Feedback on Water Supply Strategies
For the June 17, 2010 IBCC Meeting

Purpose Summary: This document provides a starting point for summarizing the feedback on Identified projects and processes (IPPs), agricultural transfer strategy concepts, conservation and reuse strategy concepts, new water supply development strategy concepts, and nonconsumptive needs. This feedback was gathered during the course of two Interbasin Compact Committee (IBCC) meetings, from each of the roundtables, and from water provider interviews. The document may become a template for the end of calendar year report to the Governor. The document provides background, next steps, potential guiding principles, and other draft information necessary for developing strategies to meet our future water needs.

Colorado's Water Supply Planning Process

Colorado has a robust water supply planning process based on local basin planning. In 2003, because of Colorado's population increase, the 2002 drought, and potential water shortage issues, the Colorado General Assembly authorized the Colorado Water Conservation Board (CWCB) to implement the Statewide Water Supply Initiative (SWSI). Senate Bill 03-110 authorized SWSI, which implemented a collaborative approach to helping Colorado maintain an adequate water supply for its citizens and the environment. SWSI focused on using a common technical basis for identifying and quantifying water needs and issues throughout the state. SWSI formed the basis of Colorado's current water supply planning process.

In 2005, the Colorado General Assembly formalized this statewide water supply planning process through the Colorado Water for the 21st Century Act (C.R.S. 37-75-101 to -107). The Colorado Water for the 21st Century Act, now known as the Basin Roundtable Process, provides a permanent forum for basin level water supply planning. It incorporates and extends SWSI by creating nine Basin Roundtables based on Colorado's eight major river basins and a separate roundtable for the Denver Metro area. The Act also established an Interbasin Compact Committee.

Each Basin Roundtable is charged with developing a basin-wide water needs assessment by analyzing their consumptive (municipal and industrial [M&I] and agricultural) water needs, analyzing their nonconsumptive (environmental and recreational) water needs, analyzing available water supplies, and proposing projects and methods to meet their identified water needs. The Basin Roundtables are in the process of developing their needs assessments with technical assistance from CWCB. In 2006, the IBCC established and the General Assembly ratified the IBCC's Charter. The Charter outlines the roles of the IBCC, one of which is to provide a "framework that creates incentives for successful deliberations, agreements, and their implementation."

Findings

SWSI found that by 2030 Colorado will need an additional 630,000 acre-feet (AF) of M&I water. About 80 percent of this could be met through the successful implementation of projects and planning processes that the local water providers are currently pursuing, also called Identified Projects and Processes, or IPPs. SWSI also found even if the IPPs are 100 percent successful there would still be a 20 percent "gap." To the extent that the IPPs are not successful, the "gap"

is larger. In addition, SWSI found that to the extent the IPPs are not successfully implemented, Colorado will see a significantly greater reduction in irrigated agricultural lands as M&I water providers seek additional permanent transfers of agricultural water rights to provide for the demands that would otherwise have been met by specific IPPs. Initial investigations into the gap in 2050 are so far consistent with SWSIs findings, and the gap will be updated by the end of the calendar year.

2050 M&I Water Use Projections and Updated Information from SWSI

To help the Basin Roundtables with their needs assessments, CWCB projected M&I water needs out to 2050. Because of the uncertainty associated with long-range projections, CWCB projected these demands using a range. The Basin Roundtables now have low, medium, and high population projections and M&I water use projections (including energy needs and oil shale). The results summarized below differ from the draft results published June 2009. The final results incorporate feedback received on the draft analysis and will fully described in an M&I Demands to 2050 Final Report. The results of this analysis include:

Population Growth: Because of Colorado's strong and diversified economy Colorado's population will almost double from 5 million to over 9 million people by 2050, even after taking the current recession into account. By 2050, Colorado's population is projected to be between 8.4 and 10.0 million people.

- About half of this population growth is expected to result from net migration into the state and about half from birth rates exceeding death rates.
- On a percentage basis, the fastest growth will take place on the West Slope – between 2005 and 2050, each of the West Slope basins will more than double. Most significantly, the Yampa/White Basin will grow by approximately 2.8 times, and the Colorado Basin by over 2.5 times.
- The Arkansas and South Platte Basins will have slower growth rates (approximately 90 percent and 80 percent, respectively), but combine to add almost 3.3 million people by 2050.
- By 2050, between 7.4 and 8.4 million people will live in the South Platte and Arkansas Basins. On the West Slope, population will be between 1.2 and 1.5 million people.

Basin	Population Projections				
	2008	2035	2050	2050	2050
			Low	Middle	High
Arkansas Basin	948,430	1,451,034	1,581,169	1,687,627	1,841,210
Colorado Basin	307,030	558,243	660,745	725,388	832,143
Gunnison Basin	105,330	183,694	205,654	220,103	239,769
Metro Basin	2,512,770	3,622,200	4,017,674	4,144,455	4,533,783
North Platte Basin	1,521	1,817	2,003	2,196	2,484
Rio Grande Basin	49,934	68,366	74,062	79,593	86,684
Southwest	105,175	184,637	204,008	224,262	248,977
South Platte Basin	977,451	1,621,897	1,808,338	1,902,474	2,065,396
Yampa/White Basin	45,128	80,698	93,860	116,823	152,830
All Basins	**5,052,770**	**7,772,587**	**8,647,515**	**9,102,920**	**10,003,278**

Water Demands: This population growth will drive a significant need for additional water to meet future M&I demands. By 2050, Colorado will need between 690,000 and 970,000 AF of additional water for municipal, commercial, and small industrial use. Passive conservation savings have the potential to reduce that demand to be between 540,000 and 810,000 AF. In addition, up to 400,000 AF may be needed for large industry, including as much as 170,000 for oil shale development.

The IBCC has concluded that agriculture-to-urban water transfers are the default solution for meeting these water needs. They also recognize that large-scale dry-up of irrigated agriculture has major economic, environmental, and cultural impacts. In order to meet the projected gap without these impacts, the IBCC embarked on a visioning process. From these discussions and the technical work that supported them, it is clear that there is no silver bullet for meeting the future gap; a portfolio of water supply strategies will be necessary.

The portfolio includes water conservation, reuse, IPPs, agricultural transfers (both permanent and alternative), and new supply development from the Colorado Basin. Each of these portfolio elements will require additional storage. The IBCC has identified the following issues associated with each portfolio element:

Agricultural Dry-up

- Large-scale dry-up of irrigated agriculture has major adverse economic impacts
- Dry-up of agricultural lands also has major environmental impacts
- This is the default solution, but is not a good option for solving all of our needs
- Large-scale agricultural transfers (whether permanent or alternative) will require significant investment in delivery and treatment infrastructure
- There are some alternative transfer methods that may preserve rural economies, but these methods need further support and assurances that they will be accepted
- A coordinated agricultural dry-up approach would be significantly less expensive than many smaller projects

Identified Projects and Processes

- IPPs are projects or planning processes that have been identified by the water provider for meeting their future needs
- IPPs can include:
  - Conservation
  - Agricultural transfers
  - Growth into existing supplies
  - Reuse of existing or future consumable water supplies
  - New water supply projects
- Success of IPPs is important to meeting the gap
- To the extent they are not successful, other options will have to take their place (agricultural dry-up is the most likely candidate)
- Water providers are actively pursuing or relying on these projects or plans

Conservation

- Water conservation will be counted on to reduce existing and future water demands
- Conservation is a significant component of all the portfolios CWCB and the IBCC are examining

- Additional water conservation efforts are crucial, but will not be enough alone

New Supply Development

- Any new supply project on the West Slope bringing water east will need to be a multiuse project, mitigating for or enhancing West Slope economies and critical environmental values, and include a significant investment in reuse
- Developing new water supplies in the Colorado River Basin for use on both the East and West Slope will reduce agricultural transfers
- To achieve this, there needs to be cooperation between the East and West Slope
- This will result only if we have ongoing dialogue and some mechanism for cooperation
- IBCC and Basin Roundtables with CWCB's support are meeting this need
- In addition, better land use planning is recommended

Land Use Planning

- There needs to be a closer connection and better coordination between land use planning and water supply planning
- This should happen at the local government level
- Existing plans for denser new growth in the Metro area could reduce new demand by as much as 35,000 AF.

