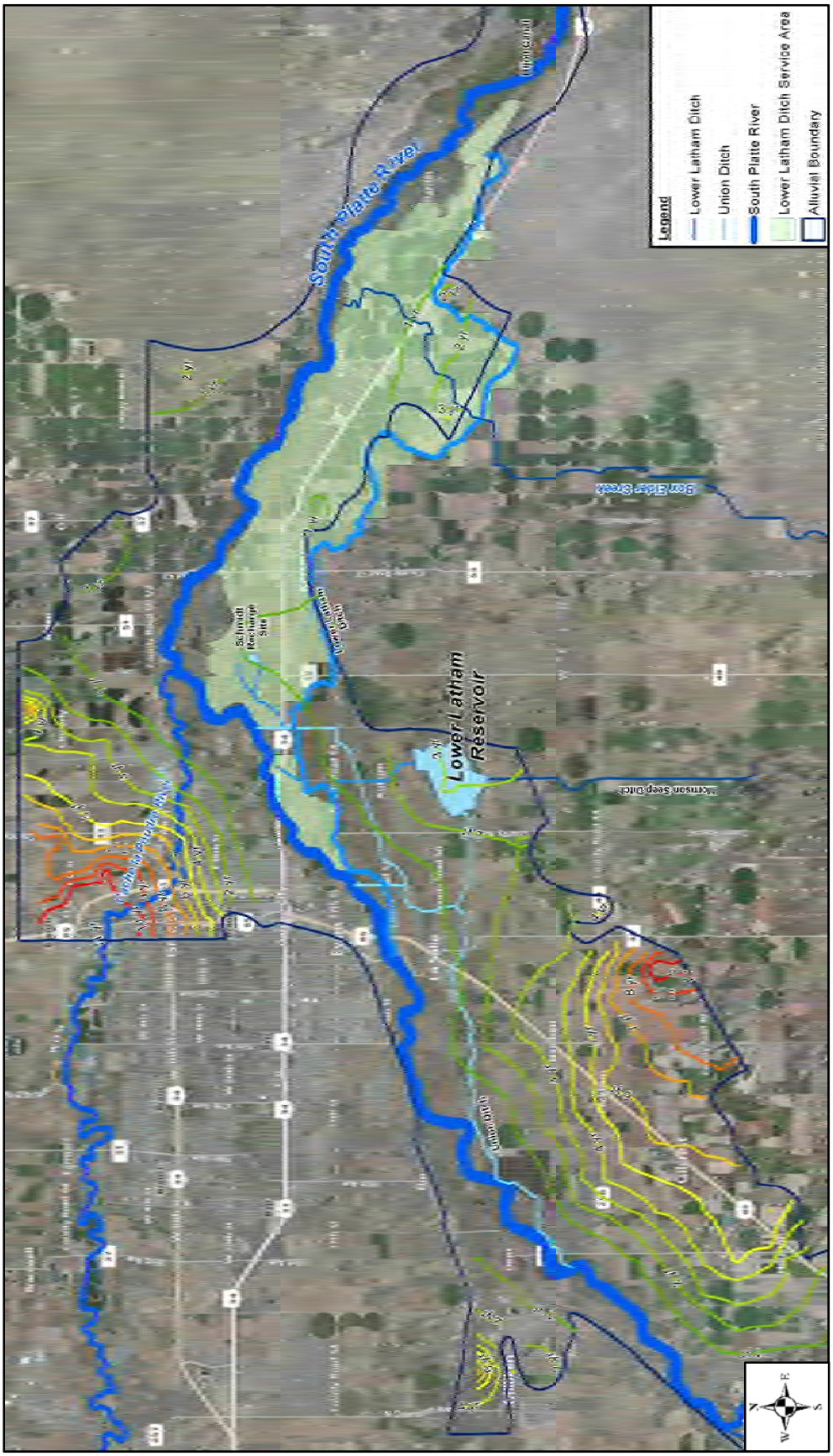

Figure 10-9. Lower Latham Ditch Facilities and Contours Showing Amount of Time for 50% of Recharge to Reach the South Platte River

10.6 Administration

Depending on the amount of shareholder participation in the Lower Latham system, administration and operation of the FLEX Market could be done by the LLDC/LLRC or by a third party administrator. It is anticipated that, if a large number of shareholders chose to participate, the work load for water accounting, managing deliveries and/or retiming of FLEX water, managing deliveries of historical return flow obligations, coordinating with end users, etc. could be large, and a third party administrator might be necessary manage all of the activities associated with the FLEX Market. Costs for the third party administrator could be paid for with fees assessed to FLEX Market members or could be a part of the transaction costs for water (i.e. a per-acre foot charge).

Section 11

Platte Valley Irrigation Company Demonstration Project

The goal of the Platte Valley Irrigation Company (PVIC) demonstration project is to investigate the ability to deliver PVIC shares to end users in various locations along the South Platte River basin in the context of a FLEX Market. The PVIC demonstration project covers the quantification of available water supplies under the Evans No. 2 Ditch, the ability to deliver these water resources to potential end users, and guidance on infrastructure that could aid in the operation of a FLEX Market.

11.1 Description of the PVIC System and Water Supplies

The PVIC provides water to its shareholders from the Platte Valley Canal and the Evans No. 2 Ditch under a 10/5/1871 priority for irrigation for a diversion rate up to 177.07 cfs (Adjudication Date: 4/28/1883; Admin No.: 7948.00000; Case No. CA6009). There are 344 outstanding shares in the ditch company. The Platte Valley Canal headgate diverts from the South Platte River in Water District 2 in the NW ¼ of Section 19, Township 2N, Range 66W between Fort Lupton and Platteville. PVIC shares are diverted from the river and delivered via the Platte Valley Canal to the Evans No. 2 Ditch, which bifurcates from the Platte Valley Canal north of Platteville, approximately 10 miles downstream of the river headgate. Nearly all irrigated area is located after this bifurcation on the Evans No.2. and can be seen in Figure 11-1. The Evans No. 2 terminates below the Milton Reservoir spillway where it empties into Beebe Draw.

11.2 Historical Consumptive Use

As described in Section 3, the PVIC Augmentation Group (PAG) recently conducted a historical consumptive use (HCU) analysis on 8 PVIC shares owned by the PAG members. The assessment was conducted in support of Water Court Case No. 08CW71. The HCU analysis concluded that the 8 PVIC shares yield approximately 38 AF of transferrable consumptive use per share. In the assessment, each farm was considered independently with respect to historical cropping patterns, irrigation methods, and soils. The water yield per share estimate is based on the average water yield of the farms included in the analysis.

The assessment of HCU was conducted using the Integrated Decision Support Consumptive Use (IDSCU) model, which was developed by the Integrated Decision Support (IDS) group at Colorado State University (CSU). Inputs to IDSCU include climate data, irrigation methods and efficiencies, cropping patterns, soil types, and irrigation amounts. The following describes the input data to the analysis and the sources of input data:

- Climate data: Mean monthly temperature, monthly precipitation, and frost dates were obtained from Hydrobase for weather stations near the Greeley area. Climate data was obtained for the 1950 to 2007 time period.
- Irrigation methods and efficiencies: shareholders were interviewed to obtain the methods used for irrigation over the study period. It was assumed that flood irrigation methods would have a maximum irrigation efficiency of 60 percent, and center pivot irrigation would have a maximum efficiency of 80 percent.

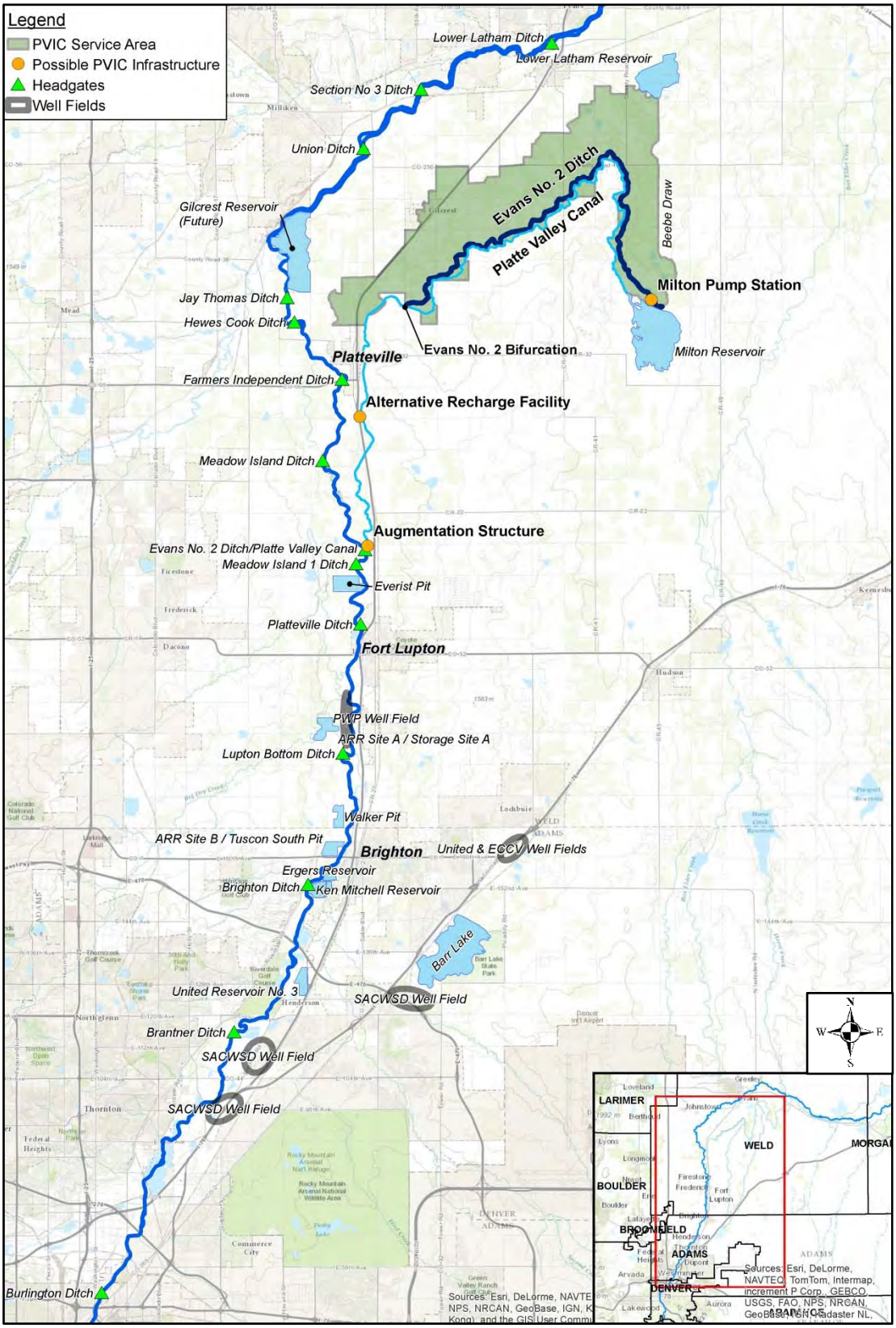

Figure 11-1. South Platte River Diversions and Facilities Described in the PVIC FLEX Market Demonstration Project

- Cropping patterns: The irrigated acres for each parcel, as well as the cropping patterns, were derived from interviews with the owners of the 8 shares, the current owners of the lands included in the historical use analysis. Historically, a mix of corn (for grain), potatoes, sugar beets, alfalfa, irrigated pasture, wheat, and small amounts of barley, dry beans, and turf grass were grown with the 8 PVIC shares.
- Soil types: GIS data for soils were available from the South Platte Decision Support System irrigated lands assessment. The soil coverages were derived from Natural Resources Conservation Service (NRCS) soil maps for counties in Colorado, and included information regarding the available water holding capacity (AWC) of each soil type. The average AWC for soil types on study farms was 1.27 inches per foot.
- Irrigation amounts: Pro-rata farm headgate deliveries were estimated assuming an average 16.25 percent ditch loss. The pro-rata farm headgate deliveries were then adjusted based on an analysis of actual irrigation water demands by the crops grown on each farm.

Assuming that similar conditions exist on the other PVIC farms, the 344 outstanding shares could yield 13,000 AF of transferrable consumptive use on an average annual basis. The water available each year would depend on hydrologic conditions and the call regime on the river.

The amount of water that the PVIC could transfer via a FLEX Market would depend on the level of participation by PVIC shareholders, negotiations with end users on the amount of water needed, the price for water, hydrologic conditions, etc. Assuming that half of the shareholders in the PVIC system would be interested in participating in the FLEX Market and, on average, a quarter of the land owned by the participants would be rotationally fallowed in a typical year to produce water for the market, the approximate amount of water that would be transferred may average 1,600 AF/year.

11.3 Historical Return Flows

Only the consumptive use (CU) component of an agricultural water right is able to be transferred to municipal use. The remaining portion is the return flow which is non-transferable and consists of the irrigation losses and inefficiencies that eventually make their way back to the South Platte River. Regardless of where the CU is transferred the historic return flows still need to be maintained in time, location, and amount in order to prevent injury to downstream, senior water rights who depend on these flows.

Historical return flows associated with the use of 8 PVIC shares were quantified in the recently-conducted HCU analysis. The HCU analysis found that the average annual amount of subsurface return flows associated with PAG's shares was 18.6 AF per share. The total amount of historical return flow accruing to the South Platte River from the 344 PVIC shares would be 6,398 acre-feet per year. In the HCU analysis, it was assumed that return flows were generated from deep percolation of water on each farm and not from end-of-field runoff. Most PVIC farms are not located near the South Platte River, and it is likely that end-of-field runoff accumulates in road ditches and other depressions, and it seeps into and recharges the alluvial aquifer.

Delivery of historical return flows to PVIC recharge facilities would be a convenient way to maintain historical return flows and to prevent injury to downstream, senior water rights. Some PVIC farms have existing recharge facilities located on or very close to the farm where shares have been historically used, and the timing and location of return flows delivered to recharge facilities would correspond very closely to historical return flow timing and location. Delivery of historical return flows to these facilities would be consistent with the "pay-as-you-go" method of meeting historical return flow obligations described in Section 8.2. Under the "pay-as-you-go" method, the FLEX CU will be delivered to the end user while the non-transferable return flow obligation would be diverted at the PVIC headgate and delivered to a recharge facility located on or very near the farms where irrigation is permanently or temporarily suspended. The return flows delivered to the

recharge facilities will infiltrate into the alluvial aquifer and will eventually accrue to the river in the correct amount, time, and location as they have historically. Evaporation and/or consumptive use of water from the recharge facilities or wetlands would need to be considered and added to the amount of water to be delivered to maintain historical return flows. As described above, no surface water return flows are associated with the historical use of PVIC shares, and therefore, no provision of surface water return flows is necessary in the operation of this FLEX Market.

Under the "return flow accounting" method of meeting historical return flow obligations, the PVIC could use a variety of sources to meet return flow obligations. It is possible that this could be done using recharge facilities constructed in strategic locations to provide flexibility in the timing and location of return flows. Under a rotational fallowing program, return flow obligations may accrue in a variety of locations with a variety of timing requirements depending on the specific fields that are fallowed each year. The FLEX Market participants would need to plan what fields would be fallowed, evaluate the timing and location of return flow obligations associated with the fallowed fields, and make the appropriate return flow deliveries to recharge ponds so that the historical timing is mimicked and the return flows are provided upstream of senior water rights that depend on them.

11.4 Reliability Requirements of End Users

As described above, the objective of this demonstration project is to identify a range of potential end users who could participate in a FLEX Market with the PVIC. No specific discussions were conducted with potential end users regarding their participation in a FLEX Market.

Potential end users include the City of Aurora, Denver Water, Xcel Energy, the City of Thornton, City of Brighton, Arapahoe County Water and Wastewater Authority, East Cherry Creek Valley Water and Sanitation District, South Adams County Water Authority, United Water and Sanitation District, Central Colorado Water Conservancy District, Farmers Reservoir and Irrigation Company, Fort Lupton, as well as smaller municipalities. In addition, augmentation plans and oil and gas exploration could also be end users of water from a FLEX Market.

The needs and reliability requirements would likely vary from entity to entity depending on the portfolio of water supplies that they already have. In many cases, a water provider may already possess adequate water supplies for normal years but FLEX water may serve as a supplemental supply in dry years. Based on FLEX Market meetings with larger municipal suppliers, they are more likely to use the FLEX Market for firming supplies and drought recovery rather than base supply needed every year. Augmentation plans and small municipalities on the other hand may participate in the FLEX Market to build their base water supply.

While the reliability requirements for specific entities were not researched for this project, strategies for developing reliable supplies from the PVIC system were researched and developed. The ability to exchange water to upstream end users is a key consideration in assessing delivery reliability. To quantify the exchange potential, an exchange analysis was performed. Using daily call records and flow records for the South Platte, points where exchange may be difficult due to low flows or frequent calls were identified. A statistical analysis of daily exchange capacity through two locations where exchange may be difficult was performed (i.e. at the Hewes Cook and Burlington Ditch diversions). Tables 11-1 and 11-2 describe upper and lower amounts of exchange capacity through the Burlington Ditch and Hewes Cook Ditch headgates using 90% confidence intervals. These tables indicate the range of flows that can be expected with 90% confidence when exchanges are able to occur. The data in the tables reflect reduced flows from exchanges that may have occurred in the past, but they do not account for existing conditional exchanges that may be conducted in the future. Note that Table 11-2 was also presented in Section 10 as Table 10-3.

Table 11-1. 90% Confidence Interval for Exchange Capacity Through the Burlington Ditch Headgate.		
Month	Lower Limit (cfs)	Upper Limit (cfs)
January	79	94
February	81	96
March	125	163
April	246	332
May	440	559
June	342	425
July	242	284
August	207	254
September	75	91
October	148	181
November	125	140
December	60	73

Table 11-2. 90% Confidence Interval for Exchange Capacity Through the Hewes Cook Ditch Headgate.		
Month	Lower Limit (cfs)	Upper Limit (cfs)
January	277	302
February	337	360
March	378	426
April	492	615
May	819	990
June	960	1135
July	486	561
August	503	607
September	211	247
October	321	363
November	408	435
December	301	324

Exchange capacity limitations through the Burlington Ditch diversion were also examined by developing a frequency distribution (a frequency distribution for the Hewes Cook diversion was described in Section 10). Figure 11-2 shows the results of a frequency analysis used to quantify the magnitude and variability of exchange capacity through the Burlington Ditch diversion. Approximately 59% of the time, there was some amount of exchange capacity through the diversion because the Burlington Ditch was not calling for water and there was flow running past the diversion structure. Approximately 34% of the time, there was at least 100 cfs of exchange capacity.

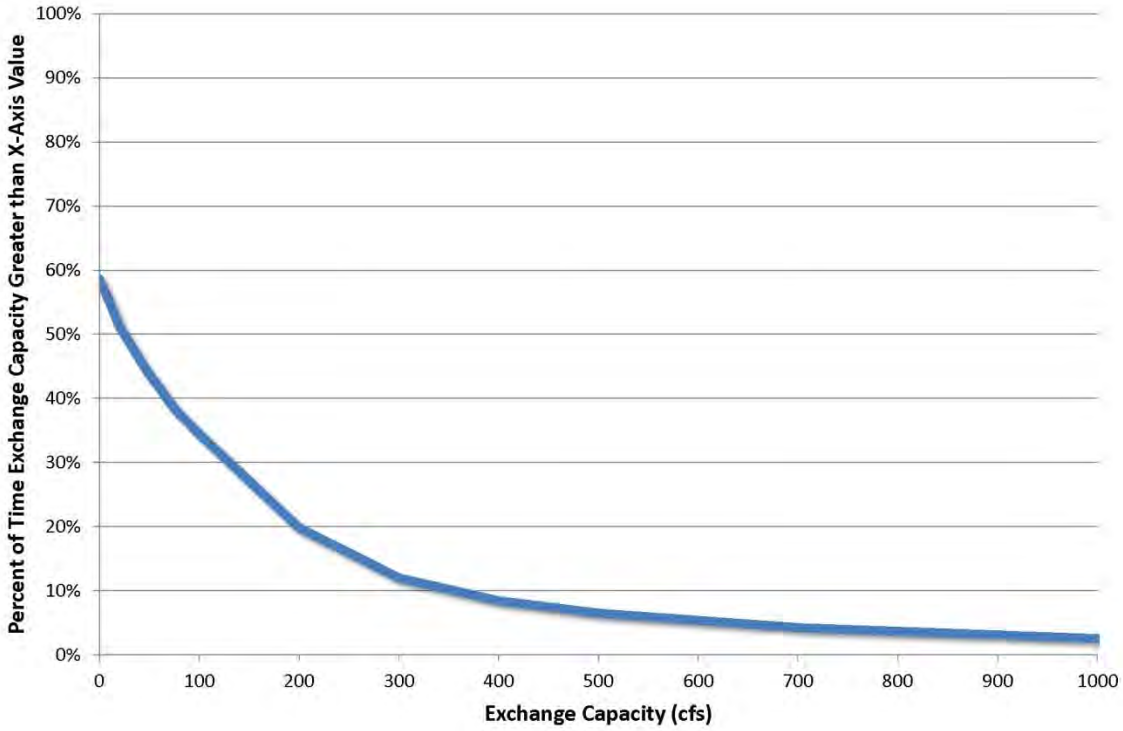

Figure 11-2. Frequency Analysis of Exchange Capacity through the Burlington Ditch Diversion

In addition to the volume of flow, it's important to understand the ability to execute an exchange. This information is displayed in Figure 10-5 which shows the number of days various ditches typically call per month. Depending on the location of the end user and the location where the PVIC could provide water to the South Platte River, various ditches could potentially pose an impediment to exchange. For example, if PVIC were able to provide water just downstream of the Platte Valley Canal headgate for exchange to an end user upstream of the Burlington Ditch, the Burlington Ditch would frequently limit exchange capacity because it typically calls for water during several months of the year.

Establishing the reliability requirements of FLEX Market end users will be critical to constructing future FLEX Agreements and will play a significant role in determining how the FLEX Market will operate. For example, the FLEX Market could be used by some entities to top off storage supplies while others may depend on it for year round supplies. In some situations it may be necessary to construct additional infrastructure to meet the needs of the end user.

11.5 Beneficial Infrastructure

11.5.1 Recharge

Recharge is necessary not only for maintaining historical return flows but it can also play a useful role in establishing continuous supplies and marketability of water through the FLEX Market. Currently, recharge facilities under the PVIC are located approximately 3 miles from the South Platte River, which results in very slow lag times. Because of extended aquifer recharge lag time, year-round regular supplies of recharge credit could result from consecutive years of recharge. In addition, recharge accretions could persist for several years if recharge deliveries were curtailed due to senior calls or other interruptions to recharge deliveries. While this long lag time is useful for mitigating drought conditions, flexibility in timing of deliveries may be diminished and could increase risks associated with making timely deliveries to end users. With

long return times PVIC may need to commit a portion of their shares to recharge years in advance of making deliveries and receiving payment for water while forgoing the crop yield that could be derived from those shares. Furthermore, if no end user needs water when the recharge accretions are available in the future, the recharge accretions may need to be exchanged back into PVIC recharge facilities or marketed to others so that they are not lost downstream. To mitigate this risk, future recharge accretions could potentially be sold to agricultural water users or municipal water providers with augmentation plans that need recharge accretions many years in the future. A potential issue with PVIC's existing recharge facilities is that their accretions enter the South Platte River downstream of the Hewes Cook Ditch, which frequently calls for water during the irrigation season. When the Hewes Cook is calling, PVIC cannot exchange recharge accretions upstream. Frequent interruptions of exchange capacity add a level of uncertainty for potential end users.

To increase PVIC's ability to react to varying reliability requirements of end users, it would be beneficial to have additional recharge facilities closer to the river that have shorter lag times. With these recharge facilities, PVIC could deliver transferrable consumptive use on a shorter "turn around" time and potentially tailor the timing of deliveries more precisely to the needs of end users. An ideal location for these recharge facilities located along the Platte Valley Canal between the town of Platteville and the Platte Valley Canal headgate (an example location is shown in Figure 11-1). This location places accretions from the recharge facilities upstream of the Hewes Cook increasing the reliability of exchanges.

If a large number of PVIC farms participate in the FLEX Market, providing historical subsurface return flows may be accomplished by constructing a small recharge facility on each participating farm or constructing a few, larger facilities at strategic locations with varying lag times. If a small recharge basin is constructed on each participating farm, the provision of return flows would be relatively straightforward with respect to matching historical timing of return flows under the "pay-as-you-go" methodology described in previous sections of this report. However, operations and maintenance of a large number of recharge ponds may prove to be expensive. To make managing return flows easier, PVIC may choose to construct new recharge facilities in a few strategic locations that reflect a diversity of lag times. A few new recharge facilities with a diversity of lag times could be useful for providing historical subsurface return flows for various farms that might participate in the FLEX Market. Utilization of fewer recharge basins may result in increased economies of scale via lower management and operational costs. This strategy would require the analysis of return flow timing for all FLEX Market participant farms and assignment of farms with similar return flow times to corresponding recharge facilities.

New recharge facilities could potentially be constructed as water conservation wetlands in cooperation with Ducks Unlimited (DU). Wetlands provide additional benefits such as high quality habitat for migrating waterfowl and improved water quality through nutrient uptake and sediment deposition while generating recharge credits. Although there is some consumptive use as a result of wetland vegetation, it is comparable to open water evaporation in a typical recharge facility.

11.5.2 Augmentation Station

Water from the FLEX Market could be delivered to the South Platte River via a return or augmentation station at or near the Platte Valley Canal river headgate (see Figure 11-1). An augmentation station constructed in this location would be upstream of many frequently-calling water rights that would impede exchange. In addition, an augmentation station near the headgate would be close to the river, and construction costs for a pipeline from the ditch turnout to the river would be minimized. With this in mind, an augmentation station consisting of a concrete headwall, gate, and 24" corrugated steel pipe running 500 feet could cost between $40,000 and $60,000 to construct.

11.5.3 Milton Pump Station

For PVIC to provide water to end users in the upper reaches of Beebe Draw, a small pump station could be constructed at the end of the Evans No. 2 Ditch to pump water into Milton Reservoir. ECCV and United Water and Sanitation District have water supply wells upstream of Milton Reservoir, and they could potentially use FLEX water to augment their depletions. A pump station would allow PVIC to convey water for augmentation or replacement purposes directly into Milton Reservoir. It is also conceivable that the Farmers Reservoir and Irrigation Company (FRICO) could use FLEX water to bolster their storage. The feasibility of a pump station is increased by the close proximity (less than a quarter mile) of the Evans No. 2 Ditch to Milton Reservoir. The approximate construction cost of pump station sized to deliver 300 AF/year could be from $150,000 to $200,000. The approximate costs assume that water would be conveyed via pipeline about a quarter mile and that it would cost $90,000 for connecting the pumping station to existing electrical lines approximately a half-mile away (connection costs were obtained from United Power). The required lift from the ditch to the reservoir would be less than 20 feet resulting in relatively low energy/operational costs.

11.6 Delivery Strategies

11.6.1 Upstream Delivery

The most straightforward way for PVIC to deliver water to upstream entities is to convey transferrable consumptive use to the South Platte River through an augmentation station and to exchange that water upstream. In many cases, it is likely that exchanged water will be diverted to upstream reservoirs. South of the City of Brighton, a number of reservoirs are located along the South Platte that could potentially divert exchanged water for storage. In addition, a number of municipalities may choose to make diversions to intakes that directly lead to treatment and incorporation into a water distribution system.

The City of Aurora is an obvious potential end user of FLEX water from PVIC. The potential to exchange water supplies from the PVIC to the Prairie Waters well field was assessed and discussed in a demonstration project previously conducted by the study team. The demonstration project found that it would be very feasible for the City of Aurora to make use of FLEX water.

The Prairie Waters well field and infrastructure could also be used to provide supplies to entities such as Denver Water and water providers associated with the South Metro Water Supply Authority. Seventeen entities in the South Platte basin are moving forward with an agreement named the Water, Infrastructure, and Supply Efficiency (WISE) Partnership. An intent of the WISE Partnership is to provide participants with access to unused capacity in the Prairie Waters Project for the conveyance of potential new supplies.

It is possible that the City of Thornton could benefit from a FLEX Market - perhaps not for base supplies, but potentially for drought recovery or other periodic water needs. Thornton has constructed a number of gravel pit reservoirs located along the South Platte River located between 88th and 104th avenues and is in the process of constructing additional facilities in this same area. The two primary reservoirs are South Tani Reservoir and East Gravel Lake 4. Both reservoirs could take delivery of FLEX water via the Burlington Ditch.

The City of Brighton is a potential end user that could benefit from a FLEX Market with PVIC. Brighton, which is located upstream of the PVIC headgate, could potentially take delivery of water into their Ken Mitchell and Ergers Reservoirs by means of a pump station located on the South Platte River. The City of Brighton also has a storage reservoir along the Fulton Ditch. Water could be delivered to this reservoir by exchanging water from PVIC up to the Fulton diversion headgate and then to the reservoir via a turnout on the Fulton.

Arapahoe County Water and Wastewater Authority (ACWWA) and East Cherry Creek Valley (ECCV) also have access to facilities located upstream along the South Platte that would allow them to take delivery of the water. One such facility is United Reservoir Number 3. This reservoir has a capacity of approximately 4,000 AF and is filled with a diversion capacity of 750 cfs.

The South Adams County Water and Sanitation District (SACWSD) could potentially take delivery or make use of FLEX Market water in two ways. First, SACWSD owns and operates several alluvial groundwater wells along the South Platte River located immediately downstream of the Burlington Ditch headgate and plans to construct more alluvial wells in this vicinity. Water from the FLEX Market could potentially be used to augment depletions from SACWSD's alluvial groundwater wells by delivering water through an augmentation station or through a short term recharge facility just downstream of the Platte Valley Canal headgate and upstream of the frequently-calling Hewes Cook Ditch. Second, SACWSD has constructed surface water storage facilities along the Fulton Ditch near the Fulton headgate. FLEX water could be exchanged to the Fulton Ditch headgate and conveyed (via the Fulton Ditch) to SACWSD storage facilities. Again, the ability to exchange water from PVIC would be enhanced by the construction of facilities to deliver water to the South Platte River upstream of the Hewes Cook headgate to avoid exchange issues created by the Hewes Cook call.

11.6.2 End of Ditch Delivery

ECCV and United Water and sanitation District have water supply wells north of Barr Lake, and depletions from the wells accrue to Beebe Draw and require augmentation. The FLEX Market could be useful in providing augmentation credits to offset their well depletions. To accomplish this, FLEX water could be conveyed down the length of the Evans No. 2 Ditch to its outlet at Beebe Draw. At this point the ditch is located just below the Milton Reservoir outlet. FLEX water could be pumped from the end of the Evans No. 2 Ditch and into Milton Reservoir, which is located on Beebe Draw. It is possible that FLEX water could be delivered to and held in Milton Reservoir to offset well depletions that occur outside of the irrigation season when direct deliveries of FLEX water could be made. Depletions to Beebe Draw occurring during the irrigation season could be augmented by delivering FLEX water directly to Beebe Draw.

11.6.3 Downstream Delivery

Downstream water users of FLEX water from PVIC include several of the end users identified in the Lower Latham demonstration project described in Section 10 of this report. Downstream end users could include water providers for oil and gas exploration, augmentation plans such as those run by the Central Colorado Water Conservancy District, and municipal and industrial water providers including Xcel Energy and the City of Greeley. In addition, United Water and Sanitation could be a downstream end user and could potentially take delivery into their future Gilcrest Reservoir.

