Colorado's Water Supply Future

Interbasin Compact Committee Annual Report

October 30, 2009

Yampa Canyon Photo by Kent Vertrees

To the House of Representatives Committee on Agriculture, Livestock, and Natural Resources and the Senate Committee on Agriculture, Natural Resources, and Energy

COLORADO
DEPARTMENT OF NATURAL RESOURCES

COLORADO'S WATER SUPPLY FUTURE: Interbasin Compact Committee Annual Report

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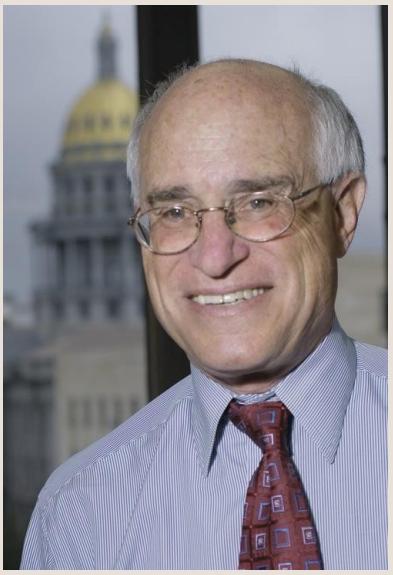
Bill Ritter, Jr. - Governor
Harris D. Sherman - DNR Executive Director
Jennifer Gimbel - CWCB Director

From Harris Sherman

Executive Director of DNR & Director of Compact Negotiations

October 6, 2009

Fellow Coloradans:



In 2005, the Colorado General Assembly passed HB 05-1177, The *Colorado Water for the 21st Century Act* and created a new collaborative process for addressing Colorado's water needs. This process, of setting up the Interstate Basin Compact Committee (IBCC) and nine Basin Roundtables (BRTs), continued the state's water planning efforts that began with the Statewide Water Supply Initiative (SWSI). The Interbasin Compact Process in such efforts as the SWSI information and a grassroots approach, foster inter-basin and intra-basin dialogue to create agreements that will lead to a more secure water supply future for Colorado.

This report documents the progress and milestones achieved in 2009 and fulfills the requirement of C.R.S. 37-75-105(4) to report to the House of Representatives Committee on Agriculture, Livestock, and Natural Resources and the Senate Committee on Agriculture, Natural Resources, and Energy on the status of compact negotiations by October 31st of each year.

This is the fourth year of the Interbasin Compact Process. IBCC's goal has been to build an understanding between the different water users in Colorado and the different geographic areas about what our water future could be. It is difficult to quantify how we are doing. However, the IBCC and Basin Roundtables have led to a greater cooperation and understanding within the water community.

In 2008, I reported on the accomplishments of: creating a vision for Colorado's water supply future and strategies to help meet that vision; developing more comprehensive understanding of the water needs in each basin through basin-wide water needs assessments; using the Water Supply Reserve Account (WSRA) to implement projects and water activities that help address the water needs in each basin; and engaging and educating the general public.

In 2009 the IBCC and Basin Roundtables, with the support of the Colorado Water Conservation Board (CWCB), built on these accomplishments. We continued seeking a mutually agreeable and consensus based vision for Colorado's future and looked at what the state will look like under a status quo approach to our water use and development. The IBCC and BRT's asked whether the status quo is the Colorado we want to see, and if not what do we need to do differently. We came to the conclusion that we must provide a safe and reliable water supply to our citizens, in a manner that also addresses the future of agriculture in Colorado and the health and viability of our streams.

With Colorado predicted to double in population, we discussed ways to conserve water beyond current levels. In particular we are examining the relationship of water to growth and land use. It is

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Letter from Director (continued)

not a question of whether we grow; rather it is a question of how we grow. There are ways to better integrate land use planning and water supply planning. We have continued to look at a variety of approaches to understanding water needs in each basin through basin-wide water needs assessments; using the Water Supply Reserve Account (WSRA) to implement projects and water activities that help address the water needs in each basin; and engaging and educating the general public.

In 2009 the IBCC and Basin Roundtables, with the support of the Colorado Water Conservation Board (CWCB), built on these accomplishments. We continued seeking a mutually agreeable and consensus based vision for Colorado's future and looked at what the state will look like under a status quo approach to our water use and development. The IBCC and BRT's asked whether the status quo is the Colorado we want to see, and if not what do we need to do differently. We came to the conclusion that we must provide a safe and reliable water supply to our citizens, in a manner that also addresses the future of agriculture in Colorado and the health and viability of our streams.

With Colorado predicted to double in population, we discussed ways to conserve water beyond current levels. There are ways to better integrate land use planning and water supply planning. We have continued to look at a variety of approaches to increase water conservation. As water is transferred from farms to cities we are looking to see how these transfers can be accomplished so as to benefit our agricultural economy and rural communities. We are looking hard at the possibilities of new water supply projects both in basin and between basins. We are examining how the development of new water supplies in the Colorado River system can benefit the basin of origin as well as the receiving basin. These are the challenges on which the Interbasin Compact Committee is focusing and we are making substantial progress.

Much of the progress in 2009 resulted in the release of four draft reports. These reports, done in conjunction with the CWCB, analyze Colorado's consumptive and nonconsumptive water needs and evaluate strategies to meet those needs. They include:

1. State of Colorado 2050 Municipal and Industrial Water Use Projections
2. Non-Consumptive Needs Assessment (NCNA) Priorities Mapping
3. Watershed Flow Evaluation Tool (WFET) Pilot Study for Roaring Fork and Fountain Creek Watersheds and Site-Specific Quantification Pilot Study for Roaring Fork Watershed
4. Evaluation of Water Supply Strategies

These reports indicate that:

- Colorado's population will nearly double by 2050 requiring between 830,000 and 1.7 million acre -feet of additional water to meet M&I needs.
- Nonconsumptive water needs have been identified statewide. Identifying projects and methods to meet those needs will continue to be a priority.
- To meet these consumptive and nonconsumptive needs, Colorado will rely on a mix of conservation, agricultural transfers, and new water supply development.
- Meeting Colorado's consumptive and nonconsumptive needs will require a substantial investment. For example, a new water supply project yielding 250,000 acre-feet will cost between $7.5 and $10 billion, exceeding previous projections.

Our work over the past year has also helped Colorado citizens understand that meeting Colorado's future water supply needs will require a mix of solutions. A multi-dimensional approach that relies on conservation, agricultural transfers, and the development of new water supplies is the best strategy to

Letter from Director (continued)

meet our future needs. There is no "silver bullet" for solving our water supply challenges. We also know that a portion of Colorado's future needs will be met with the projects and plans that water providers are currently pursuing. If all of these projects are successful, Colorado will not have a water supply gap until around 2020. If, however, these projects are only partially successful, Colorado's "M&I gap" will be larger and shortages could happen sooner.

This annual report includes summaries of:

- M&I demands to 2050,
- Each basin's nonconsumptive needs assessment,
- A database CWCB is implementing to track projects and plans for meeting our future water needs
- Evaluations of water supply strategies
- Efforts to build "portfolios" of solutions
- The Road Ahead
- IBCC member's comments
- Finance and Expenditures

In addition, there is a companion Water Supply Reserve Account (WSRA) Annual Report which details how the WSRA funds were spent. Under this program, $23,457,157 have supported over 110 water activities. The WSRA program supported projects and studies for addressing agricultural, urban, environmental and recreational needs throughout the state. The $23 million has leveraged for a total of $45 million. I encourage you to look at the WSRA annual report which details the program's finances and summarizes the details and status of each grant.

When I was appointed by the Governor as the Executive Director of DNR in 2007 I was introduced to the IBCC process. I inquired why this new structure was created, how it worked, and how it fit within the CWCB and DNR. Initially, I doubted whether this process made sense or whether it could truly make a difference. After two and a half years I am now a believer. As I move on to begin a new adventure at the federal level, I would like to thank each and every one of you for the dedication that you have put into this process to make it successful. Because of you, I think that the Interbasin Compact Process has brought many new faces into water decisions through the roundtables. It has brought our different geographic regions together to talk about cooperation. The trust level between different water users and different geographic regions is higher. We are on a path where we can really set a new direction for the state to deal with the water issues facing Colorado.

It has been my great honor to work with you, and I look forward to hearing about Colorado's future water supply successes.

Harris D. Sherman
Executive Director of DNR and
Director of Compact Negotiations

State of Colorado 2050 M&I Water Use Projections

One of the key findings of the 2004 Statewide Water Supply Initiative (SWSI) Phase 1 Study was that very few municipal and industrial (M&I) water providers have identified supplies beyond the study's 2030 horizon. Beyond 2030, growing demands may require more aggressive solutions requiring advanced planning. To better anticipate these increased demands the CWCB conducted a study to project M&I water use to the year 2050. Total municipal and industrial demands for Colorado could reach a total 2.9 million acre-feet per year. This demand is being driven by both population growth and the potential for oil shale production. The new demand is anywhere from 830,000 to 1.7 million more acre-feet for municipal and industrial uses than in 2000 (see Figure 1).

This 2050 update of M&I water demand forecasts will assist the Basin Roundtables in completing their consumptive water needs assessments. The West Slope Basin Roundtables suggested the 2050 timeframe to better characterize potential growth rates on the West Slope. In addition, the CWCB determined that the forecast horizon needed to be extended to the year 2050 to better represent the State's long-term water needs and accommodate infrastructure investments. Also many of Identified Projects and Processes (IPPs) that CWCB identified in the SWSI Phase 1 Study are in the National Environmental Policy Act (NEPA) process and use 2050 as their planning horizon.