The South Platte and Denver Metro area is projected to need between 375,700 and 548,300 AF of additional M&I water by 2050. This 113,000 AF of new water supply development in the IPPs listed above will only meet a portion of that need. The remainder will be met through conservation efforts, other smaller IPPs, local agricultural water transfers, and potential new water supply development projects above and beyond the IPPs. To the extent that water projects developed by local water providers do not move forward, different water projects will need to be considered. Colorado through the IBCC and CWCB has analyzed different water projects. These include:

- Lower South Platte Pumpback
- Lower Arkansas Pumpback
- Green Mountain Pumpback
- Yampa Pumpback
- Flaming Gorge Pipeline
- Blue Mesa Pumpback

To the extent the IPPs fail, these types of projects may be needed sooner and in larger configurations.

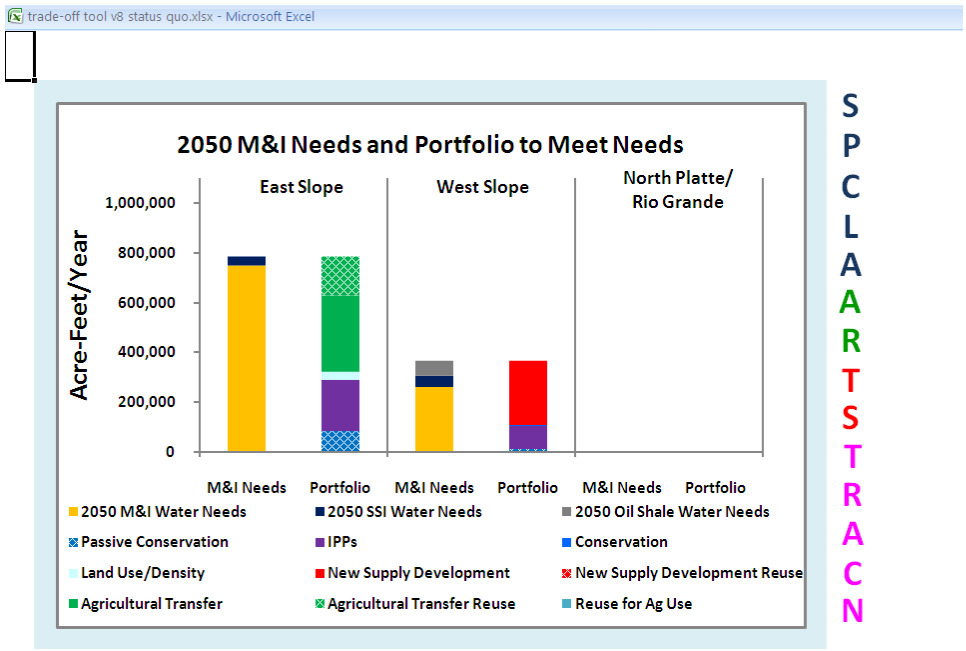
The CWCB is also working with the IBCC and Basin Roundtables to develop "portfolios" or combinations of strategies for meeting Colorado's water supply needs. We have developed a "status quo" portfolio. The status quo assumes the following:

- IPP – Success rate varied by basin (40 percent to 90 percent)
- Conservation – Current water use rates reduced by Passive Conservation
- New Supply – Future development of Colorado River water beyond IPPs will only occur for uses on the West Slope

- Agricultural Transfer – Remaining East Slope M&I demands will be met through agricultural transfers
- Reuse – 50 percent of reusable supplies

This status quo portfolio would lead to dry-up of 40 percent of the South Platte Basin's irrigated lands and 31 percent of the Arkansas. CWCB and many water stakeholders throughout the state are concerned that this level of agricultural dry-up will have detrimental impacts to Colorado's economic diversity, cultural heritage, rural economies, and wetlands/riparian habitat.

The CWCB and the IBCC is in the process of developing alternative scenarios under low, medium, and high supply and demand futures. The goal is to develop alternative portfolios that use a combination of conservation, reuse, agricultural transfers, and new supply projects that have the least impact to agricultural, environmental, recreational, fiscal, and other values identified by the IBCC, CWCB, and Basin Roundtables while still meeting the state's projected needs. In each of these scenarios, the success of IPPs is a major factor in minimizing the overall impact of the necessary portfolio.



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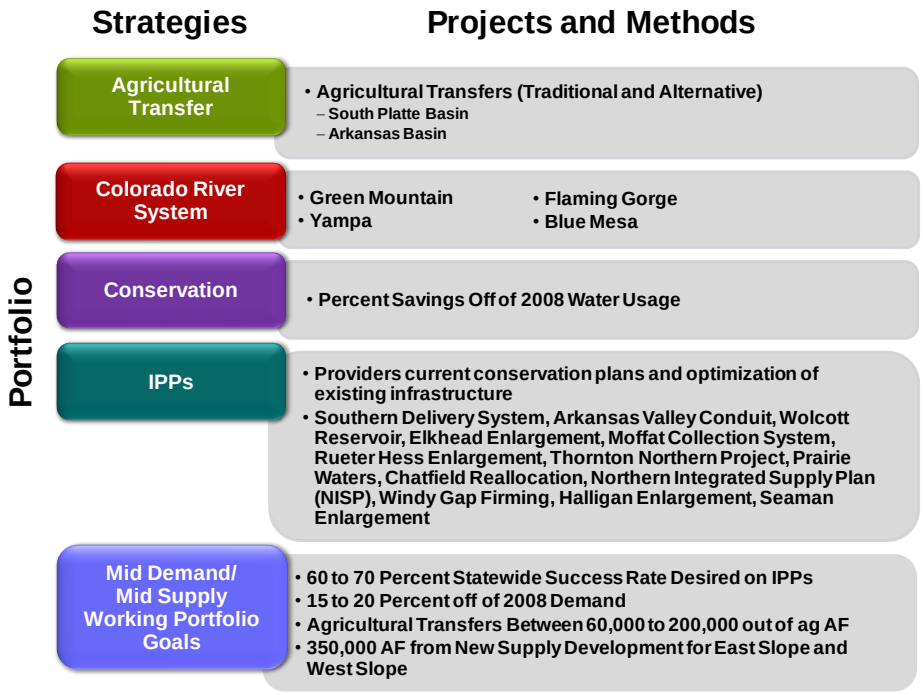


Identified Projects and Processes

Colorado's water supply planning process has concluded that meeting our state's water supply needs will require a mix of successful IPPs, additional conservation, agricultural transfers, and new water supply development. There is no "silver bullet" solution for our future water needs, and relying solely on any one strategy will not have a favorable result. Even with the successful implementation of the IPPs, Colorado will have a water supply "gap." Additionally, Colorado will not be able to meet all of its future water supply needs through conservation alone, nor should Colorado rely solely on one or two large water projects.

A significant portion of Colorado's future needs will be met with the implementation of projects and planning processes that the local water providers are currently pursuing (IPPs). If all of these projects are successful, Colorado will not have an M&I water supply gap until around 2020. If, however, these projects are only partially successful, Colorado's gap will be bigger and will appear sooner.

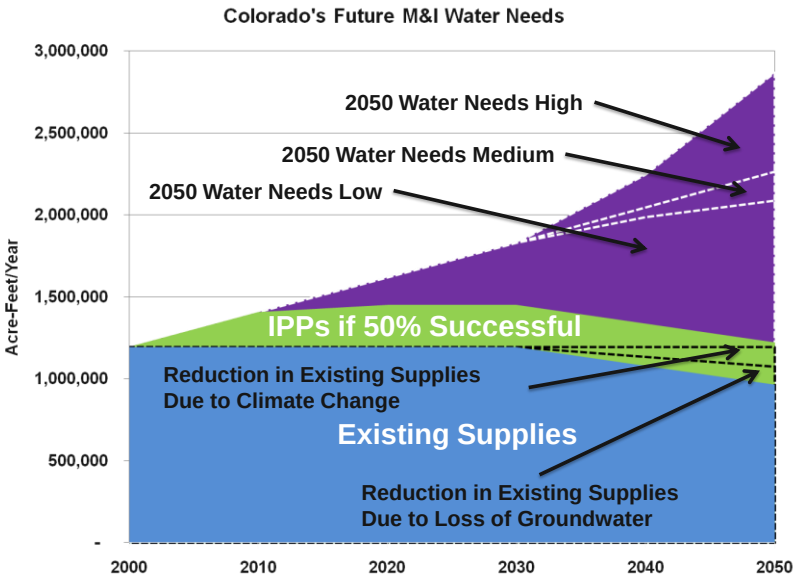
Examples of West Slope IPPs include:

- Wolcott Reservoir – 25,000 AF
- Upper Yampa Water Conservancy District Stagecoach Reservoir Enlargement – 1,000 AF
- Upper Gunnison River Water Conservancy District and Hinsdale County Commissioners Lake San Cristobal water development – 950 AF

There are several IPPs in the South Platte Basin and Denver Metro area that are currently in the National Environmental Policy Act (NEPA) process and could yield an average totaling about 113,000 AF. These projects include:

- Moffat Collection System Improvement – 18,000 AF
- Windy Gap Firming – 30,000 AF

- Northern Integrated Supply Project (NISP) – 40,000 AF
- Halligan-Seaman Reservoir Enlargements – 17,000 AF
- Chatfield Reservoir Storage Reallocation – 8,000 AF



Identified Projects and Processes Barriers and Next Steps

A significant portion of Colorado's future M&I water needs will hopefully be met with the implementation of the IPPs that the local water providers are currently pursuing. However, the IPPs have faced significant hurdles; the reasons for some of these hurdles were identified by the IBCC, Basin Roundtables, and interviewed water providers. These are summarized below, including potential next steps:

- Providers should work with the state and get help to support regional and multiuse projects
  - Pursue collaboration with Department of Natural Resources (DNR)/CWCB and the federal permitting entities to establish basic guidelines around demand calculations, conservation, hydrology modeling, cumulative impacts, alternatives, and/or reliability.
  - Continue DNR/CWCB meeting with the U.S. Army Corps of Engineers (USACE), the U.S. Environmental Protection Agency (EPA), and others to help permitting entities understand the issues Colorado faces and help CWCB/DNR understand permitting issues that could be better handled up front. Work to educate providers on these topics.
  - Address permitting disincentives that inadvertently drive agricultural dryup.

- Some believe the IPPs lack a regional perspective, lack integration
  - Many IPPs contain regional cooperation and integration among providers. Also, many are coordinating NEPA processes so cumulative impacts and joint mitigation can be analyzed.
  - However, it appears that permitting can be more easily accomplished without including multiple partners, thus creating a strong disincentive for regional

cooperation and multipurpose projects. Future work should explore with the permitting entities if there are ways to incentivize multipurpose projects and regional cooperation.
  - Encourage better integration so that local entities can better gage the impact of multiple projects affecting one area.
  - Encourage providers to use an Integrated Resource Planning (IRP) approach to comprehensively address water planning.

- The State needs to get behind the IPPs
  - The CWCB could support IPPs through general or project specific resolutions.
  - CWCB should continue to submit comments on IPPs in the permitting process describing the role of IPPs in meeting Colorado's future water needs
  - Continue to provide financial support to water providers (loans and grants).
  - Provide better data concerning IPPs via provider surveys and BNDSS

- There are cultural roadblocks to any new water supply development
  - Conduct educational efforts for both the public and decisionmakers/elected officials on the future needs within each basin and the state and the potential solutions.
  - Continue to bring multiple stakeholders together to solve problems within the basin.
  - Have additional meetings between Basin Roundtables to discuss IPPs that cross basins.

- Collaborative process missing, need to start the public process earlier than in NEPA
  - Much of the upfront planning and analysis is not included in NEPA, and the public is misinformed about the large number of alternatives that were considered prior to the NEPA process. Encourage providers to address the public and various stakeholders early in the process and to fully document all alternatives considered prior to entering the permitting process.
  - Use this involvement to lead to multi-use benefits being built into the projects from the initial design forward.

- Permitting is becoming overly complicated and time consuming
  - Continue providing nonbiased technical material that can be used as a starting point for small providers.
  - Explore the possibility of developing regional permitting for small enlargements, maintenance, and improvements of existing reservoirs where the national permit does not apply.

Agricultural Transfer Strategy

Agricultural transfer strategies have been developed in the CWCB Strategies Report for both the Arkansas and South Platte Basins. The following represent specific feedback regarding these strategies from the IBCC and Basin Roundtables.

General Observations

- Alternatives to permanent dry-up should be pursued (including rotational fallowing and long-term leases)
- Energy—pumping and treatment need alternative sources of energy (e.g., wind, etc.)
- Need to address water quality issues with reverse osmosis (RO) or zero liquid discharge (ZLD)
- RO brine and permitting issues—need methods to deal with the waste stream
- Must include protection for smaller entities
- Protect environmental values and consider ways to include environmental enhancements
  - Maintain water fowl habitats and wetlands
  - Maintain stream flows in fisheries
  - Include resources for vegetative management (land re-seeding) and protection for the local environment
- Focus on lower producing lands
- Cooperative effort—multiple stakeholders
- Permanency of supply—lease terms must be specified
- Maintain rural economies and address local economic issues
  - Protect existing tax revenue and rural economies
  - Diversification of economy
  - Diversify crops
- Assure receivers have mandatory water conservation (M&I/agriculture)
- Maintain return flows and groundwater levels
- Storage for management/firming

Arkansas Pumpback

- Build on Super Ditch concept for alternative agricultural transfers
- Concept should provide augmentation water for remaining agriculture in the lower Arkansas
- Supplement with Tamarisk removal
- Integrate with Southern Delivery System and other existing infrastructure

South Platte Pumpback

- Include local storage for agricultural use
  - Firm up lower river supplies and senior rights
  - Augmentation
  - Aquifer Storage and Recovery (ASR)
- Endangered Species Act (ESA) compliance must be maintained (three state agreement – Colorado, Nebraska, Wyoming)
- Concept should not include tributaries

Alternative Agricultural Transfers

Rotational fallowing, interruptible supply, water bank, purchase and lease back, deficit irrigation and changing crop type are the types of options that are available as alternatives to permanent agricultural transfers. With the exception of purchase and lease back, these alternative agricultural transfer methods (ATMs) are just beginning to be explored as viable options for meeting M&I water demands. While promising, there are technical, legal and institutional, and financial issues associated with ATMs. CWCB and others are currently exploring ways to address these issues

The CWCB has established a grant program to facilitate these alternative water transfer methods. To date, the CWCB has granted $1.5 million to six projects to further explore these methods and help address the challenges to their implementation. The challenges facing the implementation of ATMs and which grant projects are addressing those issues are summarized in Table 1.

Table 1. Alternative Agricultural Transfer Issues

	Parker Water & Sanitation District/Colorado State University	Colorado Corn Growers Association/ Ducks Unlimited/ City of Aurora	Lower Arkansas Valley Water Conservancy District/Super Ditch	Farmers Reservoir & Irrigation Company	Colorado State University Extension Office	High Line Canal Company
Technical Issues						
Suitable irrigated lands (i.e., having adequate water yield, water quality/soil suitability)	X	X	X	X	X	X
Infrastructure requirements compared to traditional agricultural transfers	X	X	X	X		X
Impact of geography on alternative transfer viability (e.g., stateline vs. upstream water right)	X	X	X	X	X	X
Water quality impacts (e.g., effects of reduced river flows due to agricultural transfers on total maximum daily loads [TMDLs], salinity, etc.)	X	X	X		X	X
Legal and Institutional Issues						
Administrative/Verification	X	X	X	X		X
Legislative or regulatory changes necessary to facilitate implementation of alternative agricultural transfer program	X	X	X	X		
Water Court process related to program approach and implementation (i.e., Water Court test case)	X	X	X	X		X
Program administration (i.e., by end user, governmental agency, agricultural water rights owners, or ditch and reservoir companies)	X	X	X	X	X	X
Likelihood of success if agricultural user is not required to bind the land and water to irrigation (short term protection of agriculture)	X	X	X	X		
Program conditions necessary to ensure that private property rights are not impaired (how will a leasing program effect value of other water rights)	X	X	X	X		

Through these ATM grant projects, the CWCB and others have identified numerous hurdles that must be overcome for these alternative water transfer methods to be successful in Colorado. The major hurdles facing the implementation of ATM programs in Colorado include:

1. High transaction costs.
2. Ability to transfer a portion of a water right.
3. Certainty of long-term supplies.
4. Water rights administration.