Water delivered downstream would need to be shepherded past surface water diversions to the intended end user.

Section 12

Conclusions and Recommendations

The following is a summary of the major lessons learned in the course of the Study, and recommendations for further action.

12.1 Water Transfers Should Preserve Economic Benefit in Local Economies

By definition, any water transfer – whether traditional "buy and dry" or "ATM" - results in a reduction of water supply to irrigated agriculture. The question is not whether reductions will occur, but when, where, how much, and most importantly—the extent of the economic impact to the locale losing the water supply. Traditional "buy and dry" approaches are damaging to local economies because they remove water supplies permanently in exchange for a one-time payment. The party selling the water right achieves a substantial economic gain, but the economic 'fuel' of the local economy – the renewable water supply – is permanently removed, dramatically and unalterably changing the economic and social landscape long after the party receiving the payment is gone.

ATM approaches have often been defined in temporal terms as a method by which the water leaves the land but only on a 'temporary' basis, allowing agriculture to resume upon its return. This may be true in some cases, but in a broader sense, the goal of alternative transfer mechanisms should be to retain the economic benefit of the water rights in the historical location of the rights, even as some water supplies move towards urban uses, and to retain sufficient water supply in the historical location to permit productive irrigated agriculture to continue. Limiting ATM discussion to 'temporary' arrangements ignores M&I Users need for permanent supplies. While there is an application for markets meeting demand for temporary supply, the opportunities to meet ATM goals – retaining economic benefit, and retaining sufficient water supply – multiply dramatically if the discussion is opened to permanent elements. "Permanent" need not be synonymous with "buy and dry." It is possible to meet M&I and EC permanency concerns, retain economic benefit, and retain sufficient water supply to foster irrigated agriculture.

The study team found that one key to ATM implementation lies in rethinking the terms of previous discussions. While terms such as "buy and dry," "leaseback" "ATM" have been useful in the past, they can become limiting factors as new concepts are developed that are properly neither one nor the other, but a combination of both. Shared or "unbundled" ownership concepts particularly blur these distinctions. For example, a permanent agreement between an M&I User and an Ag User whereby the Ag User agrees to deliver a senior right to the M&I User's reservoir if reservoir levels reach a specific low point is in a sense a "buy" and has an element of "dry," but at the same time may allow the Ag User to continue farming in 8 out of 10 years, and to receive compensation in the other two. This arrangement, and many more like it, achieve the goals of ATMs but do not succumb easily to labels.

After discussing these concepts with numerous water users and water professionals, the study team believes there is reason to be optimistic regarding the potential for successful ATM implementation. Large scale implementation has the potential to substantially reduce the externalities associated with "buy and dry" methods of acquiring additional supply. Parties that have been traditionally reticent to examine new concepts of water rights use and management (on all sides) have consistently demonstrated a willingness and interest in pursuing the FLEX and related ATM concepts.

The principal barrier to ATM implementation continues to be concern over legal standards and processes. The team finds reason for optimism in this area too. Though the last 10 years have witnessed a dramatic increase in cost and complexity of water court proceedings, large scale well augmentation plan and change in use litigation in Division One has had the unexpected benefit of yielding technical and legal approaches to address some of the thorniest problems in administration. These concepts proved useful as the Water users group worked in good faith to establish the Model Terms and Conditions. Ironically, after working through the issues, the Water Users Group was among the more optimistic of study participants regarding the viability of terms and conditions addressing alternative transfer mechanisms. Though each case is unique, the study team is hopeful that the model terms and conditions will provide a foundation for change in use decrees implementing ATM principles.

12.2 Keep It Simple

One of the most pronounced themes in the study group meetings was a desire to keep the ATM transfer process as simple as possible. The Ag User Group felt that simplicity in concept, explanation and execution was critical to achieving mutual ditch company board and shareholder support. Those promoting ATM concepts need to be able to explain them in simple, easy to grasp terms so that the entry barriers for individual participants are as low as possible. M&I Users likewise had a desire to keep the market as straightforward as possible so that transaction costs could remain low enough to generate M&I interest. Attorneys and engineers expressed a consistent preference for reducing complexity in the Model Terms and Conditions, and chose terms and conditions incorporating conservative, simplifying assumptions over complex, detailed terms that were perhaps more technically precise but difficult to administer. All of the User Groups repeatedly stressed that excessive complexity was a danger to ATM implementation. Better an executed, simple transaction than an elaborate plan that is never implemented.

12.3 Promote Ditch Wide Changes in Use to Multiple End Users

In order for alternative transfers to occur, senior water rights must be quantified and the use changed to include M&I and EC uses. Until this occurs on a broad scale, obtaining significant water supply from ATM transactions is unlikely. Ditch wide changes in use, in which the entire senior water right of a mutual ditch company is quantified, are the most fair, efficient and protective method of quantifying historical diversions, consumptive use and return flows generated by the use of the senior right. All of the issues surrounding a change in use of the right can be examined in a single case, allowing water court participants and the Court to fashion protective terms and conditions that are applied consistently to all changes in use under the ditch. Diversions and historical consumptive use are determined for each shareholder, dramatically reducing the potential for unfair or unlawful division of the consumptive use and benefits of the senior right and associated disagreements between shareholders. New uses can be examined and decreed for all shares in the mutual ditch company, opening up the potential for FLEX transactions to all shareholders.

The ditch-wide approach is contrasted with a “parcel specific” approach whereby specific shareholders change the use of their pro-rata portion of a senior water right based upon historical use that occurred on the parcels served by the shares. Under this approach, each Applicant seeks their own decree and terms and conditions, which can vary depending upon a number of factors, including the timing of the application, the number and tenacity of opposers, and the Applicant and opposers’ respective budgets for legal and engineering counsel. Rates of consumptive use, return flows and protective terms and conditions vary between decrees, raising questions of consistency and fairness, and the potential for disputes among shareholders regarding the allocation of the historical consumptive use associated with the right.

Colorado’s Supreme Court has stated that the ditch wide methodology is “preferable for many reasons,” but neither that Court nor the Colorado General Assembly has mandated use of either methodology. CCWCD v. City of Greeley, 147 P.3d 9, 19 (Colo. 2006). Historically, the majority of cases have been prosecuted using

a parcel-specific methodology. Applicants and mutual ditch companies have been reticent to seek ditch wide changes in use because of the potential for limiting terms and conditions that could reduce the amount of water available to shareholders. Mutual ditch companies have been concerned about volumetric limitations on diversions, reduction in permissible irrigated acreage based upon "expanded use" arguments, and other forced changes in ditch administration affecting shareholders, particularly shareholders who have not elected to seek a change in use of their shares. Transaction cost and time frame to completion are also seen as significant concerns – companies do not desire to be at the center of protracted litigation. As a result, companies have not been supportive of ditch wide change in use efforts, preferring instead to shunt shareholders into "parcel specific" changes in use that are perceived to be safer, at least in the sense that a bad result effects principally the applicant, as opposed to the Company's other shareholders.

One of the concerns—related to expanded use arguments—may have been mitigated by the passage of Senate Bill 13-74, the "Legacy Ditch Bill," which recognized historical use occurring within the first fifty years following the entry of a decree as lawful. However, many of the other concerns remain, and could be barriers to implementation of wide scale, ditch wide changes in use. This section suggests some measures that could help address the remaining concerns and encourage ditch-wide changes setting the stage for regional FLEX implementation.

12.3.1 Statutory Amendments

The FLEX Market is designed to operate within the existing statutory framework. However, there are statutory amendments that could facilitate implementation. The following is a list of ideas, some generated by Water Users in the discussion groups, some by one or more members of the study team. The proposed statutory changes are not universally supported by those participating in the Study. They do, however, highlight some key issues with regard to implementation and provide a vehicle for discussion.

- Incentives and Protections for Applicants and Mutual Ditch Companies. Statutory measures designed to encourage ditch wide changes in use. Some combination of the following:
  - Delayed Volumetric Limits. Recognition that for ditch wide change in use cases, no volumetric limits on use of senior right apply until share is first used for changed uses.
  - SWSP Approval. Applicants who have completed a system wide analysis entitled to participate in temporary approval (SWSP) (CWCB Pilot) based upon the terms of the ditch wide decree. Such applications would be presumptively valid and would be accelerated for approval.
  - Water Trades. Applicants who have completed the process are entitled to trade water with other users in the same basin through an abbreviated SEO approval process.
  - Funding. System wide applicants are entitled to apply for grants from a newly established program to fund infrastructure allowing alternative transfers.
  - Docket preference. Preference on the court docket over other water court applications for speedy resolution.
  - Entitlement to groundwater diversions. Right to install "headgate wells" - groundwater diversions in immediate proximity to river -- delivering to the ditch under defined terms and conditions.
- Redefining Uses.
  - Use Types. Create broad "use types" by statute to substitute for named end users – e.g. "M&I Use" or "EC Use." Changes in use would be approved for the use type, and delivery at specific locations, allowing a variety of users (to be determined later) to take water at delivery point. Increasing the number of potential end uses and users for a changed senior water right would provide additional incentive for water users to engage in changes of use.

  - FLEX Use. Create a new use definition entitled FLEX Use that permits application to all lawful uses, or a set of lawful uses defined in the statute. Delivery of consumptive use would be to specified locations, where multiple end users (TBD) could take delivery of FLEX supplies. It may be possible to tighten abandonment provisions for FLEX supplies to address concerns re: non-use and hoarding.
- CU Quantification. Recognition that CU could be quantified and return flow requirements established in the absence of any specific use. This would permit ditch companies and water users to change the use of a right without the need of contracted end users, which could come later.

12.3.2 Standardized Approaches

Give rulemaking authority to the state engineer or CWCB to establish conservative, uniform assumptions regarding consumptive use and return flows for ditch systems, either for application in water court or in administrative contexts. Make the rule assumptions conservative enough that the majority of other water users would be comfortable with them. Leave potential for individual quantifications open at the discretion of the applicant.

12.3.3 Funding

Identify FLEX friendly infrastructure priorities in State Water Plan basin implementation plans. Provide grants and subsidized loans for installation of infrastructure and improvements necessary for operation of FLEX market.

12.4 Develop New Models of Ownership

12.4.1 Shared Ownership. Explore new models of shared ownership by separating the "sticks" in the water rights "bundle."

Viewing ownership of water rights in new ways could facilitate ATM implementation. Each of the elements or "sticks" in the water rights ownership bundle could be the subject of terms in the FLEX Market. Examples of how the sticks might be distributed include:

- **One Party Holds All Ownership Rights.** In the simplest arrangement, all the sticks remain with one party – eg, the Ag User retains all ownership rights, and leases the supplies to M&I and EC Users. A traditional leaseback provision is another example, where an M&I User buys all ownership rights, then leases shares back the Ag User.
- **Several Parties Hold All Ownership Rights.** In this scenario, all the "sticks" remain in one bundle, but portions of the rights are owned by each party. For example, if 100 mutual ditch company shares are involved, the Ag User might retain all ownership rights on 80 shares, while the M&I User buys all ownership rights on 20 shares. Each party owns the shares outright and enjoys all ownership rights.
- **Ownership Rights Are Unbundled and Held by Different Parties.** For example, an Ag User could hold the majority of the ownership rights, but the right to possession and use could be divided between other parties on the basis of:
  - Time. The Ag User retains the right of use in 8 out of every 10 years. The M&I User has the right of possession and use in 2 out of every 10 years, subject to the terms and conditions of the agreement.
  - Drought Indicators.
    - Reservoir Levels. The Ag User could retain the right of possession and use except when the level(s) in identified storage vessel(s) are at or below a specified mark. When triggered, the consumptive use associated with the senior right could be delivered to the identified reservoirs until target levels are achieved.

  - Snowpack levels.
  - Climate Data. Precipitation, temperature and related measurements.
  - River flows at identified locations.
  - Yields of other water rights owned by the parties, such as Colorado-Big Thompson units.
  - Drought Indicator publications and services.
- Priority. The parties could divide the right to possession and use based upon river call. For example, Ag User could possess and use when the call is senior to 1870, and EC user when call is junior to 1870.
- Water trading agreements. Exchanging senior Ag supplies under defined conditions for more junior M&I sources in amounts sufficient to supplement irrigation practices.

- Other examples of unbundling involve the right to alienate:
  - The Ag user could retain legal title and right to alienate (lease or sell) the rights, subject to a Right of First Refusal or Option to Purchase given to the M&I or EC User.
  - The M&I User could obtain legal title and the right to alienate, subject to a right of first refusal or option to lease given to the Ag User and EC User.
  - The Ag User could retain legal title, but give the right to alienate to the M&I User, subject to identified terms and conditions, such as payment of proceeds for leases.

Separating the 'sticks' in the water rights 'bundle' increases flexibility, permitting arrangements to be made that are best suited to the needs of the parties. In some cases, buy and dry may be an unavoidable necessity. In many, the goals of M&I and EC providers could be met while still providing water supply to Ag Users.

12.4.2 Market Based Interventions preventing buy and dry

It is possible that M&I and EC Users interested in creating an environment conducive to Ag uses could prevent "buy and dry" by buying the rights themselves, and then committing the water supply to sustain local Ag Economies when not needed for M&I and EC uses. This strategy could be viewed as a formalized leaseback, with additional elements of security for Ag Users so that water supply is assured in most years. Elements of this strategy might include:

- Intentional acquisition of Ag water by M&I and EC Users for delivery to local food production areas, as well as delivery to M&I and EC uses.
- Dedication of acquired water supplies to Ag in perpetuity, subject to identified M&I or EC use periods. Establishment of conservation easements or other land use strategies to preserve open space in FLEX zones.
- Establishment of M&I operated "over the counter" ("OTC") markets benefitting local ag economies.
- M&I User purchase of shares, change in use to FLEX uses, then rededication to Ag users to run or participate in OTC market, subject to City rights based on growth, drought triggers.

12.5 Distinguish between ATM Market Types

Discussions with the Water User groups brought into focus two distinct needs that ATM projects could service. These needs can best be characterized in temporal terms. On the one hand, M&I Users in particular expressed a strong interest in term limited supplies to meet identifiable, one-time demands or shortfalls, such as drought recovery or interim supply while permanent supplies are developed. On the other, there was also a desire for permanent supply, and a reticence to develop any reliance on term limited supplies. These demands are very different, as are the market strategies used to address them. For the

purposes of communicating the distinctions between these market types, they are set forth below as distinct options. In reality, it is likely that many ATM projects will include elements of both.

12.5.1 "Over the Counter" ("OTC") Market: Water available on a "cash and carry" basis for a limited term.

- **Ownership:** Ag Users retain all sticks in the ownership bundle, except for time limited surrender of possession/use.
- **Uses:** Drought Survival/Recovery, Interim Supply.
- **Methods:** Fallowing, regulated deficit irrigation, reduced consumptive use cropping
- **Process:** Water Court Application, Administrative Application

12.5.2 Permanent Supply: Water delivered to an end user perpetually

- **Ownership:** M&I and EC Users obtain some or all sticks in the ownership bundle. Ag Users retain enough sticks to facilitate delivery of water sufficient for irrigation
- **Uses:** Annual base supply or permanent drought survival/recovery
- **Methods:** Fallowing/reduced CU/regulated deficit irrigation
- **Process:** Water court application.

12.5.3 Blended Market

A blended market would contain elements of an OTC Market and Permanent Supply. For example, an M&I User might obtain a permanent right to fill identified reservoirs with a senior right if water levels reach a specified low point (permanent supply). At the same time, the remainder of the senior right might be FLEX water available for spot delivery or leasing on an annual term in the context of an OTC market.

12.6 Use Land Use and Policy Tools

If the goal of maintaining irrigated agriculture is important to local communities, the tool box should not be limited to water rights strategies. Land Use and policy decisions could also be powerful methods of identifying and sustaining critical Ag production areas if used in concert with water rights strategies.

12.6.1 Real Covenants

This strategy is most effective in the context of M&I or EC acquisition of working farms and associated water rights. The M&I or EC owner of the land could impose covenants requiring continued irrigation/Ag use, and make a concurrent commitment to provide water supply back to farm in perpetuity, subject to specified terms.

12.6.2 Prioritizing Food and Fiber Production Areas

M&I Users, Ag Users and EC Users could work together to identify local "FLEX development zones" - ditch systems or parts of ditch systems identified as critical for preservation as FLEX source, local food supply, and open space. These zones would be carefully chosen to keep the most productive agricultural land in production, focusing any necessary permanent dry-up on marginal lands. The Water Users could develop a plan to supply water to the FLEX zone in perpetuity using OTC markets and ATM permanent supply concepts, and a system of real covenants or easements to address land use issues. M&I Users and or the Colorado General Assembly could provide zoning and tax incentives, creating a 'water development' or 'ag development' zone.

The logical outgrowth of the FLEX Development Zone concept is the creation of "Food Hubs" for the sale and distribution of local Ag products. *See* "Food Hubs: Creating Opportunities for Producers Across the Nation"

http://blogs.usda.gov/2011/04/19/food-hubs-creating-opportunities-for-producers-across-the-nation/ . For a Colorado entity exploring local foodshed options see http://ccfa.coop/category/blog , describing the activities of the Central Colorado Foodshed Alliance.

12.7 Investigate Indexed Pricing Mechanisms

Discussions with Water Users indicate that one of the most difficult issues to reach agreement upon in the context of a term-limited ATM transaction is the price paid per acre foot of water delivered. Because there are no established markets, there is a great deal of uncertainty with regard to value. M&I Users do not always have good information about the value of water in the Ag Users operation. Conversely, Ag Users are without knowledge with regard to the financial realities of M&I operators. Several ideas came up in the group discussions that the study team feels have potential to bridge the gap between lessors and lessees by providing objective pricing standards.

- Commodity based: Key pricing on commodities markets in a way intended to reflect the profit the Ag User lessor could have made in the absence of the lease. Ag Users are familiar with the concept of managing risk, and locking in prices now for future sale.
- Rate plus inflator. An effort should be made to establish options for contractual inflators—eg, consumer price index—that are relevant to Ag related water transactions.
- Other indices. The study team felt it would be useful to open this question to a qualified economist in general terms. Are there other indices or pricing mechanisms that are available or that could be developed?

12.8 Educate

12.8.1 Water User Community

The study team found the water user community to be receptive to exploring ATM concepts. Intentional educational and outreach efforts should be continued. Water users, attorneys and engineers need to be aware of ATM developments and strategies in order to consider these options and to advise their clients accordingly. Policy makers in the executive and legislative branches would benefit from additional educational so that they can be supportive of ATM efforts as the opportunities arise. Specific ideas for further education and outreach include:

- A FLEX/ATM website dedicated to communicating study results and information about pilot projects on a statewide basis.
- FLEX/ATM summits in each water division, like the one held by the study team in Division One.
- Educational outreach to legislators and executive staff- scheduled presentation, reference materials

12.8.2 Public Education

The study team also felt that public education is key to widescale FLEX implementation. These educational efforts would focus on the importance of water as local economic driver, local food and fiber supplies, open space, and potential mechanisms to maintain healthy ag economies. These efforts would serve to cultivate awareness of costs of FLEX implementation and a willingness to fund FLEX Market efforts via “check the box” donations or dedication of public funds.

Section 13

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Appendix A: Membership Lists for Each of the Four Study Groups

Ag Users Study Group

- Mark Sponsler (Corn Growers Association)
- Matt Lindburg (Brown & Caldwell)
- Andy Jones (Lawrence Jones Custer Grasmick LLP)
- Stephen Smith (Regenesis Management Group)
- Carl Hergenreder (Lower Latham Reservoir Company)
- Ted Buderus (Lower Latham Reservoir Company)
- Dennis Hoshiko (Lower Latham Reservoir Company)
- Doug Seely (Lower Latham Reservoir Company)
- David Hunt (Platte Valley Irrigation Company)
- Pat Spayd (Platte Valley Irrigation Company)
- Scott Holwick (Platte Valley Irrigation Company)
- Corky Cantrell (Lupton Bottoms Ditch Company)
- Jane Ann Johnson (Lupton Bottoms Ditch Company)
- Bruce Wilson (Lupton Bottoms Ditch Company)
- Bob Sarchet (Lupton Bottoms Ditch Company)
- Alan Berrymore (Northern Colorado Water Conservancy District)
- Andy Pineda (Northern Colorado Water Conservancy District)
- Brad Wind (Northern Colorado Water Conservancy District)
- Randy Ray (Central Colorado Water Conservancy District)

Environmental and Conservation Users Study Group

- Greg Kernohan (Ducks Unlimited)
- Matt Lindburg (Brown & Caldwell)
- Andy Jones (Lawrence Jones Custer & Grasmick LLP)
- Stephen Smith (Regenesis Management Group)
- John Sanderson (Nature Conservancy District)
- Drew Peternell (Trout Unlimited)
- D. Nickum (Trout Unlimited)
- Kaylea White (Colorado Water Conservation Board, Instream Flow Program)
- Linda Bassi (Colorado Water Conservation Board, Instream Flow Program)
- John Stokes (City of Fort Collins)
- Amy Beatie (Colorado Water Trust)
- Zach Smith (Colorado Water Trust)

M&I Users Study Group

- Lisa Darling (City of Aurora)
- Rich Vidmar (City of Aurora)
- Dan Gallen (City of Aurora)

- Bret Fox (City of Aurora)
- Matt Lindburg (Brown & Caldwell)
- Andy Jones (Lawrence Jones Custer & Grasmick LLP)
- Stephen Smith (Regenesis Management Group)
- Marc Waage (Denver Water)
- Jeff Bandy (Denver Water)
- Kelly DiNatale (East Cherry Creek Valley Water and Sanitation District)
- Sarah Borgers (City of Brighton)
- Angela Miles Fiore (City of Greeley)
- Leif Lesoing (City of Greeley)
- Randy Rhodes (Xcel Energy)

Water Professionals Study Group

- P. Andrew Jones, Esq.
- Veronica Sperling, Esq.
- Alan Curtis, Esq.
- Matthew Merrill, Esq.
- Mike Shimmin, Esq.
- John Cyran, Esq.
- Bruce Kroeker, P.E.
- Ed Armbruster, P.E.
- Mike Sayler, P.E.
- Stephen Smith, P.E.
- Matt Lindburg, P.E.

Appendix B: Table Summarizing each Group's Views on each Element of the FLEX Scale

	Ag User Group	M&I User Group	EC User Group
Participants	The Ag User Group felt that FLEX type agreements could best be executed and administered on the basis of mutual ditch companies, as opposed to individual shareholders or at a larger, multi-ditch company level. Though individual shareholders would be given the ability to participate, and, as owners of the water rights, would make their own decision, the framework for participation would rest at the mutual ditch company level to ensure economies of scale and fairness to all shareholders. Though the group left open the possibility of a FLEX Market involving two or more mutual ditch companies, the group's frank assessment was that it would be very difficult for South Platte ditches to cooperate to the level of a finalizing an agreement of this type. With regard to the nature and composition of the M&I and EC User participant groups, Ag Users expressed a strong preference for multiple M&I and EC participants, with the rationale that more purchasers or lessees in the market would bring more favorable results in terms of pricing and other terms. The potential for being "tied" to a single or a small number of M&I or EC users was not attractive. The Ag Users group struggled with the necessity to name the end users in the FLEX Agreement to satisfy Colorado's anti-speculation doctrine, and spent considerable time discussing potential solutions to this issue. One suggestion that was endorsed by the group was a statutory change that identified certain defined "Use Types" for FLEX Agreements that were pre-approved in the statute (e.g. "Municipal and Industrial Use" or "Environmental/Conservation Use"), and would substitute for named end uses or users in the water court application. Once a right is changed for "Municipal and Industrial Use," the consumptive use quantified in the change case could be leased to any user that met the statutory definition of a "Municipal and Industrial User." The Ag Users felt that opening the markets in this way would encourage investment in the legal, engineering and infrastructure costs necessary to change the use of senior water rights and make them available in a FLEX context.	M&I User Group members' comments on the number and makeup of FLEX market participants were the converse of Ag User comments. As a whole, M&I Users did not favor entering into voluntary market structures including other M&I providers. Like the Ag Users, M&I Users had concerns about whether the relevant entities could achieve the level of parity and cooperation necessary for voluntary participation. In addition, there was a reluctance to invest in a water supply with the inherent potential to be outbid by other participants, unless the supply was used purely on a spot basis and the cost of entry was low. Conversely, the M&I User Group favored the concept of a large number of Ag Users in a FLEX market. This was perceived as beneficial in the sense that it would create a greater amount and diversity of water supplies available for FLEX leasing and would create beneficial competition between FLEX lessors.	The EC User Group did not spend a great deal of time discussing the nature and composition of participant groups, but as a rule, members were interested in discussing multi-party agreements that offered the broadest possible application of the senior right. Because the EC uses are often intermittent by nature (e.g. in-stream flows, supplies for duck habitat) in comparison to the demands of Ag and M&I Users, EC Users had a relatively high level of comfort for the participation of multiple parties of different types that could make use of the water when needed.
Ownership	Ag Users in this Study Group expressed a strong preference for maintaining ownership of the underlying senior water rights. They did not see a great deal of utility in selling a small portion of the senior right to M&I or EC partners, as described in the FLEX concept summary. Some of this preference can be attributed to the makeup of the group, which consisted of individuals who tended to be well capitalized, established landowners under their respective ditch systems with a long term history of survival in the agricultural economy. They did not need an influx of capital for retirement purposes or to support their farming operations. These water rights owners clearly presented a business-like approach to their farming operations and perceived the FLEX concept as business opportunity to be evaluated under its own terms. As such, they were willing to consider providing their own investment capital to fund the FLEX Market, if there was a guaranteed payout (a 'take or pay' contract) upon successful establishment of the market.	M&I User discussion varied depending upon the type of FLEX application under discussion. In a spot market application used for drought recovery and interim supply, M&I Users were not interested in obtaining any ownership interest in the underlying water rights. Instead, the expectation was that the Ag User owners of the rights would retain ownership of the rights, perform all of the activities necessary to free the water for M&I use, and then offer it to M&I Users at a price reflecting the cost of these activities. It was also emphasized that the price would have to be significantly lower than the amortized cost of acquiring the water rights outright in order to entice M&I Users to lease the supplies. When discussing potential FLEX market applications to supplement base supplies, the Group was in favor of owning the underlying water rights. This conclusion has been uniformly expressed in ATM studies to date. The reasons for this conclusion include: 1) necessity of permanent supply; 2) uncertainty associated with long term leasing; 3) high acquisition and transactional cost associated with ATM methods, equivalent to purchase.	The EC User Group was the most flexible of all the Groups regarding underlying ownership of the water rights. All options were discussed, from Ag User ownership and a "spot market" similar to the M&I User scheme, to EC Ownership of the underlying rights. Blended ownership schemes were also discussed, including interruptible supply agreements, leaseback provisions, and multiple uses of in-stream flows.
Water Court/ Admin App	In an ideal agreement, the Ag User Group the Ag Group expressed a preference for controlling the water court application or administrative process necessary to change the use of the senior water right. Because they intended to maintain ownership of the right, the process, terms and conditions for the change of right were important to them and they wanted to be principally involved in the process. The Ag User Group was significantly concerned about the cost and risks associated with a water court application. The potential for a negative water court outcome affecting shareholders in the ditch who were not pursuing the FLEX concept was of particular concern.	As is the case with many of the FLEX Scale issues, the M&I User Group's views varied depending upon the FLEX Application begin discussed. For short term "spot markets" used to meet drought recovery and interim supply needs, the Group was not interested in being involved in any water court or administrative process. Rather, the vision was that this burden would be carried by the Ag Users and reflected in in the price of contracted water supplies. For longer term base supply agreements, M&I Users' desire to remain principally responsible for the water court or administrative process paralleled their desire to obtain ownership of the water rights. Because the supplies were envisioned as a part of the M&I Users' permanent supplies, M&I Users were willing to take on the costs and risks associated with these processes.	The EC User Group did not discuss this issue in detail. Most of the FLEX scenarios discussed assumed EC participation in a water court or administrative change process led by an M&I or Ag User, however, not all of them. One possible FLEX outcome was for EC Users to own the underlying water rights and finance the change in use and administrative processes via leaseback to M&I and Ag Users.
Infrastructure	Several scenarios for financing necessary infrastructure were discussed in the Ag User Group. Most involve a financial commitment from M&I User and/or EC participants to invest in ditch company infrastructure as a part of the compensation for use of the senior water right. This commitment was expressed variously as a commitment to directly finance infrastructure at the outset of the agreement or to advance funds to Ag Users to construct the necessary infrastructure to be repaid from lease proceeds upon water delivery. The potential for Ag Users to assemble private capital to install necessary infrastructure was also discussed, in association with a "take or pay" commitment on the part of M&I Users that would repay the investment. Finally, the potential for state investment in key infrastructure in the forms of loans, grants or direct construction, was discussed, particularly with regards to exchanges.	M&I User Group thoughts on infrastructure investment varied along the lines already discussed. For a "spot market" application, the Group was not in favor of capital investment. Rather, it was expected that Ag User Groups would make necessary improvements as a cost of FLEX Market start-up, and re-coup these costs in the charge for water delivered. In contrast, when long term base supplies are acquired, the M&I Group was willing to consider infrastructure investment to facilitate delivery.	The EC User Group identified infrastructure development as a potential area where EC Users could contribute to FLEX Market development. Many of the EC entities have grant funds available for habitat development. To the extent that infrastructure necessary to improve habitat benefits M&I and Ag Users (diversion structures, recharge sites), installation can improve the viability of the FLEX Market for end users. EC Users expressed a willingness to contribute to develop infrastructure development in the context of a FLEX market.

	Ag User Group	M&I User Group	EC User Group
Administration	Consistent with its vision for FLEX Market operation in other key agreement elements, the Ag Users Group was in favor of Ag User administration of the change in use and FLEX Market, either directly or via the use of a hired third party administrator.	The M&I User group discussed the concept of Ag User administration of the FLEX Market in the "spot market" scenario. Conversely, if the agreement is for long term or permanent base supply, the M&I User Group expressed a desire to administer the FLEX Agreement itself.	This issue was not discussed in detail in the EC Users group. To the extent it was discussed, the EC Group expressed flexibility on the issue.
Term	As set forth in the preceding sections, the Ag User Group favored the concept of establishing the FLEX Market themselves, and were interested in opening the market to as many end users as possible. As such, the Group's discussion of terms focused on the necessity of a terms long enough to recoup initial investment, but short enough to allow timely readjustment of pricing and the potential for additional participants to enter the market. The vision was that the market platform would be permanent, while terms for agreements to deliver water would be variable and dependent upon the needs of the parties.	The M&I User Group's "spot market" vision was characterized by a permanent market platform, populated by multiple Ag User suppliers, with leases of varying length depending upon the needs of the parties. A different vision emerged with regard to acquisition of permanent base supply via ATMs (leaseback, rotational fallowing). In that case, the 'term' was assumed to be perpetual in the sense that once acquired, the CU produced using alternative methods would be available indefinitely on an annual basis.	The EC User Group was interested in long term solutions. Whether on the basis of a permanent market platform and intermittent "spot leases" or permanent water sharing agreements, the emphasis was on establishing mechanisms that would meet EC needs indefinitely.