Standard methods were adapted for use in updating future M&I water demands throughout Colorado. The objective was to develop a statewide reconnaissance-level water use forecast with consistent data collection and forecast methodology while maximizing available data. Due to the uncertainty in projecting economic conditions and employment levels in 2050, the study developed low, medium, and high population projections. Each scenario reflects unique assumptions for the economy and for each employment sector. These sectors include agriculture, government, mining, manufacturing, regional and national services, and tourism.

The population projections were estimated using the forecasting process and models of the Colorado State Demographer's Office (SDO). Since SDO population projections were only available through the year 2035, projections from 2035 to 2050 were based on extending and adjusting the SDO forecasting models. The population projections were then paired with water use rates to calculate projected water use throughout the State.

The study concluded that Colorado is facing significant growth, with its population potentially doubling by 2050. This population growth will drive municipal and industrial (M&I) water demand. Though the majority of the state's population in 2035 and 2050 will live in the South Platte and Arkansas Basins, West Slope basins were projected to have the highest rates of growth.

In addition to traditional M&I demands, the Demands to 2050 report also takes into account Self Supplied Industrial (SSI) Demands. This includes snowmaking, thermoelectric, energy development, and large industry. One major driver may be oil shale. The Colorado and Yampa/White basin roundtables also are conducting a study on energy demands. Phase I of the energy report, completed by URS estimated that future commercial scale oil shale could need as much as 378,310 acre-feet per year of total water demands at a production scenario of 1.5 million barrels of oil per day. This figure is included in the high demand scenario depicted in Figure 1.

Both SSI and M&I demands are currently undergoing review, and revised figures will be included in the final report.

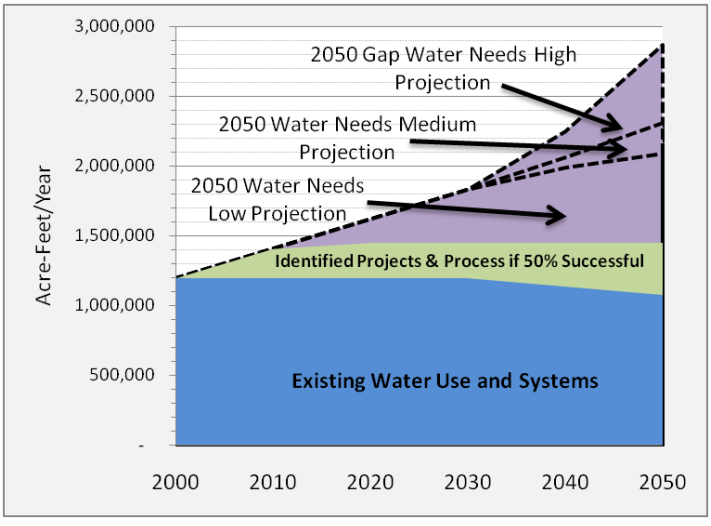


Figure 1 of 18: M&I Demands to 2050

Nonconsumptive Needs Assessment Phase I Results

The legislation creating the Interbasin Compact Process asked each basin roundtable to "develop a basin-wide nonconsumptive water supply needs assessment" (NCNA).

In July of 2009, Phase I of the NCNA was completed. Phase I is an objective, science-based set of maps representing the location of Colorado's important environmental and recreational attributes. Phase I includes a map approved by each basin roundtable that represents the accumulation of attributes. These attribute maps built upon the Statewide Water Supply Initiative Phase II work. From there, each roundtable determined how to combine that data into a single map. The Arkansas and Rio Grande decided to map concentrations of attributes by 12 digit hydrologic units, essentially small watersheds. The North Platte and Southwest Basins similarly developed an inventory of where those attributes were concentrated, but by stream reach. The South Platte, Metro, Yampa/White, Colorado, and Gunnison developed tables and maps that indicated stream reaches of greatest interest to the basin roundtable. The mapping provides each basin roundtable a tool to assist in determining focus areas where quantifications may be developed, where future implementation actions could be taken, and where there may be opportunities for successful multi-purpose projects.

The statewide map (see Figure 2) shows the environmental and recreational inventory/focus areas for all of the nine BRTs. This effort involved working with each of the BRTs and their respective subcommittees to assemble data on the nonconsumptive resources in their basin, discuss options for mapping, present mapping results, integrate feedback, and assemble maps upon which

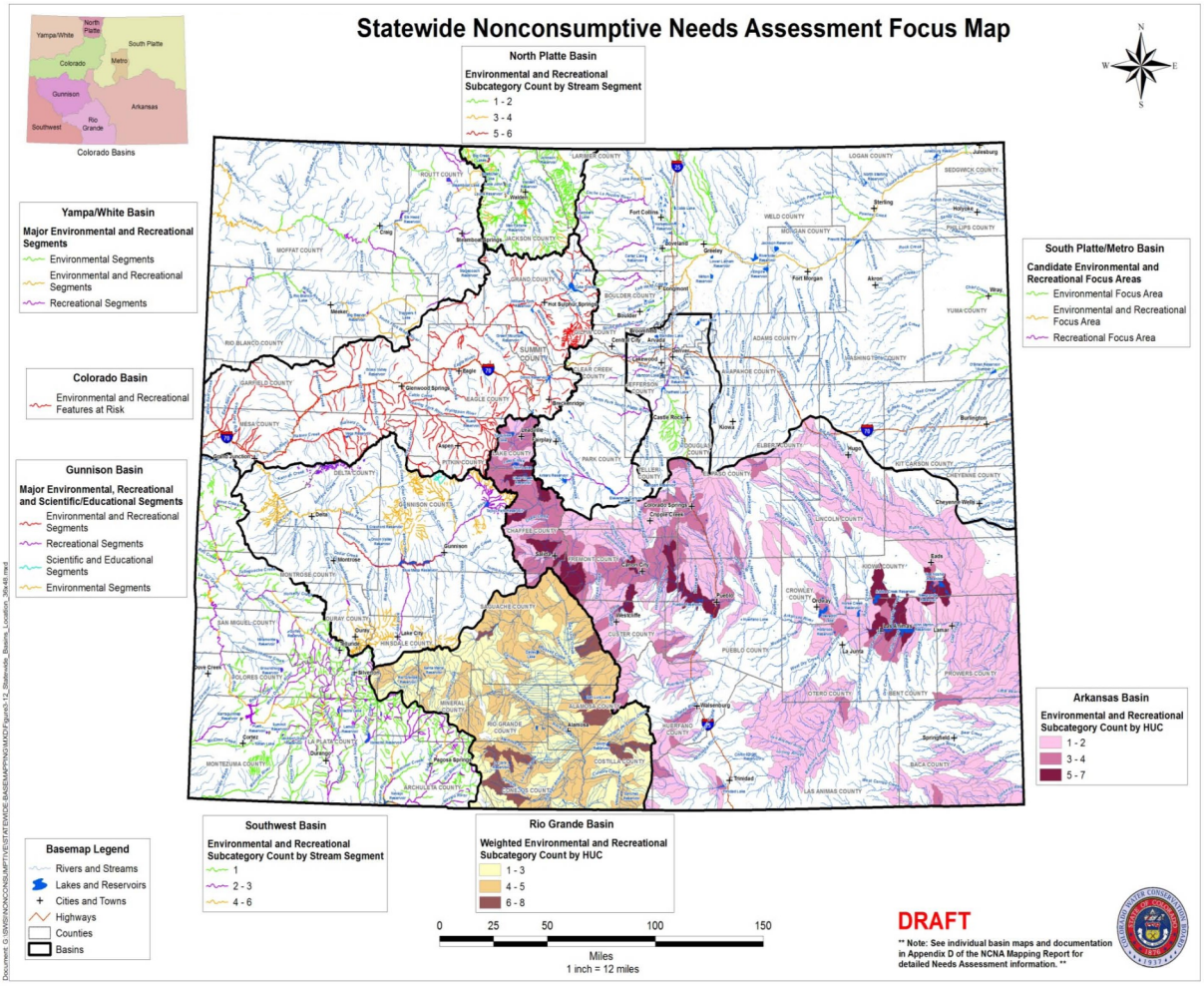


Figure 2 of 18: Statewide Compiled Nonconsumptive Needs Focus Map

NCNA Phase I Results (continued)

all subcommittee members could agree. Throughout this iterative process, CWCB staff met with the BRTs or their nonconsumptive subcommittees more than 40 times across the state.

Because the legislation asked the basin roundtables to "develop" a basin-wide nonconsumptive water supply needs assessment, it is necessary in some areas or basins to quantify nonconsumptive needs. To assist those basin roundtables who chose to do additional nonconsumptive quantification, Phase I also included the pilot test of the Watershed Flow Evaluation Tool (WFET). Under this pilot test, the WFET was compared to site-specific instream flow quantifications in the Fountain Creek and Roaring Fork watersheds. The results of the pilot indicate that the tool is useful in developing broad-brush quantification within a basin, while the site-specific work is helpful if a limited number of reaches need an in depth analysis. The following are some major results from the pilot study:

- Flow-ecology relationships were derived for several key environmental and recreational attributes across the state
- Ecological risk mapping was developed for key attributes
- The WFET can provide a regional assessment of ecological ris condition related to flow, identifying locations with minimal to high risk based on flow conditions for specific stream attributes without detailed site-specific information.
- For Roaring Fork, preliminary validation shows that WFET results are comparable with site-specific data
- For Roaring Fork, results build upon and support previous watershed efforts
- WFET is best utilized in areas with detailed hydrologic data or models for pre and post water management conditions
- WFET could be used in a predictive capacity to examine potential future water management using conditions today as a baseline
- WFET can be used to generate a range of seasonal flow conditions based on ecological risk
- WFET could be used to target Instream Flow acquisitions as well as restoration efforts

There are some additional limitations that were determined in the pilot study:

- The WFET is not intended to set flow prescriptions or rules for flow needs to the level of detail that would be required in a National Environmental Policy Act analysis or that might be needed to guide day-to-day management of a flow in a specific water project.
- The WFET will not provide results as detailed or accurate as a site-specific analysis.
- The WFET will not identify areas that are at ecological risk for factors not directly associated with flow conditions.