These hurdles and potential next steps are described below.

High Transaction Cost

Establishing a viable marketplace without an expensive Water Court process has been raised by some as a needed incentive to encourage participation in ATM programs. A potential barrier to a more active water market is that water rights change cases can entail high engineering and legal expenses. Reducing transaction costs and providing for impartial oversight by Division of Water Resources (DWR) staff could be incentives for alternative agricultural transfer programs to succeed. Below are a few concepts geared towards reducing the transaction costs associated with water transfers.

Presumptive Consumptive Use

The adoption of presumptive historical crop consumptive use (CU) procedures could streamline the process. This would reduce the time and effort needed to perform a detailed engineering study often done for a permanent agricultural water transfer application. If a presumptive CU analysis procedure could be established by statute or regulation, then cost of the engineering could be reduced.

Ditch-Wide Analysis

Determining historical CU analysis for a canal or ditch system could also streamline the process and provide general information on the worth of a water right. This would allow the irrigators and cities some additional certainty before negotiating leasing agreements. There have been examples of successful ditch wide historical CU analyses that the Water Courts have approved that allow a determination of the yield of a share of the water right that can be used for future change cases as other shares are purchased and the use changed to a new use. This can significantly reduce the engineering costs for a change-in-use application especially for either a rotational fallowing program or even a permanent dry-up application for a portion of a canal system.

Transferring a Portion of a Water Right

Many of the ATM programs being pursued in Colorado are examining the potential of transferring for M&I purpose a portion of the CU of a water right through deficit irrigation, different crop types, and/or irrigation scheduling. While the transfer of this water is possible under Colorado water law, it has not yet been tested in Water Court or codified by the Legislature. This increases the uncertainty associated with ATM programs.

It may be helpful recognize the ability to transfer a part of the CU of a water right and to provide clarification to the Water Courts when doing so. This could be accomplished through legislation and/or DWR rule making.

Certainty of Long Term Supply

Another issue often raised is the need to reduce the uncertainty for water users so they are willing to participate in an alternative agricultural transfer program. Reducing the transactional costs as discussed above could provide some encouragement for those programs that rely on individual farmer's participation.

Water Rights Administration

Alternative agricultural transfer methods may require significant work by the Division Engineers' Offices and the water commissioners to properly administer an alternative program as compared to a permanent dry-up of irrigated agricultural lands. The water users expect that the DWR will provide the impartial oversight needed to verify an irrigator is not expanding his water right or that other water right holders are not injured.

A Potential "To-Do List" for Discussion

A potential "To-Do List" for reducing transaction costs associated with alternative agricultural transfer methods could include:

- The adoption of presumptive historical crop CU procedures
- Determining historical CU analysis for a canal or ditch system
- Explore legislation and/or DWR rule making that would recognize the ability to transfer a part of the CU of a water right and to provide clarification to the Water Courts when doing so

Conservation Strategy

This strategy is currently under development by the Colorado Water Conservation Board (CWCB) Conservation section. However some general comments on conservation levels in the portfolio tool have been discussed by the IBCC and Basin Roundtables. These include:

- Providers will need to rely on wide mix of conservation practices to reach these levels. These include:
  - Leak detection
  - Water Rates and Incentives (tax incentives, rebates, rate structures, economic development incentives, cash for grass)
  - Education and Technology (customer usage information, leak detection, public education, dry cooling technology)
  - Land use regulations (yard turf size limitations, public space turf allocation, turf following, landscape codes, treat new development differently to reach 30 percent)
- Water planning elements will need to be included to make this a viable strategy
  - Factor in demand hardening effects
  - Use saved water to increase supply reliability, environment climate change
  - Use interruptible agricultural supply contracts to address demand hardening
  - More efficient use of total supplies
- Statewide/regional efforts will be needed
  - Smaller utilities conservation assistance
  - Identify impacts on agriculture
  - Adopt uniform conservation goals east and west slope
  - Close loopholes allowing development with inadequate water supplies
  - Establish statewide efficiency reporting requirements
- Growth, land use, and water supply—Need to examine how Colorado grows as a way to reduce water needs

Conservation Next Steps for Discussion:

- Update state-based plumbing codes
- Consider unified standards for new developments
  - Closer integration of land use planning and water supply planning
  - Sub-metering multifamily units
  - Increased use of xeriscaping and/or turf limitations
- Encourage the use of block rate structures and water budgets
- Encourage dual metering for indoor and outdoor
- Consider a benchmark for indoor single-family residential water use
- Gather additional data on conservation impacts to landscapes
- Conduct studies on the certainty/permanency of savings since 2002
- Cultural roadblocks to conservation exist
  - Encourage a state-wide water conservation messaging campaign
- Conservation ethics should be statewide but it does not have to be a one size fits all
  - Facilitate roundtable conversations once more technical resources are available

Current CWCB Water Conservation Research Projects

Currently there are several conservation projects underway within the CWCB. These include:

- **Colorado Statewide Water Conservation Best Practices Guidebook** –The guidebook will assist urban water providers with the selection and implementation of effective water conservation programs and measures. A Project Advisory Committee and stakeholder group, consisting of water professionals and water conservation experts from around the state, was formed to guide the process and review the technical aspects of the project. Over the past few months, a list of best practices has been selected for inclusion and the guidebook is being written at present time. The guidebook is scheduled for completion in 2010.

- **SWSI Water Conservation Level Analysis** – The purpose of this project is three-fold; first, to determine what level of water conservation Colorado water utilities have presently achieved; second, to reassess the classification used in SWSI I (levels 1-5) and the conservation measures within each category; and third, to reassess the passive conservation savings used in SWSI I. The reported levels must be analyzed for validity in order to ensure the best water conservation baseline data is incorporated into the Colorado statewide water supply planning initiative. The CWCB is working with a consultant to analyze the results of the 2004 and 2007 Drought and Water Supply Assessment (DWSA) surveys, the SWSI I and SWSI II reports, and relevant CWCB approved water conservation plans. By examining these varied data sets spanning the last 5 years, the CWCB will gain insight into current water conservation efforts of participating utilities, the consistency of and the discrepancies between self-reported conservation efforts and whether or not the conservation levels should be refined to strengthen the usefulness of this conservation assessment tool.

- **SWSI Update-Water Conservation Section** – The purpose of this task is to update the conservation section of the Statewide Water Supply Initiative (SWSI) report for 2010**.** The CWCB staff will work with consultants to write the conservation section of the 2010 SWSI update, analyze and update the projected conservation savings and penetration rates from SWSI II, resulting in a revised matrix of potential savings. This new information will be used to develop conservation strategies for meeting the water supply gap to 2050. The update will integrate past CWCB water conservation work products, as well as the 2050 Demands report, the *Best Practices Guide for Water Conservation in Colorado* from Colorado WaterWise, and the *SWSI Conservation Level Analysis.*

- **Water Conservation Permanency and Penetration Rate Feasibility Study –** The purpose of this project is to assess the feasibility of future research into the permanency and penetration rates of past and current water conservation savings and measures. This project will also seek to develop partnerships with Colorado urban water providers who may inform the feasibility of this study through data sharing. Through this reconnaissance level study, the CWCB will be able to assess what challenges and opportunities exist at the provider level in order to carry out future water conservation savings permanency and penetration rates research. Ultimately this future research will define what the water conservation potential is out to 2050.

Nonconsumptive Strategy

The goal of the nonconsumptive needs assessment (NCNA) is to provide an objective, science-based set of evaluation tools for the Basin Roundtables and other stakeholders to utilize in making informed decisions about future water supply management. Science-based evaluation tools will facilitate analyses of ways to maintain or enhance the environmental and/or recreational values associated with rivers, reservoirs, and lakes while developing water supplies to meet current and future domestic, municipal, commercial, industrial, and agricultural water supply needs. In fulfillment of this goal, the process will seek to identify both non-flow aspects (i.e., habitat, geomorphology, public access, etc.) and the minimum flows needed to achieve the resource management objectives.

This set of tools and the utilization of a scientifically-based approach are consistent with the responsibilities of the basin roundtables as described in the Colorado Water for the 21st Century Act, which calls for the development of basin-wide consumptive and nonconsumptive water supply needs assessments.[1]

This set of tools is intended to be used by the Basin Roundtables to make informed, collaborative decisions about water supply management. These tools adhere to the goals of the permanent Basin Roundtables: "to facilitate continued discussions within and between basins on water management issues, and to encourage locally driven collaborative solutions to water supply challenges."