Appendix C: Model FLEX Agreement

FLEX AGREEMENT MODEL DRAFT

Colorado Water Conservation Board
Alternative Agricultural Water Transfers Grant Program
FLEX Market Study

FLEX MARKET AGREEMENT

This FLEX MARKET AGREEMENT (the "Agreement") is entered into by and between Agricultural Water User ("Ag User"), Municipal and Industrial Water User ("M&I User") and Conservation Water User ("Conservation User"), collectively hereinafter the "Parties" or individually as "Party," this _____ day of _____, _____.

WHEREAS Ag User owns certain water rights known as _____ shares in the Mutual Ditch Company (the "Company") that were adjudicated for irrigation uses in [water court case number] (the "Water Rights"); and

WHEREAS M&I User provides water (describe service area and uses); and

WHEREAS M&I User has a demand for additional water supplies to service its existing and future customers; and

WHEREAS Conservation User provides water for conservation uses including (describe); and

WHEREAS Conservation User has a demand for additional water supplies to achieve its objectives; and

WHEREAS Ag User, M&I User and Conservation User wish to enter into an agreement:

a) Defining and coordinating a cooperative effort to change the use of the Water Rights to include M&I and conservation uses, (and to adjudicate exchanges necessary to maximize beneficial use and to implement deliveries of water to the Parties);
b) Providing a framework for future leases of the Water Rights between Ag User, M&I User and Conservation User;
c) Describing the means of delivery of the fully consumable portion of the Water Rights ("CU") to M&I User and Conservation User;
d) Defining the roles and responsibilities of the of Parties in the administration of an annual plan for the use of the Water Rights (the "Water Use Plan");
e) Setting forth terms and conditions upon which other Parties may join the FLEX Market established herein;

NOW, THEREFORE, in consideration of the mutual promises and other valuable consideration exchanged herein, Ag User, M&I User and Conservation User agree as follows:

1. **Incorporation of Recitals.** The recitals are incorporated herein as if part of the Agreement.

PARTICIPANTS

2. **In FLEX Market.** The participants in the FLEX Market created by this Agreement are the parties to this Agreement, any subsidiaries, subdistricts, or enterprises wholly owned and controlled by the parties, and any parties added pursuant to paragraph 5 herein.

3. (OPTIONAL) **Agreement Contingent Upon Additional Participants**. This Agreement shall not be effective until (NUMBER) of additional (Ag) (M&I) (Conservation) users have committed to participate in the FLEX Market established hereunder and been approved by the existing parties pursuant to paragraph 5 herein.

4. **Assignment of Contractual Rights Under This Agreement**. Rights and obligations established under this Agreement are assignable upon approval of the majority of the remaining Parties. Approval shall not be unreasonably withheld. Participation in the Market upon assignment shall be subject to the terms of any water court decree or substitute water supply plan application.

5. **Addition of Parties to FLEX Market.** Parties may be added to this Agreement upon approval of the majority of existing Parties, on terms and conditions substantially similar to those herein; accounting, however, for the investment of existing Parties in the Agreement and associated infrastructure, legal, and engineering costs to maintain the parity of the Parties, and subject to the terms and conditions of any water court decree or substitute water supply plan approval. Parties approved for participation shall accept the terms and conditions of this Agreement in writing.

6. **Removal of Parties from the FLEX Market**. Parties may be removed from the FLEX Market voluntarily, upon the request of the Party and approval of the majority of the remaining parties, or involuntarily, in the event of a breach of this Agreement, upon a vote of two-thirds of the remaining parties. In either case, a removal shall be conditioned upon full payment of any costs, fees or contributions outstanding and any attorneys fees incurred by the remaining parties arising out of or related to any breach of this Agreement, or the removal process, and upon such other terms and conditions approved by the remaining parties.

OWNERSHIP

7. **Sale of Water Rights.**

    a. **Complete Ownership Interest.** By separate agreement, Ag User has agreed to sell (M&I User) (Conservation User) (NUMBER) shares of the Mutual Ditch Company. (M&I Shares) (Conservation Shares). Upon the closing of this sale, (M&I User) (Conservation User) shall have full right, title and interest to the (M&I Shares) (Conservation Shares). The (M&I Shares) (Conservation Shares) shall be delivered to the (Ag User)(M&I User) (Conservation User) pursuant to the terms of paragraph 25 herein for the term of this Agreement.

b. **Partial Ownership Interest.** By separate agreement, Ag User has agreed to sell (M&I User) (Conservation User) a specific ownership interest or right in and to _____ shares of the Mutual Ditch Company consisting of (state limited ownership interest—eg, delivery during specified time frames, in response to drought indicators, by priority, etc.). The terms and conditions of this sale and the deliveries of water pursuant to same shall be governed by the separate agreement entered into between the parties.

8. **Ownership of Remaining Shares Unchanged by This Agreement.** The Parties agree that Ag User owns and shall continue to own _____ Shares of Mutual Ditch Company Stock (the "Ag Shares"). This agreement shall never be interpreted to grant M&I User or Conservation User any right, title or interest in the Ag User Shares other than a leasehold interest negotiated between the Parties pursuant to a FLEX contract.

9. (OPTIONAL) **Assignment of Shares: Right of First Refusal.** For the term of this Agreement, any Party seeking to lease or sell Shares to a person or entity that is not a Party to this Agreement shall first offer the Shares to the Parties herein upon terms identical to those offered to the third party, and upon acceptance by another Party of said terms, shall sell or lease the Shares to the accepting Party, and not to the third party. This provision shall not apply in the event of a sale or lease of Ag Shares for agricultural purposes, as evidenced by the following: 1) the proposed sale or lease is to a shareholder in Mutual Ditch Company who intends to maintain the ability to use all of the Ag Shares for agricultural irrigation purposes; or 2) Ag User proposes to sell Ag User's lands in the same transaction, and the buyer intends to maintain the ability to use all of the Ag User Shares for agricultural irrigation.

10. (OPTIONAL) **Sale During First Term**. In the event Ag User sells Ag Shares to a third party prior to the expiration of the first term of this Agreement, other than a sale of Ag Shares for agricultural purposes as defined in ¶9 above, Ag User shall repay 1/3 of infrastructure, engineering and legal costs expended by M&I User through the date of closing.

WATER COURT/ ADMINISTRATIVE APPLICATION

11. **Water Court Application**. Ag User, M&I User, and Conservation user agree to file, as co-applicants, a new water court application to change the use of Ag User's ____ shares of Mutual Ditch Company (the "Ag User Shares") and the M&I Shares and Conservation Shares (collectively, the "Purchased Shares") (the "Application") to include M&I User and Conservation User uses, including, without limitation, irrigation, commercial, industrial, conservation, and all municipal uses; including but not limited to domestic, mechanical, manufacturing, equipment washing, industrial, power generation, fire protection, sewage treatment, street sprinkling, irrigation of parks, lawns, grounds, open spaces and agricultural lands, recreational, piscatorial, maintenance and preservation of wildlife and aesthetic values, lake and reservoir evaporation, oil and gas exploration,

development and reclamation, augmentation, and replacement in addition to the existing irrigation use. The application shall include proposed terms and conditions allowing delivery of part of the CU associated with the Ag User Shares and Purchased Shares for farming and part of the CU for M&I User and Conservation User uses through the techniques of fallowing, cultivation of crops with lower consumptive use needs, and/or limited or deficit irrigation. The parties agree that upon filing of the Water Court Application, an application for approval of substitute supply plan shall be submitted to the State Engineer pursuant to §37-92-304, C.R.S. to allow operation pending adjudication. Upon agreement of the parties, the Application may include an application for approval of plan of augmentation and/or exchange (DESCRIBE).

12. **Lead Applicant**. (M&I User) (Ag User) (Conservation User) agrees to be principally responsible for preparing the Application, filing it, and prosecuting it to completion. (M&I User) and (Ag User) (Conservation User) agree to cooperate in the prosecution of the Application and to provide documentation and support as requested by (M&I User) (Ag User) (Conservation User) in this regard. (M&I User) (Ag User) (Conservation User) shall consult (M&I User) (Ag User) (Conservation User) on all critical decisions, including, without limitation, drafting of proposed terms and conditions and terms and conditions of any proposed settlement or stipulation, and shall not proceed without the agreement of all parties on these critical issues.

13. **Counsel and Consultants.** (Lead Applicant) shall select counsel, consultants and expert witnesses; provided, however, that said selection shall be subject to the approval of all other parties. (Ag User) and (Conservation User) (M&I User) may, but are not required to, provide counsel and/or engineering assistance to M&I User at their sole cost and expense.

14. **Cost.** M&I User, Ag User and Conservation User agree to pay all costs and fees arising out of or related to the adjudication of the Application in the following proportions:

    Ag User: ___%
    M&I User: ___%
    Conservation User: ___%

    Bills shall be submitted to the Lead Applicant, who shall provide them to the other parties with a breakdown of costs and fees owed. OR Each party shall be billed separately for their portion of the costs and fees.

15. **Acknowledgment of Risk.** The Parties understand that there are certain risks inherent in seeking to adjudicate the change in use, and that a specific outcome is not guaranteed. No party to this agreement guarantees the outcome of the water court proceeding, or any substitute water supply plan applications filed in connection therewith. Whether or not the water court case and any substitute water supply plan applications are approved,

absent a further FLEX Contract, as described in ¶21 below, Ag User does not promise to deliver any specific amount of consumptive use from the Ag Shares. Likewise, absent further agreement, neither M&I User nor Conservation User promise to take delivery of any amount of consumptive use from the Ag Shares.

INFRASTRUCTURE

16. **Delivery Locations**. Ag User currently has the ability to deliver consumptive use and return flows from Mutual Ditch Company Shares to the South Platte River in the following location(s):

    a. **Direct Delivery**:
        i. In the (DESCRIBE S. PLATTE RIVER LOCATION), at the outfall of the Mutual Ditch Company River Bypass Structure.
    b. **Recharge Accretions**:
        i. In the (DESCRIBE S. PLATTE RIVER LOCATION), as recharge accretions from the delivery of water to the following recharge sites:
            1. Mutual Ditch Company Recharge Site A
            2. Mutual Ditch Company Recharge Site B

17. **New Infrastructure**. Ag User, M&I User, and Conservation User, in cooperation with Mutual Ditch Company, plan to install the following additional infrastructure (the "New Infrastructure") to facilitate administration of this Flex Market Agreement:

    a. **Direct Delivery**:

    b. **Recharge**:

    c. **Measuring Devices**:

18. **Shared Cost of Installation.** Ag User, M&I User, and Conservation User shall share the cost of the design and installation of the New Infrastructure as follows:

    Ag User: ___%
    M&I User: ___%
    Conservation User: ___%

19. **Ownership of Infrastructure.** (Ag User)(M&I User)(Conservation User) shall be the owner of the New Infrastructure during the term of this agreement. Upon conclusion of the Term, all right, title and interest in the New Infrastructure shall vest in (Ag User)(M&I User)(Conservation User). (Additional terms here).

20. **Maintenance of Infrastructure**. (Ag User)(M&I User)(Conservation User) shall maintain, repair and replace the New Infrastructure during the term of this agreement. Upon conclusion of the Term (Ag User)(M&I User)(Conservation User) shall assume all duties of maintenance, repair and replacement. (Additional terms here).

ADMINISTRATION

21. **Flex Leasing Anticipated**. The Parties anticipate that they may enter into leases with one another for the delivery of specified amounts of consumptive use from the Ag Shares (the M&I Shares, and the Conservation Shares) over a defined term and/or subject to specific conditions (eg, interruptible supply) ("FLEX Contracts"). These contracts may address first use of the shares and/or successive uses of fully consumable water derived from the shares. The amount, price, term and other details of these FLEX Contracts are not set forth or established herein, but are left to future negotiation and the discretion of the Parties.

22. **Administrator.** (Ag User) (M&I User) (Conservation User) agrees to be the Administrator of the FLEX Market. OR The parties have selected (THIRD PARTY ADMINISTRATOR) to be the Administrator of the FLEX Market. The Administrator shall be principally responsible for coordinating the activities of the parties and ensuring compliance with water court and substitute water supply plan terms and conditions. (Ag User) (M&I User) (Conservation User) agree to cooperate with the efforts of the Administrator by implementing measuring devices and reporting practices required by water court terms and conditions or SWSP approvals. The selected Administrator may be changed by a majority vote of the parties.

23. **Water Use Plan.** The Parties' use of the Ag Shares, the M&I Shares, and the Conservation Shares, collectively hereinafter referred to as the "Shares," shall be governed by a jointly prepared Annual Water Use Plan (the "Water Use Plan"), to be completed no later than April 1 annually. The Water Use Plan shall include, without limitation, the intended place and type of use(s) for the Ag Shares, the M&I Shares and the Conservation Shares, including any successive use or re-use, and any proposed well pumping under the plan, if applicable. Unless otherwise agreed by the Parties, Administrator shall be responsible for organizing one or more meetings of Ag User, M&I User, and Conservation User prior to April 1 each year, facilitating the preparation of the plan, and providing a copy of the final plan to all Parties. The Parties shall endeavor to implement a Water Use Plan that maximizes the beneficial use of the Shares for all Parties through use, re-use and re-diversion of same; provided, however, that the use of the Shares shall at all times be subject to this Agreement and any FLEX Contracts entered into between the Parties.

24. **Reporting.** The Administrator shall collect and summarize all data and reports required by any SWSP approval or water court decree and ensure delivery of same to the State and Division Engineer, any water court parties entitled to receive it under the terms of a

decree and to the parties to the FLEX agreement. The parties shall share the cost of ongoing measurement and reporting as follows:

Ag User:	___%
M&I User:	___%
Conservation User:	___%

25. **M&I and Conservation Shares.**

    a. **CU Delivery**. Subject to the terms and conditions of any substitute water supply plan approvals or water court decree, Ag User agrees to deliver consumptive use and return flows from the M&I Shares and Conservation Shares to the South Platte River in a manner consistent with the Annual Water Use Plan at a rate of $_____ per acre foot of CU delivered for the term of this Agreement. The rate for delivery of CU established herein shall increase annually in an amount equivalent to (CPI or other adjustment). Delivery of additional amounts of FLEX CU from the Ag Shares shall be subject to the terms and conditions of separately negotiated FLEX Contracts.

    b. **Leaseback**. Pursuant to a separate FLEX Lease (M&I User) (Conservation User) has agreed that Ag User shall have the use of the (M&I Shares) (Conservation Shares) for agricultural purposes (describe terms of lease).

TERM OF FLEX MARKET AGREEMENT

26. **Term**. The initial term of this Agreement is 10 years from its signing by all Parties. Upon mutual consent of all Parties, the Agreement may be renewed for one or more additional ten-year terms upon expiration.

ADDITIONAL TERMS

27. (Insert additional terms: e.g., liability issues, dispute resolution, breach and remedies, attorneys fees, choice of venue, force majeure)

Appendix D: Model Terms and Conditions “Pay as You Go” Draft

FLEX MODEL TERMS AND CONDITIONS
'Pay As You Go' Version

Colorado Water Conservation Board
Alternative Agricultural Water Transfers Grant Program
FLEX Market Study

FLEX MODEL TERMS AND CONDITIONS: CHANGE OF WATER RIGHTS

'PAY AS YOU GO' MODEL

SUMMARY

- Change of water rights in Mutual Ditch Company
- Applicants: Agricultural User, City of Municipality, and Conservation User
- 100 of 500 shares changed to include full range of M&I and Conservation uses
- Deliveries to:
  - Historical farms
  - Recharge sites under ditch
  - Bypass structures – return to River
- Return Flows: Required deliveries to River and approved recharge sites at time of diversion – 'pay as you go'
- No projection or return flow accounting
- Accounting: daily, reported monthly

CHANGE IN USE

1. **Water Rights Changed.** The Mutual Ditch Company ("Company") operates the Mutual Ditch water right for the benefit of its shareholders. There are 500 outstanding shares in the Company. Applicants seek to change the use of 100 shares (the "Subject Shares"). Expressed as a flow rate, the amount changed is equal to 25 c.f.s. of the Mutual Ditch water right described in ¶2 of this Decree. This flow rate is set forth herein solely for the purpose of recording the change of water rights in the water rights tabulation and is not intended to serve as a term and condition governing the delivery or use of the Mutual Ditch Company water right.

2. **Previous Decrees.** The Mutual Ditch Company was decreed Priority --- in Case No. ----, District Court, -------. The decreed appropriation date for the water right is ---, ------. The decreed rate of diversion is 100 cubic feet per second. The decreed use is for irrigation. The Mutual Ditch Company water right is diverted from the River through the Mutual Ditch Company headgate located in the --- Quarter of Section ---, Township - ---- ----, Range 66 West of the 6th P.M.

3. **Proposed Change in Type and Place of Use**.

3.1. *Existing Type and Location of Use by Agricultural User*: Applicants intend to retain the existing type and location of use decreed in Case No. -------, subject to the terms and conditions of this decree.

3.2. *City of Municipality Uses.* Applicants seek to change the use of the water rights represented by the Subject Shares to include, directly or by storage, exchange or recharge, the following uses by the City of Municipality within the boundaries of the City of Municipality or at other locations in (list counties) by contract with City of Municipality: irrigation, commercial, industrial, maintenance and preservation of habitat, wildlife and aesthetic values and all municipal uses; including but not limited to domestic, mechanical, manufacturing, equipment washing, industrial, power generation, fire protection, sewage treatment, street sprinkling, irrigation of parks, lawns, grounds, open spaces and agricultural lands, recreational, piscatorial, maintenance and preservation of wildlife, habitat and aesthetic values, lake and reservoir evaporation, oil and gas exploration, development and reclamation, augmentation, and replacement.

3.3. *Conservation User Uses.* Applicants seek to change the use of the water rights represented by the Subject Shares to include, directly or by storage, exchange or recharge, the following uses by Conservation User or by contract with Conservation User in (list counties): irrigation, fish and wildlife, recreational, piscatorial, maintenance and preservation of wildlife, habitat and aesthetic values, lake and reservoir evaporation and maintenance of minimum stream flows or natural surface levels or volumes for natural lakes by contractual agreement with the Colorado Water Conservation Board pursuant to §37-92-102(3), C.R.S.

3.4. *Use in Decreed Plans.* Use of the Subject Shares in decreed augmentation plans, substitute water supply plans approved pursuant to §37-92-308, C.R.S, and interruptible water supply agreements approved pursuant to §37-92-309, C.R.S. shall be made subject to and consistent with this Decree. To the extent there is a conflict between the terms of this Decree and the decrees in these other plans, the volumetric limits and other limiting terms of this Decree shall control use of the Subject Shares in other plans.

3.5. *Use to Extinction.* Applicants intend to maintain dominion and control over the water diverted and claim the right to consume it to extinction for the decreed purposes. To the extent the consumptive use portion of the water delivered by the Subject Shares is not consumed in a first use by Agricultural User, City of Municipality or Conservation User, the remaining portion may be re-diverted and applied to subsequent uses decreed herein until such water is entirely consumed; provided, however, that any such successive use or re-use must be approved by the Water Court in a subsequent water court application.

3.6. *Return Flow Appropriation.* Applicant proposes to replace return flows only at times the call on the river, including an adjudicated exchange, is senior to -----, effectively appropriating return flows at times the call or adjudicated exchange is junior to that date.

4. **Methodology**. Applicant seeks to change the use of the Subject Shares using a parcel-specific methodology. This decree does not quantify historical consumptive use by the 'ditch-wide method,' *see Williams v. Midway Ranches Property Owners' Assoc.*, 938 P.2d 515, 521 & 526 (Colo. 1997), and thus does not set any precedent for future changes of the water rights associated with other shares of capital stock in Mutual Ditch Company.

5. **Historical Use.** The Subject Shares were historically used to irrigate --- farms. These farms are listed below and depicted on **Exhibit A**. A study period of ---- to ----- was selected as representative of historical use. **Exhibit B** summarizes the consumptive use and return flows associated with each parcel. Ditch loss was assumed to be ---- percent based on information from Mutual Ditch Company representatives. The average annual farm headgate deliveries attributable to the Subject Shares were ----- acre-feet, or ------ acre-feet per share. The average annual historical consumptive use per year for the Subject Shares was ----- acre-feet, or ----- acre-feet per share. The average annual ground water return flows attributable to the Subject Shares were ----- acre-feet, or ----- acre-feet per share.

5.1. *Mutual Ditch Company Farm One.* Mutual Ditch Company Farm One, located in the ---- ¼ of Section --, Township -- North, Range -- West of the 6th P.M., was historically irrigated with --- shares, ---- of which are Subject Shares. From ---- through ----, the --- shares were used to irrigate up to --- acres of ----, ------, ------, ------ and -------. The return flows attributable to the -- shares historically accrued to the River in Section --, Township -- North, Range -- West of the 6th P.M., at the location shown on **Exhibit A**.

6. **Terms and Conditions for Use of the Subject Shares.** Applicant's use of water available under the Subject Shares shall be limited by the following terms and conditions.

6.1. *Seasonal Limitation.* Diversions under the Subject Shares for all uses shall be limited to the period from ----- to ------ each year.

6.2. *Point of Diversion.* All water diverted attributable to the Subject Shares shall be diverted from the River through the Mutual Ditch Company river headgate.

6.3. *Uses.* Following the change in use decreed herein, the Subject Shares may be used for the uses described in ¶3.

6.4. *Ditch Company Regulation.* The Company shall assess the same amount of conveyance losses to the delivery of the Subject Shares as are assessed all other shareholders.

6.5. *Points of Delivery*. All deliveries of water available to the Subject Shares shall be made at one the following locations:

6.5.1. Mutual Ditch Company Farm Headgates. Subject to the regulations of Mutual Ditch Company applicable to all shareholders, the Subject Shares may be delivered to any farm headgate located on the Mutual Ditch Company Ditch.

6.5.1.1. For Irrigation. Shares may be delivered to any Mutual Ditch Company farm headgate for irrigation purposes; provided, however, that Return Flow Credits shall be permitted only for farms historically irrigated by the Subject Shares or other farms approved for use pursuant to ¶6.8.2.1. For all other farms, no Return Flow Credit shall be permitted.

6.5.1.2. For Recharge. All water delivered to Mutual Ditch Company farm headgates and subsequently delivered to Recharge Ponds approved for use under this Decree shall be accounted for, and accretions to the River from such deliveries to Recharge Ponds shall be determined, in accordance with the terms of this Decree.

6.5.2. Mutual Ditch Company Bypass Structures. The Subject Shares may be delivered to bypass structures which return water to the River:

6.5.2.1. Existing Structures.

6.5.2.1.1. The (name) Bypass Structure, located in (location), which returns water to the River in (location).

6.5.2.2. Additional Structures.

6.5.2.2.1. Any Bypass Structure shall be equipped with a measuring device capable of continuous recording. In the event Applicant seeks to deliver water directly to the River via an additional Bypass Structure, it shall first file with the Court and serve on the Division Engineer and Objectors a notice

identifying the location of the Bypass Structure, the equipment and infrastructure present at the site, and the means of delivery to the River, including any transit losses to be assessed en route to the River. Objectors shall have 28 days to provide comments to the Division Engineer regarding Applicant's proposal. The Division Engineer shall provide approval of the proposed Bypass Structure in writing within 28 days of comments filed by Objectors, if any, or within 56 days of Applicant's notice if no comments are filed. The Division Engineer shall provide a copy of such approval and any and all information supporting such approval to Objectors. If the Division Engineer cannot approve the proposed Bypass Structure, he or she shall provide written comments to the Applicant, along with a copy of said comments and any and all information supporting said comments to Objectors, identifying specific issues that must be addressed to obtain approval. Applicant shall thereafter provide proof satisfactory to the Division Engineer and the Objectors that the identified items have been addressed. The Court retains perpetual jurisdiction to review disputes concerning the Division Engineer's approval or disapproval of the Bypass Structure. The standard of review of such disputes shall be *de novo* and Applicant shall have the burden of proof to demonstrate that the proposed Bypass Structure complies with the terms and conditions.

6.5.3. Rediversion by City of Municipality, Conservation User, and/or Agricultural User. Once delivered to the River via a Bypass Structure or as recharge accretions, water attributable to the subject shares may be re-diverted by City of Municipality, Agricultural User or Conservation User upstream through operation of a lawful exchange or downstream subject to any transit losses assessed by the Division Engineer. Diversions by a well or into a recharge site shall be permissible only pursuant to a water court decree or §37-92-308, C.R.S. substitute water supply plan setting forth the terms and conditions for the operation of the recharge site or well. Applicants shall be responsible for obtaining any agreements necessary to

deliver water past any dry-up points in the River using bypass structures owned by third parties.

6.5.4. Notification To Mutual Ditch Company. Pursuant to ¶6.10 herein, Applicant shall notify Mutual Ditch Company of the percentage of the flow rate attributable to each Subject Share to be delivered to Mutual Ditch Company farm headgates and Mutual Ditch Company Bypass Structures. Deliveries to all identified Mutual Ditch Company farm headgates and Mutual Ditch Company Bypass Structures shall be measured and shall be counted against Applicant's volumetric limits.

6.6. *Farm Specific Volumetric Limitations on the Amount of Water Delivered Through Farm or Bypass Headgates*. All uses of the Subject Shares, including use by Agricultural User at the historical location, shall be subject to the per share monthly maximum volumetric limits, per share annual maximum volumetric limits, and per share twenty-year rolling average volumetric limits for the farm on which the particular Subject Share was historically used, as set forth on **Exhibit C**. To the extent Subject Shares are dedicated to different uses (irrigation, municipal and industrial, or conservation) in fractional increments per ¶6.10, maximum volumetric limits shall be pro-rated and applied to the fractional Subject Shares by type of use. For example, if ½ of a Subject Share is dedicated to municipal and industrial use, the maximum volume of diversion for the month of May would be ½ of the maximum volume of diversion for the month of May for one Subject Share. For the purposes of cumulative limits, all diversions under each Subject share shall be included in the total, regardless of whether a Subject Share has been divided and dedicated to multiple uses for the purposes of delivery.

For purposes of initiating the 20 year rolling average volumetric limit, ------- will be used for each of the first 19 years of the rolling average calculation. Farm or bypass headgate deliveries of water available to the Subject Shares shall be measured using measuring devices equipped with continuous recorders.

6.7. *Farm Specific Return Flow Obligations*. Historical use of the Subject Shares for irrigation resulted in return flows that accrued to the River. These return flows must be replaced pursuant to the following terms and conditions to prevent injury to vested water rights.

6.7.1. Sources of Water to Replace Return Flow Obligations: Return flow obligations shall be met on an instantaneous 'pay as you go' basis by delivery of the return flow component and any necessary supplemental portion of the consumptive use component of the Subject Shares directly

to the River, to Recharge Ponds approved for use to replace return flows for each Subject Share (**Exhibit C**), and/or to farms approved for Return Flow Credit for irrigation uses. The purpose of delivering return flows to specific Recharge Ponds approved for use for each Subject Share is to deliver subsurface returns into the alluvial aquifer in a manner mimicking the location and timing of historical return flow infiltration.

6.7.2. Location. Applicant shall replace return flows by delivery of a portion of the Subject Shares to the River at approved Bypass Structures (¶6.5.2), to Recharge Ponds approved for use under this decree to replace return flows for each Subject Share (**Exhibit C**) and via Return Flow Credits resulting from use of the Subject Shares for irrigation on approved farms (¶6.8.2).

6.7.3. Amount and Timing: Applicant shall apply the on-farm return flow factors set forth in **Exhibit C** to all measured farm or bypass headgate deliveries of each of the Subject Shares to determine the amount and timing of its return flow obligation. Surface Return Flows shall be due to the River the same day as the diversions of Subject Shares through the farm or bypass headgates. Subsurface Return Flows shall be due to a Recharge Pond approved for use under this decree or, in the case of approved Return Flow Credits, to the farm for irrigation within 72 hours of the diversions of the Subject Shares through the farm or bypass headgates.

6.7.4. Conditions Requiring Replacement:

6.7.4.1. Surface Returns. Applicant shall replace surface return flow obligations to the River at times when there is a valid call for water or an adjudicated exchange operating at or downstream of the historical return flow location for the Subject Shares described in ¶5 that is senior to (return flow appropriation date). At times when there is not a valid call for water or an adjudicated exchange operating at or downstream of the historical return flow location for the Subject Shares described in ¶5 that is senior to (return flow appropriation date), Applicant shall be entitled to use the surface return flow component of deliveries under the Subject Shares for the purposes described in ¶3.

6.7.4.2. Subsurface Returns. Applicant shall replace subsurface return flow obligations contemporaneous with diversions of water attributable to the Subject Shares, without regard to call conditions on the River. Applicants may, but are not required to track return flow accretions using the methodology set forth in ¶9.4. Provided Applicant tracks return flow accretions using the methodology set forth in ¶9.4, Applicant shall be entitled to use the return flow accretions affecting the River for the purposes described in ¶3 at times when there is not a valid call for water or an adjudicated exchange operating at or downstream of the historical return flow location for the Subject Shares described in ¶5 that is senior to (return flow appropriation date).

6.7.5. Evaporative Losses. Evaporative losses and any losses attributable to vegetation in the Recharge Pond to which the water is so delivered shall be calculated pursuant to the terms of this decree, subtracted from the consumptive use portion of the Subject Share and delivered to the Recharge Pond along with the return flow component.

6.8. *Subject Shares Used For Irrigation*:

6.8.1. Types of Irrigation Uses Defined. For the purposes of administration, two types of agricultural irrigation uses shall be recognized. All agricultural irrigation uses shall fall within one of these two defined types. The two types of irrigation are:

6.8.1.1. Full Irrigation. If, at the time of the annual dedication of Subject Shares under ¶6.10, the total anticipated water supply from all sources is greater than or equal to the anticipated net crop water irrigation requirement for any specific farm, or Applicant plans to deliver the full number of Subject Shares historically associated with a specific farm, the farm shall be considered to be in Full Irrigation status for the ensuing irrigation season. For the purposes of this paragraph, deliveries to Subject Shares shall be presumed to be a (dry year deliveries), and precipitation shall be presumed to be (drought year). Net Crop Water Irrigation requirement shall be calculated using (specify model).

6.8.1.2. Deficit Irrigation. If, at the time of the annual dedication of Subject Shares under ¶6.10, Applicant plans to deliver less than the full number of Subject Shares historically associated with a specific farm, and the total anticipated water supply from all sources is less than the net crop water irrigation requirement, the farm shall be considered to be in Deficit Irrigation status for the ensuing irrigation season. For the purposes of this paragraph, deliveries to Subject Shares shall be presumed to be a (dry year deliveries), and precipitation shall be presumed to be (drought year). Net Crop Water Irrigation requirement shall be calculated using (specify model).

6.8.2. Full Irrigation. For Subject Shares delivered for Full Irrigation uses to farms historically irrigated by the Subject Shares or other farms approved for use pursuant to this provision, return flow obligations shall be calculated as described in ¶6.7; provided, however, that Applicant shall be entitled to a Return Flow Credit reducing the amount that is required to be delivered to the Recharge Pond(s). The Return Flow Credit Factors for center pivot sprinkler irrigation and flood irrigation shall be (20%) and (30%) respectively. No Return Flow Credit shall be permitted for drip irrigation.

No return flow credit shall be permitted for Subject Shares used for irrigation at any location other than the farms described in ¶5 or below unless Applicant obtains Court approval of the appropriate W, X, T and S values to be used to calculate the timing of return flow accretions from irrigation use at such other locations, and the farm is equipped with the measuring structures capable of independently measuring and recording deliveries attributable to the Subject Shares.