The NCNA will not create a water right for the environment; however, it will provide tools and data to allow BRTs to integrate environmental protection into water supply planning. The NCNA shall not be interpreted to diminish, impair, or cause injury to existing absolute or conditional water rights.

(Figure 3) indicates the three major "phases" of the nonconsumptive needs assessments. The legislation requires that each BRT determine "projects and methods to meet those needs." This final set of data will be input into the *Basin Needs Decision Support System* along with consumptive projects and methods.

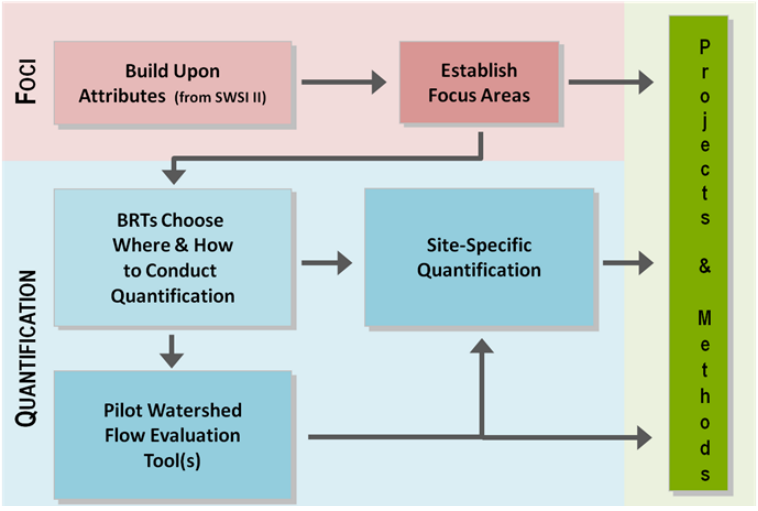


Figure 3 of 18: Nonconsumptive Needs Assessment Methodology

Basin Needs Decision Support System
(formerly known as the IPP Database)

IPPs or Identified Projects and Processes are projects (i.e. reservoirs) and processes (i.e. conservation programs) that are being pursued by water providers statewide to meet the water needs originally identified by the Statewide Water Supply Initiative (SWSI). The CWCB has implemented an initial version of its Identified Projects and Processes (IPP) Database and web application (Figure 4). The database was created to track and monitor these IPPs. CWCB staff is currently implementing refinements and expansion of the IPP Database via two concurrent efforts. The first effort involves developing and piloting a statewide survey for water providers in order to collect and maintain accurate data. The second effort entails database enhancements and integration with CWCB's other Decision Support Systems (DSS).

As a result of the extensive enhancements and integration with other CWCB DSS tools, the name of the IPP Database will be changed to the *Basin Needs Decision Support System (BNDSS)* to better reflect its broader purpose.

The BNDSS will track projects and processes that were noted during the initial SWSI efforts and other projects and processes that have been identified by water providers since the SWSI report. The BNDSS will monitor their progress and identify where

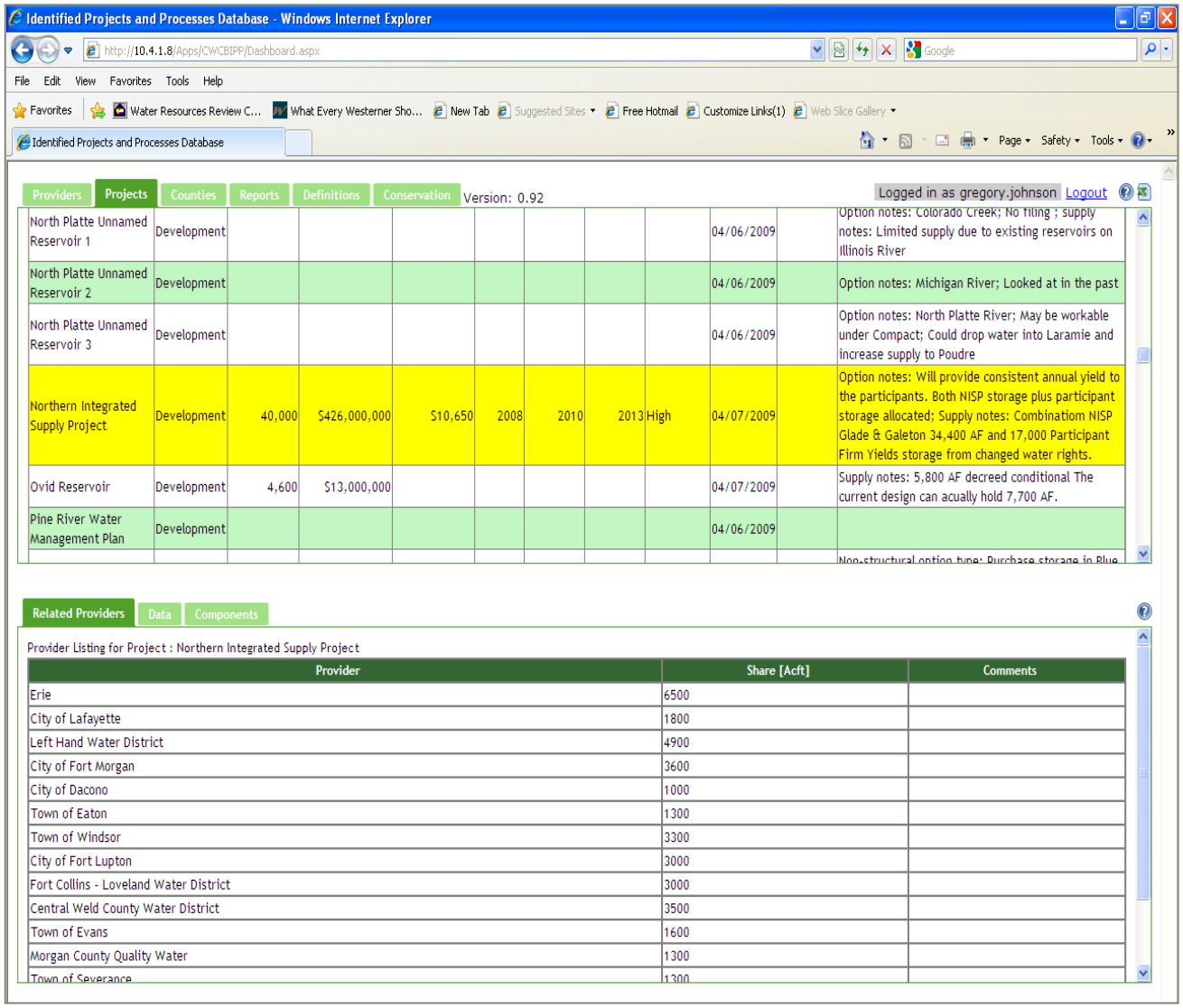


Figure 4 of 18: Example BNDSS Data

BNDSS (continued)

CWCB programs can help IPP implementation. The success of these IPPs is a critical factor in meeting Colorado's projected water supply needs. In addition to IPP's, the BNDSS will also track water use and supply data (actual and projected), population data (actual and projected), and non-consumptive project data, in order to refine local and regional estimates of the projected water supply "gap."

BNDSS Provider Survey and Consultation
The BNDSS Provider Survey and Consultation work includes the development and implementation of a survey for providers, a pilot program of provider interviews (with 6 to 8 representative providers), and advising the CWCB on BNDSS refinements including, data entry, database design, and database output (summary reports). The provider survey will help determine the format, substance, and attainability of information for the BNDSS. The surveys and pilot interviews will also identify strategies and incentives to increase water supplier participation. The survey will be used to update the BNDSS with information from water providers throughout the State allowing the CWCB to monitor the progress of IPPs.

Blue Mesa Reservoir—photo by Peter Kasper

BNDSS System Enhancements and DSS Integration
The CWCB has started a Request for Proposals (RFP) process for this effort. Work is planned to be completed by the end of the fiscal year (June 30th, 2010). As a result of the proposed scope of work, the BNDSS will become a component of Colorado's Decision Support Systems (CDSS). The CDSS consist of databases and tools for visualization, analysis, and modeling, which support the activities of Colorado's Division of Water Resources (DWR) and the CWCB. A primary focus in developing the CDSS was to analyze water supply issues within the State's major river basins. The CDSS framework provides a foundation for other DSS components with specialized focus, providing core capabilities and reducing the incremental cost of implementing new functionality.

The initial implementation of the IPP Database created a SQL Server database with a web interface to store data collected from SWSI and other CWCB activities, including county populations, water demand and supply, provider and project data, and water conservation data, with a website that allows data viewing, editing, and input. The design allows time series data to be accessed by CDSS tools for analysis (i.e. TS Tool) and will allow incorporation with Hydro Base (i.e. links to structure and water right identifiers). Other areas for refinement and integration of the BNDSS are detailed in the RFP's scope of work. The BNDSS is an important and specialized DSS component that will use the CDSS framework to provide critical water supply information and tools to better manage the water resources of Colorado.

Strategies for Colorado's Water Supply Future

During 2008, Colorado's water community embarked on a visioning process to address the following questions: If we let Colorado's water supply continue to evolve the way it is now, what will our state look like in 50 years? Is that what we want Colorado to look like? If not, what can and should we do about it?