The NCNA is not self-implementing, and it sets no binding or regulatory standards. This assessment will require the initiative of the Basin Roundtables to apply these tools and this scientifically-based approach within their basins and to coordinate with other affected Basin Roundtables, communities, water providers, and stakeholders; for example—to set water management goals for specific rivers and streams, to make collaborative decisions about how to achieve on-the-ground outcomes, or to determine how to develop new water supplies in a way that sustains environmental and recreational values.

The Basin Roundtables shall actively seek the input and advice of affected local governments, water providers and other interested persons in establishing its NCNA.[2] Specifically, the development of the NCNA must include coordination with those entities that rely on existing and future water to meet their needs.

The information and tools developed through the NCNA can and should be used in a collaborative manner, through the Interbasin Compact process, to the benefit of all interested parties. The NCNA is intended to provide a framework for informed dialogue and a basis for new and innovative solutions to our water supply management challenges, both consumptive and non-consumptive. The information and tools developed through the NCNA shall not be used to impair or diminish existing water rights, absolute or conditional and shall not impair Colorado's

[1] 37-75-104 (2)(c). Using data and information from the Statewide Water Supply Initiative and other appropriate sources and in cooperation with the on-going Statewide Water Supply Initiative, develop a basin-wide consumptive and nonconsumptive water supply needs assessment, conduct an analysis of available unappropriated waters within the basin, and propose projects or methods, both structural and nonstructural, for meeting those needs and utilizing those unappropriated waters where appropriate. Basin Roundtables shall actively seek the input and advice of affected local governments, water providers, and other interested stakeholders and persons in establishing its needs assessment, and shall propose projects or methods for meeting those needs. Recommendations from this assessment shall be forwarded to the Interbasin Compact Committee and other basin roundtables for analysis and consideration after the General Assembly has approved the Interbasin Compact Charter.

[2] id

ability to develop its compact entitled waters.[3] The NCNA shall be completed in a manner that promotes maximum utilization (consumptive and nonconsumptive) of the state's water resources.

Nonconsumptive Needs Assessment (NCNA) Phase 1

Phase 1 of the nonconsumptive needs assessment process focused on the following:

- Expanding upon the existing set of environmental and recreational attribute maps that were developed through SWSI Phase 2;
- Identify where environmental and recreational attributes are located in the basins through mapping processes conducted for each Basin Roundtable; and
- Developing quantification tools that can be used at the direction of Basin Roundtables in Phase 2 of their NCNAs

NCNA Phase 1 resulted in nonconsumptive focus maps for each Basin Roundtable and piloting of a Watershed Flow Evaluation Tool on Fountain Creek and Roaring Fork watersheds. The NCNA Phase 1 maps are intended to:

- Serve as a useful guide for water supply planning so that future conflicts over environmental and recreational needs can be minimized
- Assist in identifying where environmental and recreational water needs are being met, and where additional study or implementation of nonconsumptive projects are needed
- Provide opportunities for collaborative efforts for future multi-objective projects

Nonconsumptive Needs Assessment Phase 2 Framework

Phase 2 is identifying existing and planned project and methods for meeting nonconsumptive needs by working with entities ranging from the U.S. Forest Service (USFS) to local watershed groups. Doing so will identify where local entities are working on meeting nonconsumptive needs in the roundtable identified focus areas. The final step is to work with the roundtables and IBCC to determine if projects and methods are needed to address nonconsumptive needs in those "gap" areas around the following:

- Tier one: Prevent federal listing of species or further federal action on listed species
- Tier two: Protecting/enhancing economic values to local and statewide economies
- Tier three: Win/win projects that benefit both water users and native species (esp. those listed as species of concern or with imperiled state or global concern by CNHP and/or CDOW)

[3] 37-75-102. Water rights - protections. (1) It is the policy of the General Assembly that the current system of allocating water within Colorado shall not be superseded, abrogated, or otherwise impaired by this article. Nothing in this article shall be interpreted to repeal or in any manner amend the existing water rights adjudication system. The General Assembly affirms the state constitution's recognition of water rights as a private usufructuary property right, and this article is not intended to restrict the ability of the holder of a water right to use or to dispose of that water right in any manner permitted under Colorado law. (2) The General Assembly affirms the protections for contractual and property rights recognized by the contract and takings protections under the state constitution and related statutes. This article shall not be implemented in any way that would diminish, impair, or cause injury to any property or contractual right created by intergovernmental agreements, contracts, stipulations among parties to water cases, terms and conditions in water decrees, or any other similar document related to the allocation or use of water. This article shall not be construed to supersede, abrogate, or cause injury to vested water rights or decreed conditional water rights. The General Assembly affirms that this article does not impair, limit, or otherwise affect the rights of persons or entities to enter into agreements, contracts, or memoranda of understanding with other persons or entities relating to the appropriation, movement, or use of water under other provisions of law.

Nonconsumptive Needs Related to Portfolios to Meet Colorado's Future M&I Needs

At the April 22, 2010 IBCC meeting, the Nonconsumptive Break Out Group discussed the following questions and provided the following feedback.

What do you have? What do you need? What are you willing to give up to get what you need?

- Not all environments are created equal—there is recognition that not all places can be protected and that prioritization is necessary
- Need to identify future issues by considering future consumptive and nonconsumptive needs together. This will further clarify where "gaps" are across the state.
- Meeting environmental needs in the future will require willingness and funding.
- Need to avoid future endangered species listings.
- Connectivity of stream networks are important and should see opportunities for improving habitat.
- Principles for multi-purpose project needed.
- Adaptive management will continue to be important.
- Overlap of nonconsumptive and consumptive uses could show potential for collaborative projects.
- If the IPPs aren't successful we can't have meaningful dialogue about NCNA or New Supply Development.

What infrastructure is necessary in meeting nonconsumptive needs?

- Public lands are certainly under less risk.
- Need to look at all scales of infrastructure (i.e. fish ladder may be ineffective due to other stream problems).
- Need to look at big picture of habitat with regards to where development/projects make sense.
- Good to have prioritization at statewide level, which may even help federal decisions and priorities.
- Nonconsumptive issues take decades to address – need long term funding and commitment.
- Sustainable funding is important and mutually beneficial to all. No one wants to be stuck with bill. Public benefits enjoyed by all. Examples: ditch improvements to help fish and boat passage. New irrigation gates (rubicon) to improve diversion accuracy. There are alternative processes to avoid species listing issues, for example work completed in the Rio Grande with counties.

How can the nonconsumptive maps generated by the BRTs be used to guide implementation of portfolios and strategies?

- Project design is critical to minimize conflict.
- Maps should help identify conflicts and bring in stakeholders earlier.
- The best mitigation is to avoid conflicts to begin with.

Additional Nonconsumptive Next Steps for Discussion

- Identify gap areas by attribute
- Target funding towards the gap areas, including consideration of the tiers (this should include both existing programs and any future impact fee)

- Continue to provide technical support identifying areas with important nonconsumptive attributes, what projects and methods exist or are planned to assist those attributes, and where there are opportunities to address the remaining gap areas
- Consider adding the protection/mitigation/enhancement of these tiers to any guidelines for future projects
- Examine Colorado Natural Heritage Program's criteria for how much of a specific attribute should be protected and work to ensure sufficient habitat is available and has enough connectivity for such species

New Supply Development Strategy

New Supply Development is outlined in the CWCB Strategies Report. The following represent IBCC and Basin Roundtable comments on new supply development, especially as it relates to transfers between divisions.

Potential Guiding Principles

These general points could be crafted into guiding principles for any additional transbasin diversions between divisions.