Return flow credit shall be reduced by (--%) in any year following fallowing in which no water supplies were delivered to the fallowed farm to account for potential refilling of the soil moisture reservoir.

6.8.2.1. (Additional farms description)

6.8.3. Deficit Irrigation. For Subject Shares delivered to Deficit Irrigation uses, return flow obligations shall be calculated as described in ¶6.7. Deficit Irrigation uses shall be presumed to be 100% consumptive. Applicant shall not be entitled to credit for accretions to the River from return flows resulting from such irrigation uses.

6.9. *Fallowing/Zero Delivery.* In the event Applicants choose to entirely cease use of one or more Subject Shares on part or all of an historically irrigated farm to support City of Municipality or Conservation User Uses, the number of acres on each farm proportionate to the number of dedicated Subject Shares on each farm, determined in accordance with the farm specific Zero Delivery acreage per share amounts set forth on **Exhibit C** (collectively, the "Zero Delivery Acreages"), shall not be irrigated with the dedicated Subject Shares. The number of acres required per Subject Share for Zero Delivery on each farm shall be fixed under this Decree; however, the location of Zero Delivery acres on a particular farm may change from irrigation year to irrigation year. The location of the historically irrigated acres on each farm is shown on **Exhibit A**.

6.9.1. Cessation of Irrigation with Surface Water from Mutual Ditch Company: The Zero Delivery Acreages shall not be irrigated with any water from the Mutual Ditch Company water right, and shall be separated from irrigated areas so that no water from the first use of the Mutual Ditch Company water right flows onto the Zero Delivery Acreages.

6.9.2. Permissible Water Supplies: Zero Delivery Acreages may be irrigated by any lawful source other than diversions attributable to the Mutual Ditch Company Water Right, including, without limitation:

6.9.2.1. By a well included in a decreed augmentation plan or in a substitute water supply plan approved by the State Engineer pursuant to C.R.S. § 37-92-308(4), or successor statute;

6.9.2.2. By water lawfully available for irrigation secured from City of Municipality, Conservation User, or third parties by contract, to be delivered through Mutual Ditch;

6.9.2.3. Pursuant to a decree of this Court approving a change of water right or determination of new water right to be used on the Zero Delivery Acreages; or

6.9.2.4. By using a municipal water supply of treated or raw water delivered to the property via municipal delivery systems;

6.9.2.5. By the remaining fully consumable portion of the Subject Shares, after delivery to the River and one or more uses by City of Municipality, Agricultural User and/or Conservation User; provided, however that such re-use must first be approved by separate decree of this Court.

6.9.3. Permitted Vegetation: Shallow rooted perennial and annual vegetation shall be permitted on Zero Delivery Acreages. In the event a Zero Delivery Acreage is planted with alfalfa or other deep rooted crops, and the Zero Delivery Acreage will receive no irrigation water, Applicants shall install a monitoring well to determine the depth to groundwater. If the depth to groundwater is less than six feet, Applicant shall calculate the amount of water consumed by the deep rooted crop using the IDSCU Method and reduce consumptive use credit for the Subject Share(s) by an equal amount. If the Zero Delivery Acreages will receive water from another source, or if the water table is in excess of 6 feet from the ground surface, alfalfa or other deep rooted crops are permitted without necessity to calculate any reduction in consumptive use.

6.9.4. Notice: Applicant shall file with the Court and serve notice to the Division Engineer, the Water Commissioner and the Objectors designating the Zero Delivery Acreages no later than April 1, except when a Subject Share is dedicated late pursuant to ¶6.10 of this Decree, in which case the dry-up shall be documented at the time of dedication.

Said notice shall include a detailed map identifying the Zero Delivery Acreages and the crop or cover type proposed for each acreage, as well as any proposal to irrigate the Zero Delivery Acreages with sources other than Mutual Ditch Company shares, together with a copy of any information provided as part of the request. In the event Agricultural User intends to continue to irrigate any part of the farm containing the Zero Delivery Acreage with Mutual Ditch Company shares, any request must be accompanied by documentation that the non-Mutual Ditch Company supplies can be measured and delivered to the Zero Delivery

Acreage and distinguished from the Mutual Ditch Company supplies running in any common lateral or delivery system.

Objectors shall be permitted 28 days from Applicant's submission to provide comments to the Division Engineer. At the conclusion of the 28 day comment period, the Division Engineer or his representatives shall review the materials provided by the Applicant and any objectors, and, at his or her discretion, may inspect the farm or require additional information from the Applicant including, without limitation, inspection and report by a Colorado registered engineer.

In the event the Division Engineer finds the proposal acceptable, no further response is necessary, and Applicant shall be permitted to proceed as proposed. If, following the review of the materials submitted by Applicant and any inspection, the Division Engineer or his representative cannot approve of the proposed irrigation plan, he or she shall provide written comments to the Applicant within 42 days of the filing of Applicant's request identifying specific issues that must be addressed to obtain approval with a copy of said comments and any and all information supporting said comments to Objectors. Applicant shall thereafter provide proof satisfactory to the Division Engineer and the Objectors that the identified items have been addressed. Upon providing such notice, the Applicant may proceed with the plan as approved by the Division Engineer.

At the conclusion of the irrigation season, no later than October 1, Applicant shall provide an affidavit summarizing actual operations on the Zero Delivery Acreage and confirming that the Zero Delivery plan was successfully implemented and that none of the Shares were used on the Zero Delivery Acreage. In the alternative and upon approval of the Division Engineer, the Applicant may provide aerial and/or satellite imagery demonstrating compliance with dry-up requirements.

The Court retains perpetual jurisdiction to resolve disputes concerning Applicant's compliance with the requirements of this paragraph. The standard of review of such disputes shall be *de novo* and Applicant shall have the burden of proof to demonstrate that its use of the proposed water supplies complies with the terms and conditions of this Decree.

6.10. *Share Dedication.* No later than April 1 each year, Applicant shall identify the use of the Subject Shares as irrigation, municipal and industrial, or conservation. Partial shares may be dedicated in increments no smaller than (1/2) share. The

points of delivery for the Subject Shares or fractions thereof shall be designated by a written notice on or before April 1 each year. The notice shall be provided to Mutual Ditch Company, the Division Engineer and Objectors, and shall identify the points of delivery for each Subject Share or fraction thereof in the ensuing year, by month, including deliveries to Recharge Pond(s) approved for the use by the specific Subject Share (**Exhibit C**) for return flow replacement. By way of example, the notice of points of delivery for ½ Subject Share dedicated to municipal and industrial uses could specify the following for the month of May:

Mutual Ditch Company Bypass Structure 1: 40% (consumptive use)
Mutual Ditch Company Recharge Pond 1: 60% (return flow)

In this example, the flow rate attributable to the Subject Share in May would be delivered, on an instantaneous basis, 40% to the Bypass Structure and 60% to the recharge site approved for use by the specific Subject Share. In the case of irrigation on farms approved for Return Flow Credits, the Return Flow Credit percentage shall be included in the requested deliveries to the farm, as well as any supplemental deliveries to recharge needed to maintain the historical return flow percentage. By way of example, the notice of points of delivery for ½ Subject dedicated to irrigation uses on an approved farm could specify the following for the month of May:

Historical Farm 1: 70% (CU 40%, Return Flow Credit 30%)
Mutual Ditch Company Recharge Pond 1: 30%

For Subject Shares applied to irrigation on approved farms for which Applicant seeks Return Flow Credit, the notice shall also identify the crops proposed to be cultivated on each farm, the net irrigation water requirement calculated pursuant to ¶6.8, and the total anticipated water supplies for the farm.

Dedicated uses and points of delivery for Subject Shares may be changed provided that diversions under the Subject Shares remain within volumetric limits established by this Decree. In the event of a change in the point of delivery of Subject Shares, Applicant shall provide a revised notice to Mutual Ditch Company, the Division Engineer, and Objectors setting forth the percentage of each of the Subject Shares or fraction thereof to be delivered at each point of delivery on a monthly basis. Changes in the point of delivery for Subject Shares may become effective no sooner than the first day of the month following distribution of the revised notice.

RECHARGE PONDS

7. **Recharge Ponds.** The Subject Shares will be diverted into and delivered down the Mutual Ditch Company Ditch to the following recharge ponds ("Recharge Ponds"):

7.1. *Mutual Ditch Company Recharge Pond 1*

7.1.1. Legal Description of Location:

7.1.2. Surface Area: -- acres.

7.1.3. Capacity: -- acre feet.

7.1.4. Aquifer Parameters: T=---; X=---; W=---; S= ---.

7.1.5. Location of Accretions: River, in the ----. The point of accretion is depicted on **Exhibit A** attached hereto.

8. **Additional or Modified Recharge Ponds.** Applicant may modify a Recharge Pond or add new recharge ponds so long as the Division Engineer approves modification of the existing Recharge Pond or new recharge pond prior to its use. Applicant shall provide notice of the modified Recharge Pond or new recharge pond to the Division Engineer and Objectors at least 60 days prior to the proposed use of a modified Recharge Pond or a new recharge pond. The notice required by this paragraph shall include at least the following information: (1) a description of the proposed modification to any Recharge Pond; (2) the location of any new recharge pond; (3) the increased capacity of any Recharge Pond or the capacity of any new recharge pond including the increased or new surface area; (4) the W, X, T and S values that Applicant proposes to use determine the timing of the increased or new accretions to the River; (5) whether the modified Recharge Pond or new recharge pond intercepts groundwater and whether there will be an increase in consumptive use of groundwater caused by recharge in the modified Recharge Pond or new recharge pond; and (6) the location of the accretions from the modified Recharge Pond or new recharge pond and whether the accretions will affect the River or a tributary or drain to the River. If any Objector files a Notice of Objection to use of the modified Recharge Pond or new recharge pond within 28 days of service of the notice required herein, Applicant shall not use such modified Recharge Pond or new recharge pond until it is approved by the Court. All terms and conditions applicable to existing Recharge Ponds shall also apply to any modified Recharge Pond or new recharge pond added to this Decree, except as otherwise ordered by the Court at the time the modified Recharge Pond or new recharge pond is added. The Court shall retain perpetual jurisdiction to resolve any dispute regarding the inclusion, use or operation of any modified Recharge Pond or new recharge pond.

9. **Terms and Conditions for Use of Recharge Ponds**.

9.1. *Measuring Devices***.** Prior to the delivery of water to a Recharge Pond, Applicant shall install a continuous recording device capable of measuring the amount of water delivered to each Recharge Pond on a daily basis. Each measuring device must be at least as accurate as a Parshall flume. If the Recharge Pond has the capability to release water, the outlet shall likewise be equipped with a continuous recording measuring device to measure outflows from each Recharge Pond on a daily basis. Applicant shall install a staff gauge at the lowest surface elevation in each Recharge Pond. All staff gauges must be readable from a readily accessible location adjacent to the Recharge Pond. All measuring devices required by this paragraph must be approved by the Water Commissioner prior to operation of the Recharge Pond. Any modified Recharge Pond or new recharge ponds shall have installed measuring devices that comply with this paragraph. Each Recharge Pond shall be surveyed prior to use, and a stage-area-capacity curve delivered to the Division Engineer and all Objectors. In the event any party, other than the Division Engineer, objects to the determination of the maximum number of surface acres associated with delivery of water into the Recharge Pond or calculation of the relationship between the depth of the water in the Recharge Pond and the exposed surface acres, the objection shall be filed with the Court within 56 days after service of the survey and stage-area-capacity curve on the Division Engineer and all parties to this case. The Court retains perpetual jurisdiction to resolve any dispute regarding the determination of surface area hereunder.

9.2. *Amount Credited to Recharge*. The net monthly volume of water recharged to the alluvial aquifer at each Recharge Pond will be determined by measuring the amount of water delivered to that Recharge Pond by use of a continuous recording measuring device, and by subtracting: (1) the amount of water that flowed out of the Recharge Pond, if any, measured by use of a continuous recording measuring device; (2) the amount of water that was lost to evaporation, as determined by the method described in ¶9.2.1 of this Decree; (3) the amount of water lost to consumptive use due to vegetation located in the Recharge Pond, which will be determined by multiplying the area of each Recharge Pond in acres that is covered by vegetation during the two months following any month in which water is in the Recharge Pond, by the monthly factors, which are in feet, shown in Table 2 below; (4) the amount of water retained in the Recharge Pond that has not yet percolated into the ground. The staff gages required by ¶9.1 of this Decree shall be read weekly and the data interpolated to arrive at daily levels. The staff gauge data shall be used to determine: (1) the volume of the water in the Recharge Pond; and (2) the exposed surface area of water, in acres. Accounting shall be done on a daily basis using the accounting forms attached hereto as **Exhibit D.**

9.2.1. Evaporation: Losses to evaporation shall be calculated based upon exposed surface area in a given month (in acres). Exposed surface area for each Recharge Pond shall be computed using the stage-area-capacity curve for the Recharge Pond. Evaporation losses from each Recharge Pond shall be calculated by multiplying the surveyed surface area for the Recharge Pond by the rate of net evaporation for the days of exposed water surface. The Applicant shall use real time net evaporation data from the ---- weather station, maintained by ----- in its calculations. If data from the --- weather station is not available, then Applicant shall use data from the --- weather station. If for any reason data from either of these stations is not available, then the average evaporation loss values in Table 1 below, which are in inches per acre per month of exposed surface area, shall be prorated for the number of days of exposed water in each Recharge Pond each month to determine the Recharge Pond evaporation. Real time net evaporation shall be determined on a daily basis as follows: Gross pan evaporation shall be computed by multiplying daily standard alfalfa reference crop evapotranspiration (ETr) published by NCWCD for ---- or, if unavailable from ----, from -----, in inches, by 1.2 to determine monthly gross pan evaporation in inches. Gross pan evaporation will then be multiplied by a pan coefficient of 0.7 to obtain daily gross pond evaporation in inches. Daily net pond evaporation will be computed as gross pond evaporation minus effective precipitation, where effective precipitation is total daily precipitation, in inches, multiplied by 0.7.

TABLE 1

NOAA Technical Report NWS 33 CF table 119a	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Monthly Distribution (for sites under 6500 ft msl)	0.03	0.035	0.055	0.09	0.12	0.145	0.15	0.135	0.1	0.07	0.04	0.03	1
Monthly Evaporation (in) per Acre of Surface Area	1.35	1.575	2.475	4.05	5.4	6.525	6.75	6.075	4.5	3.15	1.8	1.35	45

9.2.2. Evapotranspiration: Evapotranspiration losses from vegetation located within the Recharge Pond shall be assessed only to the extent there is vegetation within the confines of the Recharge Pond. In these circumstances, the amount of water lost to evapotranspiration shall be determined by multiplying the number of acres of the Recharge Pond covered with vegetation in a given month by the following factors to arrive at an amount in acre-feet consumed by such vegetation.

TABLE 2

Apr	May	Jun	Jul	Aug	Sept	Oct
0.08	0.16	0.27	0.40	0.35	0.22	0.08

9.3. *Accounting for Sources of Water Delivered to Recharge Ponds.* Applicant shall distinguish in its accounting between the consumptive use component of the Subject Shares and the return flow component of the Subject Shares. Accretions resulting from the delivery of consumptive use component of the Subject Shares to the Recharge ponds shall be lagged pursuant to ¶9.4. Accretions from deliveries dedicated to return flow replacement need not be lagged. Total evaporation and consumptive use due to vegetation shall be allocated to the consumptive use component of the Subject Shares, and shall not be assessed on the return flow component of the Subject Shares delivered to the Recharge Ponds for replacement of return flows.

9.4. *Lagging Recharge Credits.* The timing of accretions to the River from the Subject Shares delivered to the Recharge Ponds shall be calculated using the analytical equations described by Glover (Glover, Robert E., 1977, *Transient Ground Water* Hydraulics, Water Resources Publications) and others. The method to be used for applying the analytical equations described by Glover shall represent a parallel no-flow boundary that requires the following parameters: (1) a boundary condition for the alluvial aquifer indicating that the boundary constitutes a "no-flow" condition; (2) the width of the aquifer on the side of the river where the Recharge Pond is located, commonly referred to as "W"; (3) the distance from the river to the location of the Recharge Pond, commonly referred to as "X"; (4) the harmonic transmissivity of the aquifer between the Recharge Pond and the river, commonly referred to as "T"; and (5) the specific yield of the aquifer, commonly referred to as "S". The aquifer parameters for each of the Recharge Ponds were determined, when possible, from the U.S. Geological Survey Publications entitled Hydrogeological Characteristics of the Valley Fill

Aquifer in the Brighton and Greeley Reaches of the Valley, Colorado ("Hydrogeologic Characteristics"). For purposes of determining the aquifer parameters for the Recharge Ponds, the location of the River was determined by reference to the plates included within the Hydrogeologic Characteristics. The "X" and "W" factors for each Recharge Pond were determined by measurement of the perpendicular distance from the River to the Recharge Pond and from the Recharge Pond to the aquifer boundary. The "T" factor was determined by using the harmonic transmissivity of the aquifer between the Recharge Pond and the river. To the extent a Recharge Pond was located outside the area of the Hydrogeologic Characteristics, the "X", "W", and "T" factors were determined by reference to alternative aquifer data. The specific yield for the aquifer was assumed to be twenty percent (20%). AWAS is based upon the Analytical Stream Depletion Model of the Office of the State Engineer, Colorado Division of Water Resources, which was developed by Dewayne R. Schroeder in 1987 to compute stream depletion caused by a well pumping from an aquifer hydraulically connected to the stream. The alluvial aquifer setting of the AWAS program, or another program which incorporates the Glover no-flow boundary method, shall be used to determine the timing of stream accretions.

ADMINISTRATION AND ACCOUNTING

10. **Accounting and Reporting**.

10.1. *Measurement of Subject Share Deliveries*. Deliveries of water available to the Subject Shares shall be measured daily through farm headgates and/or bypass headgates and such daily measurements shall be reported by Applicants no less than monthly.

10.2. *Accounting Form.* A sample accounting form is attached hereto and incorporated herein by reference as **Exhibit D**. This accounting form is not decreed herein and may be changed from time to time with the approval of the Division Engineer and 30 days advance written notice to all Objectors in this case, provided that all information required by this Decree is included in any changed accounting forms.

10.3. *Frequency of Reporting.* Accounting for the plan will be done on a daily basis, and all accounting for each month's operation will be completed and sent to the Division Engineer no later than the last day of the following month.

10.4. *Minimum Terms.* Applicant's accounting under this Decree shall include, at a minimum, the following information:

10.4.1. River call in effect each day downstream of the location of historical return flow accrual to the ------ River

10.4.2. Total measured inflows into each Recharge Pond.

10.4.3. Stage reading and surface area for each Recharge Pond.

10.4.4. Evaporation for each Recharge Pond.

10.4.5. Surface area of vegetation in each Recharge Pond.

10.4.6. Evapotranspiration for each Recharge Pond.

10.4.7. Net recharged water for each Recharge Pond.

10.4.8. Net stream accretions resulting from the delivery of the consumptive use component of the Subject Shares to each Recharge Pond.

10.4.9. Number of Subject Shares designated for use by Agricultural User, City of Municipality, and Conservation User on a farm by farm basis.

10.4.10. Number of acres in the Zero Delivery Acreages and map of location of Zero Delivery Acreages.

10.4.11. Measured deliveries of water under the Subject Shares for City of Municipality and Conservation User uses at each point of delivery.

10.4.12. Measured deliveries of water under the Subject Shares for irrigation use, on a farm by farm basis, at each point of delivery.

10.4.13. Running totals on monthly, annual, and 20-year annual volumetric limits, on a farm by farm basis for each Subject Share.

10.4.14. If any other entities use the same Bypass Structure as the Applicants, an accounting sheet should be prepared showing total measured deliveries through the Bypass Structure and how the water is allocated between the Applicants and the other entities.

RETAINED JURISDICTION – FARM SPECIFIC RETURN FLOW FACTORS

11. *Revised Return Flow Credit Factors*. The Return Flow Credit Factors set forth in ¶6.8 are the best estimates, based on sound science, available to the Court and the parties at

the time this decree is entered. Applicant may engage in additional, farm, or farms, specific study and petition the court for approval of Return Flow Credit Factors to replace the ¶6.8 estimates. A course of study to achieve better understanding of return flows occurring on specific farms should employ a water balance approach, and should, at a minimum, include direct measurement and/or estimation of the following water balance elements:

11.1. Farm headgate deliveries.

11.2. Beneficial evapotranspiration.

11.3. Non beneficial evapotranspiration.

11.4. Evaporation (free water surface evaporation).

11.5. Surface return flows leaving the farm.

11.6. Soil Moisture Storage.

11.7. Deep percolation (also known as subsurface return flows).

Upon completion of a course of study involving no less than 3 full irrigation seasons, and no later than 10 years following the entry of this decree, Applicants may petition the Court to establish customized return flow factors to replace the assumptions in ¶6.8. The new factors may be annual estimates, or may be more specific and identify different return flow factors based upon month, irrigation type, crop type, soil type and other significant variables. They may be specific to a single farm, or may encompass larger areas and multiple farms sharing similar characteristics. Applicant shall bear the burden of demonstrating that the proposed new factors are based on sound science and sufficient to prevent injury to other water users.

EXHIBITS

A. Map: Farms, recharge sites, historically irrigated areas, return flow location

B. Table: Historical consumptive use and return flows

C. Table: Farm specific volumetric limits, return flow factors, dry up acreage requirements, approved recharge ponds

FLEX MODEL TERMS AND CONDITIONS
'Pay As You Go' Version
Colorado Water Conservation Board
Alternative Agricultural Water Transfers Grant Program
FLEX Market Study

D. Accounting Form

Appendix E: Model Terms and Conditions "Return Flow Accounting" Draft

FLEX MODEL TERMS AND CONDITIONS
'Return Flow Accounting' Version

Colorado Water Conservation Board
Alternative Agricultural Water Transfers Grant Program
FLEX Market Study

FLEX MODEL TERMS AND CONDITIONS: CHANGE OF WATER RIGHTS

'RETURN FLOW ACCOUNT' MODEL

SUMMARY

- Change of water rights in Mutual Ditch Company
- Applicants: Agricultural User, City of Municipality, and Conservation User
- 100 of 500 shares changed to include full range of M&I and Conservation uses
- Deliveries to:
  - Historical farms
  - Recharge sites under ditch
  - Bypass structures – return to river
- Return Flow Accounting: Annual plan detailing planned deliveries, accounting for actual deliveries and verifying return flow replacement
- Accounting: daily, reported monthly in Return Flow Projection

CHANGE IN USE

1. **Water Rights Changed.** The Mutual Ditch Company ("Company") operates the Mutual Ditch water right for the benefit of its shareholders. There are 500 outstanding shares in the Company. Applicants seek to change the use of 100 shares (the "Subject Shares"). Expressed as a flow rate, the amount changed is equal to 25 c.f.s. of the Mutual Ditch water right described in ¶2 of this Decree. This flow rate is set forth herein solely for the purpose of recording the change of water rights in the water rights tabulation and is not intended to serve as a term and condition governing the delivery or use of the Mutual Ditch Company water right.

2. **Previous Decrees.** The Mutual Ditch Company was decreed Priority --- in Case No. ----, District Court, -------. The decreed appropriation date for the water right is ---, ------. The decreed rate of diversion is 100 cubic feet per second. The decreed use is for irrigation. The Mutual Ditch Company water right is diverted from the River through the Mutual Ditch Company headgate located in the --- Quarter of Section ---, Township - ---- ----, Range --- West of the 6th P.M.

3. **Proposed Change in Type and Place of Use**.

FLEX MODEL TERMS AND CONDITIONS
'Return Flow Accounting' Version

Colorado Water Conservation Board
Alternative Agricultural Water Transfers Grant Program
FLEX Market Study

3.1. *Existing Type and Location of Use by Agricultural User*: Applicants intend to retain the existing type and location of use decreed in Case No. -------, subject to the terms and conditions of this decree.

3.2. *City of Municipality Uses.* Applicants seek to change the use of the water rights represented by the Subject Shares to include, directly or by storage, exchange or recharge, the following uses by the City of Municipality within the boundaries of the City of Municipality or at other locations in (list counties) by contract with City of Municipality: irrigation, commercial, industrial, maintenance and preservation of habitat, wildlife and aesthetic values, and all municipal uses; including but not limited to domestic, mechanical, manufacturing, equipment washing, industrial, power generation, fire protection, sewage treatment, street sprinkling, irrigation of parks, lawns, grounds, open spaces and agricultural lands, recreational, piscatorial, maintenance and preservation of wildlife, habitat and aesthetic values, lake and reservoir evaporation, oil and gas exploration, development and reclamation, augmentation, and replacement.

3.3. *Conservation User Uses.* Applicants seek to change the use of the water rights represented by the Subject Shares to include, directly or by storage, exchange or recharge, the following uses by Conservation User or by contract with Conservation User in (list counties): irrigation, fish and wildlife, recreational, piscatorial, maintenance and preservation of wildlife, habitat and aesthetic values, lake and reservoir evaporation and maintenance of minimum stream flows or natural surface levels or volumes for natural lakes by contractual agreement with the Colorado Water Conservation Board pursuant to §37-92-102(3), C.R.S.

3.4. *Use in Decreed Plans.* Use of the Subject Shares in decreed augmentation plans, substitute water supply plans approved pursuant to §37-92-308, C.R.S. and interruptible water supply agreements approved pursuant to §37-92-309, C.R.S. shall be made subject to and consistent with this Decree. To the extent there is a conflict between the terms of this Decree and the decrees in these other plans, the volumetric limits and other limiting terms of this Decree shall control use of the Subject Shares in other plans.

3.5. *Use to Extinction.* Applicants intend to maintain dominion and control over the water diverted and claim the right to consume it to extinction for the decreed purposes. To the extent the consumptive use portion of the water delivered by the Subject Shares is not consumed in a first use by Agricultural User, City of Municipality or Conservation User, the remaining portion may be re-diverted and applied to subsequent uses decreed herein until such water is entirely consumed;

provided, however, that any such successive use or re-use must be approved by the Water Court in a subsequent water court application.

3.6. *Return Flow Appropriation.* Applicant proposes to replace return flows only at times the call on the river, including an adjudicated exchange, is senior to -----, effectively appropriating return flows at times the call or adjudicated exchange is junior to that date.

4. **Methodology**. Applicant seeks to change the use of the Subject Shares using a parcel-specific methodology. This decree does not quantify historical consumptive use by the 'ditch-wide method,' *see Williams v. Midway Ranches Property Owners' Assoc.*, 938 P.2d 515, 521 & 526 (Colo. 1997), and thus does not set any precedent for future changes of the water rights associated with other shares of capital stock in Mutual Ditch Company.

5. **Historical Use.** The Subject Shares were historically used to irrigate --- farms. These farms are listed below and depicted on **Exhibit A**. A study period of ---- to ----- was selected as representative of historical use. **Exhibit B** summarizes the consumptive use and return flows associated with each parcel. Ditch loss was assumed to be ---- percent based on information from Mutual Ditch Company representatives. The average annual farm headgate deliveries attributable to the Subject Shares were ----- acre-feet, or ------ acre-feet per share. The average annual historical consumptive use per year for the Subject Shares was ----- acre-feet, or ----- acre-feet per share. The average annual ground water return flows attributable to the Subject Shares were ----- acre-feet, or ----- acre-feet per share.

5.1. *Mutual Ditch Company Farm One.* Mutual Ditch Company Farm One, located in the ---- ¼ of Section --, Township -- North, Range --- West of the 6th P.M., was historically irrigated with --- shares, ---- of which are Subject Shares. From ---- through ----, the --- shares were used to irrigate up to --- acres of ----, ------, ------, ------ and -------. The return flows attributable to the -- shares historically accrued to the ------ River in Section --, Township -- North, Range --- West of the 6th P.M., at the location shown on **Exhibit A**.

6. **Terms and Conditions for Use of the Subject Shares.** Applicant's use of water available under the Subject Shares shall be limited by the following terms and conditions.

6.1. *Seasonal Limitation.* Diversions under the Subject Shares for all uses shall be limited to the period from ----- to ------ each year.

6.2. *Point of Diversion.* All water diverted attributable to the Subject Shares shall be diverted from the River through the Mutual Ditch Company river headgate.

6.3. *Uses.* Following the change in use decreed herein, the Subject Shares may be used for the uses described in ¶3.

6.4. *Ditch Company Regulation.* The Company shall assess the same amount of conveyance losses to the delivery of the Subject Shares as are assessed all other shareholders.

6.5. *Points of Delivery.* All deliveries of water available to the Subject Shares shall be made at one the following locations:

6.5.1. Mutual Ditch Company Farm Headgates. Subject to the regulation of Mutual Ditch Company applicable to all shareholders, the Subject Shares may be delivered to any farm headgate located on the Mutual Ditch Company Ditch.

6.5.1.1. For Irrigation. Shares may be delivered to any Mutual Ditch Company farm headgate for irrigation purposes; provided, however, that Return Flow Credits shall be permitted only for farms historically irrigated by the Subject Shares or other farms approved for use pursuant to ¶6.8.2.1. For all other farms, no Return Flow Credit shall be permitted.

6.5.1.2. For Recharge. All water delivered to Mutual Ditch Company farm headgates and subsequently delivered to Recharge Ponds approved for use under this Decree shall be accounted for, and accretions to the River from such deliveries to Recharge Ponds shall be determined, in accordance with the terms of this Decree.

6.5.2. Mutual Ditch Company Bypass Structures. The Subject Shares may be delivered to Bypass Structures which return water to the River:

6.5.2.1. Existing Structures.

6.5.2.1.1. The (name) Bypass Structure, located in (location), which returns water to the River in (location).

6.5.2.2. Additional Structures.

6.5.2.2.1. Any Bypass Structure shall be equipped with a measuring device capable of continuous recording. In the event Applicant seeks to deliver water directly to the River via an additional Bypass Structure, it shall first file with the Court and serve on the Division Engineer and Objectors a notice identifying the location of the Bypass Structure, the equipment and infrastructure present at the site, and the means of delivery to the River, including any transit losses to be assessed en route to the River. Objectors shall have 28 days to provide comments to the Division Engineer regarding Applicant's proposal. The Division Engineer shall provide approval of the proposed Bypass Structure, in writing within 28 days of comments filed by Objectors, if any, or within 56 days of Applicant's notice if no comments are filed. The Division Engineer shall provide a copy of such approval and any and all information supporting such approval to Objectors. If the Division Engineer cannot approve the proposed Bypass Structure,, he or she shall provide written comments to the Applicant, along with a copy of said comments and any and all information supporting said comments to Objectors, identifying specific issues that must be addressed to obtain approval. Applicant shall thereafter provide proof satisfactory to the Division Engineer and the Objectors that the identified items have been addressed. The Court retains perpetual jurisdiction to review disputes concerning the Division Engineer's approval or disapproval of the Bypass Structure. The standard of review of such disputes shall be *de novo* and Applicant shall have the burden of proof to demonstrate that the proposed Bypass Structure complies with the terms and conditions.

6.5.3. <u>Rediversion by City of Municipality, Conservation User, and/or Agricultural User</u>. Once delivered to the River via a Bypass Structure or

as recharge accretions, water attributable to the subject shares may be re-diverted by City of Municipality, Agricultural User or Conservation User upstream through operation of a lawful exchange or downstream subject to any transit losses assessed by the Division Engineer. Diversions by a well or into a recharge site shall be permissible only pursuant to a water court decree or §37-92-308, C.R.S. substitute water supply plan setting forth the terms and conditions for the operation of the recharge site or well. Applicants shall be responsible for obtaining any agreements necessary to deliver water past any dry-up points in the River using bypass structures owned by third parties.