Discussions between the IBCC, the Basin Roundtables and the CWCB concluded that "a range of strategies are needed to help meet our state's consumptive and nonconsumptive water supply need. These include a combination of demand side strategies such as conservation and supply side strategies such as storage and agricultural transfers." Based on this conclusion CWCB staff began evaluating water supply strategies starting with:

- M&I Conservation
- Agricultural Transfers
- New Water Supply Development

In June 2009, CWCB released the draft report: Strategies for Colorado's Water Supply Future which: 1) describes the agricultural transfer strategy and new supply development strategy (Figure 5); 2) presents reconnaissance level engineering and cost estimates for the agricultural and new supply development strategies; and 3) summarizes the benefits, impacts, and opportunities of the conservation, agricultural transfer, and new supply development strategies.

From this analysis we know that meeting Colorado's consumptive and nonconsumptive needs will require a substantial investment. For example, a new water supply project could cost between $65,000 per acre-foot and $125,000 per acre-foot over the life of the project. These cost estimates greatly exceed previous cost projections.

We also know that meeting Colorado's future water supply needs will require a mix of conservation, agricultural transfers, and the development of new water supplies – there is no "silver bullet" as no single strategy will meet all of our future water supply needs. Recognizing this, the IBCC began examining combinations or "portfolios" of solutions.

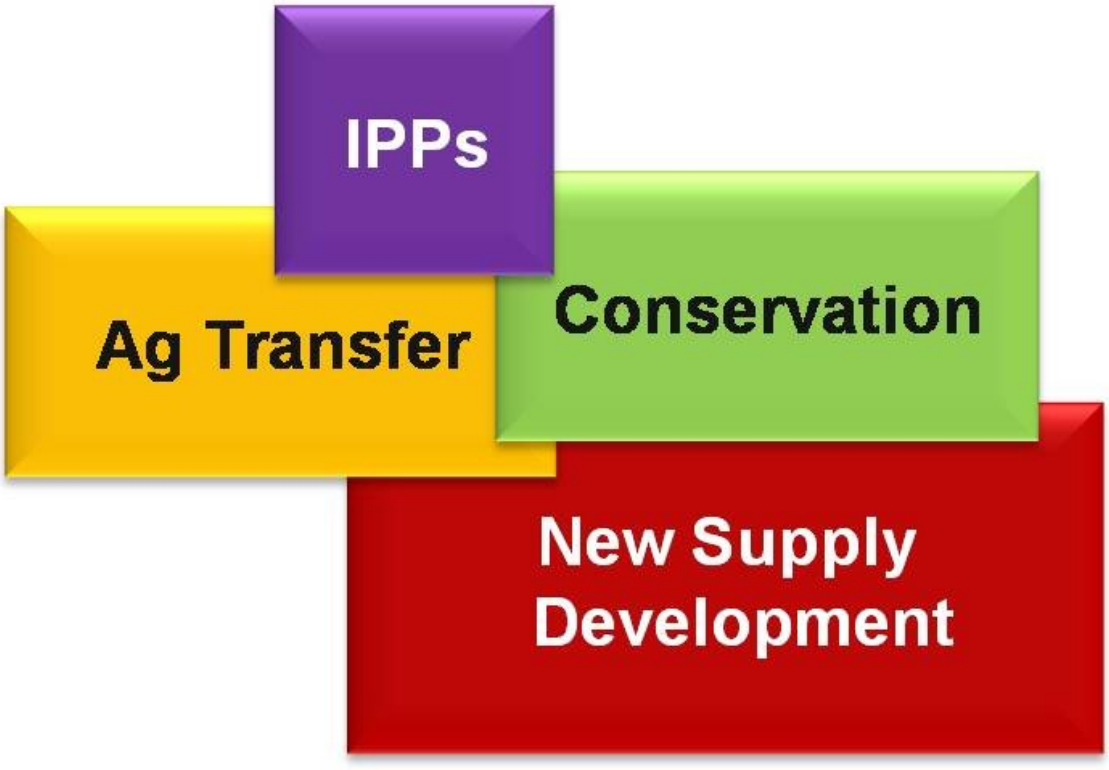


Figure 5 of 18: Overview of Major Strategies

Bracketing Our Future- The Portfolio Tool

Despite the best science, critical input from stakeholders, and asking the right questions, it is impossible to fully predict what the year 2050 will be like. Nonetheless, utilizing these three techniques can yield important information, allowing CWCB and the IBCC to bracket what the future may look like and plan for different futures.

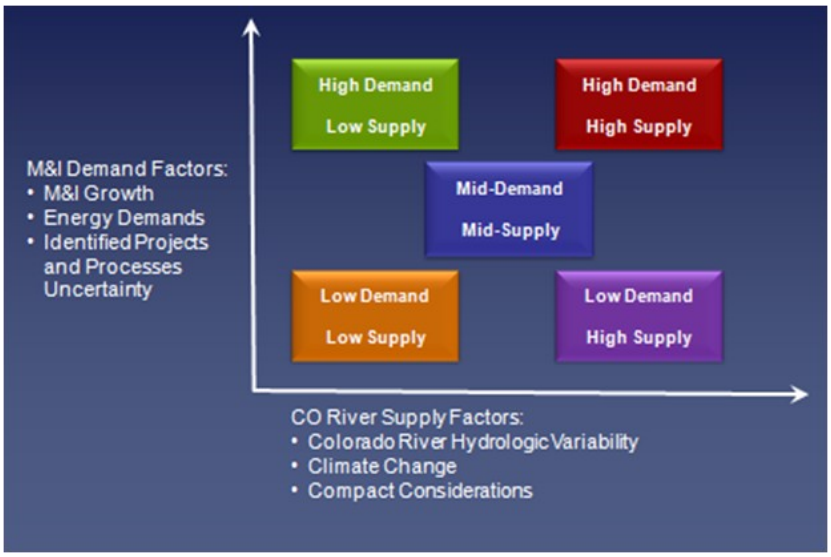


Figure 6 of 18: Potential Future Scenarios

Future Demand Scenarios: Colorado may be presented with slow growth, going in and out of recession for the next forty years with elevated petroleum prices, rampant beetle kill impacting our mountain tourism economies and climate change impacting our ski areas. Alternatively, Colorado may be able to mitigate for these scenarios and experience a vibrant economy. The future may also lie somewhere in-between these two extremes. Since Colorado's economy drives population growth, one can expect water supply demand to track with any of these economic futures.

Future Supply Scenarios: Similarly, the availability of future supplies cannot be fully known. Climate change may lead to precipitously decreased hydrologies, or it may be mitigated for and more moderate temperature changes could occur, causing less impact to our West Slope rivers and streams.

Such different future conditions are known as **scenarios**. Each scenario represents a different, but plausible, representation of circumstances that would result in differing statewide consumptive and nonconsumptive water demand and water supply. The IBCC is considering 5 different scenarios, which will encompass the range of high, medium, and low water supply and water demand (see figure 6).

Each of these scenarios is likely going to need a different set of solutions – combinations of strategies, known as **portfolios** (Figure 7), which collectively meet statewide water demands. Such **strategies**, broad categories of solutions for meeting Colorado's consumptive and nonconsumptive water supply needs, were identified by the IBCC through its visioning process. They include a set of Demand Side Strategies and Supply Side Strategies. Thus far CWCB began developing conservation, agricultural transfers, and new water supply development strategies.

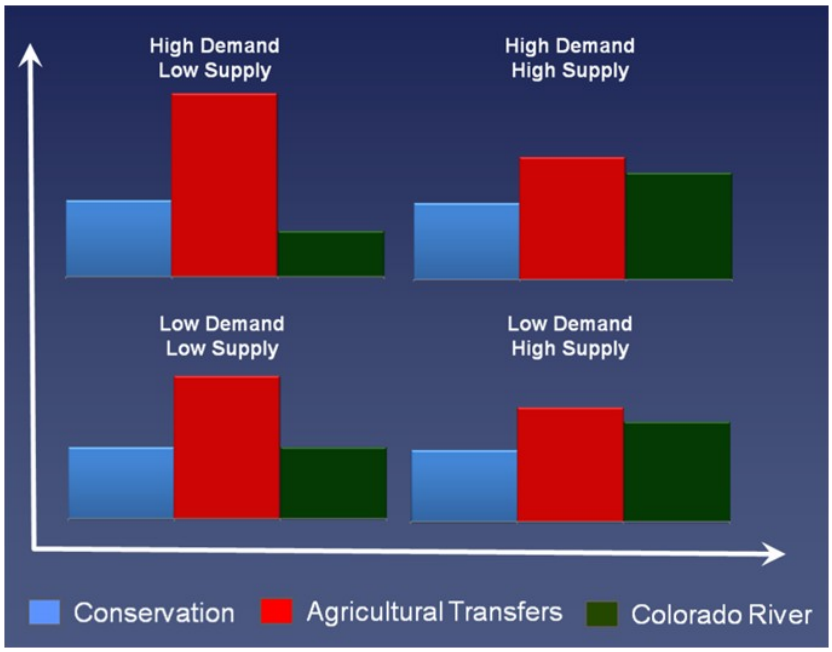


Figure 7 of 18: Potential Portfolios and Strategies

At this point the IBCC is not focused on **projects and methods**, which are specific actions which help implement each strategy. For example a water

Portfolio Tool (continued)

project helps implement a new water supply development strategy, a rotational fallowing program helps implement an agricultural transfer strategy, and a block rate pricing program helps implement a conservation strategy. Each Basin Roundtable is responsible for proposing projects and methods to meet their identified consumptive and nonconsumptive needs.