- West Slope will need to see direct benefits from the project
- Front Range entities will need to prove extensive demand management. This could include:
  - Existence of a water conservation program approved by CWCB as being in compliance
  - Front Range entities will need a conservation program designed to achieve a high level of conservation compared to average gallons per capita per day (gpcd) use
- Plans to fully reuse transferred water (including funds or existing infrastructure)
- Assurances that west slopes growth and needs can be met
- Allowances for West Slope basins to be allowed to develop at their own pace
- West Slope also needs certainty that any additional large transbasin diversion will be the last
- Recognition that the state as a whole has a vested interest in avoiding a compact call and any project needs minimize the risk of a compact call
- Plans not to have a major impact on Colorado's carbon footprint
- Ways to limit West Slope agriculture from being a target for dry up
- Ensure that the project does not lead to further federal action on federally threatened or endangered species or the listing of additional species We need an example multi-use
- Strong environmental/recreational protections including mitigation and/or enhancements for the environment and recreational-based economies
- Support for significant storage in the future on east and west slope
- Capacity to timely receive all necessary federal, state, and local permits and approvals
- Financial feasibility
- Physical and legal water availability
- Project viability in light of social/economic/political factors
- Reliable and sustainable project yield
- Considerations for providing relief to communities in the headwaters

Other Comments and Observations

Mentioned Potential Solutions

- A diversion low in the system could provide headwaters relief
- Renewable energy for pumping
- Limitations to the amount of water from this project to address concerns regarding water availability, the ability for the West Slope to develop at its own pace, and the need to limit targets on West Slope agriculture dry up
- Inclusion of some sort of a development fund to be utilized to address socio-economic and/or environmental impacts and opportunities on the West Slope

- State contract from Blue Mesa for 200,000 AF to act as insurance against compact curtailment
- Availability of long-term financing

New Supply projects need to pass the following criteria:

1. Is the project capable of timely receiving all necessary federal, state, and local permits/approvals?
2. Is the project financially feasible for known project proponents?
3. Is the water physically and legally available to the known project proponents?
4. Is the project viable in light of social/economic/political factors?
5. Is the project yield reliable and sustainable?

Project Specific Comments and Observations (Provided by Basin Roundtables)

Green Mountain Pumpback

- More storage for compensatory uses
  - Wolcott – West Slope
  - Williams Fork reoperations
  - Phased approach
- Nonconsumptive uses
  - Fish
  - Recreation
  - Protect flows below Kremmling
- Address Heeney
- Uses infrastructure in place
- Administration and institutions issues
- Use in conjunction with other strategies statewide
- Fully conservable users (M&I/ag)
- Not just a Denver Water project

Flaming Gorge

- Interstate cooperation: Colorado and Wyoming working together to develop Colorado River allocation
- Put in the public forum not for profit or speculation
- Federal state project utilizing CRSP Fund
- Protect endangered species flow on the Green River
- Multiple Use Project
  - Upper Green River use
  - Involve Wyoming municipalities
  - Front Range municipalities
  - Return flows for agriculture or second use
  - Colorado River Basin exchange through existing systems
  - Consumptive and nonconsumptive
  - Recreation—terminal storage reservoir
  - Environmental flows for South Platte
  - Secure recreation and headwaters flows in headwaters to the extent of exchange potential
- Size—Look at maximum size considering compact entitlement and supply availability

Yampa Pumpback

- Yampa Basin steeped in environmental/recreational interests
- Yampa wants compensation in many ways—Yampa Basin wants some benefits from this concept for their basin—environment, recreation, help meet demands from oil shale
- Multiple stakeholders needed to finance (federal involvement, Dinosaur National Monument)
- Water must be accessible for agricultural use
  - Overall cost to municipality must be cheaper than buy and dry
- Recreational flows—flushing flows
- Limit timing of diversion (during high flow times)
- Facilitate conditional water rights in that basin to be perfected, stored, and conveyed within the basin
- Work through Colorado River Compact to assure Yampa Basin that right with Yampa project would be called out first
- Project beneficiaries closely work with Yampa Basin show commitment through tax proceeds—address this in potential operations
  - Maybe build a larger west slope reservoir (600 KAF instead of 500 KAF) to protect environmental and recreational needs in times of shortage/drought
  - Yield for increased irrigation for Yampa Basin

Blue Mesa Pumpback

There has been no specific feedback on Blue Mesa Pumpback from IBCC or Basin Roundtable since it was not available until June 2010. It has been suggested that Blue Mesa Reservoir should be used to ensure compact compliance by the State of Colorado and also to meet obligations associated with the Black Canyon.

General Strawman Multi-Purpose Project for IBCC Discussions

(For Brainstorming Purposes Only – Not a proposal)

This memo outlines potential elements of a multi-purpose project.[4] At the April 22, 2010 IBCC meeting, the New Supply Development Break Out Group asked for staff to bring them an example or "strawman" multi-purpose project. They requested this so they would have a "target" to help stimulate and focus their discussions.

Elements of a multi-purpose project will vary depending upon the configuration of the project. The IBCC has been considering six concepts that could form the basis of a multi-purpose project including:

- Lower South Platte agricultural transfer concept
- Lower Arkansas agricultural transfer concept
- Green Mountain Pumpback
- Flaming Gorge Pipeline
- Yampa River Pumpback
- Blue Mesa Multipurpose Project – this concept could be a direct diversion from Blue Mesa Reservoir or pairing the use of the Aspinal Unit with another concept

Describing the elements of a multi-purpose project involves outlining the:

- Project Description
- Overall Benefits of the Project
- Challenges/Issues/Costs of the Project
- Potential Area of Origin Compensation
- Statewide Policy Objectives
- Compact Compliance Strategies
- Financing and Governance

These elements are outlined in general terms below for a new water supply development multi-purpose project. Additional specificity would require outlining a specific example.

[4] Several sources were used to compile this memo including:

- Prior "Basin of Origin" bills – between 1988 and 2000 the Colorado General Assembly looked at 16 out of basin transfer proposals. Some were compensation/mitigation approaches, some focused on additional requirements before diversion, and two required voter authorization. Most applied to transfers from one basin to another; two applied to transfers across jurisdictional boundaries.
- Reports from the Colorado Water Resources Research Institute on area-of-origin compensation
- SWSI Phase II Section 5 (Addressing the Water Supply Gap)
- Discussions between the Yampa/White Roundtable and South Platte Roundtable on the proposed Yampa Pumpback Project
- Discussions on the evaluation of water supply strategies with the CWCB, IBCC, Front Range Water Council, Colorado River District, Basin Roundtables, and others.

Elements of a General Multi-Purpose Project

Project Description:

This General New Water Supply Development Strawman Multi-Purpose Project contains several major components:

1. **Transbasin Diversion:** The source of water for the project would be an increment of approximately 150,000 AFY transferred from the west slope to the east slope. It would be transferred through new infrastructure and would be diverted lower in the system to provide headwaters relief.

2. **Compact Compliance Contract:** The State could contract with BOR for an equivalent amount of storage in one of the CRSP reservoirs. This water would be tagged as Colorado water and used as an insurance policy against a potential lower-basin call. Depending on the location of this contract water (Blue Mesa, Flaming Gorge, or Lake Powell) it could potentially be used for other uses such as in-basin uses and environmental flows to meet nonconsumptive needs identified by the basin roundtables.

3. **West Slope Water Bank for pre-1922 Water Rights:** This multi-purpose project could include a west slope water bank to protect critical uses in the event of a "compact call." The purpose of the Water Bank would be to provide a means for pre-compact water rights to be used to allow critical post-compact water rights to continue to divert rather than be curtailed in the event the Upper Division states deplete the 10-year running average flow at Lee Ferry, AZ below 75 MAF. The concept of the Water Bank is twofold: 1) temporarily dry up of irrigated land during a Compact curtailment then return to irrigation afterwards to minimize disruptions to the west slope's agricultural economic; and 2) develop the Water Bank before there is a curtailment to avoid a crisis.

4. **Operational Limitations, Conjunctive Use and ASR:** Diversion of water from the west slope could be tied to levels in Lake Powell to avoid triggering a "compact call." Because populations and economies would be dependent upon this water supply, mechanisms would need to be in place to manage these shortages. These could include diverting a larger amount of water in wet years for front range ASR (aquifer Storage and recovery). It could also include conjunctive use with the Denver Basin Aquifer.

5. **Headwater Enhancements:** Exchanges with current transbasin diverters for additional flows in Colorado headwaters (Grand County Streamflow Management Plan; Blue River Flow enhancement)

Overall Benefits of the Project

- Front-range municipalities get 150,000 acre feet of high quality firm yield reusable water.
- New water supply development minimize loss of irrigate acres in South Platte and Arkansas Basins. Transfers of east slope agricultural would no longer be the dominate strategy for meeting front-range water needs. East slope agriculture could participate in the project and receive additional yields (either directly or through "second use" of fully consumable return flows).
- Acceptable water quality that may not require advanced water treatment.