6.5.4. Notification To Mutual Ditch Company. Pursuant to ¶6.10 herein, Applicants shall notify Mutual Ditch Company of the percentage of the flow rate attributable to each Subject Share to be delivered to Mutual Ditch Company farm headgates and Mutual Ditch Company Bypass Structures. Deliveries to identified Mutual Ditch Company farm headgates and Mutual Ditch Company Bypass Structures shall be measured and shall be counted against Applicant's volumetric limits.

6.6. *Farm Specific Volumetric Limitations on the Amount of Water Delivered Through Farm or Bypass Headgates*. All uses of the Subject Shares, including use by Agricultural User at the historical location, shall be subject to the per share monthly maximum volumetric limits, per share annual maximum volumetric limits, and per share twenty-year rolling average volumetric limits for the farm on which the particular Subject Share was historically used, as set forth on **Exhibit C**. To the extent Subject Shares are dedicated to different uses (irrigation, municipal and industrial, or conservation) in fractional increments per ¶6.10, maximum volumetric limits shall be pro-rated and applied to the fractional Subject Shares by type of use. For example, if ½ of a Subject Share is dedicated to municipal and industrial use, the maximum volume of diversion for the month of May would be ½ of the maximum volume of diversion for the month of May for 1 Subject Share. For the purposes of cumulative limits, all diversions under each Subject Share shall be included in the total, regardless of whether a Subject Share has been divided and dedicated to multiple uses for the purposes of delivery.

For purposes of initiating the 20 year rolling average volumetric limit, ------- will be used for each of the first 19 years of the rolling average calculation.

Farm or bypass headgate deliveries of water available to the Subject Shares shall be measured using measuring devices equipped with continuous recorders.

6.7. *Farm Specific Return Flow Obligations*. Historical use of the Subject Shares for irrigation resulted in return flows that accrued to the ------ River. These return flows must be replaced pursuant to the following terms and conditions to prevent injury to vested water rights.

6.7.1. Location. Applicant shall replace return flows upstream of any calling right or exchange located downstream of the historical return flow location described in ¶5.

6.7.2. Amount and Timing: Applicant shall apply the on-farm return flow factors set forth in **Exhibit C** to all measured farm or bypass headgate deliveries of each of the Subject Shares to determine the amount and timing of its return flow obligation.

Surface Return Flows shall be due to the River the same day as the diversions of Subject Shares through the farm or bypass headgates.

For Subsurface Return Flows, the daily return flow obligation for the entire length of time over which return flows would have occurred had the shares been delivered to the farm upon which the water was historically applied shall be determined individually for each of the Subject Shares using the W, X, T and S values for the farm on which the particular Subject Share was used historically as set forth in **Exhibit A** and the Glover methodology set forth in ¶6.7.3. Applicant's potential return flow obligation at the River at any given time shall consist of the sum of return flow obligations incurred over current and preceding diversion seasons (based upon diversions and application of the on-farm return flow factors set forth on **Exhibit C**), lagged to the River.

Monthly results shall be divided by the number of days in that month to determine the daily return flow obligation and such daily return flow obligation shall be reduced by the amount of any daily Return Flow Credit available to Applicant pursuant to ¶6.8.

6.7.3. Calculation of Subsurface Return Flows, Return Flow Obligations, and Recharge Credits. The timing and location of subsurface return flows, recharge credits, and return flow obligations reaching or affecting the River from use of Subject Shares shall be calculated using the analytical equations described by Glover (Glover, Robert E., 1977, Transient Ground Water Hydraulics, Water Resources Publications) and others. The method to be used for applying the analytical equations described by Glover shall

represent a parallel no-flow boundary that requires the following parameters: (1) a boundary condition for the alluvial aquifer indicating that the boundary constitutes a "no-flow" condition; (2) the width of the aquifer on the side of the river where the farm is located, commonly referred to as "W"; (3) the distance from the river to the location of the farm, commonly referred to as "X"; (4) the harmonic transmissivity of the aquifer between the farm and the river, commonly referred to as "T"; and (5) the specific yield of the aquifer, commonly referred to as "S". The aquifer parameters for each of the farms were determined, when possible, from the U.S. Geological Survey Publications entitled Hydrogeological Characteristics of the Valley Fill Aquifer in the Brighton and Greeley Reaches of the Valley, Colorado ("Hydrogeologic Characteristics"). For purposes of determining the aquifer parameters for the farms, the location of the River was determined by reference to the plates included within the Hydrogeologic Characteristics. The "X" and "W" factors for each farm were determined by measurement of the perpendicular distance from the River to the farm and from the farm to the aquifer boundary. The "T" factor was determined by using the harmonic transmissivity of the aquifer between the farm and the river. To the extent a farm was located outside the area of the Hydrogeologic Characteristics, the "X", "W", and "T" factors were determined by reference to alternative aquifer data. The specific yield for the aquifer was assumed to be twenty percent (20%). AWAS is based upon the Analytical Stream Depletion Model of the Office of the State Engineer, Colorado Division of Water Resources, which was developed by Dewayne R. Schroeder in 1987 to compute stream depletion caused by a well pumping from an aquifer hydraulically connected to the stream. The alluvial aquifer setting of the AWAS program, or another program which incorporates the Glover no-flow boundary method, shall be used to determine the timing of stream depletions or accretions.

6.7.4. Conditions Requiring Replacement: Applicant shall replace return flow obligations to the River at times when there is a valid call for water or an adjudicated exchange operating at or downstream of the historical return flow location for the Subject Shares described in ¶5 that is senior to (return flow replacement date).

At times when there is not a valid call for water or an adjudicated exchange operating at or downstream of the historical return flow location for the Subject Shares described in ¶5 that is senior to (return flow replacement date), Applicant shall be entitled to use the return flow

component of deliveries under the Subject Shares for the purposes described in ¶3.

6.7.5. Delivery to Recharge: The return flow component of each of the Subject Shares and any amount of the consumptive use component of such Subject Shares required to replace all return flow obligations, as shown by the Return Flow Projection and Accounting required by ¶7 of this Decree, may be delivered to a Recharge Pond or Recharge Ponds approved for use under this Decree. Evaporative losses and any losses attributable to vegetation in the Recharge Pond to which the water is so delivered shall be calculated pursuant to the terms of this decree, subtracted from the consumptive use portion of the Subject Share and delivered to the Recharge Pond along with the return flow component.

6.7.6. Sources of Water to Replace Return Flow Obligations: Applicant's return flow obligations hereunder may be met with water delivered to the River from the following sources:

6.7.6.1. Accretions to the River from deliveries of the return flow or consumptive use component of Subject Shares to the Recharge Ponds;

6.7.6.2. Direct deliveries to the River of the consumptive use or return flow component of Subject Shares through the Bypass Structures described in ¶¶6.5.2;

6.7.6.3. Return Flow Credits from irrigation use of the Subject Shares calculated as provided in ¶6.8.2;

6.7.6.4. Re-use of the consumptive use portion of the Subject Shares not fully consumed in previous uses by Agricultural Use, City of Municipality or Conservation User; provided, however, that such re-use must be approved by separate decree.

6.7.6.5. City of Municipality Sources set forth on **Exhibit E**.

6.7.6.6. Conservation User Sources set forth on **Exhibit F**.

6.8. *Subject Shares Used For Irrigation*:

6.8.1. Types of Irrigation Uses Defined. For the purposes of administration, two types of agricultural irrigation uses shall be recognized. All agricultural

irrigation uses shall fall within one of these two defined types. The two types of irrigation are:

6.8.1.1. Full Irrigation. If, at the time of the annual dedication of Subject Shares under ¶6.10, the total anticipated water supply from all sources is greater than or equal to the anticipated net crop water irrigation requirement for any specific farm, or Applicant plans to deliver the full number of Subject Shares historically associated with a specific farm, the farm shall be considered to be in Full Irrigation status for the ensuing irrigation season. For the purposes of this paragraph, deliveries to Subject Shares shall be presumed to be a (dry year deliveries), and precipitation shall be presumed to be (drought year). Net Crop Water Irrigation requirement shall be calculated using (specify model).

6.8.1.2. Deficit Irrigation. If, at the time of the annual dedication of Subject Shares under ¶6.10, Applicant plans to deliver less than the full number of Subject Shares historically associated with a specific farm, and the total anticipated water supply from all sources is less than the net crop water irrigation requirement, the farm shall be considered to be in Deficit Irrigation status for the ensuing irrigation season. For the purposes of this paragraph, deliveries to Subject Shares shall be presumed to be a (dry year deliveries), and precipitation shall be presumed to be (drought year). Net Crop Water Irrigation requirement shall be calculated using (specify model).

6.8.1.3. Adjustment- Measured Deliveries. Farms projected to be in Deficit Irrigation Status shall remain so throughout the ensuing irrigation season unless measured deliveries of water to the farm meet or exceed the Net Crop Water Irrigation Requirement, in which case, for the purpose of return flow accounting, the farm shall be considered to have been in Full Irrigation status for the month or months in which Net Crop Water Irrigation requirement was been satisfied.

6.8.2. Full Irrigation. For Subject Shares delivered for Full Irrigation uses to farms historically irrigated by the Subject Shares or other farms approved for use pursuant to this provision, return flow obligations shall be calculated as described in ¶6.7; provided, however, that Applicant shall be

entitled to a Return Flow Credit. The Return Flow Credit Factors for center pivot sprinkler irrigation and flood irrigation shall be (20%) and (30%) respectively. No Return Flow Credit shall be permitted for drip irrigation.

No return flow credit shall be permitted for Subject Shares used for irrigation at any location other than the farms described in ¶5 or below unless Applicant obtains Court approval of the appropriate W, X, T and S values to be used to calculate the timing of return flow accretions from irrigation use at such other locations, and the farm is equipped with the measuring structures capable of independently measuring and recording deliveries attributable to the Subject Shares.

Return flow credit shall be reduced by (--%) in any year following fallowing in which no water supplies were delivered to the fallowed acres to account for potential refilling of the soil moisture reservoir.

6.8.2.1. (Additional farms description)

6.8.3. Deficit Irrigation. For Subject Shares delivered to Deficit Irrigation uses, return flow obligations shall be calculated as described in ¶6.7. Deficit Irrigation uses shall be presumed to be 100% consumptive. Applicant shall not be entitled to credit for accretions to the River from return flows resulting from such irrigation uses.

6.9. *Fallowing/Zero Delivery.* In the event Applicants choose to entirely cease use of one or more Subject Shares on part or all of an historically irrigated farm to support City of Municipality or Conservation User Uses, the number of acres on each farm proportionate to the number of dedicated Subject Shares on each farm, determined in accordance with the farm specific Zero Delivery acreage per share amounts set forth on **Exhibit C** (collectively, the "Zero Delivery Acreages"), shall not be irrigated with the dedicated Subject Shares. The number of acres required per Subject Share for Zero Delivery on each farm shall be fixed under this Decree; however, the location of Zero Delivery acres on a particular farm may change from irrigation year to irrigation year. The location of the historically irrigated acres on each farm is shown on **Exhibit A**.

6.9.1. Cessation of Irrigation with Surface Water from Mutual Ditch Company.

The Zero Delivery Acreages shall not be irrigated with any water from the Mutual Ditch Company water right, and shall be separated from irrigated

areas so that no water from the first use of the Mutual Ditch Company water right flows onto the Zero Delivery Acreages.

6.9.2. Permissible Water Supplies. Zero Delivery Acreages may be irrigated by any lawful source other than diversions attributable to the Mutual Ditch Company Water Right, including, without limitation:

6.9.2.1. By a well included in a decreed augmentation plan or in a substitute water supply plan approved by the State Engineer pursuant to C.R.S. § 37-92-308(4), or successor statute;

6.9.2.2. By water lawfully available for irrigation secured from City of Municipality, Conservation User, or third parties by contract, to be delivered through Mutual Ditch;

6.9.2.3. Pursuant to a decree of this Court approving a change of water right or determination of new water right to be used on the Zero Delivery Acreages; or

6.9.2.4. By using a municipal water supply of treated or raw water delivered to the property via municipal delivery systems;

6.9.2.5. By the remaining fully consumable portion of the Subject Shares, after delivery to the River and one or more uses by City of Municipality, Agricultural User and/or Conservation User; provided, however that such re-use must first be approved by separate decree of this Court.

6.9.3. Permitted Vegetation. Shallow rooted perennial and annual vegetation shall be permitted on Zero Delivery Acreages. In the event a Zero Delivery Acreage is planted with alfalfa or other deep rooted crops, and the Zero Delivery Acreage will receive no irrigation water, Applicants shall install a monitoring well to determine the depth to groundwater. If the depth to groundwater is less than six feet, Applicant shall calculate the amount of water consumed by the deep rooted crop using the IDSCU Method and reduce consumptive use credit for the dedicated Subject Share(s) by an equal amount. If the Zero Delivery Acreages will receive water from another source, or if the water table is in excess of 6 feet from the ground surface, alfalfa or other deep rooted crops are permitted without necessity to calculate any reduction in consumptive use.

6.9.4. Notice. Applicant shall file with the Court and serve notice to the Division Engineer, the Water Commissioner and the Objectors designating the Zero Delivery Acreages no later than April 1, except when a Subject Share is dedicated late pursuant to ¶6.10 of this Decree, in which case the dry-up shall be documented at the time of dedication.

Said notice shall include a detailed map identifying the Zero Delivery Acreages and the crop or cover type proposed for each acreage, as well as any proposal to irrigate the Zero Delivery Acreages with sources other than Mutual Ditch Company shares, together with a copy of any information provided as part of the request. In the event Agricultural User intends to continue to irrigate any part of the farm containing the Zero Delivery Acreage with Mutual Ditch Company shares, any request must be accompanied by documentation that the non-Mutual Ditch Company supplies can be measured and delivered to the Zero Delivery Acreage and distinguished from the Mutual Ditch Company supplies running in any common lateral or delivery system.

Objectors shall be permitted 28 days from Applicant's submission to provide comments to the Division Engineer. At the conclusion of the 28 day comment period, the Division Engineer or his representatives shall review the materials provided by the Applicant and any objectors, and, at his or her discretion, may inspect the farm or require additional information from the Applicant including, without limitation, inspection and report by a Colorado registered engineer.

In the event the Division Engineer finds the proposal acceptable, no further response is necessary, and Applicant shall be permitted to proceed as proposed. If, following the review of the materials submitted by Applicant and any inspection, the Division Engineer or his representative cannot approve of the proposed irrigation plan, he or she shall provide written comments to the Applicant within 42 days of the filing of Applicant's request identifying specific issues that must be addressed to obtain approval with a copy of said comments and any and all information supporting said comments to Objectors. Applicant shall thereafter provide proof satisfactory to the Division Engineer and the Objectors that the identified items have been addressed. Upon providing such notice, the Applicant may proceed with the plan as approved by the Division Engineer.

At the conclusion of the irrigation season, no later than October 1, Applicant shall provide an affidavit summarizing actual operations on the Zero Delivery Acreage and confirming that the Zero Delivery plan was successfully implemented and that none of the Shares were used on the Zero Delivery Acreage. In the alternative and upon approval of the Division Engineer, the Applicant may provide aerial and/or satellite imagery demonstrating compliance with dry-up requirements.

The Court retains perpetual jurisdiction to resolve disputes concerning Applicant's compliance with the requirements of this paragraph. The standard of review of such disputes shall be *de novo* and Applicant shall have the burden of proof to demonstrate that its use of the proposed water supplies complies with the terms and conditions of this Decree.

6.10. *Share Dedication.* No later than April 1 each year, Applicant shall identify the use of the Subject Shares as irrigation, municipal and industrial, or conservation. Partial shares may be dedicated in increments no smaller than (1/2) share. The points of delivery for the Subject Shares or fractions thereof shall be designated by a written notice on or before April 1 each year. The notice shall be provided to Mutual Ditch Company, the Division Engineer and Objectors, and shall identify the points of delivery for each Subject Share or fraction thereof in the ensuing year, by month, including deliveries to Recharge Pond(s) approved for the use by the specific Subject Share (**Exhibit C**) for return flow replacement. By way of example, the notice of points of delivery for ½ Subject Share dedicated to municipal and industrial uses could specify the following for the month of May:

Mutual Ditch Company Bypass Structure 1: 40%
Mutual Ditch Company Recharge Pond 1: 60%

In this example, the flow rate attributable to the Subject Share in May would be delivered, on an instantaneous basis, 40% to the Bypass Structure and 60% to the recharge site approved for use by the specific Subject Share. The 60% delivered to the Recharge Pond could be applied to meet Applicants' return flow obligation for the ½ Subject Share, or, if the Return Flow Projection and Accounting demonstrates an ability to meet projected return flow obligations with sources other than the ½ Subject Share, could be colored as consumptive use credit available for use by the Applicants.

In the case of irrigation on farms approved for Return Flow Credits, the Return Flow Credit percentage shall be included in the requested deliveries to the farm, and could include supplemental deliveries to an approved Recharge Pond is

desired to maintain the historical return flow percentage. By way of example, the notice of points of delivery for ½ Subject dedicated to irrigation uses on an approved farm could specify the following for the month of May:

Historical Farm 1: 90% (CU 40%, Return Flow Credit 50%)
Mutual Ditch Company Recharge Pond 1: 10%

For Subject Shares applied to irrigation on approved farms for which Applicants seek Return Flow Credit, the notice shall also identify the crops proposed to be cultivated on each farm, the net irrigation water requirement calculated pursuant to ¶6.8, and the total anticipated water supplies for the farm.

Points of delivery for Subject Shares may be changed provided that diversions under the Subject Shares remain within volumetric limits established by this Decree. In the event of a change in the point of delivery of Subject Shares, Applicant shall provide a revised notice to Mutual Ditch Company, the Division Engineer, and Objectors setting forth the percentage of each of the Subject Shares or fraction thereof to be delivered at each point of delivery on a monthly basis. Changes in the point of delivery for Subject Shares may become effective no sooner than the first day of the month following distribution of the revised notice.

RETURN FLOW PROJECTION AND ACCOUNTING

7. **Return Flow Projection and Accounting.** On or before April 1 of each year, Applicants shall submit a Return Flow Projection and Accounting to the Division Engineer and Opposers containing the following information, by month, for the (---) year period following the date of submission. The purpose of the Return Flow Projection and Accounting is to demonstrate that Applicant has sufficient supplies to replace all return flow obligations for the projection period and to verify that return flows are replaced in the operation. A Return Flow Projection and Accounting form is attached hereto as **Exhibit D**. This form is approved for initial use. Applicant may update the form, subject to Division Engineer approval, upon 30 days notice to opposers. The Return Flow Projection and Accounting shall contain the following information:

7.1. *Projected Deliveries to Irrigation.* The number of Subject Shares and estimated amount of acre feet proposed to be delivered for irrigation, the location of farm on which the proposed irrigation use will occur, the method of irrigation application on such farm (flood, sprinkler, drip), the crops to be grown, and whether the proposed irrigation is Full Irrigation or Deficit Irrigation.

7.2. *Projected Deliveries to the River.*

7.2.1. To City of Municipality. Consumptive use from the Subject Shares projected to be delivered to City of Municipality.

7.2.2. To Conservation User. Consumptive use from the Subject Shares projected to be delivered to Conservation User.

7.2.3. To Replace Return Flows. Portions of the Subject Shares projected to the delivered directly to the River to meet return flow obligation.

7.3. *Projected Deliveries to Recharge.*

7.3.1. The amount from the Subject Shares projected to be delivered to recharge sites approved for use under this decree as consumptive use or to offset return flow obligations.

7.4. *Recharge Accretions.* The amount of accretions expected to reach the river during the Return Flow Projection and Accounting period as a result of:

7.4.1. Past deliveries of water from Subject Shares to the Recharge Ponds.

7.4.2. Projected deliveries of water available to the Subject Shares to the Recharge Ponds.

7.5. *Projected Return Flow Obligations for the Subject Shares.* The amount of surface and subsurface return flow obligations associated with previous and projected use of the Subject Shares under this Decree, including the Subject Shares proposed to be used for irrigation.

7.6. *Projected Return Flow Replacement.*

7.6.1. Projected sources of replacement sufficient to meet all return flow obligations.

7.6.2. For Subject Shares proposed to be used for irrigation, the Return Flow Projection and Accounting shall include the projected amount of Return Flow Credits resulting from irrigation use.

7.7. *Planned Exchanges and Deliveries.* A description of any exchanges and the location, type, and to the extent known, amount of exchanges or deliveries using the River planned in the Return Flow Projection and Accounting period. In

addition to including this information in the Return Flow Projection and Accounting, Applicants shall provide a concise outline for use of the Division Engineer and Water Commissioner.

7.8. *Return Flow Projection and Accounting Limitations and Assumptions.*

7.8.1. Period of Call. The Return Flow Projection and Accounting shall be completed assuming that a call senior to the (operative date for return flow replacement) will occur continuously for all years of the Return Flow Projection and Accounting and that all return flow obligations associated with the Subject Shares must be replaced at all times throughout the Return Flow Projection and Accounting period.

7.8.2. Projected Farm Headgate Deliveries to the Subject Shares. Projected farm headgate deliveries of water available to the Subject Shares shall be in acre-feet by month as set forth in Table 1 below, which represents the farm headgate deliveries for (dry year yield).

TABLE 1 (Acre-feet per Share)

Apr	May	June	Jul	Aug	Sep	Oct
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7.8.3. Projecting Return Flows from Irrigation Uses.

7.8.3.1. Return Flow Factors – Irrigation. The Return Flow Obligations for Full Irrigation of each Subject Share shall be estimated using the farm specific factors set forth in **Exhibit C**. The projected Return Flow Credits for Full Irrigation shall be estimated using a return flow factor of 20% for sprinkler irrigation and 30% for flood irrigation. The projected Return Flow Factor for deficit irrigation shall be 0%.

7.8.3.2. Subsurface Return Flows. The timing and location of subsurface return flows projected to reach the River from use of Subject Shares shall be calculated using the method set forth in ¶6.7.3.

RECHARGE PONDS

8. **Recharge Ponds.** The Subject Shares will be diverted into and delivered down the Mutual Ditch Company Ditch to the following recharge ponds ("Recharge Ponds"):

8.1. *Mutual Ditch Company Recharge Pond A*

8.1.1. Legal Description of Location:

8.1.2. Surface Area: -- acres.

8.1.3. Capacity: -- acre feet.

8.1.4. Aquifer Parameters: T=---; X=---; W=---; S= ---.

8.1.5. Location of Accretions: ------ River, in the ----. The point of accretion is depicted on **Exhibit** "--," attached hereto.

9. **Additional or Modified Recharge Ponds.** Applicant may modify a Recharge Pond or add new recharge ponds so long as the Division Engineer approves modification of the existing Recharge Pond or new recharge pond prior to its use. Applicant shall provide notice of the modified Recharge Pond or new recharge pond to the Division Engineer and Objectors at least 56 days prior to the proposed use of a modified Recharge Pond or a new recharge pond. The notice required by this paragraph shall include at least the following information: (1) a description of the proposed modification to any Recharge Pond; (2) the location of any new recharge pond; (3) the increased capacity of any Recharge Pond or the capacity of any new recharge pond including the increased or new surface area; (4) the W, X, T and S values that Applicant proposes to use determine the timing of the increased or new accretions to the River; (5) whether the modified Recharge Pond or new recharge pond intercepts groundwater and whether there will be an increase in consumptive use of groundwater caused by recharge in the modified Recharge Pond or new recharge pond; and (6) the location of the accretions from the modified Recharge Pond or new recharge pond and whether the accretions will affect the River or a tributary or drain to the River. If any Objector files a Notice of Objection to use of the modified Recharge Pond or new recharge pond within 28 days of service of the notice required herein, Applicant shall not use such modified Recharge Pond or new recharge pond until it is approved by the Court. All terms and conditions applicable to existing Recharge Ponds shall also apply to any modified Recharge Pond or new recharge pond added to this Decree, except as otherwise ordered by the Court at the time the modified Recharge Pond or new recharge pond is added. The Court shall retain perpetual jurisdiction to resolve any dispute regarding the inclusion, use or operation of any modified Recharge Pond or new recharge pond.

FLEX MODEL TERMS AND CONDITIONS
'Return Flow Accounting' Version

Colorado Water Conservation Board
Alternative Agricultural Water Transfers Grant Program
FLEX Market Study

10. **Terms and Conditions for Use of Recharge Ponds**.

10.1. *Measuring Devices***.** Prior to the delivery of water to a Recharge Pond, Applicant shall install a continuous recording device capable of measuring the amount of water delivered to each Recharge Pond on a daily basis. Each measuring device must be at least as accurate as a Parshall flume. If the Recharge Pond has the capability to release water, the outlet shall likewise be equipped with a continuous recording measuring device to measure outflows from each Recharge Pond on a daily basis. Applicant shall install a staff gauge at the lowest surface elevation in each Recharge Pond. All staff gauges must be readable from a readily accessible location adjacent to the Recharge Pond. All measuring devices required by this paragraph must be approved by the Water Commissioner prior to operation of the Recharge Pond. Any modified Recharge Pond or new recharge ponds shall have installed measuring devices that comply with this paragraph. Each Recharge Pond shall be surveyed prior to use, and a stage-area-capacity curve delivered to the Division Engineer and all Objectors. In the event any party, other than the Division Engineer, objects to the determination of the maximum number of surface acres associated with delivery of water into the Recharge Pond or calculation of the relationship between the depth of the water in the Recharge Pond and the exposed surface acres, the objection shall be filed with the Court within 56 days after service of the survey and stage-area-capacity curve on the Division Engineer and all parties to this case. The Court retains perpetual jurisdiction to resolve any dispute regarding the determination of surface area hereunder.

10.2. *Amount Credited to Recharge*. The net monthly volume of water recharged to the alluvial aquifer at each Recharge Pond will be determined by measuring the amount of water delivered to that Recharge Pond by use of a continuous recording measuring device, and by subtracting: (1) the amount of water that flowed out of the Recharge Pond, if any, measured by use of a continuous recording measuring device; (2) the amount of water that was lost to evaporation, as determined by the method described in ¶10.2.1 of this Decree; (3) the amount of water lost to consumptive use due to vegetation located in the Recharge Pond, which will be determined by multiplying the area of each Recharge Pond in acres that is covered by vegetation during the two months following any month in which water is in the Recharge Pond, by the monthly factors, which are in feet, shown in Table 3 below; (4) the amount of water retained in the Recharge Pond that has not yet percolated into the ground. The staff gages required by ¶10.1 of this Decree shall be read weekly and the data interpolated to arrive at daily levels. The staff gauge data shall be used to determine: (1) the volume of the water in the Recharge Pond;

and (2) the exposed surface area of water, in acres. Accounting shall be done on a daily basis using the accounting forms attached hereto as **Exhibit D.**

10.2.1. Evaporation. Losses to evaporation shall be calculated based upon exposed surface area in a given month (in acres). Exposed surface area for each Recharge Pond shall be computed using the stage-area-capacity curve for the Recharge Pond. Evaporation losses from each Recharge Pond shall be calculated by multiplying the surveyed surface area for the Recharge Pond by the rate of net evaporation for the days of exposed water surface. The Applicant shall use real time net evaporation data from the ---- weather station, maintained by ----- in its calculations. If data from the --- weather station is not available, then Applicant shall use data from the --- weather station. If for any reason data from either of these stations is not available, then the average evaporation loss values in Table 2 below, which are in inches per acre per month of exposed surface area, shall be prorated for the number of days of exposed water in each Recharge Pond each month to determine the Recharge Pond evaporation. Real time net evaporation shall be determined on a daily basis as follows: Gross pan evaporation shall be computed by multiplying daily standard alfalfa reference crop evapotranspiration (ETr) published by -------- for ---- or, if unavailable from ----, from -----, in inches, by 1.2 to determine monthly gross pan evaporation in inches. Gross pan evaporation will then be multiplied by a pan coefficient of 0.7 to obtain daily gross pond evaporation in inches. Daily net pond evaporation will be computed as gross pond evaporation minus effective precipitation, where effective precipitation is total daily precipitation, in inches, multiplied by 0.7.

TABLE 2

NOAA Technical Report NWS 33 CF table 119a	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Monthly Distribution (for sites under 6500 ft msl)	0.03	0.035	0.055	0.09	0.12	0.145	0.15	0.135	0.1	0.07	0.04	0.03	1
Monthly Evaporation (in) per Acre of Surface Area	1.35	1.575	2.475	4.05	5.4	6.525	6.75	6.075	4.5	3.15	1.8	1.35	45

10.2.2. Evapotranspiration. Evapotranspiration losses from vegetation located within the Recharge Pond shall be assessed only to the extent there is vegetation within the confines of the Recharge Pond. In these circumstances, the amount of water lost to evapotranspiration shall be determined by multiplying the number of acres of the Recharge Pond covered with vegetation in a given month by the following factors to arrive at an amount in acre-feet consumed by such vegetation.

TABLE 3

Apr	May	Jun	Jul	Aug	Sept	Oct
0.08	0.16	0.27	0.40	0.35	0.22	0.08

10.3. *Accounting for Sources of Water Delivered to Recharge Ponds*. Applicant shall distinguish in its accounting between the consumptive use component of the Subject Shares and the return flow component of the Subject Shares. Accretions resulting from the delivery of consumptive use component of the Subject Shares to the Recharge ponds shall be lagged pursuant to ¶---. Accretions from deliveries dedicated to return flow replacement need not be lagged. Total evaporation and consumptive use due to vegetation shall be allocated to the consumptive use component of the Subject Shares, and shall not be assessed on the return flow

component of the Subject Shares delivered to the Recharge Ponds for replacement of return flows.

10.4. *Lagging Recharge Credits.* The timing of accretions to the ------ River from the delivery of Subject Shares delivered to the Recharge Ponds shall be calculated pursuant to ¶6.7.3.

ADMINISTRATION AND ACCOUNTING

11. **Accounting and Reporting**.

11.1. *Measurement of Subject Share Deliveries.* Deliveries of water available to the Subject Shares shall be measured daily through farm headgates and/or bypass headgates and such daily measurements shall be reported by Applicants no less than monthly.

11.2. *Accounting Form.* Applicant shall use the Return Flow Projection and Accounting form as the accounting form. As data is collected, it shall be input into the Return Flow Projection and Accounting, replacing projected data. A sample Return Flow Projection and Accounting is attached hereto and incorporated herein by reference as **Exhibit D**. This form is not decreed herein and may be changed from time to time with the approval of the Division Engineer and 30 days advance written notice to all Objectors in this case, provided that all information required by this Decree is included in any changed accounting forms.

11.3. *Frequency of Reporting.* Accounting for the plan will be done on a daily basis, and all accounting for each month's operation will be completed and sent to the Division Engineer and Objectors in the same electronic format no later than the last day of the following month.

11.4. *Minimum Terms.* In addition to the items specified in ¶7, Applicant's Return Flow Projection and Accounting Form under this Decree shall include, at a minimum, the following information:

11.4.1. River call in effect each day downstream of the location of historical return flow accrual to the ------ River.

11.4.2. Total measured inflows into each Recharge Pond.

11.4.3. Stage reading and surface area for each Recharge Pond.

11.4.4. Evaporation for each Recharge Pond.

11.4.5. Surface area of vegetation in each Recharge Pond.

11.4.6. Evapotranspiration for each Recharge Pond.

11.4.7. Net recharged water for each Recharge Pond.

11.4.8. Net stream accretions resulting from the delivery of the consumptive use component and return flow component of the Subject Shares to each Recharge Pond.