In order to grapple with what types of portfolios could meet all of these potential future demand and supply scenarios, the technical team built an Excel based tool to determine how agricultural transfers, new supply development, conservation, reuse, and the successful completion of identified projects and processes work together. This tool, known as the ***Portfolio Tool***, is also being used to determine the trade-offs such portfolios have in relation to the IBCC values, such as maintaining an agricultural economy.

CWCB staff have worked closely with the Interbasin Compact Committee to determine how the Portfolio Tool can be further developed and what the future scenarios may look like. In September 2009 the IBCC discussed draft status quo and mid-supply / mid-demand scenarios and related portfolios.

Figure 8 of 18: Status Quo M&I Demand & Supply Settings

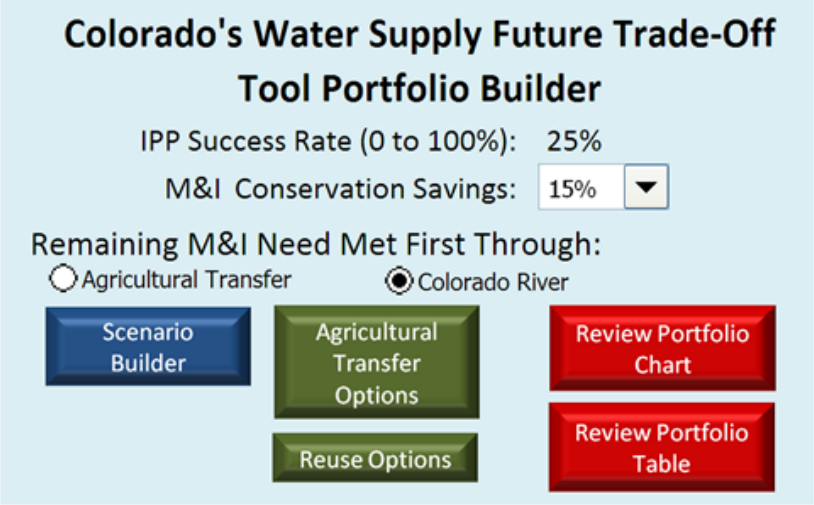


Figure 9 of 18: Status Quo IPP Success & M&I Conservation Settings

Status Quo Scenario and "portfolio": The status quo assumed that demands would be in the mid range and that new availability of Colorado River water would be low, with only 100,000 acre feet of new water supply available for West Slope uses (Figure 8). In addition, seventy-five percent of the identified projects and processes (IPPs) are not successful due to regulatory and other hurdles. Municipalities continue to conserve, but at a rate of fifteen percent on top of any savings accrued since 2000 (Figure 9).

The results indicate that the demand is 1,053,400 acre-feet of additional water for municipal and industrial uses. The portfolio (right side of figure) first meets the demand through the 25% of IPPs that are successful (128,000 AF/Y), then through 15% conservation off of new demand (139,000), then through reuse (199,100 AF/Y), and then through the 100,000 AF of new Colorado River water to meet West Slope water demands. The final increment of water comes from agricultural transfers (487,300 AF/Y) (Figure 10, next page).

The results of maintaining the status quo indicate that over 550,000 acres of irrigated agriculture will need to be dried up to meet municipal and industrial demands. That is 42% of South Platte Basin agriculture and 33% of Arkansas Basin agriculture (Figure 11 on the next page).

Portfolio Tool (continued)

Example Mid-Supply/Mid-Demand scenario and portfolio: **This example portfolio is intended to be representative of the mid-demand, mid-supply scenario. It is intended solely to stimulate the discussion of solutions under an assumed set of conditions. It is not intended to represent any proposed or particular package of solutions for those conditions and should not be viewed in that light. This will be adjusted per the IBCC discussions. More detail on this example portfolio is available on the CWCB website at http://cwcb.state.co.us**

Alternatives to proceeding with the status quo are possible. The figures below represent a future in which 100,000 acre-feet of water is transferred from the West Slope to the Front Range and the remainder is available for West Slope development. Conservation is increased from 15% to 20% off future demand. The efficiency of reuse is increased. And finally the success of the IPPs is increased from 25% to 50% (Figure 12). The result is that the impact to agriculture is nearly cut in half (Figure 13).

The IBCC directed the technical team to make several changes both to the tool and the mid supply/ mid demand scenario to assist them in future planning discussions. Adjustments to the tool include 1) the ability to turn on or off major IPPs to test sensitivity, 2) having oil shale turn on or off since there may not be a middle oil shale long term scenario, 3) having the ability to adjust strategies by each basin, and 4) adding additional impacts beyond the decrease in irrigated acres. Adjustments to the actual mid supply and demand scenarios include 1) changing the high, medium, and low water availability to reflect the results of the Colorado River Water Availability Study (CRWAS) Phase I, 2) adjusting oil shale numbers to reflect Phase II of the Colorado and Yampa/White Energy Study, and 3) consider bringing any remaining water available to the Front Range if the West Slope cannot fully use what water is available.

CWCB and the technical team will continue to develop portfolios for the remaining scenarios and work with the IBCC on refining them. The results will be input into the CRWAS Phase II.

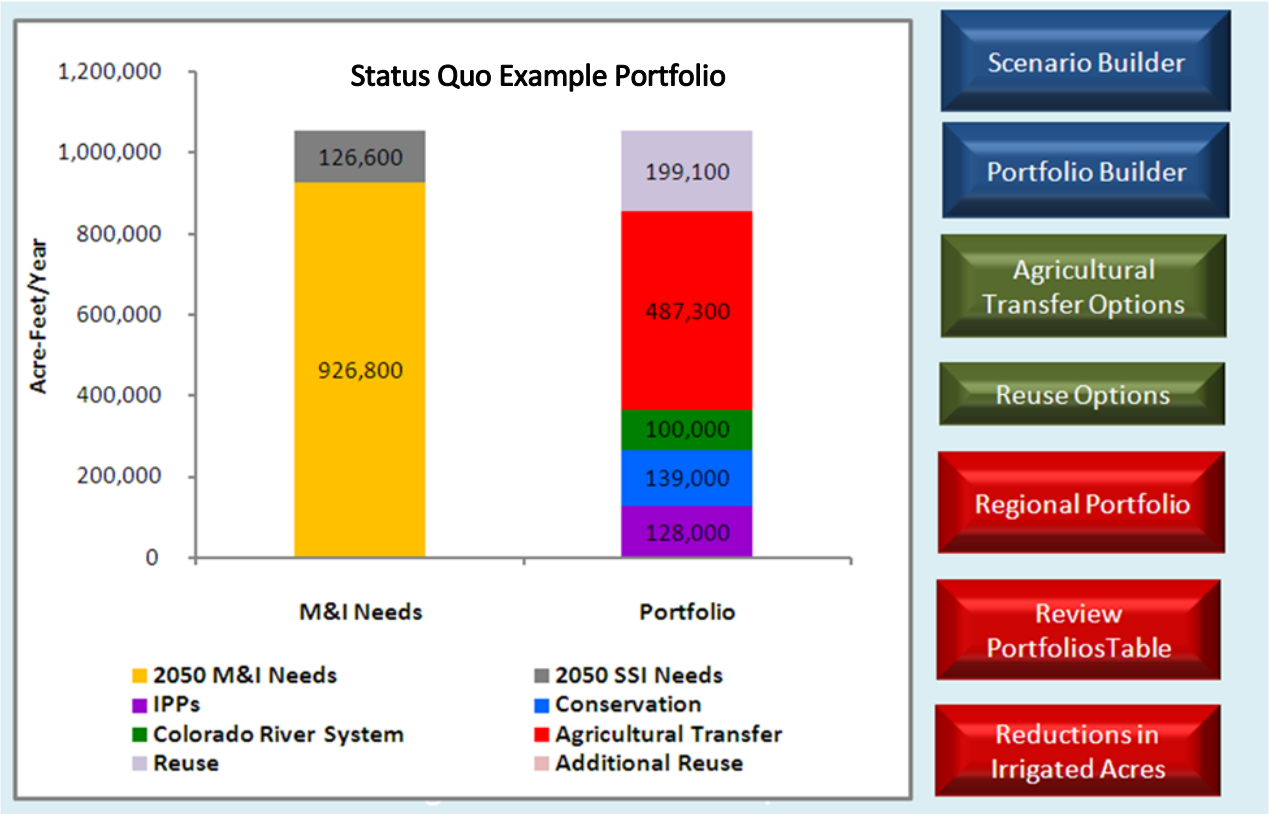


Figure of 10 of 18: Statewide Portfolio Chart, Status Quo

Portfolio Tool (continued)