- Allows development of new water supplies and utilization of Colorado's compact entitlements while protecting recreation and environmental flows on the west slope, particularly in the headwaters.
- Depending upon the location of the diversion it could diversify the state's M&I water supplies. The CRWAS indicates that climate change impacts are less sever in northern basins such as the Yampa or Green. Adding a more northerly water supply, or a basin other than the Colorado mainstem, would diversify the state's M&I water supply and could mitigate potential risks from climate change.

Challenge/Issues/Costs of the Project

- Components of the project may need to be changed (or other components added) if Colorado is in a low supply scenario. The low supply scenario does not mean "do nothing," rather it means more reallocation and less new water development. There could be common elements between this multi-purpose project and one developed for the low supply scenario.
- Potential endangered fish and depletion issues downstream of the diversion would need to be analyzed
- Would require enlargement or construction of additional storage in the South Platte or Arkansas basins. This storage could be surface water storage or underground storage.
- Large energy requirements although some renewable energy may be available and it may require less energy than the other concepts.
- Complexities of water right administration in the event of a compact call.

Potential Area of Origin Compensation

At the April 22, 2010 New Water Supply Break Out group, west slope representatives indicated that they would need several commitments before being supportive of this type of multi-purpose project. These included:

- Continued viability of the west slope's regional economy
- Certainty – ensure an increment of water is available for development in each basin
- Front-Range commitment to conservation and reuse

These elements could be met through a combination of water related benefits for the west slope sub-basins and/or socio-economic compensation.

Water Related Benefits for West Slope Sub-basins

Even though the diversion may not occur directly in each basin, different elements could be included to distribute statewide benefits, ensure continued viability of the west slope's economy, and provide certainty.

- Yampa/White
  - Infrastructure for irrigation of additional acres in Moffat County (20,000-30,000 acres of land could be irrigated)
  - Water for future municipal development particularly in Steamboat and Craig. Upper basin interests have previously secured 60,000 AF subordinations to protect future uses and they have indicated they would want a similar subordination or component of the project.

- Colorado
  - Exchanges with current transbasin diverters for additional flows in Colorado headwaters (Grand County Streamflow Management Plan; Blue River Flow enhancement)
  - Maintain Dillon Reservoir Levels
  - Wolcott Reservoir for future west slope water demands, additional yield to the Grand Valley, some or all of the 10,825 AF obligation to the 15 mile reach
  - Potential abandonment of Eagle River Rights

- Gunnison
  - Agricultural firming projects in the upper basin (Tomichi Creek, etc.) to help with current agricultural shortages
  - Water quality improvements in the Uncompahgre River and Lower Gunnison (salinium)

- Southwest
  - Financial assistance with several of their identified projects and processes

Socio-Economic Compensation (Development Fund)

Generally, the most useful form of compensation would be unrestricted monetary compensation to be used by the west slope to compensate unprotected parties and for whatever other purposes its citizenry prefers. Rather than committing to specific projects, a development fund could be established. The money from this fund would be available to provide assistance for future water needs (see above) or other economic development on the west slope.

The fund could be financed by a charge placed on users of the multi-purpose project water (perhaps indexed to the current price of water in the South Platte Basin). The fund would be held by the state (CWCB) or potentially the Colorado River Water Conservation District. Expenditures would be made against the fund for projects proposed by municipalities, conservancy districts, and other public entities on the west slope. Appropriate expenditures could be water related[5]. Appropriate expenditures could also include economic development projects similar to DOLA's severance tax grant program.

Statewide Policy Objectives

- Safe reliable drinking water supply for Colorado citizens
- Land use and density patterns – the project can be configured to require or encourage certain lot sizes, density patters, and/or landscaping
- Conservation – the project can be configured to require or encourage different conservation measures
- Reuse – the project can be configured for maximum utilization of fully consumable water either through M&I reuse or "second use" by east slope agriculture
- Maximum utilization of the state's Colorado River Compact entitlements
- Environmental and recreational enhancements

[5] New storage projects, repair, and rehabilitation of existing water storage and delivery facilities, municipal water systems, improvement of irrigation systems, on-farm improvements resulting in greater efficiency, water based recreation facilities, securing instream flows, and other water-related projects.

Compact Compliance Strategies

- Tie diversions to levels in Lake Powell to avoid triggering a compact call
- Conjunctive use with non-tributary groundwater (Denver Basin)
- West slope water bank
- Potential use of CRSP reservoirs as a compact compliance pool

Financing and Governance

In addition to the configuration of the project, the other major outstanding questions relate to how the project would be financed, managed, and implemented. Four models could be further explored:

1. Federal/State partnership similar to the Central Arizona Project
2. State water project such as the California State Water Project
3. State/Local partnership where the state facilitates the project, but end users finance and manage it
4. Public/Private partnership similar to those used to build transportation projects (E-470)

Another potential funding mechanism is the enactment of a "water" mill levy to fund some of the components of the multi-purpose project.

- A two (2) mill property tax on the nine largest front-range counties will generate about $107 million/year. (Adams $9m; Arapahoe $15.2M; Boulder $11M; Denver $20.2M; Douglas $8.6; El Paso $11.6; Jefferson $14.4; Larimer $7.6M; Weld $9M). As a point of comparison most fire districts collect an 8+ mill. An additional two mills might incentivize linking land-use planning and water supply planning in the "Big 9."
- One (1) mill, or about $54 million/year could fund rural economic development. This could be done either through a Development Fund as described above or it could be divided between the west slope counties.[6]
- The other (1) mill or about $54 million/year could fund construction of the multi-purpose project.

[6] As a point of comparison, the 2009 General Fund Revenue for the following counties—Gunnison $10.388M; Montrose $10.1M; Logan $4.5M; Garfield $28M; Otero $1M (estimate)—approximate what this fund could generate.

Specific Strawman Multi-Purpose Project for IBCC Discussions

(For Brainstorming Purposes Only – Not a state proposal)

This strawman outlines potential elements of a multi-purpose project. [7] At the April 22, 2010 IBCC meeting the New Supply Development Break Out Group asked for staff to bring them an example or "strawman" multi-purpose project. They requested this so they would have a "target" to help stimulate and focus their discussions.

Elements of a multi-purpose project will vary depending upon the configuration of the project. The IBCC has been considering six concepts that could form the basis of a multi-purpose project including:

- Lower South Platte agricultural transfer concept
- Lower Arkansas agricultural transfer concept
- Green Mountain Pumpback
- Flaming Gorge Pipeline
- Yampa River Pumpback
- Blue Mesa Multipurpose Project – this concept could be a direct diversion from Blue Mesa Reservoir or pairing the use of the Aspinal Unit with another concept

Describing the elements of a multi-purpose project involves outlining the:

- Project Description
- Overall Benefits of the Project
- Challenges/Issues/Costs of the Project
- Potential Area of Origin Compensation
- Statewide Policy Objectives
- Compact Compliance Strategies
- Financing and Governance

Rather than outlining these elements in general terms, a specific example is used. The "strawman" example presented in this memo involves the Flaming Gorge Pipeline concept paired with the use of the Aspinal Unit for in-basin uses, environmental flows, and compact compliance. This example is used for illustrative purposes. If the project were based on one of the other concepts, many of these elements could remain the same; however, some would necessarily change.

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[7] Several sources were used to compile this memo including:

- Prior "Basin of Origin" bills – between 1988 and 2000 the Colorado General Assembly looked at 16 out of basin transfer proposals. Some were compensation/mitigation approaches, some focused on additional requirements before diversion, and two required voter authorization. Most applied to transfers from one basin to another; two applied to transfers across jurisdictional boundaries.
- Reports from the Colorado Water Resources Research Institute on area-of-origin compensation
- SWSI Phase II Section 5 (Addressing the Water Supply Gap)
- Discussions between the Yampa/White Roundtable and South Platte Roundtable on the proposed Yampa Pumpback Project
- Discussions on the evaluation of water supply strategies with the CWCB, IBCC, Front Range Water Council, Colorado River District, Basin Roundtables, and others.