11.4.9. Number of Subject Shares designated for use by Agricultural User, City of Municipality, and Conservation User on a farm by farm basis.

11.4.10. Number of acres in the Zero Delivery Acreages and map of location of Zero Delivery Acreages.

11.4.11. Measured deliveries of water under the Subject Shares for City of Municipality and Conservation User uses at each point of delivery.

11.4.12. Measured deliveries of water under the Subject Shares for irrigation use, on a farm by farm basis, at each point of delivery.

11.4.13. Daily return flow obligations for the Subject Shares on a farm by farm basis.

11.4.14. The sources and locations of water used to meet all return flow obligations.

11.4.15. Transit losses incurred in the conveyance of water in the natural stream to meet return flow obligations.

11.4.16. Running totals on monthly, annual, and 20-year annual volumetric limits, on a farm by farm basis for each Subject Share.

11.4.17. If any other entities use the same Bypass Structure as the Applicants, an accounting sheet should be prepared showing total measured deliveries through the bypass structure and how the water is allocated between the Applicants and the other entities.

FLEX MODEL TERMS AND CONDITIONS
'Return Flow Accounting' Version

Colorado Water Conservation Board
Alternative Agricultural Water Transfers Grant Program
FLEX Market Study

RETAINED JURISDICTION – FARM SPECIFIC RETURN FLOW FACTORS

12. The Return Flow Credit Factors set forth in ¶6.8 are the best estimates, based on sound science, available to the Court and the parties at the time this decree is entered. Applicant may engage in additional, farm, or farms, specific study and petition the court for approval of Return Flow Credit Factors to replace the ¶6.8 estimates. A course of study to achieve better understanding of return flows occurring on specific farms should employ a water balance approach, and should, at a minimum, include direct measurement and/or estimation of the following water balance elements:

    12.1 Farm headgate deliveries.

    12.2 Beneficial evapotranspiration.

    12.3 Non beneficial evapotranspiration.

    12.4 Evaporation (free water surface evaporation).

    12.5 Surface return flows leaving the farm.

    12.6 Soil Moisture Storage.

    12.7 Deep percolation (also known as subsurface return flows).

    Upon completion of a course of study involving no less than 3 full irrigation seasons, and no later than 10 years following the entry of this decree, Applicants may petition the Court to establish customized return flow factors to replace the assumptions in ¶6.8. The new factors may be annual estimates, or may be more specific and identify different return flow factors based upon month, irrigation type, crop type, soil type and other significant variables. They may be specific to a single farm, or may encompass larger areas and multiple farms sharing similar characteristics. Applicant shall bear the burden of demonstrating that the proposed new factors are based on sound science and sufficient to prevent injury to other water users.

RETAINED JURISDICATION: MEASURED RETURN FLOW ACCOUNTING

13. If, upon further study, Applicants determine that technology and methodology exist to replace the fixed return flow factors set forth in ¶6.8 or further established pursuant to ¶12 herein with values based upon real-time, in-field measurement and reporting, Applicants may petition the Court for approval of additional terms and conditions

allowing administration in this manner. Terms and conditions are likely to require projection of return flow obligations based upon fixed, conservative values set forth in ¶6.8 or further established pursuant to ¶12, and accounting based upon real-time measurements or estimations reliably based upon real-time measurements.

A course of study to refine measurement techniques should employ a water balance approach, and should, at a minimum, include direct measurement and/or estimation of the following water balance elements:

13.1 Farm Headgate deliveries.

13.2 Beneficial evapotranspiration.

13.3 Non beneficial evapotranspiration.

13.4 Evaporation.

13.5 Surface return flows leaving the farm.

13.6 Soil Moisture Storage.

13.7 Deep percolation.

Applicants shall complete no less than 3 years of study prior to petitioning the Court for approval of real-time accounting techniques and shall file such petition within 10 years of the date of this decree, if at all. Applicant shall bear the burden of demonstrating that the proposed new methods of measurement and accounting are accurate and sufficient to prevent injury to other water users.

EXHIBITS

A. Map: Farms, recharge sites, historically irrigated areas, return flow location
B. Table: Historical consumptive use and return flows
C. Table: Farm specific volumetric limits, return flow factors, dry up acreage requirements, approved recharge ponds
D. Accounting Form
E. City of Municipality Return Flow Replacement Sources
F. Conservation User Return Flow Replacement Sources

Appendix F: List of Summit RSVPs

FLEX Market Summit RSVPs – February 13, 2013	
Jon Altenhofen	Steve Malers
Erik Anglund	Richard Mehren
Ed Armbruster	Matthew Merrill
Gary Barber	Erin Messner
Linda Bassi	John Murphy
Amy Beatie	Dave Nettles
Dave Bennett	Andy Pineda
Alan Berryman	Doug Rademacher
Sarah Borgers	Randy Ray
Ted Buderus	Kevin Rein
Corky Cantrell	Douglas Robotham
Tom Cech	Bob Sakata
Alan Curtis	Rob Sakata
John Cyran	John Sanderson
Drew Damiano	Dean Santistevan
Kelly DiNatale	Mike Sayler
Todd Doherty	Richard Seaworth
Marvin Dyer	Doug Seely
Jared Fiel	Mike Shimmin
Julia Firl	Steve Sims
Rep. Randy Fischer	Chris Smith
George Fosha	MaryLou Smith
Joe Frank	Zach Smith
Kim Frick	Susan Smolnik
Jimmie Gregg	Ronni Sperling
Neil Hansen	Joseph Stibrich
Eric Hecox	John Stokes
Scott Holwick	Britta Strother
David Hunt	John Stulp
John Jeffrey	Dale Trowbridge
Dawn Jewell	Marc Waage
Clarence Kemp	Ivan Walter
Will Koger	Kaylea White
Leif Lesoing	Brad Wind

Appendix G: Summit PowerPoint Presentation

FLEX Water Market Summit

Photo Credit: Alex Kerney

Photo Credit: Yassie (talk) Wikimedia Commons

Photo Credit: Public Domain

Ducks Unlimited

Aurora Water

colorado Corn

Regenesis

LJCG

Brown and Caldwell

Lawrence Jones
Custer Grasmick LLP

Are you M&I, Ag, E-C or Attorney/Engineer?

1. M&I
2. Ag
3. E-C
4. Attorney-Engineer

Which river basin do you identify as your primary basin?

1. South Platte
2. Arkansas
3. Rio Grande
4. Gunnison
5. Colorado
6. White-Yampa
7. Dolores-San Juan
8. Statewide

M&I Users: The population of my municipality is:

1. Less than 100
2. 100-5,000
3. 5,000-50,000
4. 50,000-100,000
5. 100,000+

Environmental/Conservation Users: My entity is interested in securing water supplies for (choose all that apply):

1. Maintenance of in-stream flows and natural lake levels
2. Habitat creation and maintenance (eg wetlands)
3. Recreation (kayaking, fishing)
4. Maintaining agriculture/open space
5. Other

Ag Users: I cultivate or buy feed from farms with total acreage under cultivation of:

1. Less than 160 acres
2. 160-320 acres
3. 320-640 acres
4. 640-1920 acres
5. More than 1920 acres

Have you ever participated in a water lease or other alternative to traditional buy and dry?

1. Yes
2. No

FLEX STUDY: History

- Need: Statewide Water Supply Initiative Study
- CWCB ATM Grant Program
  - Methods: Fallowing, reduced consumptive use cropping, deficit irrigation
- Corn Growers/Aurora/Ducks Unlimited Phase One : Barriers
- The “Private Market” concept
  - Water law concepts: type and place of use, speculation
  - Multiple end uses of existing senior rights
  - Water Court approved “market,” voluntary lease arrangements

What is the single greatest barrier to multiple uses of senior decreed rights?

1. Transactional Costs
2. Legal issues
3. Price point for sale or lease of water
4. Delivery infrastructure
5. Other

FLEX STUDY: Goals

Photo Credit: Wusel007

Photo Credit: Jeffrey Beall

Photo Credit: CCWCD

- Overcome Identified Barriers
- Build consensus: workable implementation models
- Summarize Results in model FLEX agreement, water court terms and conditions
- Survey level engineering on three major South Platte Ditch Companies to assess potential for implementation of market concept

FLEX Study: Process

Photo Credit: Tim Kiser

- Groups met 3 times each, total of 20 meetings
- Comments integrated, progressive drafts produced
- Engineering: meetings with ditch companies, potential end users, analysis of CU and delivery issues

- Meetings with Division Engineer
- Four Working Groups
  - Ag Users
  - M&I Users
  - Environmental/Conservation Users
  - Attorneys/Engineers

FLEX STUDY: Results

- Broad Support for Multiple Use Concept
- M&I Uses
  - Drought Recovery
  - Filling Holes while acquiring permanent water supply
  - Long Term Partnerships

Photo Credit : Ethan Emery, Angling University

- E/C Uses
  - In stream flow (CWCB)
  - Habitat restoration and development
  - Recreation
- Ag Uses
  - "Water as cash crop"
  - Risk mitigation

FLEX STUDY: Results

- 6 Keys to FLEX Agreement
  - Critical elements of alternative transfer agreement
- Model FLEX Agreement
  - Establishes market, platform for transactions between parties


Photo Credit: Dick Rochester


Photo Credit : Ethan Emery, Angling University

- Model Terms and Conditions
  - Example of FLEX water court adjudication terms
  - Developed in cooperation with attorneys/engineers group
  - Two models
    - Pay As You Go
    - Return Flow Accounting

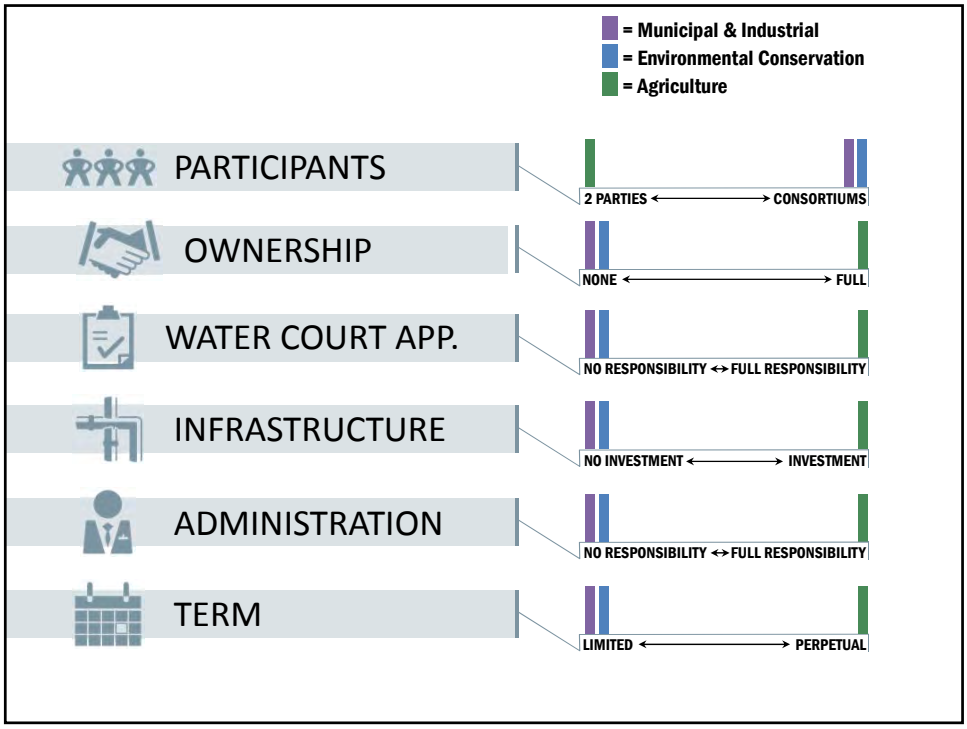
FLEX Market

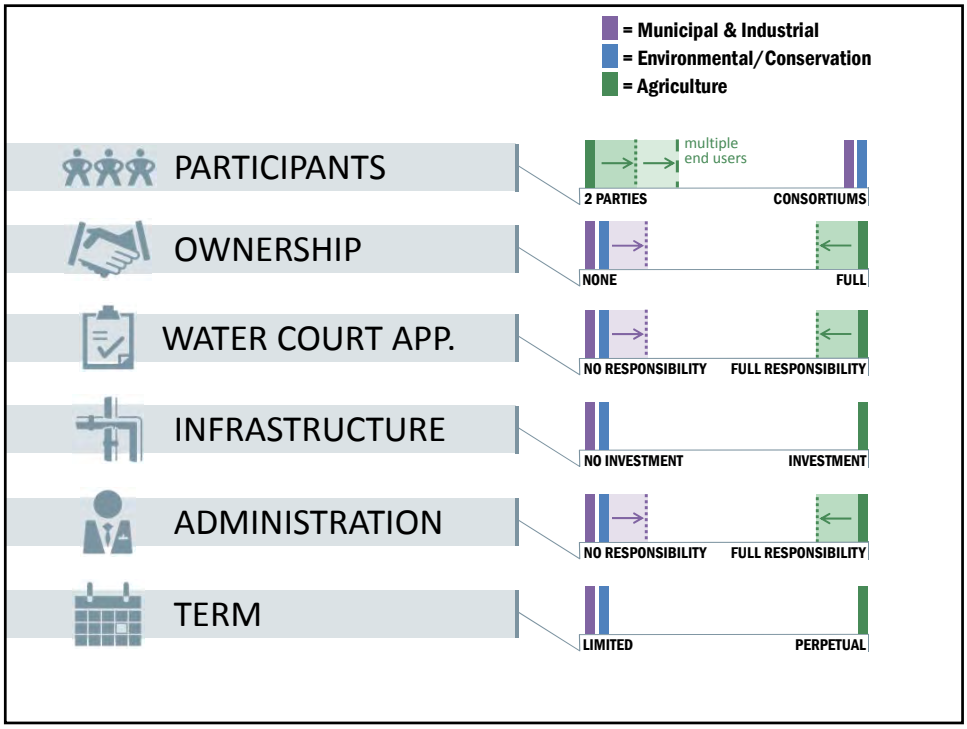
- Agreement to change the use of senior water right to include multiple uses
- Platform to facilitate voluntary leases, trades between market members
- Two components:
  - FLEX Market Agreement
  - FLEX Delivery Agreements
- Example: Ag User, M&I User, E/C User
- Intent: Create environment conducive to maintenance of irrigated agriculture


Photo Credit: Wusel007


Photo Credit: Jeffrey Beall


Photo Credit: CCWCD


= Municipal & Industrial
= Environmental Conservation
= Agriculture
PARTICIPANTS
2 PARTIES
CONSORTIUMS
OWNERSHIP
NONE
FULL
WATER COURT APP.
NO RESPONSIBILITY
FULL RESPONSIBILITY
INFRASTRUCTURE
NO INVESTMENT
INVESTMENT
ADMINISTRATION
NO RESPONSIBILITY
FULL RESPONSIBILITY
TERM
LIMITED
PERPETUAL


= Municipal & Industrial
= Environmental/Conservation
= Agriculture
PARTICIPANTS
multiple
end users
2 PARTIES
CONSORTIUMS
OWNERSHIP
NONE
FULL
WATER COURT APP.
NO RESPONSIBILITY
FULL RESPONSIBILITY
INFRASTRUCTURE
NO INVESTMENT
INVESTMENT
ADMINISTRATION
NO RESPONSIBILITY
FULL RESPONSIBILITY
TERM
LIMITED
PERPETUAL

A FLEX-type market could be useful to meet the following needs (choose all that apply):

1. Permanent Supply
2. Drought Recovery
3. Temporary supply while acquiring permanent supply
4. Sustaining open space
5. Other

As an ag user, I would lease consumptive use and adjust my farming operation if the price was right.

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree

As an M&I User, I would lease water supplies from FLEX deliverable to my integrated system if the price was right.

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree

As an E/C user, I would lease water supplies from FLEX deliverable for conservation and environmental uses if the price was right.

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree

FLEX Model Terms and Conditions

Crossing the River Platte
Worthington Whittredge (1820-1910)

Water court/administrative costs are a substantial barrier to implementation of alternatives to buy and dry like the FLEX market.

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree

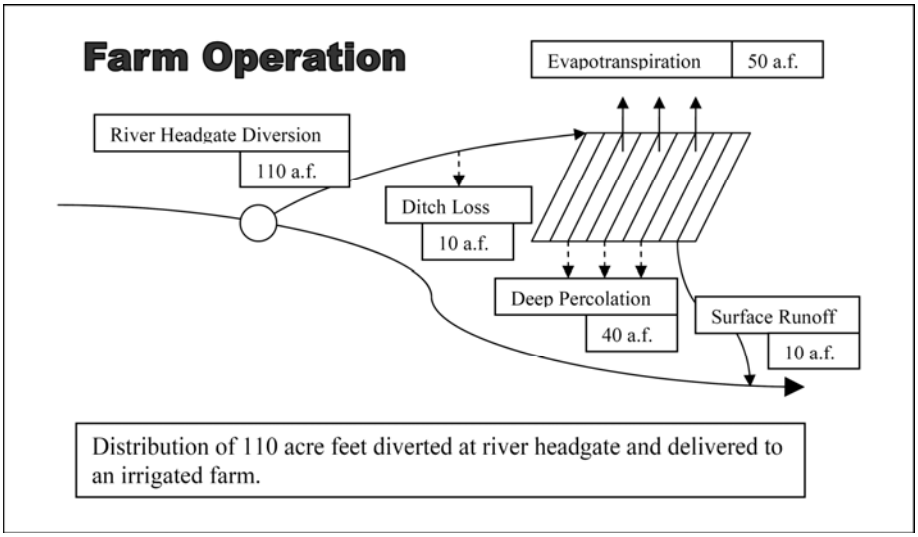
Substantive Water court issues are a substantial barrier to implementation of alternatives to buy and dry like the FLEX market.

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree

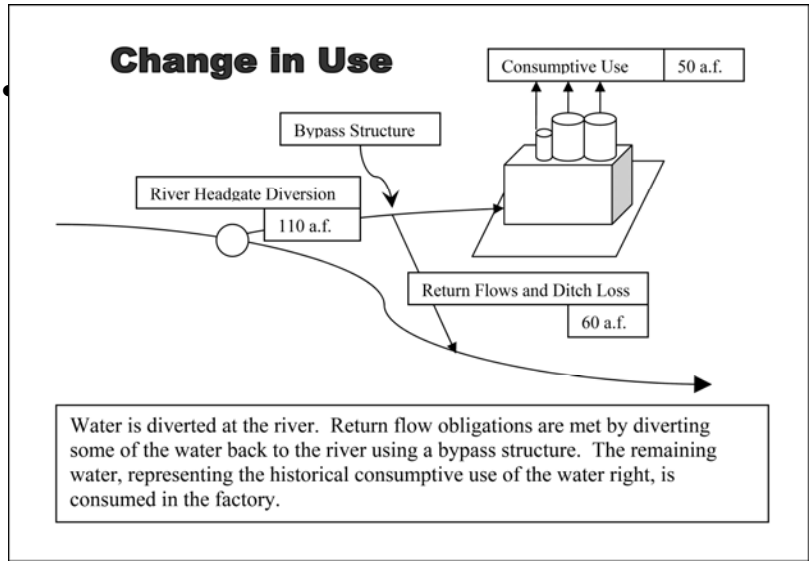
Uncertainty with regards to legal standards and outcomes is a substantial barrier to implementation of alternatives to buy and dry like the FLEX market.

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree

FLEX MODEL TERMS AND CONDITIONS



FLEX MODEL TERMS AND CONDITIONS



"Pay as You Go" Model

- Change in use to multiple uses
- Volumetric limits apply immediately at all locations of delivery
- Return flow obligations – based on historical conditions
- Credit for return flows for irrigation uses (30% flood, 20% sprinkler, 0% deficit)
- Balance of return flows repaid "as you" be depositing in recharge site at or near historical farm
- Farm may be irrigated by other water supplies

Photo Credit: Unknown

"Return Flow Accounting" Model

- Change in use to multiple uses
- Volumetric limits apply immediately at all locations of delivery
- Return flow obligations – based on historical conditions
- Credit for return flows for irrigation uses (30% flood, 20% sprinkler, 0% deficit)
- Balance of return flows repaid by multiple sources based upon "Return Flow Projection and Accounting"
  - Debit
  - Credit
- Farm may be irrigated by other water supplies

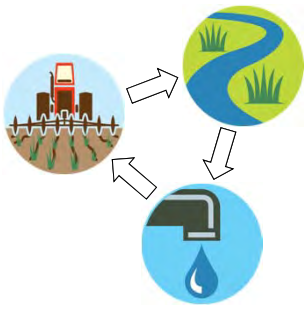
Photo Credit: Public Domain

Of the two models, which one best fits your needs and is most likely to be used, if you were going to implement a FLEX market?

1. Pay as You Go
2. Return Flow Accounting

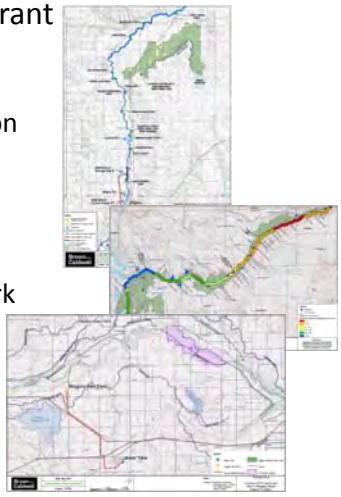
Demonstration Projects

- Purpose
  - Conduct a high-level assessment of how a Flex Market might physically operate
  - Develop enough basic information that participants can evaluate feasibility of implementation
- Targeting agricultural, municipal/industrial, and environmental users
- Intended result: Establish success stories



Demonstration Projects

- Demonstration projects were evaluated under a previous ATM grant by the study team
  - City of Aurora/Platte Valley Irrigation Company – Flex Water Market
  - Proposed Lower South Platte Cooperative – Marketing Framework
  - DT Ranch/Town of Wiggins – Local Partnerships



Demonstration Projects

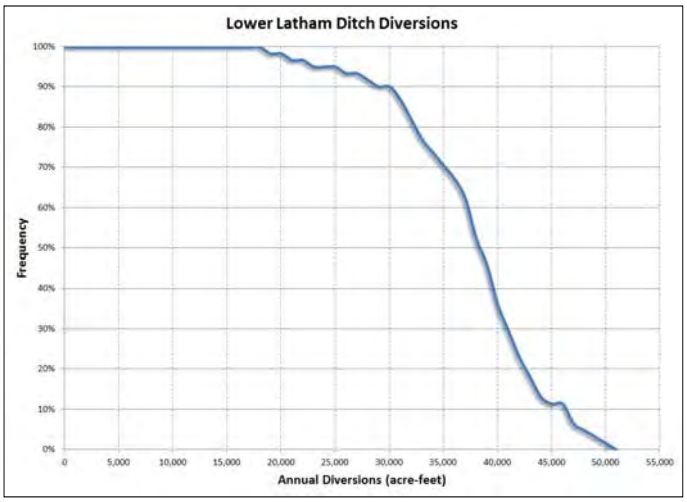
- Demonstration projects under the current study focus on implementation of a Flex Water Market
- Scope of Study
  - Understand the "plumbing" of a participating ditch system
  - Evaluate the reliability of supplier and reliability requirements of end users
  - Quantify historical consumptive use and return flows at a high level
  - Assess delivery capability
  - Develop water management strategies
  - Meet with participants to discuss

Demonstration Projects

- Example - Lower Latham Ditch Company

Demonstration Projects

- Reliability of Supplies



Demonstration Projects

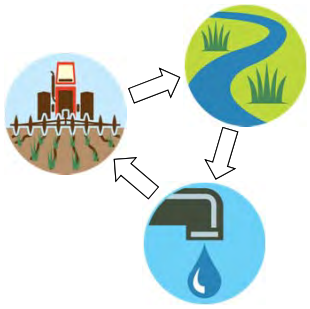
- Water Management Strategies

Demonstration Projects

- Points of Delivery – Upstream, Local, and

Demonstration Projects

- Path Forward
  - Complete demonstration projects
  - Identify parties who are interested in near-term implementation
  - Seek assistance from the CWCB's ATM grant program to make this happen.



On the Cache La Poudre River, 1876

On the Cache La Poudre River, 1876
Worthington Whittredge (1820-1910)

FLEX NEGOTIATION

Photo Credit: Alex Kerney

Photo Credit: Yassie (talk) Wikimedia Commons

Photo Credit: Public Domain

Ducks Unlimited

Aurora Water

colorado Corn

Regenesis

LJCG

Brown AND Caldwell

Lawrence Jones
Custer Grasmick LLP

Our group was able to reach agreement on

1. All six keys
2. 3-5 keys
3. 1-3 keys
4. No keys

The price we negotiated for 1 acre foot of leased supply delivered to the river under our first delivery agreement was:

1. $100-$500 per acre foot
2. $500-$1000 per acre foot
3. $1000-$2000 per acre foot
4. More than $2000 per acre foot

The number of participants (Ag, M&I and E/C) we envisioned for our FLEX market was

1. 1-3
2. 3-5
3. 5-10
4. More than 10

Ownership of the water rights in our agreement

1. Was to remain 100% with Ag Users
2. Was to remain largely with Ag Users, with less than 20% to M&I/E-C
3. Was to be 20%-50% M&I/E-C
4. Was to be 50% or more in M&I/E-C

The FLEX Agreement we negotiated

1. Put the burden largely or exclusively on Ag users to adjudicate a plan, then sell water
2. Involved shared responsibility for adjudication of the plan
3. Put the burden largely or exclusively on M&I/ E-C users to adjudicate a plan

Who had the responsibility for infrastructure?

1. Ag
2. M&I
3. E-C
4. Shared responsibility

Who was to administer the plan once completed?

1. Ag
2. M&I
3. E-C
4. Shared M&I, E-C and/or Ag
5. Third party administrator

What was the initial term of the FLEX agreement?

1. 1 year
2. 2-5 years
3. 6-10 years
4. 11+ years

FLEX Panel

Photo Credit: Alex Kerney

Photo Credit: Yassie (talk) Wikimedia Commons

Photo Credit: Public Domain

Ducks Unlimited

Aurora Water

colorado Corn

Regenesis

LJCG

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Custer Grasmick LLP

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FLEX Water Market Summit

Photo Credit: Alex Kerney

Photo Credit: Yassie (talk) Wikimedia Commons

Photo Credit: Public Domain

Ducks Unlimited

Aurora Water

colorado Corn

Regenesis

LJCG

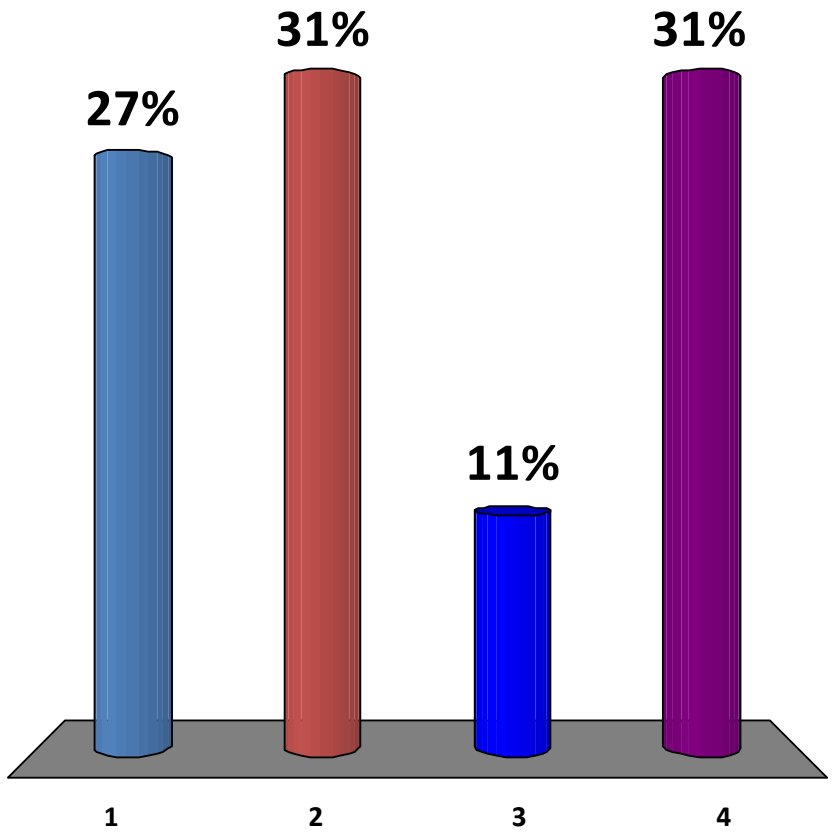
Lawrence Jones
Custer Grasmick LLP

Brown and Caldwell

Appendix H: PowerPoint Slides Reflecting All Questions and Responses, Additional Analysis Performed Following the Summit and Summary of FLEX Negotiation Results by Summit Audience Demographic

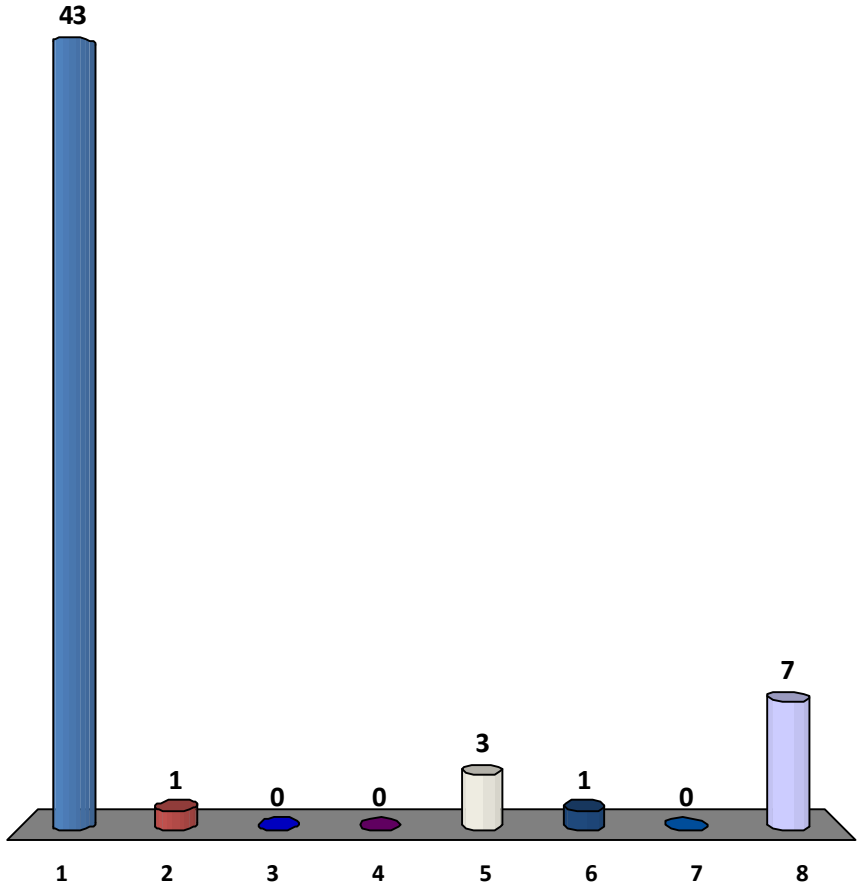
Are you M&I, Ag, E-C or Attorney/Engineer?