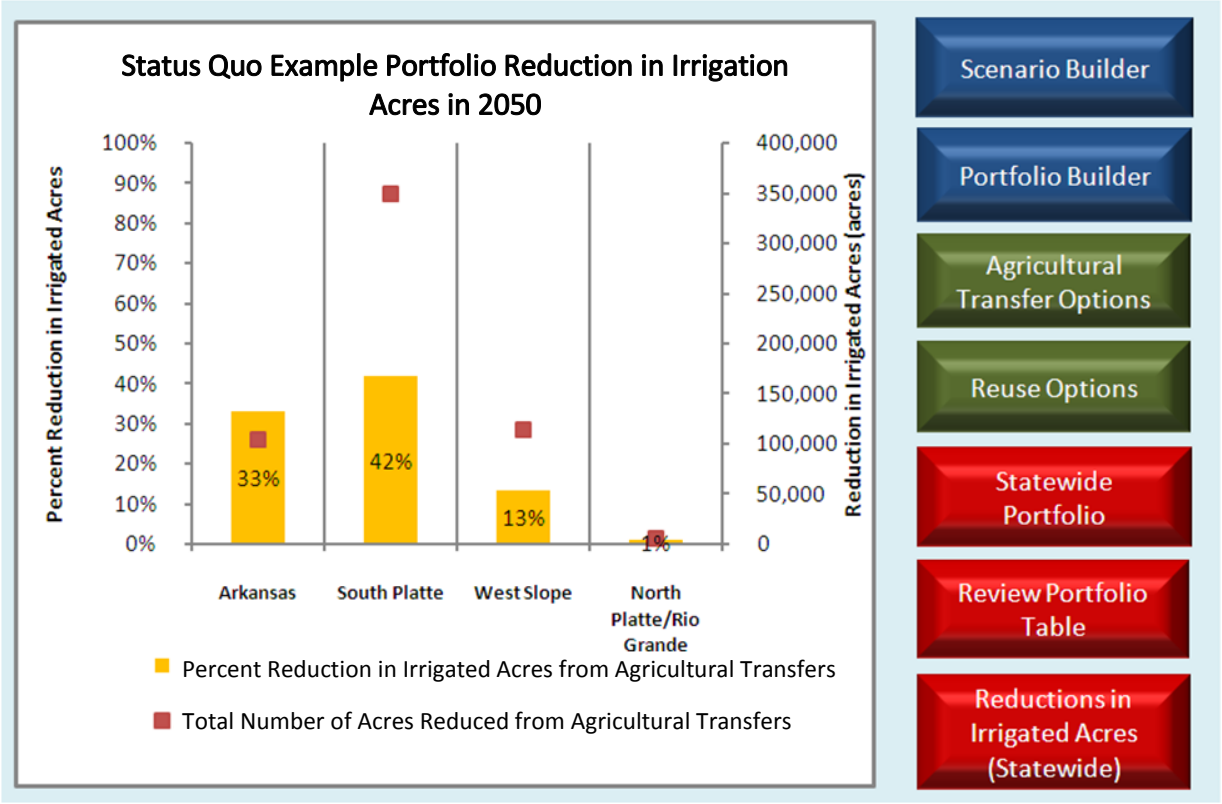


Figure 11 of 18: Status Quo Impacts to Irrigated Agriculture

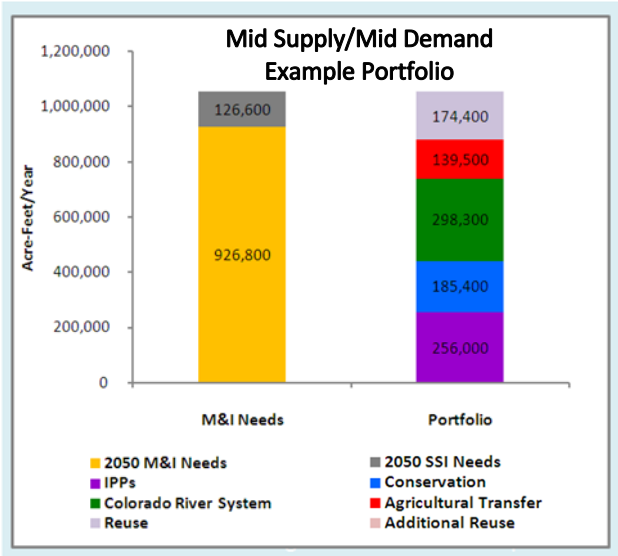


Figure 12 of 18: Statewide Portfolio Chart, Example Alt Mid Supply/Mid Demand Portfolio

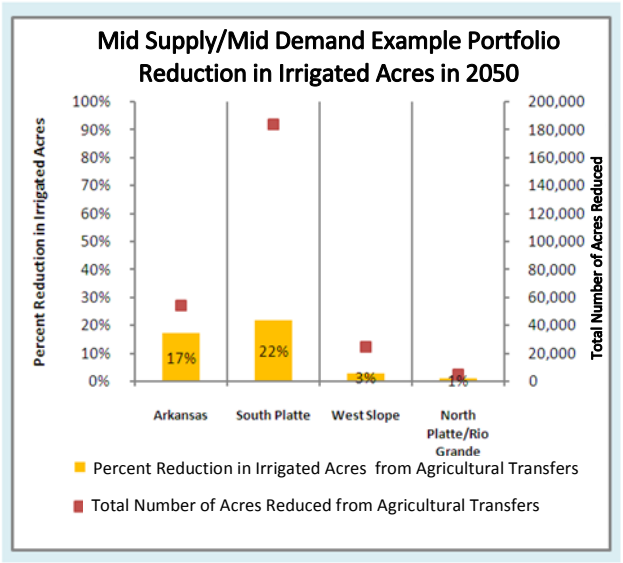


Figure 13 of 18: Example Alt Mid Supply/ Mid Demand Impacts to Irrigated Agriculture

Upper Gunnison basin cattle—photo by Peter Kasper

The Road Ahead

There are a great number of efforts the CWCB and IBCC are undertaking to help understand Colorado's water supply future. The question is, what will be known at the end of these processes and how will this information be used. As with all stakeholder driven processes, the final result is in flux, but each of these tools and studies will help Colorado better plan for the state's water supply future. Figure 14 shows how each of these efforts interrelate.

What are our water needs?

M&I Demands to 2050: By the end of July of 2010 a revised consumptive demand projection will be complete. CWCB staff and the technical team are currently working closely with the Roundtables on revising the findings of the municipal and industrial demands described in the Demands to 2050 report (see pg. 4 for more details on this report's findings). Comments are due by mid November, 2009. The technical team will also be updating Colorado's agricultural water supply needs. This will be based on the methodology used to calculate agricultural shortages in the Statewide Water Supply Initiative I and will incorporate the results from a WSRA funded study in the Yampa/White Basin. The final results of this work will provide an analysis of Colorado's 2050 agricultural water needs.

Nonconsumptive Needs Assessments: In addition, a statewide nonconsumptive needs assessment will be complete. The first task is to determine the status of each of the identified nonconsumptive need areas by compiling all of the existing flow quantification studies and planned projects and methods to meet the values mapped and approved by the basin roundtables (see pg. 5 for more details in this report's findings). Those areas that do not have existing projects and methods to meet the nonconsumptive needs are the nonconsumptive "gap." The roundtables will have a discussion of what, if anything, they would like to do as next steps in each of these areas. This will involve coordination between the roundtables, members of the

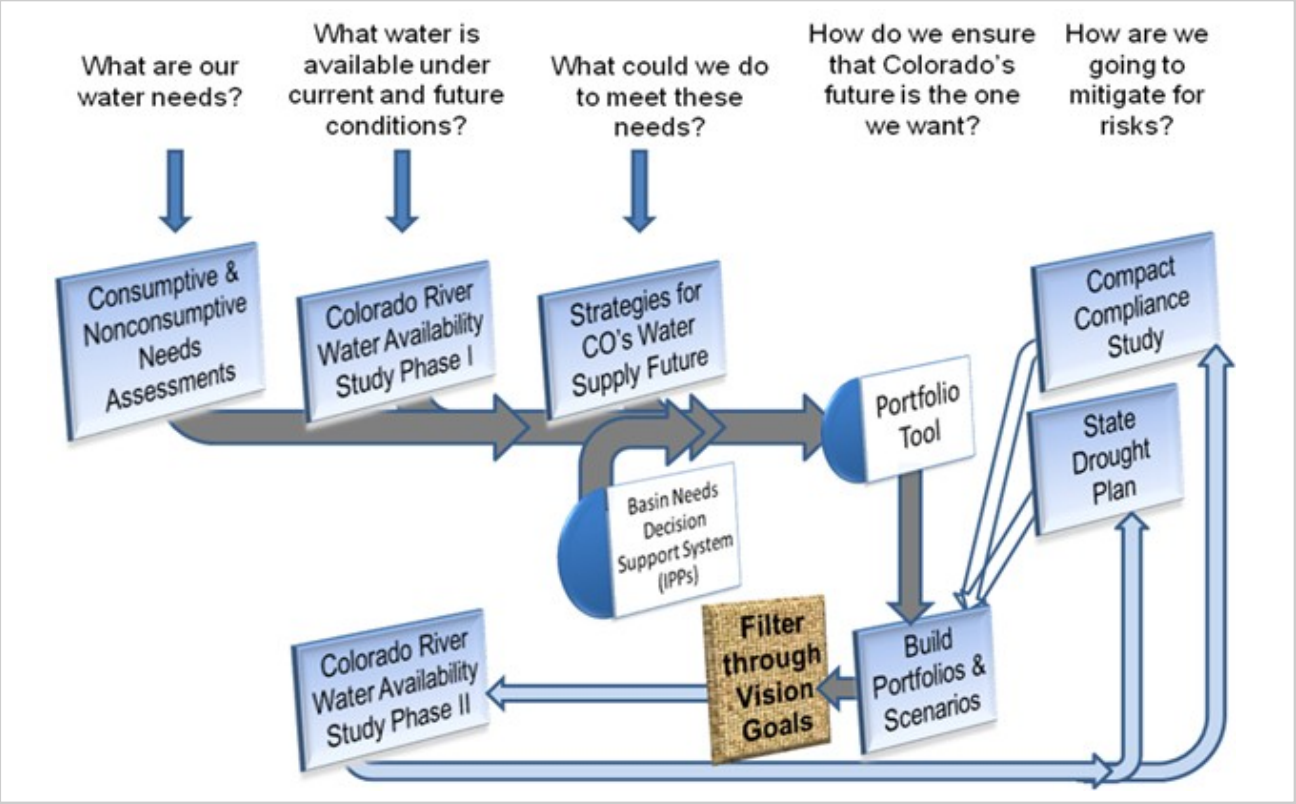


Figure 14 of 18: CWCB Study Integration

Road Ahead (continued)

environmental and recreational community, and other stakeholders. Some basins may chose to quantify flow using the Watershed Flow Evaluation Tool or other methods. The Colorado Basin Roundtable is using a WSRA grant to implement the WFET and the Arkansas basin is quantifying its additional nonconsumptive needs using site specific methods around John Martin and Neenoshe reservoirs. These two approaches will provide a quantification of water supplies needed to meet environmental and recreational demands. Other basin roundtables may focus less on nonconsumptive quantification and put their efforts into identifying projects or methods for meeting their nonconsumptive needs.