Elements of a Flaming Gorge Pipeline Multi-Purpose Project

Project Description:

This Strawman multi-purpose project contains several major components:

1. Flaming Gorge Pipeline: The source of water for the project would be a contract with the Bureau of Reclamation (BOR) for yield from Flaming Gorge Reservoir or a new water appropriation in the amount of 150,000 to 250,000 AFY.[8] The water could be diverted from the Green River at several possible locations including: Flaming Gorge Reservoir, or directly from the river near Green River, WY.

   A 400-mile 7-8 foot diameter pipeline would convey this water to the Front Range. The most likely pipeline route would travel along Interstate 80 through Wyoming to Laramie, and then convey supplies south to municipalities on the Colorado Front-Range in the South Platte and Arkansas Basin. [check these figures to be consistent with Strategies report and costing]

2. Blue Mesa Contract: The State could contract with BOR for an equivalent amount of storage in Blue Mesa.[9] This water would be dedicated for in-basin uses, environmental flows, and compact compliance. [This description could be added to from any material Alex developed when this was being discussed]

3. West Slope Water Bank for pre-1922 Water Rights: [pull a brief description from other material]

4. Operational Limitations, Conjunctive Use and ASR: Diversion of water from Flaming Gorge could be tied to levels in Lake Powell to avoid triggering a "compact call." Because populations and economies would be dependent upon this water supply, mechanisms would need to be in place to manage these shortages. These could include diverting a larger amount of water in wet years for front range ASR (aquifer Storage and recovery). It could also include conjunctive use with the Denver Basin Aquifer.

5. Headwater Enhancements: Exchanges with current transbasin diverters for additional flows in Colorado headwaters (Grand County Streamflow Management Plan; Blue River Flow enhancement)

Overall Benefits of the Project

- Front-range municipalities get 150,000 to 250,000 acre feet of high quality firm yield reusable water.
- Minimize loss of irrigate acres in South Platte and Arkansas Basins. Transfers of east slope agricultural would no longer be the dominate strategy for meeting front-range water needs. East slope agriculture could participate in the project and receive additional yields (either directly or through "second use" of fully consumable return flows).

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[8] The Bureau of Reclamation estimates that 165,000 acre-feet of water per year is available for the next 40 years. This analysis "presumes that Wyoming, Colorado, and Utah will continue to develop their water supplies, continued compliance with the flow recommendations adopted in the 2006 Flaming Gorge Environmental Impact Statement and Record of Decision, and continued use of the active storage pool, which protects the power pool." See Bureau of Reclamation letter to the Upper Colorado River Commission, March 30, 2007.

[9] There could be as much as 250,000 af available for contracting out of the Aspinal Unit. This number will need to be recalculated based upon the Black Canyon settlement.

- Acceptable water quality that may not require advanced water treatment.
- Allows development of new water supplies and utilization of Colorado's compact entitlements while protecting recreation and environmental flows on the west slope.
- Diversifies the state's water supplies. The Green River watershed is north of the Colorado's current water supplies. The CRWAS indicates that climate change impacts are less severe in the North. Adding a more northerly water supply could mitigate potential risks from climate change.

Challenge/Issues/Costs of the Project

- Components of the project may need to be changed (or other components added) if Colorado is in a low supply scenario. The low supply scenario does not mean "do nothing," rather it means more reallocation and less new water development. There could be common elements between this multi-purpose project and one developed for the low supply scenario.
- Potential endangered fish and depletion issues downstream of Flaming Gorge on the Green and Colorado Rivers
- Would require enlargement or construction of additional storage in the South Platte or Arkansas basins. This storage could be surface water storage or underground storage.
- Large energy requirements although some renewable energy may be available and it may require less energy than the other concepts.
- Complexities of water right administration in the event of a compact call.

Potential Area of Origin Compensation

At the April 22, 2010 New Water Supply Break Out group, west slope representatives indicated that they would need several commitments before being supportive of this type of multi-purpose project. These included:

- Continued viability of the west slope's regional economy
- Certainty – ensure an increment of water is available for development in each basin
- Front-Range commitment to conservation and reuse

These elements could be met through a combination of water related benefits for the west slope sub-basins and/or socio-economic compensation.

Water related benefits for west slope sub-basins

Even though the diversion is not occurring in any of these basins, different elements could be included to distribute statewide benefits, ensure continued viability of the west slope's economy, and provide certainty.

- Yampa/White
  - Infrastructure for irrigation of additional acres in Moffat County (20,000-30,000 acres of land could be irrigated)
  - Water for future municipal development particularly in Steamboat and Craig. Upper basin interests have previously secured 60,000 a.f. subordinations to protect future uses and they have indicated they would want a similar subordination or component of the project.

- Colorado
  - Exchanges with current transbasin diverters for additional flows in Colorado headwaters (Grand County Streamflow Management Plan; Blue River Flow enhancement)
  - Maintain Dillon Reservoir Levels
  - Wolcott Reservoir for future west slope water demands, additional yield to the Grand Valley, some or all of the 10,825 af obligation to the 15 mile reach
  - Potential abandonment of Eagle River Rights
- Gunnison
  - Agricultural firming projects in the upper basin (Tomichi Creek, etc.)
  - Water quality improvements in the Uncompahgre River and Lower Gunnison (selenium)
- Southwest
  - Financial assistance with several of their identified projects and processes

Socio-Economic Compensation (Development Fund)

Generally, the most useful form of compensation would be unrestricted monetary compensation to be used by the west slope to compensate unprotected parties and for whatever other purposes its citizenry prefers. Rather than committing to specific projects, a development fund could be established. The money from this fund would be available to provide assistance for future water needs (see above), other economic development on the west slope, and for environmental concerns related to water development.

The fund could be financed by a charge placed on users of Flaming Gorge water (perhaps indexed to the current price of water in the South Platte Basin). The fund would be held by the state (CWCB) or potentially the Colorado River Water Conservation District. Expenditures would be made against the fund for projects proposed by municipalities, conservancy districts, and other public entities on the west slope. Appropriate expenditures could be water related [10]. Appropriate expenditures could also include economic development projects similar to DOLA's severance tax grant program.

Statewide Policy Objectives

- Safe reliable drinking water supply for Colorado citizens
- Land use and density patterns – the project can be configured to require or encourage certain lot sizes, density patters, and/or landscaping
- Conservation – the project can be configured to require or encourage different conservation measures
- Reuse – the project can be configured for maximum utilization of fully consumable water either through M&I reuse or "second use" by east slope agriculture
- Maximum utilization of the state's Colorado River Compact entitlements
- Environmental and recreational enhancements

[10] New storage projects, repair and rehabilitation of existing water storage and delivery facilities, municipal water systems, improvement of irrigation systems, on-farm improvements resulting in greater efficiency, water based recreation facilities, securing in-stream flows, and other water-related projects

Compact Compliance Strategies

- Tie diversions to levels in Lake Powell to avoid triggering a compact call
- Conjunctive use with non-tributary groundwater (Denver Basin)
- West slope water bank
- Aspinall Unit as compact compliance pool

Financing and Governance

In addition to the configuration of the project, the other major outstanding questions relate to how the project would be financed, managed and implemented. Four models could be further explored:

1. Federal/State partnership similar to the Central Arizona Project

2. State water project such as the California State Water Project

3. State/Local partnership where the state facilitates the project, but end users finance and manage it

4. Public/Private partnership similar to those used to build transportation projects (E-470)

Another potential funding mechanism is the enactment of a "water" mill levy to fund some of the components of the multi-purpose project.

- A two (2) mill property tax on the nine largest front-range counties will generate about $107 million/year. (Adams $9m; Arapahoe $15.2m; Boulder $11m; Denver $20.2m; Douglas $8.6; El Paso $11.6; Jefferson $14.4; Larimer $7.6m; Weld $9m). As a point of comparison most fire districts collect an 8+ mill. One would hope that an additional two mills might spur some land planning and conservation in the "Big 9."
- One (1) mill, or about $54 million/year could fund rural economic development. This could be done either through a Development Fund as described above or it could be divided between the west slope counties. [11]
- The other (1) mill or about $54 million/year could fund construction of the multi-purpose project.

[11] As a point of comparison, the 2009 General Fund Revenue for the following counties - Gunnison $10.388M; Montrose $10.1M; Logan $4.5M; Garfield $28M; Otero $1M (estimate) - approximate what this fund could generate.