1. M&I
2. Ag
3. E-C
4. Attorney-Engineer



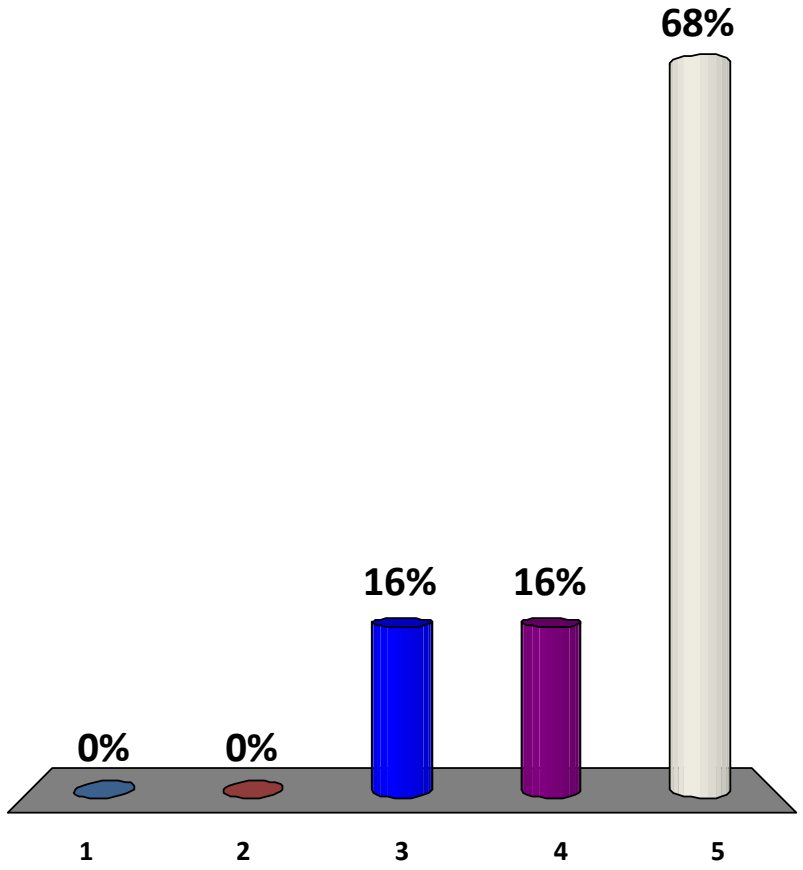
Which river basin do you identify as your primary basin?

1. South Platte
2. Arkansas
3. Rio Grande
4. Gunnison
5. Colorado
6. White-Yampa
7. Dolores-San Juan
8. Statewide



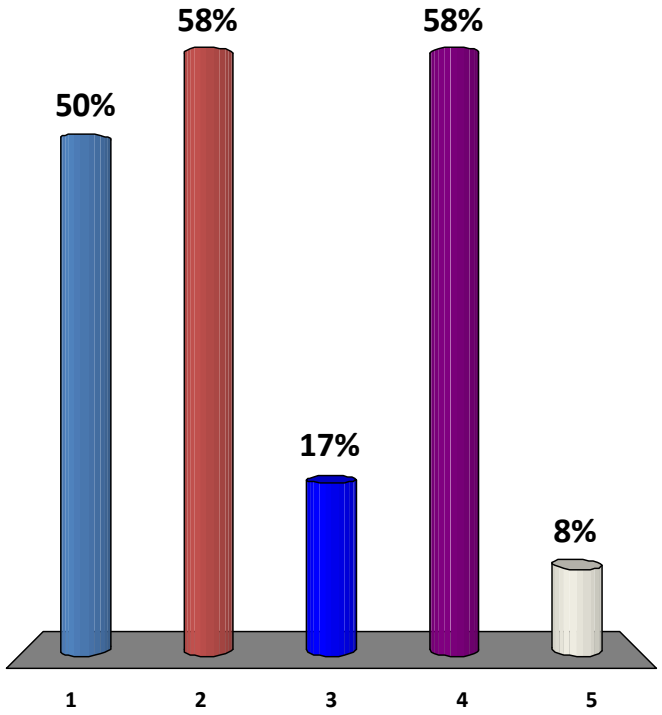
M&I Users: The population of my municipality is:

1. Less than 100
2. 100-5,000
3. 5,000-50,000
4. 50,000-100,000
5. 100,000+



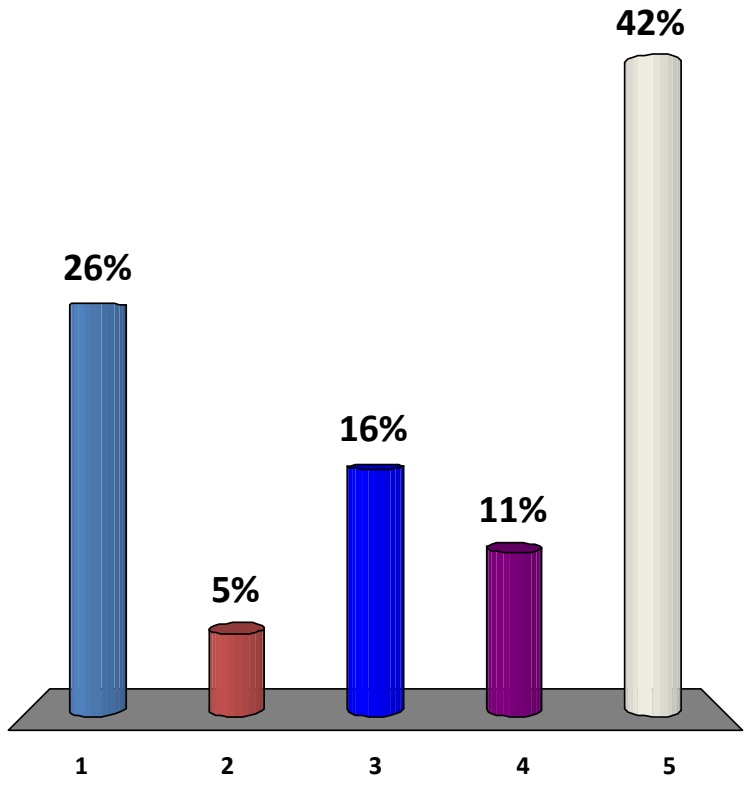
Environmental/Conservation Users: My entity is interested in securing water supplies for (choose all that apply):

1. Maintenance of in-stream flows and natural lake levels
2. Habitat creation and maintenance (eg wetlands)
3. Recreation (kayaking, fishing)
4. Maintaining agriculture/open space
5. Other



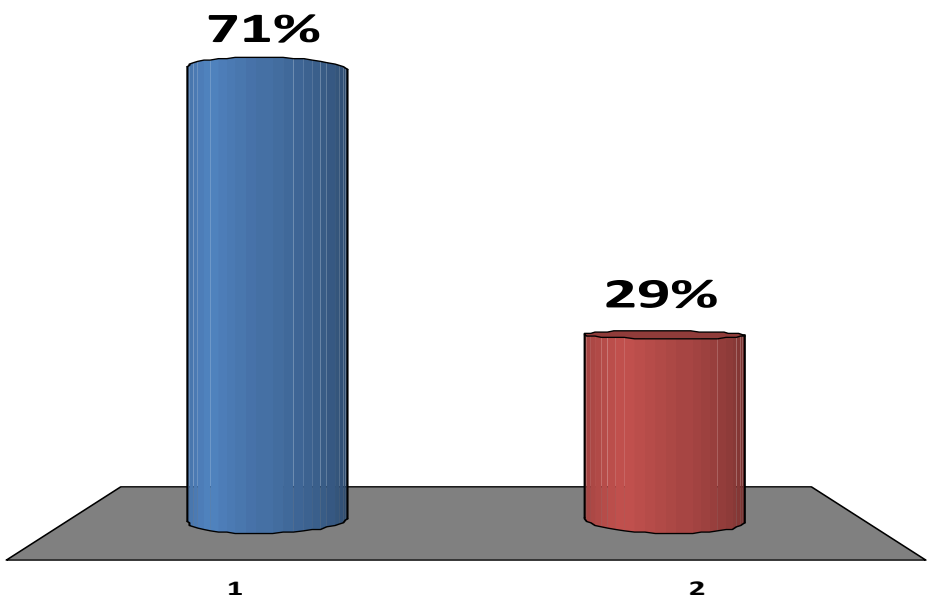
Ag Users: I cultivate or buy feed from farms with total acreage under cultivation of:

1. Less than 160 acres
2. 160-320 acres
3. 320-640 acres
4. 640-1920 acres
5. More than 1920 acres



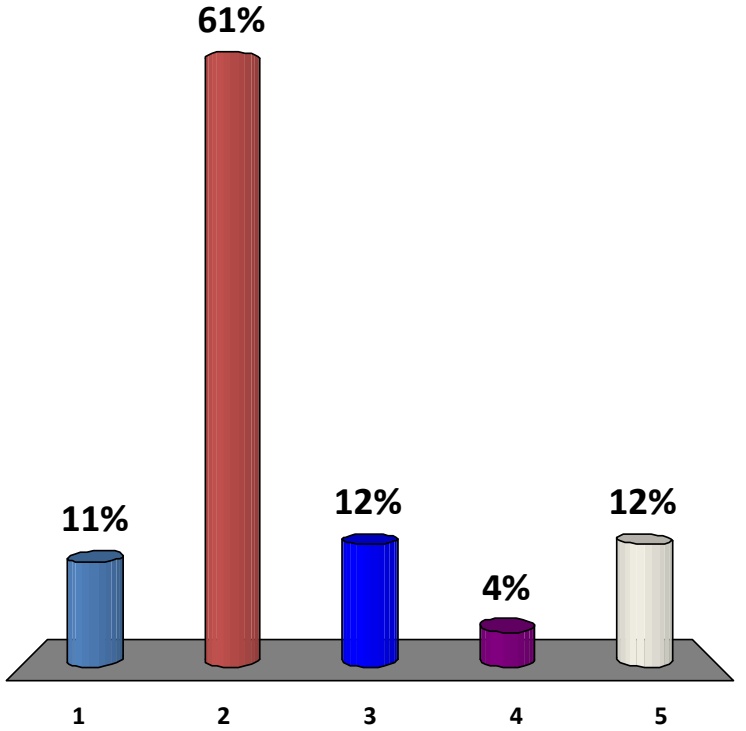
Have you ever participated in a water lease or other alternative to traditional buy and dry?

1. Yes
2. No



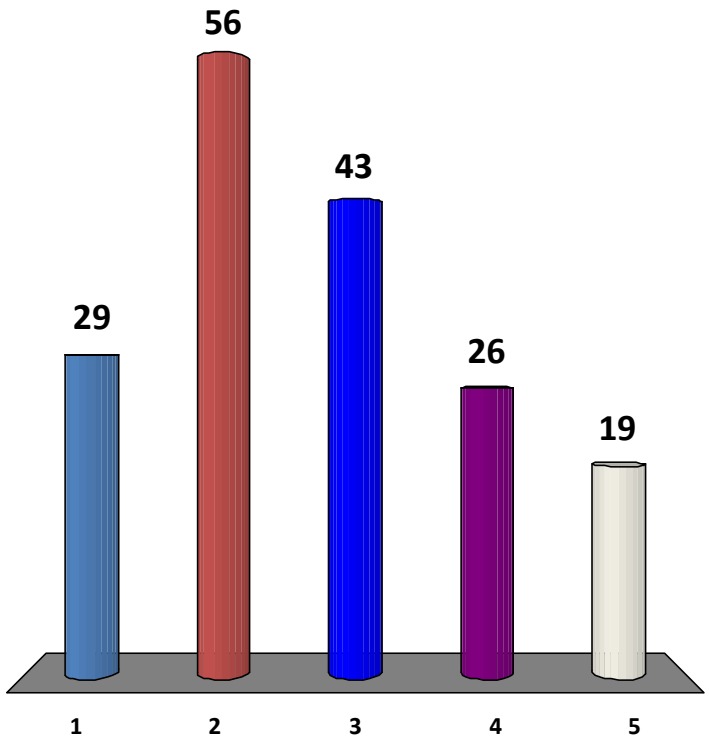
What is the single greatest barrier to multiple uses of senior decreed rights?

1. Transactional Costs
2. Legal issues
3. Price point for sale or lease of water
4. Delivery infrastructure
5. Other



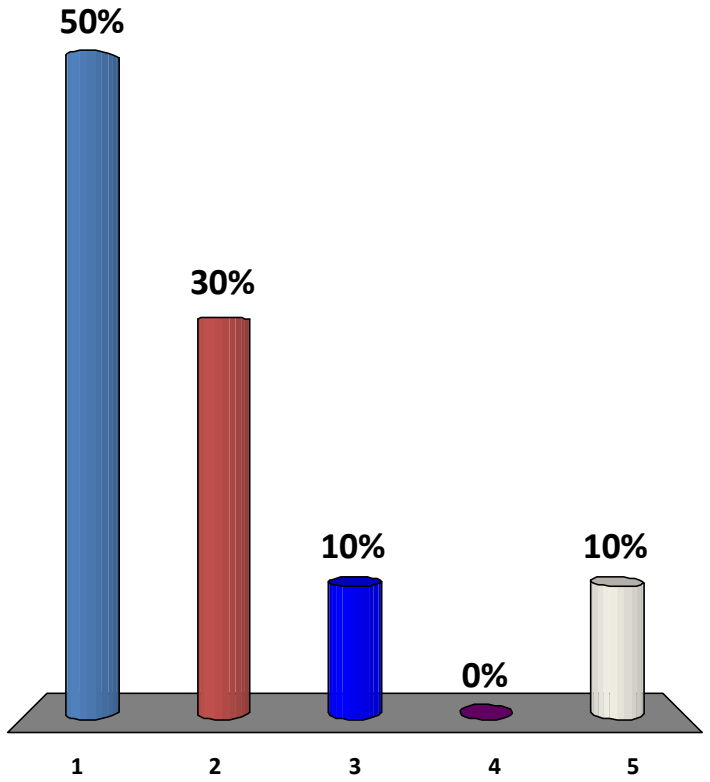
A FLEX-type market could be useful to meet the following needs (choose all that apply):

1. Permanent Supply
2. Drought Recovery
3. Temporary supply while acquiring permanent supply
4. Sustaining open space
5. Other



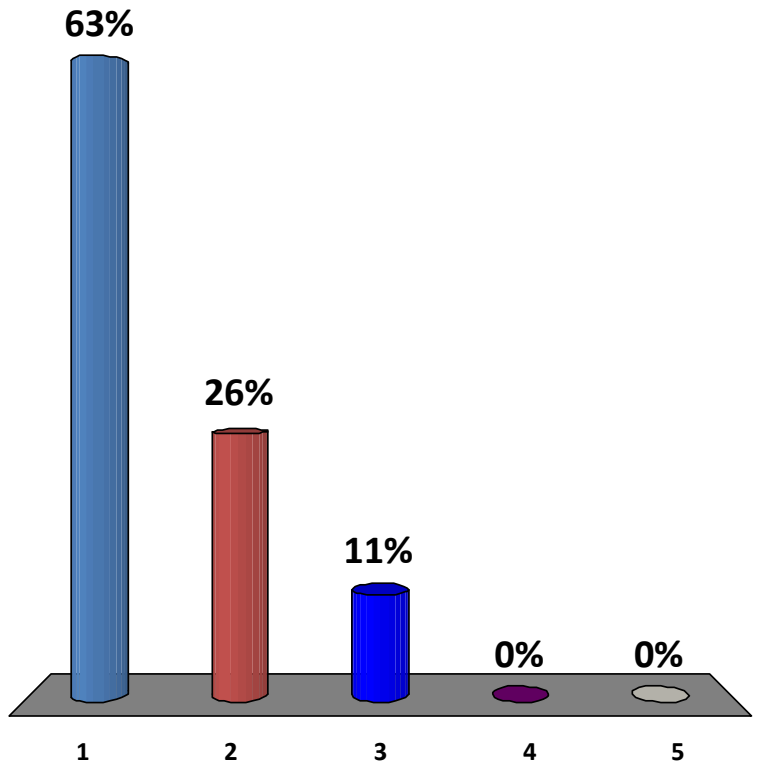
As an ag user, I would lease consumptive use and adjust my farming operation if the price was right.

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree



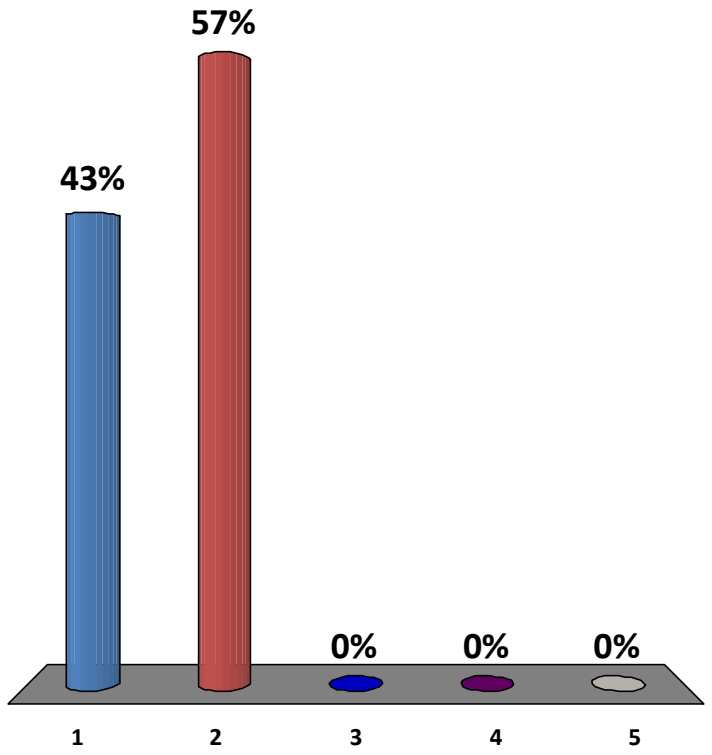
As an M&I User, I would lease water supplies from FLEX deliverable to my integrated system if the price was right.

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree



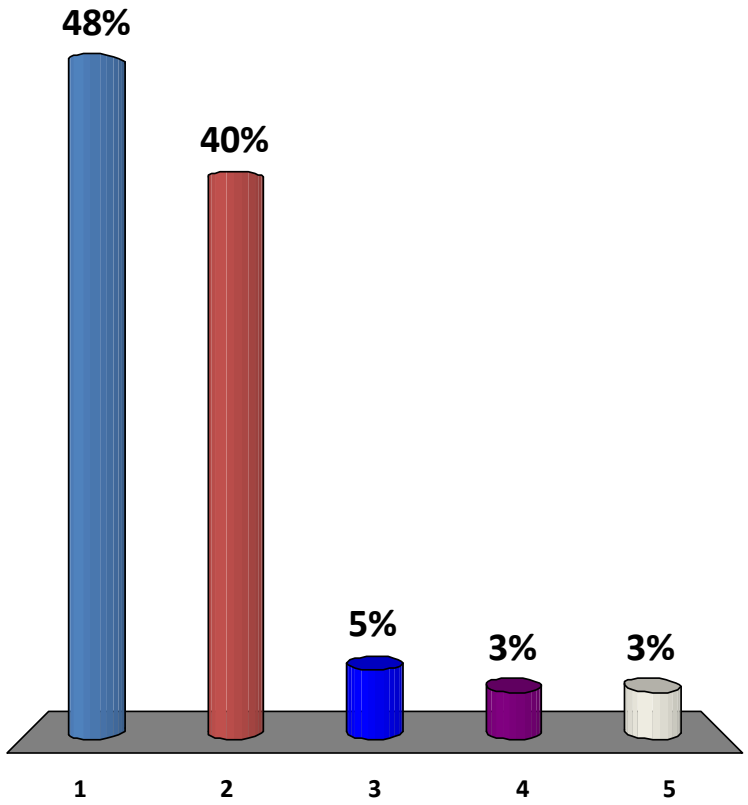
As an E/C user, I would lease water supplies from FLEX deliverable for conservation and environmental uses if the price was right.

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree



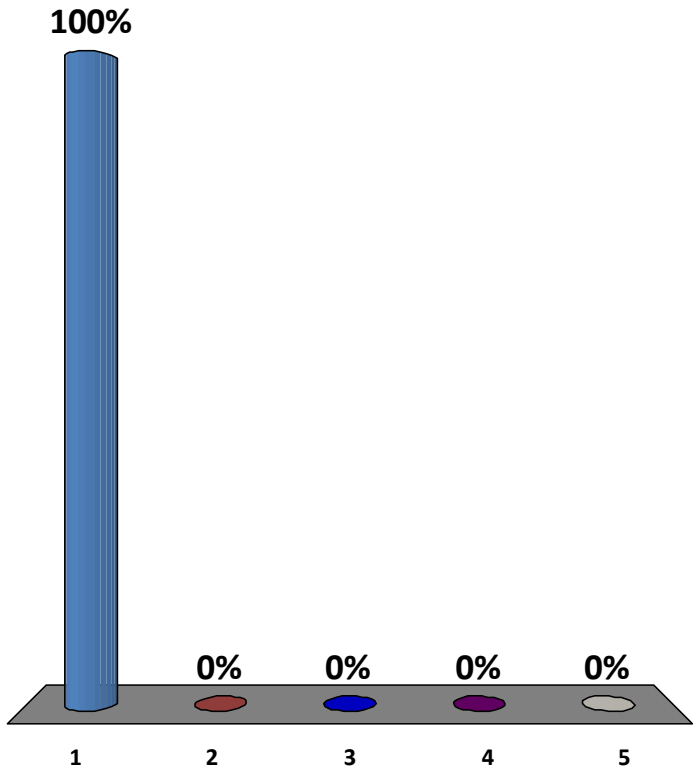
Water court/administrative costs are a substantial barrier to implementation of alternatives to buy and dry like the FLEX market.

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree



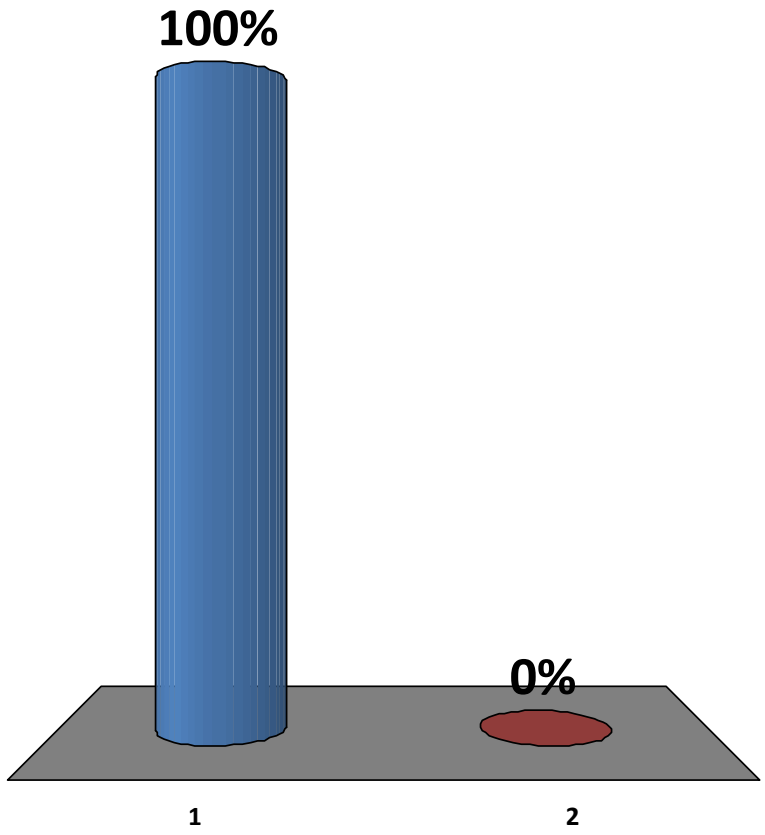
Substantive Water court issues are a substantial barrier to implementation of alternatives to buy and dry like the FLEX market.

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree



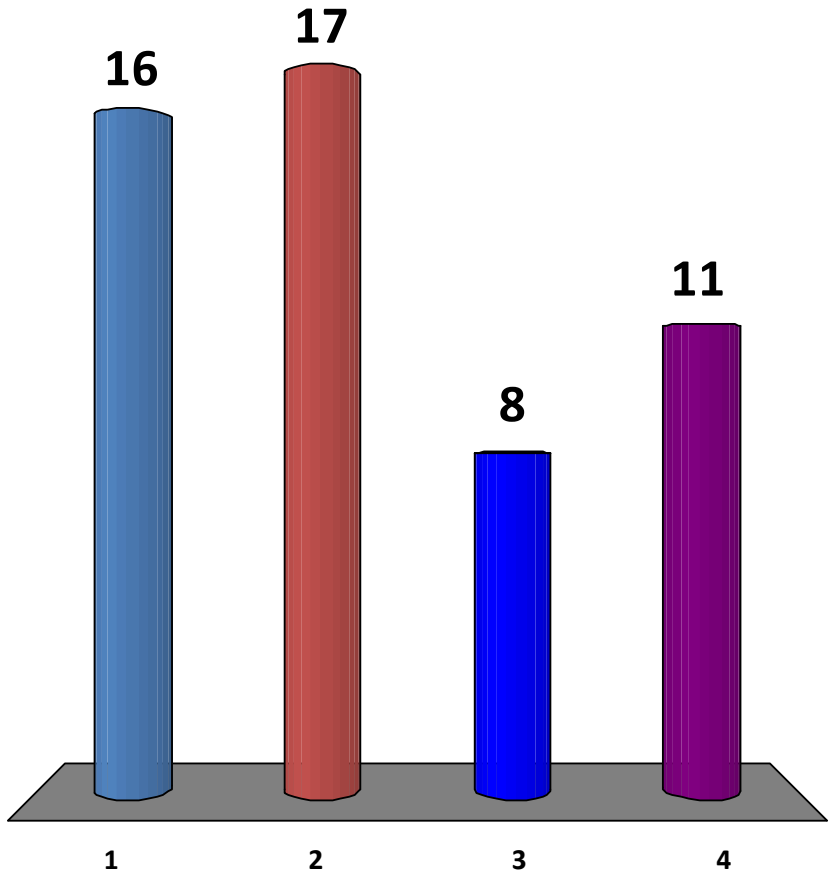
Of the two models, which one best fits your needs and is most likely to be used, if you were going to implement a FLEX market?

1. Pay as You Go
2. Return Flow Accounting



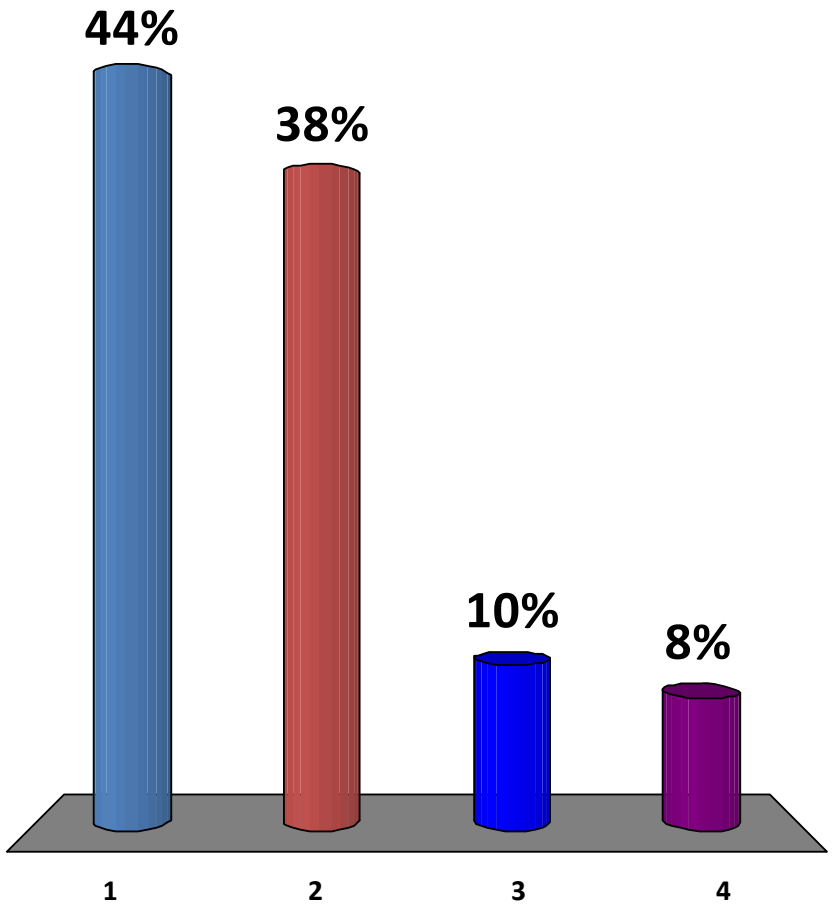
Are you M&I, Ag, E-C or Attorney/Engineer?