What water is available under current and future conditions?

Colorado River Water Availability Study Phase I: This study will give estimates of what water is available under current and predicted future hydrologies for existing demands at various locations within the Upper Colorado River Basin. This cutting edge work is critical because it will show how climate change may impact not only individual stream flows, impacts to existing withdrawals and instream flow rights, but also how much demand may go up from increased evapotranspiration. Initial results are being reviewed and by the end of the calendar year a final report will be released. This work will include an analysis of supply availability at various locations throughout western Colorado as well as an update of overall Colorado River water availability. The results of this work will define the high, medium, and low water supply scenarios in the Portfolio Tool.

Colorado River Water Availability Study Phase II: Phase I of this study examined existing demands under different hydrologies. Phase II will incorporate future consumptive and nonconsumptive demands. Defined projects and methods (identified projects and procedures), whether consumptive or nonconsumptive, will be input into the model, along with the added addition of water supply strategies and portfolios (see below). This work is likely to begin early summer 2010.

What could we do to meet these needs?

Identified Projects and Processes and Gap: In the Statewide Water Supply Initiative, several projects and methods planned by water providers were described. These were called IPPs or identified projects and processes. This year, CWCB will be further developing the Basin Needs Decision Support System (see pg. 7 for more details). The BNDSS will capture both consumptive and nonconsumptive projects that have been identified to meet the M&I, and nonconsumptive demands out to 2050. CWCB will be working with the roundtables, water providers, and environmental and recreational groups to ensure that we have accurate and up to date information on the identified projects. Not all of these projects will be successful, but this fiscal year a sensitivity analysis will be performed on these projects based on type of project and where it is in the planning, permitting, and building process. Any remaining water supply still needed in the year 2050 will be calculated as "the gap." The gap will need to be met through a combination of strategies.

Strategies for Colorado's Water Supply Future: The IBCC identified several potential strategies for meeting Colorado's future water supply needs above and beyond the IPPs. Of these, four major strategies have been studied and published in a draft report and are included in the "Portfolio Tool". These included: new water supply development from the Colorado River Basin, agricultural transfers, conservation, and reuse. In addition, the Metro basin will be focusing on shared infrastructure this year and a report regarding land use practices related to reducing water demand has gone out in draft form and will be completed along with recommendations by the end of the calendar year.

How do we ensure that Colorado's future is the one we want?

Portfolios and Evaluation of Water Supply Strategies: As described below, CWCB will work with the IBCC to further refine the mid-supply/ mid -demand scenario and develop additional scenarios and portfolios to meet those potential futures. These portfolios will be evaluated on how they meet the IBCC vision goals.

CWCB will also review the Alternative Agricultural

Road Ahead (continued)

Transfer Methods Grant Projects to determine practical solutions for how agricultural transfers could be made without significantly impacting rural and agricultural economies.

How are we going to mitigate for risks?

Compact Compliance Study: The Colorado River Compact Compliance Strategies study is intended to assist Colorado in planning and preparing for a possible future curtailment under the Colorado River Compact and Upper Colorado River Basin Compact. Phase I of the study will include 1) a thorough analysis of pre-compact perfected rights within Colorado, 2) evaluation of alternatives to avoid, minimize, or delay possible curtailments, and 3) evaluation of compliance methods and state administration if curtailment is necessary. Work is expected to begin in November of 2009 and be completed within a year.

State Drought Plan: Drought has always been a part of life in the semi-arid climate of Colorado and consequently it is critical that the state have a strong and proactive mitigation and response plan that provides a road map for how Colorado can monitor, respond and assess impacts of drought over the short and long term. Climate Change amplifies this need as projections show that Colorado will likely warm 2.5°F by 2025 and 4°F by 2050; these warmer temperatures may impact water resource availability statewide.

The CWCB is currently revising the State of Colorado Drought Response and Mitigation Plan. This comprehensive update will provide tools that utilize the best available science for drought monitoring and response as well as a vulnerability assessment of how climate change could alter water resources state wide. Incorporating lessons learned from other efforts, such as the Colorado River Water Availability Study, the revised plan will enable water providers to make more informed decisions regarding short and long term drought.

Education & Outreach: The success of the Interbasin Compact Process hinges on making sure we have the right data, decisions makers understand our future water needs, and Colorado's citizens understand the importance of water. The education strategy for the remainder of this year is to support each basin roundtable in developing an action plan on how to target educational efforts in their basin.

So what does this all mean?

Many people from Front Range water providers to Rio Grande agricultural producers to environmentalists on the West Slope have asked "How is this process ultimately going to lead Colorado forward in meeting the draft IBCC vision?" The draft vision reads "We envision a Colorado that balances municipal, industrial, agricultural, environmental, and recreational water needs and promotes cooperation among all water uses."

These studies, tools, and discussion will help Colorado balance these interests. CWCB and DNR hope that this work will help move the state forward in a way that not only meets Colorado's future water supply needs, but also, in a real sense, balances the state's values and diverse economies.

Land Use and Water Supply Planning Symposium Major Themes:

In partnership with the Western States Water Council, DNR and CWCB hosted a symposium on Land Use and Water Supply Planning for a Sustainable Future. The IBCC and basin roundtables have frequently discussed the opportunity for land use practices such as increased density and green neighborhood designs to reduce future water demand. A draft report indicating what is already being done in Colorado and determining if there are any additional steps that could be taken was released in early September. These topics were further explored in the symposium. Four significant opportunities arose:

1. 75 percent of the homes in 2050 will be 'new homes,' homes that are not currently in existence today.
2. There is about an 18 month window during which many cities and counties will update their comprehensive plans.
3. The Department of Local Affairs provides millions in grants and funds many local government comprehensive plans. The director of DOLA offered to consider grant applications that involve a water component in their plans.
4. DOLA is putting together a "Sustainable Solutions Interagency Team" which could be a forum for continued integration of water supply planning and land use planning.

Symposium participants noted that land use practices are not necessarily driven by water supply concerns. However, many other areas, such as water quality, the market and sustainable community multi-use developments, provide an opportunity for the water community to partner. In addition, regional solutions are necessary for basin-wide water demand reductions.

As one participant wrote" *"Try to be truly comprehensive, including land, water, and others such as transportation, energy, security… extend to include regional perspective."*

Several participants indicated that better data was critical.

In addition, another participant indicated that before we ever get to any regulation more consistent information, and understanding are necessary first: *"Start to better engage and inform, create a better understanding of what is already available, what tools exist. Evaluate and characterize gaps and consequences of actions. From this effort, which can be shared by the state and its many partners – public and private – better legislation can be developed to regulate and 'manage'… smarter growth."*

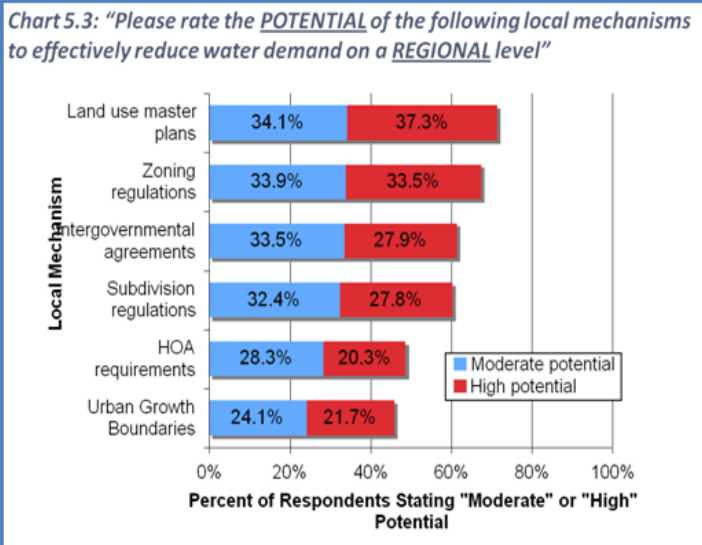


Figure 15 of 18: Potential existing mechanisms for implementing regional water demand reductions

IBCC Member Comments

Peter Nichols – The reason the IBCC and Roundtable process was formed was the growing recognition that Front Range water needs and demands that were not being met and a growing recognition of environmental and recreational needs. It creates a framework where instead of everyone trying to develop their water supplies independently and in secret, they talk to each other and cooperate.

> **If we are going to move forward, we need to do it together. We need to be patient…. The solutions are complicated and it's going to take time.**

Basically, the new framework is: talk more and fight less. I think HB 05-1177 is really the marriage of two ideas: the interstate compacts from the 1920's where different stakeholders sit down and try to work out an agreement about the future use of water, and the second being the Statewide Water Supply Initiative, which provides the technical basis.

It could take years for this process to come up with solutions and people have asked "What have we really accomplished?" There have been several projects that have happened since 2005. These may have been a result of HB 05-1177 and we are moving forward. Water problems have taken a long time to develop, but there are now a lot of people who are involved that are sitting down talking with each other and sharing many different ideas.

If we are going to move forward, we need to do it together. We need to be patient and let everyone catch up. The solutions are complicated and it's going to take time.