1. M&I
2. Ag
3. E-C
4. Attorney-Engineer



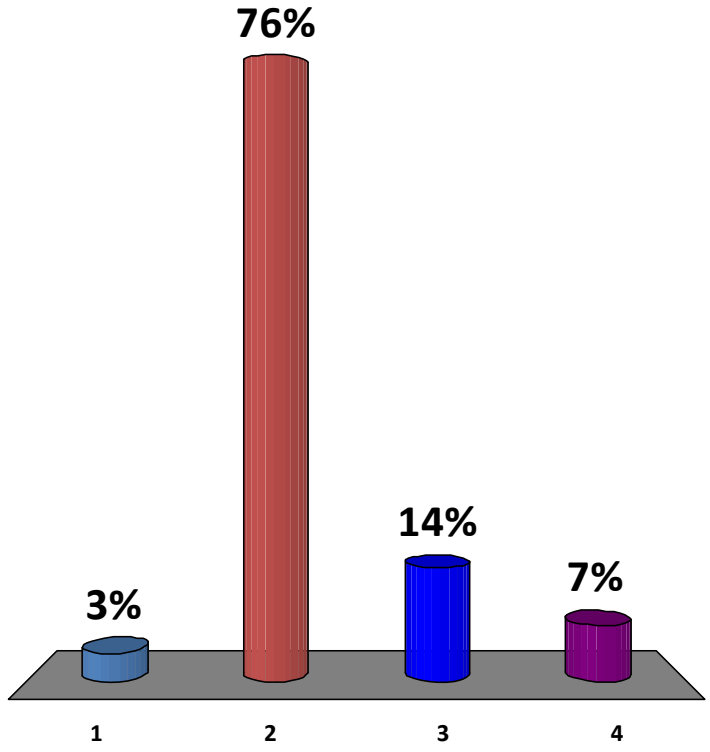
Our group was able to reach agreement on

1. All six keys
2. 3-5 keys
3. 1-3 keys
4. No keys



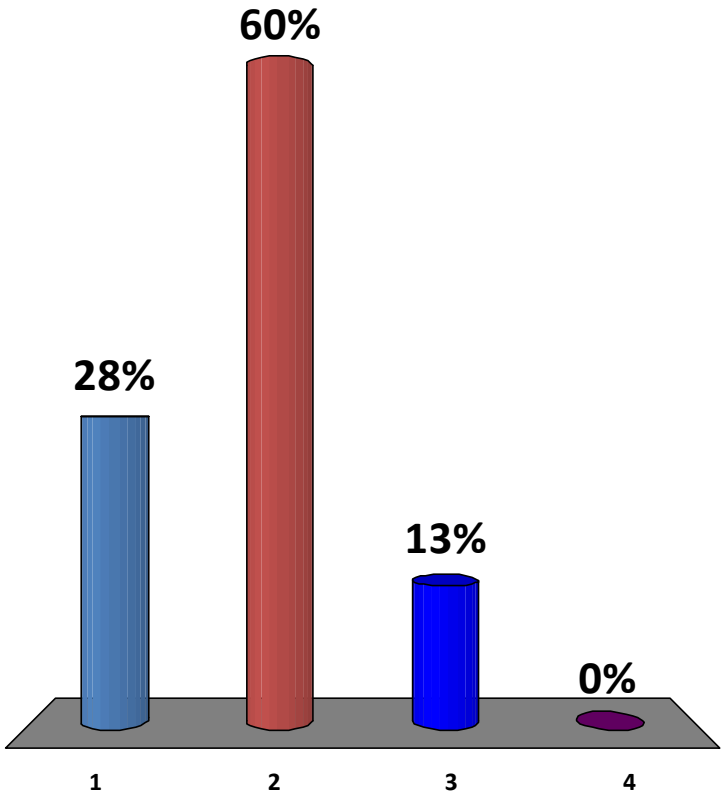
The price we negotiated for 1 acre foot of leased supply delivered to the river under our first delivery agreement was:

1. $100-$500 per acre foot
2. $500-$1000 per acre foot
3. $1000-$2000 per acre foot
4. More than $2000 per acre foot



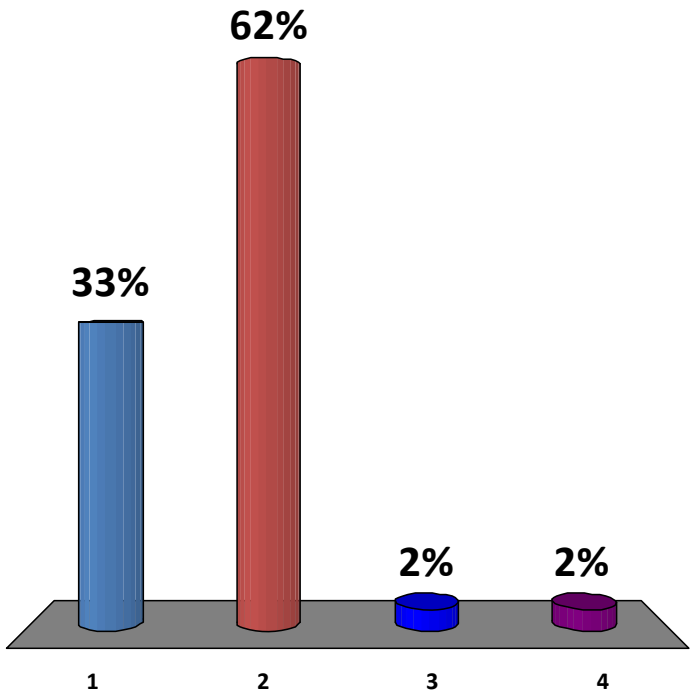
The number of participants (Ag, M&I and E/C) we envisioned for our FLEX market was

1. 1-3
2. 3-5
3. 5-10
4. More than 10



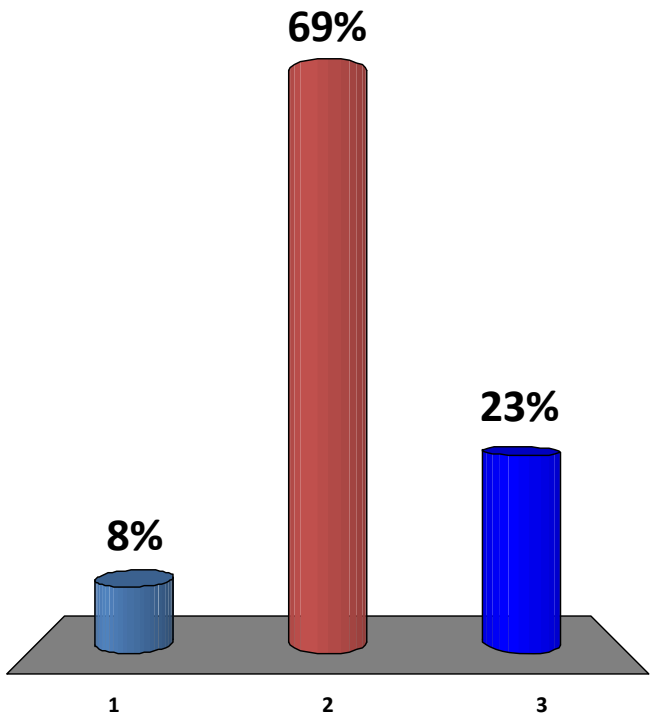
Ownership of the water rights in our agreement

1. Was to remain 100% with Ag Users
2. Was to remain largely with Ag Users, with less than 20% to M&I/E-C
3. Was to be 20%-50% M&I/E-C
4. Was to be 50% or more in M&I/E-C



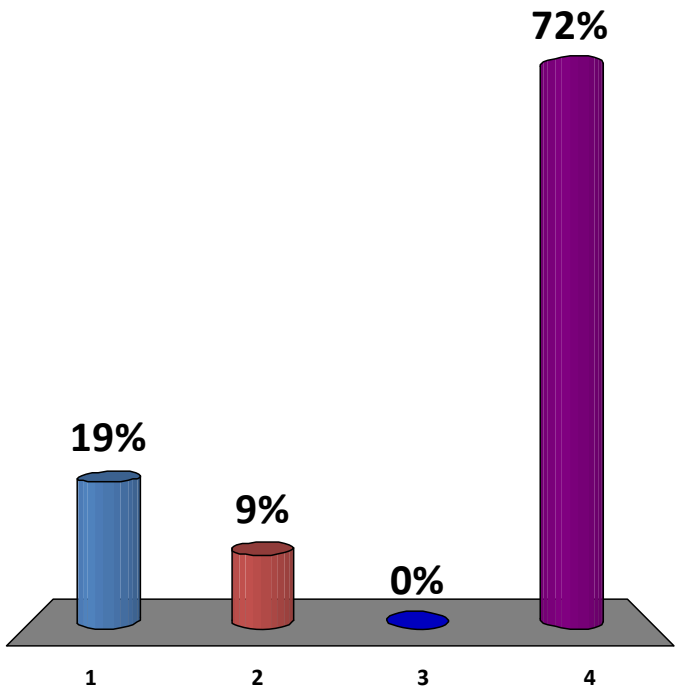
The FLEX Agreement we negotiated

1. Put the burden largely or exclusively on Ag users to adjudicate a plan, then sell water
2. Involved shared responsibility for adjudication of the plan
3. Put the burden largely or exclusively on M&I/ E-C users to adjudicate a plan



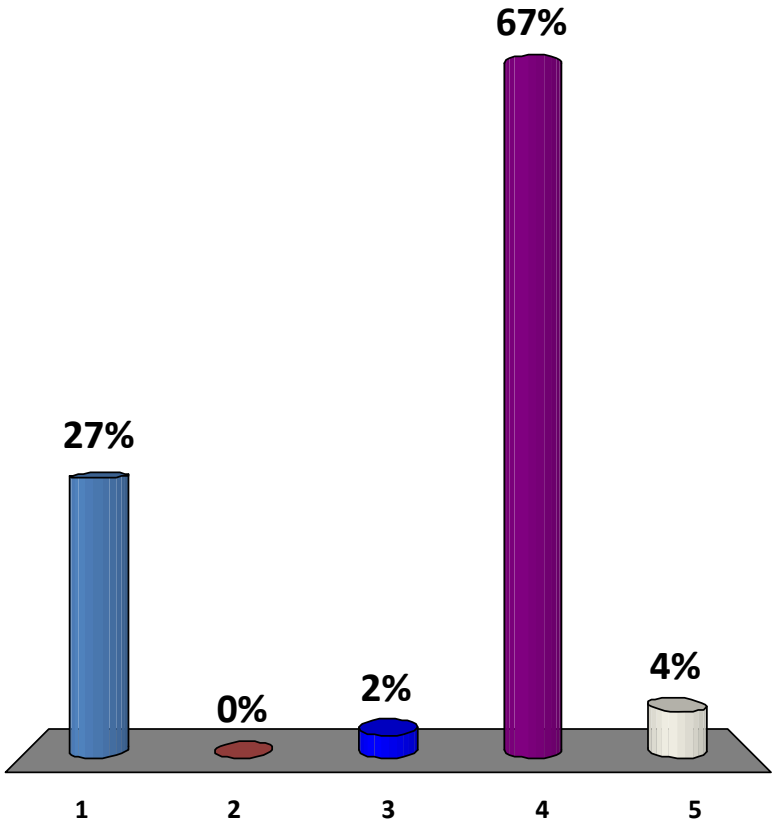
Who had the responsibility for infrastructure?

1. Ag
2. M&I
3. E-C
4. Shared responsibility



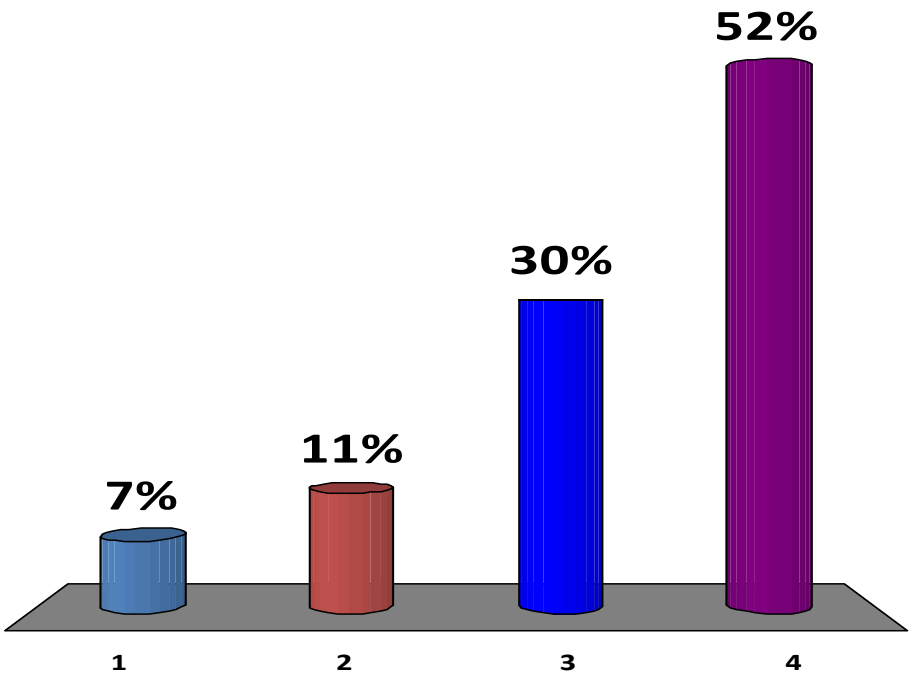
Who was to administer the plan once completed?

1. Ag
2. M&I
3. E-C
4. Shared M&I, E-C and/or Ag
5. Third party administrator



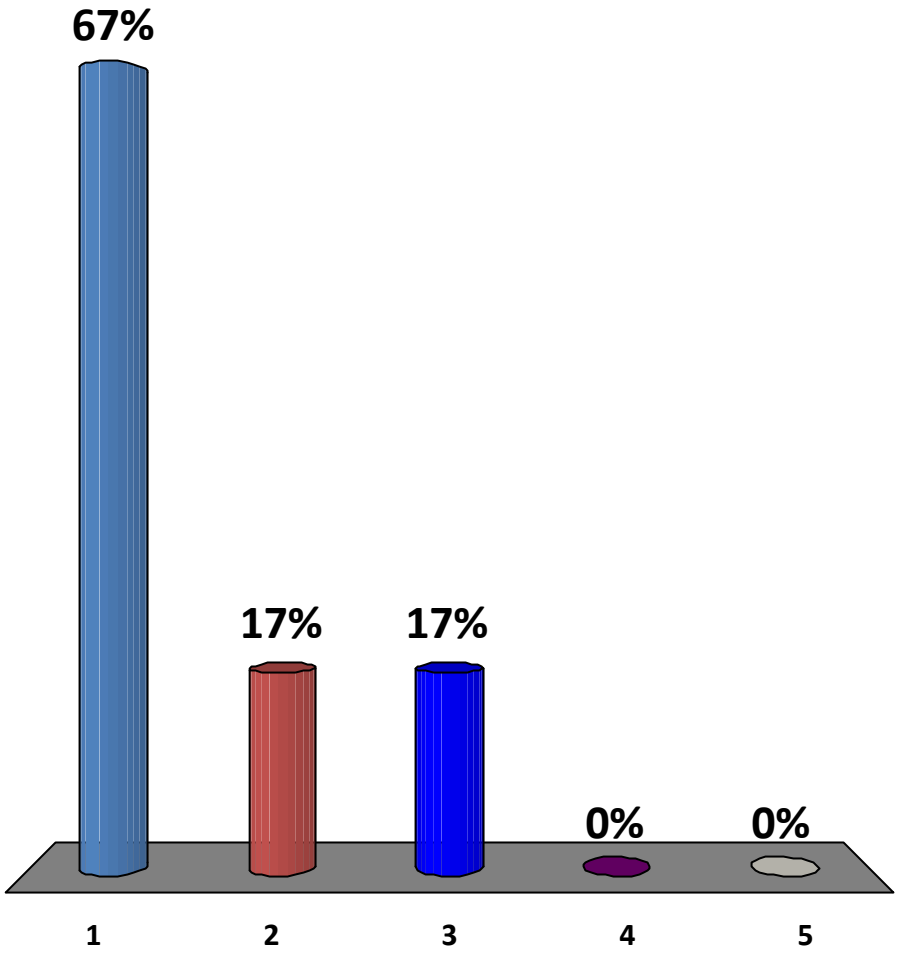
What was the initial term of the FLEX agreement?

1. 1 year
2. 2-5 years
3. 6-10 years
4. 11+ years



The Keypads were helpful

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree



Turning Demographic Comparison

1.) Are you M&I, Ag, E-C or Attorney/Engineer? (multiple choice)

M&I	15	0	0	0	15
Ag	0	17	0	0	17
E-C	0	0	6	0	6
Attorney-Engineer	0	0	0	17	17

2.) Which river basin do you identify as your primary basin? (multiple choice)

	South Platte	Arkansas	Rio Grande	Gunnison
M&I	13	0	0	0
Ag	15	0	0	0
E-C	3	0	0	0
Attorney-Engineer	12	1	0	0

	Colorado	White-Yampa	Dolores-San Juan	Statewide	Total
M&I	1	0	0	1	15
Ag	1	0	0	1	17
E-C	1	0	0	2	6
Attorney-Engineer	0	1	0	3	17

3.) M&I Users: The population of my municipality is: (multiple choice)

	Less than 100	100-5,000	5,000-50,000	50,000-100,000	100,000+	Total
M&I	0	0	2	2	11	15
Ag	0	0	0	0	1	1
E-C	0	0	0	0	0	0
Attorney-Engineer	0	0	1	1	1	3

4.) Environmental/Conservation Users: My entity is interested in securing water supplies for (choose all that apply): (multiple choice)

	Maintenance of in-stream flows and natural lake levels	Habitat creation and maintenance (eg wetlands)	Recreation (kayaking, fishing)	Maintaining agriculture/open space	Other	Total
M&I	1	1	1	1	1	15
Ag	0	0	0	1	0	17
E-C	4	5	0	2	0	6
Attorney-Engineer	1	1	1	1	0	17

5.) Ag Users: I cultivate or buy feed from farms with total acreage under cultivation of: (multiple choice)

	Less than 160 acres	160-320 acres	320-640 acres	640-1920 acres	More than 1920 acres	Total
M&I	1	0	0	0	0	1
Ag	4	1	2	2	5	14
E-C	0	0	0	0	0	0
Attorney-Engineer	0	0	1	0	1	2

6.) Have you ever participated in a water lease or other alternative to traditional buy and dry? (multiple choice)

	Yes	No	Total
M&I	13	2	15
Ag	9	7	16
E-C	4	2	6
Attorney-Engineer	11	4	15

7.) Have you ever participated in a water lease or other alternative to traditional buy and dry? (multiple choice)

	Yes	No	Total
M&I	86.7%	13.3%	15
Ag	56.3%	43.8%	16
E-C	66.7%	33.3%	6

8.) What is the single greatest barrier to multiple uses of senior decreed rights? (multiple choice)

	Transactional Costs	Legal issues	Price point for sale or	Delivery infrastructure	Other	Total
M&I	1	10	2	1	1	15
Ag	2	8	3	0	2	15
E-C	0	6	0	0	0	6
Attorney-Engineer	3	8	2	1	3	17

M&I	6.7%	66.7%	13.3%	6.7%	6.7%	15
Ag	13.3%	53.3%	20.0%	0.0%	13.3%	15
E-C	0.0%	100.0%	0.0%	0.0%	0.0%	6
Attorney-Engineer	17.6%	47.1%	11.8%	5.9%	17.6%	17

9.) As an Ag user, I would lease consumptive use and adjust my farming operation if the price was right. (multiple choice)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
M&I	0	1	0	0	0	1
Ag	7	5	0	0	2	14
E-C	0	0	0	0	0	0
Attorney-Engineer	1	0	0	0	0	1

10.) As an M&I User, I would lease water supplies from FLEX deliverable to my integrated system if the price was right.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
M&I	9	4	1	0	0	14
Ag	0	0	0	0	0	0
E-C	0	0	0	0	0	0
Attorney-Engineer	1	0	0	0	0	1

11.) As an E/C user, I would lease water supplies from FLEX deliverable for conservation and environmental uses if the price was right.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
M&I	0	0	0	0	0	0
Ag	0	0	0	0	0	0
E-C	2	4	0	0	0	6
Attorney-Engineer	1	0	0	0	0	1

12.) Water court/administrative costs are a substantial barrier to implementation of alternatives to buy and dry like the FLEX market.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
M&I	7	6	1	1	0	15
Ag	9	4	0	0	1	14
E-C	2	3	1	0	0	6
Attorney-Engineer	4	10	1	1	1	17

M&I	46.7%	40.0%	6.7%	6.7%	0.0%	15
Ag	64.3%	28.6%	0.0%	0.0%	7.1%	14
E-C	33.3%	50.0%	16.7%	0.0%	0.0%	6
Attorney-Engineer	23.5%	58.8%	5.9%	5.9%	5.9%	17

13.) Are you M&I, Ag, E-C or Attorney/Engineer? (multiple choice)

	M&I	Ag	E-C	Attorney-Engineer	Total
M&I	13	0	0	0	13
Ag	0	13	1	0	14
E-C	0	0	6	0	6
Attorney-Engineer	2	1	0	11	14

14.) Our group was able to reach agreement on (multiple choice)

	All six keys	3-5 keys	1-3 keys	No keys	Total
M&I	5	6	3	1	15
Ag	10	3	1	1	15
E-C	3	3	1	0	7
Attorney-Engineer	2	6	0	1	9

M&I	33.3%	40.0%	20.0%	6.7%	15
Ag	66.7%	20.0%	6.7%	6.7%	15
E-C	42.9%	42.9%	14.3%	0.0%	7
Attorney-Engineer	22.2%	66.7%	0.0%	11.1%	9

15.) The price we negotiated for 1 acre foot of leased supply delivered to the river under our first delivery (note: only 24 participants answered this question, so many groups did not negotiate a specific price)

	$100-$500 per acre	$500-$1000 per acre	$1000-$2000 per acre	More than $2000 per	Total
M&I	0	5	1	0	6
Ag	0	7	2	0	9
E-C	0	0	1	1	2
Attorney-Engineer	1	5	0	1	7
					24
M&I	0.0%	83.3%	16.7%	0.0%	6
Ag	0.0%	77.8%	22.2%	0.0%	9
E-C	0.0%	0.0%	50.0%	50.0%	2
Attorney-Engineer	14.3%	71.4%	0.0%	14.3%	7

16.) The number of participants (Ag, M&I and E/C) we envisioned for our FLEX market was (multiple choice)

	1-3	3-5	5-10	More than 10	Total
M&I	3	9	2	0	14
Ag	4	8	2	0	14
E-C	1	5	1	0	7
Attorney-Engineer	2	5	1	0	8
M&I	21.4%	64.3%	14.3%	0.0%	14
Ag	28.6%	57.1%	14.3%	0.0%	14
E-C	14.3%	71.4%	14.3%	0.0%	7
Attorney-Engineer	25.0%	62.5%	12.5%	0.0%	8

17.) Ownership of the water rights in our agreement (multiple choice)

	Was to remain 100%	Was to remain largely	Was to be 20%-50%	Was to be 50% or	Total
M&I	4	6	1	0	11
Ag	6	7	0	1	14
E-C	1	4	0	0	5
Attorney-Engineer	2	6	0	0	8
M&I	36.4%	54.5%	9.1%	0.0%	100.0%
Ag	42.9%	50.0%	0.0%	7.1%	100.0%
E-C	20.0%	80.0%	0.0%	0.0%	100.0%
Attorney-Engineer	25.0%	75.0%	0.0%	0.0%	100.0%

18.) The FLEX Agreement we negotiated (multiple choice)

	Put the burden largely or exclusively on Ag users to adjudicate a plan, then sell water	Involved shared responsibility for adjudication of the plan	Put the burden largely or exclusively on M&I/ E-C users to adjudicate a plan	Total
M&I	0	4	7	11
Ag	1	9	3	13
E-C	1	2	4	7
Attorney-Engineer	0	4	5	9

M&I	0.0%	36.4%	63.6%	11
Ag	7.7%	69.2%	23.1%	13
E-C	14.3%	28.6%	57.1%	7
Attorney-Engineer	0.0%	44.4%	55.6%	9

19.) Who had the responsibility for infrastructure? (multiple choice)

	Ag	M&I	E-C	Shared responsibility	Total
M&I	0	1	0	10	11
Ag	3	1	0	10	14
E-C	1	0	0	5	6
Attorney-Engineer	2	2	0	4	8

20.) Who was to administer the plan once completed? (multiple choice)

	Ag	M&I	E-C	Shared M&I, E-C	Third party	Total
M&I	2	0	0	9	0	11
Ag	3	0	0	11	0	14
E-C	2	0	0	4	0	6
Attorney-Engineer	3	0	0	5	1	9

21.) What was the initial term of the FLEX agreement? (multiple choice)

	1 year	2-5 years	6-10 years	11+ years	Total
M&I	3	2	2	4	11
Ag	0	2	6	6	14
E-C	0	0	1	5	6
Attorney-Engineer	0	1	3	4	8

22.) What was the initial term of the FLEX agreement? (multiple choice)

	1 year	2-5 years	6-10 years	11+ years	Total
M&I	27.3%	18.2%	18.2%	36.4%	11
Ag	0.0%	14.3%	42.9%	42.9%	14
E-C	0.0%	0.0%	16.7%	83.3%	6
Attorney-Engineer	0.0%	12.5%	37.5%	50.0%	8

23.) The Keypads were helpful (multiple choice)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
M&I	7	3	0	0	0	10
Ag	7	2	0	0	1	10
E-C	4	1	1	0	1	7
Attorney-Engineer	2	3	0	0	1	6

Turning Results by Question

Session Name: FLEX Water Summit
Created: 2/13/2013 7:08 PM

1.) Are you M&I, Ag, E-C or Attorney/Engineer? (multiple choice)

	Responses (percent)	(count)
M&I	27.27%	15
Ag	30.91%	17
E-C	10.91%	6
Attorney-Engineer	30.91%	17
Totals	100%	55

2.) Which river basin do you identify as your primary basin? (multiple choice)

	Responses (percent)	(count)
South Platte	78.18%	43
Arkansas	1.82%	1
Rio Grande	0.00%	0
Gunnison	0.00%	0
Colorado	5.45%	3
White-Yampa	1.82%	1
Dolores-San Juan	0.00%	0
Statewide	12.73%	7
Totals	100%	55

3.) M&I Users: The population of my municipality is: (multiple choice)

	Responses (percent)	(count)
Less than 100	0.00%	0
100-5,000	0.00%	0
5,000-50,000	15.79%	3
50,000-100,000	15.79%	3
100,000+	68.42%	13
Totals	100%	19

4.) Environmental/Conservation Users: My entity is interested in securing water supplies for (choose all that apply): (multiple choice)

	Responses (percent)	(count)
Maintenance of in-stream flows and natural lake levels	26.09%	6
Habitat creation and maintenance (eg wetlands)	30.43%	7
Recreation (kayaking, fishing)	8.70%	2
Maintaining agriculture/open space	30.43%	7
Other	4.35%	1
Totals	100%	23

5.) Ag Users: I cultivate or buy feed from farms with total acreage under cultivation of: (multiple choice)

	Responses (percent)	(count)
Less than 160 acres	26.32%	5
160-320 acres	5.26%	1
320-640 acres	15.79%	3
640-1920 acres	10.53%	2
More than 1920 acres	42.11%	8
Totals	100%	19

6.) Have you ever participated in a water lease or other alternative to traditional buy and dry? (multiple choice)

	Responses (percent)	(count)
Yes	70.91%	39
No	29.09%	16
Totals	100%	55

7.) What is the single greatest barrier to multiple uses of senior decreed rights? (multiple choice)

	Responses (percent)	(count)
Transactional Costs	10.53%	6
Legal issues	61.40%	35
Price point for sale or lease of water	12.28%	7
Delivery infrastructure	3.51%	2
Other	12.28%	7
Totals	100%	57

8.) A FLEX-type market could be useful to meet the following needs (choose all that apply): (multiple choice)

	Responses (percent)	(count)
Permanent Supply	50.88%	29
Drought Recovery	98.25%	56
Temporary supply while acquiring permanent supply	75.44%	43
Sustaining open space	45.61%	26
Other	33.33%	19
Totals	100%	173

9.) As an ag user, I would lease consumptive use and adjust my farming operation if the price was right. (multiple choice)

	Responses (percent)	(count)
Strongly Agree	50.00%	10
Agree	30.00%	6
Neutral	10.00%	2
Disagree	0.00%	0
Strongly Disagree	10.00%	2
Totals	100%	20

10.) As an M&I User, I would lease water supplies from FLEX deliverable to my integrated system if the price was right. (multiple choice)

	Responses (percent)	(count)
Strongly Agree	63.16%	12
Agree	26.32%	5
Neutral	10.53%	2
Disagree	0.00%	0
Strongly Disagree	0.00%	0
Totals	100%	19

11.) As an E/C user, I would lease water supplies from FLEX deliverable for conservation and environmental uses if the price was right. (multiple choice)

	Responses (percent)	(count)
Strongly Agree	42.86%	3
Agree	57.14%	4
Neutral	0.00%	0
Disagree	0.00%	0
Strongly Disagree	0.00%	0
Totals	100%	7

12.) Water court/administrative costs are a substantial barrier to implementation of alternatives to buy and dry like the FLEX market. (multiple choice)

	Responses (percent)	(count)
Strongly Agree	48.33%	29
Agree	40.00%	24
Neutral	5.00%	3
Disagree	3.33%	2
Strongly Disagree	3.33%	2
Totals	100%	60

13.) Are you M&I, Ag, E-C or Attorney/Engineer? (multiple choice)

	Responses (percent)	(count)
M&I	30.77%	16
Ag	32.69%	17
E-C	15.38%	8
Attorney-Engineer	21.15%	11
Totals	100%	52

14.) Our group was able to reach agreement on (multiple choice)

	Responses (percent)	(count)
All six keys	44.23%	23
3-5 keys	38.46%	20
1-3 keys	9.62%	5
No keys	7.69%	4
Totals	100%	52

15.) The price we negotiated for 1 acre foot of leased supply delivered to the river under our first delivery agreement was: (multiple choice)

	Responses (percent)	(count)
$100-$500 per acre foot	3.45%	1
$500-$1000 per acre foot	75.86%	22
$1000-$2000 per acre foot	13.79%	4
More than $2000 per acre foot	6.90%	2
Totals	100%	29

16.) The number of participants (Ag, M&I and E/C) we envisioned for our FLEX market was (multiple choice)

	Responses (percent)	(count)
1-3	27.66%	13
3-5	59.57%	28
5-10	12.77%	6
More than 10	0.00%	0
Totals	100%	47

17.) Ownership of the water rights in our agreement (multiple choice)

	Responses (percent)	(count)
Was to remain 100% with Ag Users	33.33%	14
Was to remain largely with Ag Users, with less than 20% to M&I/E-C	61.90%	26
Was to be 20%-50% M&I/E-C	2.38%	1
Was to be 50% or more in M&I/E-C	2.38%	1
Totals	100%	42

18.) The FLEX Agreement we negotiated (multiple choice)

	Responses (percent)	(count)
Put the burden largely or exclusively on Ag users to adjudicate a plan, then sell water	4.44%	2
Involved shared responsibility for adjudication of the plan	53.33%	24
Put the burden largely or exclusively on M&I/ E-C users to adjudicate a plan	42.22%	19
Totals	100%	45

19.) Who had the responsibility for infrastructure? (multiple choice)

	Responses (percent)	(count)
Ag	18.60%	8
M&I	9.30%	4
E-C	0.00%	0
Shared responsibility	72.09%	31
Totals	100%	43

20.) Who was to administer the plan once completed? (multiple choice)

	Responses (percent)	(count)
Ag	26.67%	12
M&I	0.00%	0
E-C	2.22%	1
Shared M&I, E-C and/or Ag	66.67%	30
Third party administrator	4.44%	2
Totals	100%	45

21.) What was the initial term of the FLEX agreement? (multiple choice)

	Responses (percent)	(count)
1 year	6.82%	3
2-5 years	11.36%	5
6-10 years	29.55%	13
11+ years	52.27%	23
Totals	100%	44

22.) The Keypads were helpful (multiple choice)

	Responses (percent)	(count)
Strongly Agree	61.54%	24
Agree	28.21%	11
Neutral	2.56%	1
Disagree	0.00%	0
Strongly Disagree	7.69%	3
Totals	100%	39

FLEX Negotiation Results by Audience Demographic (Ag, M&I, and E/C)						
	Participants	Ownership	Water Court Application	Infrastructure	Administration	Term
Ag	57% voted their FLEX Market include between 3-5 participants.	50% voted that ownership of the water rights should remain largely with Agriculture, with less than 20% to M&I/Environmental and Conservation participants.	69% voted to share responsibility for adjudication of the plan.	71% voted that responsibility for delivery infrastructure was shared.	79% voted that M&I, E/C and Ag would share administration.	The results of this key were tied - 43% voted that the term of the agreement was 6-10 years and 43% voted the term 11+ years.
M&I	64% voted their FLEX Market include between 3-5 participants.	55% voted that ownership of the water rights should remain largely with Agriculture, with less than 20% to M&I/Environmental and Conservation participants.	64% voted to put the burden of adjudication of the plan largely on M&I and E/C users.	91% voted that responsibility for delivery infrastructure was shared.	82% voted that M&I, E/C and Ag would share administration.	36% voted that the term of the agreement was 11+ years.
E/C	71% voted their FLEX Market include between 3-5 participants.	80% voted that ownership of the water rights should remain largely with Agriculture, with less than 20% to M&I/Environmental and Conservation participants.	57% voted to put the burden of adjudication of the plan largely on M&I and E/C users.	83% voted that responsibility for delivery infrastructure was shared.	67% voted that M&I, E/C and Ag would share administration.	50% voted that the term of the agreement was 11+ years.

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