Eric Kuhn –One of the important things HB 05-1177 does is to build grassroots support for decisions that need to be made concerning Colorado's future water supplies. This process is only as good as the roundtables and how they function; they represent a broad variety of interests. Hopefully the HB 05-1177 process will help educate all of us: the legislature, water boards, water communities, and the public to what those tradeoffs are and to lead us to a better understanding for making good decisions. Within the water business there are some changing paradigms: The future may not look like the past; There is no such thing as firm yield; The future in water management will be as much about risk management as it will be about obtaining new water supplies.

> **HB 05-1177 builds grassroots support for decisions that need to be made concerning Colorado's future water supplies.**

We hope to be able to discuss with the RT's some strategies that will meet our needs under a number of different assumptions/futures that takes into consideration the uncertainties out there. Can we adopt some strategies that will allow us to adapt to and meet water needs under a number of possible scenarios? The roundtable and IBCC process gives us an opportunity to try to do just that.

IBCC Member Comments (continued)

Eric Wilkinson - I would like to turn the clock back to July, 2002 when Colorado was in one of the most severe droughts it had ever seen. This was when the CWCB decided to move forward with the Statewide Water Supply Initiative (SWSI). The drought was revealing the lack of big picture water planning, something Colorado's water community had not done but should have been doing for a number of years. This was the first time CWCB and the water community had ever looked at the state as a whole to analyze water supplies and water demands. The study effort revealed a great deal of valuable information.

2002 gave everyone a glimpse of what a normal, future year would look like if we didn't do adequate planning for the future. Due to a concerted effort, CWCB finished SWSI in 2004. SWSI reveals the likelihood for significant agricultural conversions to meet forecasted municipal and industrial needs, investigated recreational and environmental needs, and evaluated existing, and potential future, water conservation potential. SWSI further revealed Colorado had a significant gap between envisioned water supplies and forecasted demands.

HB 05-1177 came along and as part of that process the IBCC undertook its visioning process to see how Colorado could best meet its future water supply needs. I think a lot of the feedback received early in the process from the visioning process came out of a sense of frustration because there were no real solutions being identified by the IBCC through the process, there was no rubber meeting the road. Out of the visioning process conservation was identified as one of the potential solutions. The question was how much and how do you implement conservation? A second alternative was the development of new water projects. Another inevitable solution was agricultural transfers. That was identified as the common solution - if all else failed, water for future needs could come from agriculture. But with agricultural conversion, what about the adverse affects on rural economies and the environment?

The course the IBCC is now pursuing is to develop a series of portfolios that contain both projects and water management strategies that can be evaluated as to their ability to meet future water needs. By evaluating these portfolios, we all can glean valuable information to help us determine the best way to move forward. The evaluation of the portfolios will let people see what it might take to put a solution together that will address Colorado's future water needs. The evaluation of the portfolios will also give an indication of costs associated with various solutions. The information from the portfolio evaluations will then dove-tail with the ongoing Colorado River Water Availability study. This evaluation will allow things to be compared on a common technical basis including costs and impacts caused by a project, the benefits from a project, and how the impacts can be minimized and the benefits can be maximized.

We have a significant challenge by 2050; we are no longer fat and happy like we were in 2001 when we thought we had all the water in the world. We need to stay on this road to help chart our course as we move into the future.

I've heard a lot of concern about what Colorado will get out of evaluating potential portfolios, including the strategies and projects being considered. We will gain knowledge and education, and the information we need to go forward to make good sound decisions. The portfolios can act as a vehicle to get people talking about their concerns and what has to be done to address those concerns. The formulation of these portfolios is not a top down exercise. The portfolios are a vehicle by which people can learn about how a strategy or project can be incorporated into a river basin, what the impacts and benefits are, and gain an understanding of the characteristics of

IBCC Member Comments (continued)

that river basin. We have a significant challenge by 2050; we are no longer fat and happy like we were in 2001 when we thought we had all the water in the world. We need to stay on this road and use the information we are developing to help chart our course as we move into the future.

Dan Birch - The Yampa/White/Green basin is a little bit of an anachronism in the state – generally not over appropriated and not impacted or benefiting from transbasin diversions. So when the basin roundtable process started we said we'd meet but we really didn't know what we were going to talk about. That's ended.

It's ended with a potential multi-billion dollar project that would pump water from the lower Yampa some hundreds of miles to the Front Range. We were dumbfounded that this was within the realm of consideration. We now have Shell Oil looking at pumping water from the Yampa to the White. Before all this there wasn't really a lot of collective or basin-wide though. In large part entities in the valley did their own water development but had never come together as a valley.

> **Before all this… entities in the valley had never come together.**

It's very important that the basin defines its own vision before considering a statewide vision and the role that the Yampa might play. There is no one single view within the basin because there are so many differences. The interest and desires are not completely different but are diverse.

In terms of the consumptive needs assessment, with a couple exceptions the Roundtable is on board with the findings in SWSI. Shortly after the enactment of HB 05-1177 we obtained a Water Supply Reserve Account grant for $300,000 to study energy development. This was the first time that such a comprehensive study had been done. Phase I of the study concluded that except for oil shale, the water needed for energy development is fairly moderate. Phase II is just underway and will look at sources of supply to satisfy those demands. This should take about 12 months to complete.

The other study of consumptive needs is the Agricultural study which identifies possible arable lands and estimates the water supply needed to irrigate those lands. This should also be done by the end of this calendar year.

The other study of interest is the nonconsumptive needs assessment. This has been the subject of interesting and, at times, heated discussions but with a positive result. Just last week we adopted the identified 30 or so river segments which have important environmental and recreational attributes. I assume we will prioritize these segments and do some quantification of their nonconsumptive needs.

T. Wright Dickinson – We are doing what the authors and legislators intended. Some frustration is shared by all of us, but part of the comfort level I have is we are not constrained by 180 days to make a decision; we are having this conversation at this table and not in water court. It's taking time, but culturally in Colorado the ability to utilize this forum for water issues and especially the Basin roundtables is where the power lies in this arena.

IBCC Member Comments (continued)

Jay Winner – HB 05-1177 has been very successful. It set a blue print in place which is very simple: consumptive needs assessment, nonconsumptive needs assessment, and what are you going to do about it? From these meetings, I've learned a lot of important issues just by listening. Six months ago we were talking about land use. Two weeks ago I sat in a meeting between El Paso county and Pueblo county that addressed everything we had talked about earlier: pavers in driveways, high density, and use for outside irrigation. Things are already taking place in the Arkansas basin.

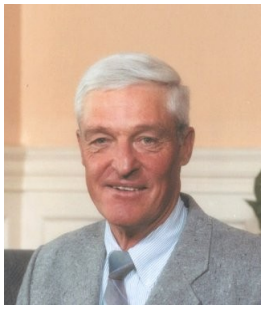
Melinda Kassen – As the IBCC representative for environmental and recreational interests across the state, I think that one of the most important parts of HB 05-1177 is its direction to the roundtables to quantify their nonconsumptive needs. Phase I of the nonconsumptive needs assessment – identifying the rivers and streams that have high instream values is done; although each roundtable did it's in a different way. For example, some roundtables indicated where their environmental and recreation needs are on a reach by reach basis while others did it by watershed. Still others further refined these by choosing the reaches that they felt were most important.

...I think that one of the most important parts of HB 05-1177 is its direction to the roundtables to quantify their nonconsumptive needs.

Phase 2, which will quantify the water needed at protect these reaches, will help us understand what the maps mean.

The Colorado Roundtable is using some Water Supply Reserve Account money to quantify the water needed for all of its high value reaches. The Arkansas Round Table already has an upper Arkansas flow management plan, so they decided to focus quantification on the lower river at two sites. So again every basin is doing something a little different. Ultimately, the question is what should Colorado do with this information? The legislature in 2008 authorized $1M for the CWCB to use to buy water rights for instream flow purposes. Should we direct that money to protect the values shown on this map? We will also need to explore the ways to protect environmental and recreational flows without having a water right.

Mike Shimmin - I have heard Senator Isgar say that the real intent of the WSRA was to provide some money to allow the smaller water supply entities to get their projects going. We are almost up to 20 million dollars that will generate some tangible results. If you think that some of long-term efforts of the IBCC are not so tangible, please keep that in perspective.



Bill Trampe – When HB 05-1177 was formed the Gunnison basin had real reservations as to whether they wanted to participate and there was a lot of debate between the upper and lower basin. That eventually calmed down. We realized that we had forgotten to talk to each other about the needs in our own basin. It's amazing how things work and attitudes change. The Gunnison basin is working hard to get ourselves prepared for the future.

Finance and Expenditures

Over the past two years, Colorado has invested $2.2 million in the Interbasin Compact Process (see Figure 16 below). Over 70% of this money assisted the Basin Roundtables with the development of their basin-wide water needs assessments. This included almost $600,000 for nonconsumptive needs assessments, over $700,000 for consumptive needs assessments and basin roundtable task orders, and about $260,000 for evaluating strategies or solutions for meeting our future water supply needs. These combined expenditures are broken down into fiscal year 2008 expenditures (see figure 17) and fiscal year 2009 expenditures (see Figure 18).

The Interbasin Compact Process is also supported by 6 staff positions within the CWCB, 5 of which were funded out of this account. In 2009, the General Assembly transferred these salaries to the CWCB Construction Fund.

In the coming years, the Interbasin Compact Process is authorized to receive approximately $745,000 per year. The majority of this funding (approximately $500,000) will continue to be invested in technical support for the basin roundtable's development of their needs assessments, with the remainder split between education efforts, holding basin roundtable and IBCC meetings, and staff and member travel.

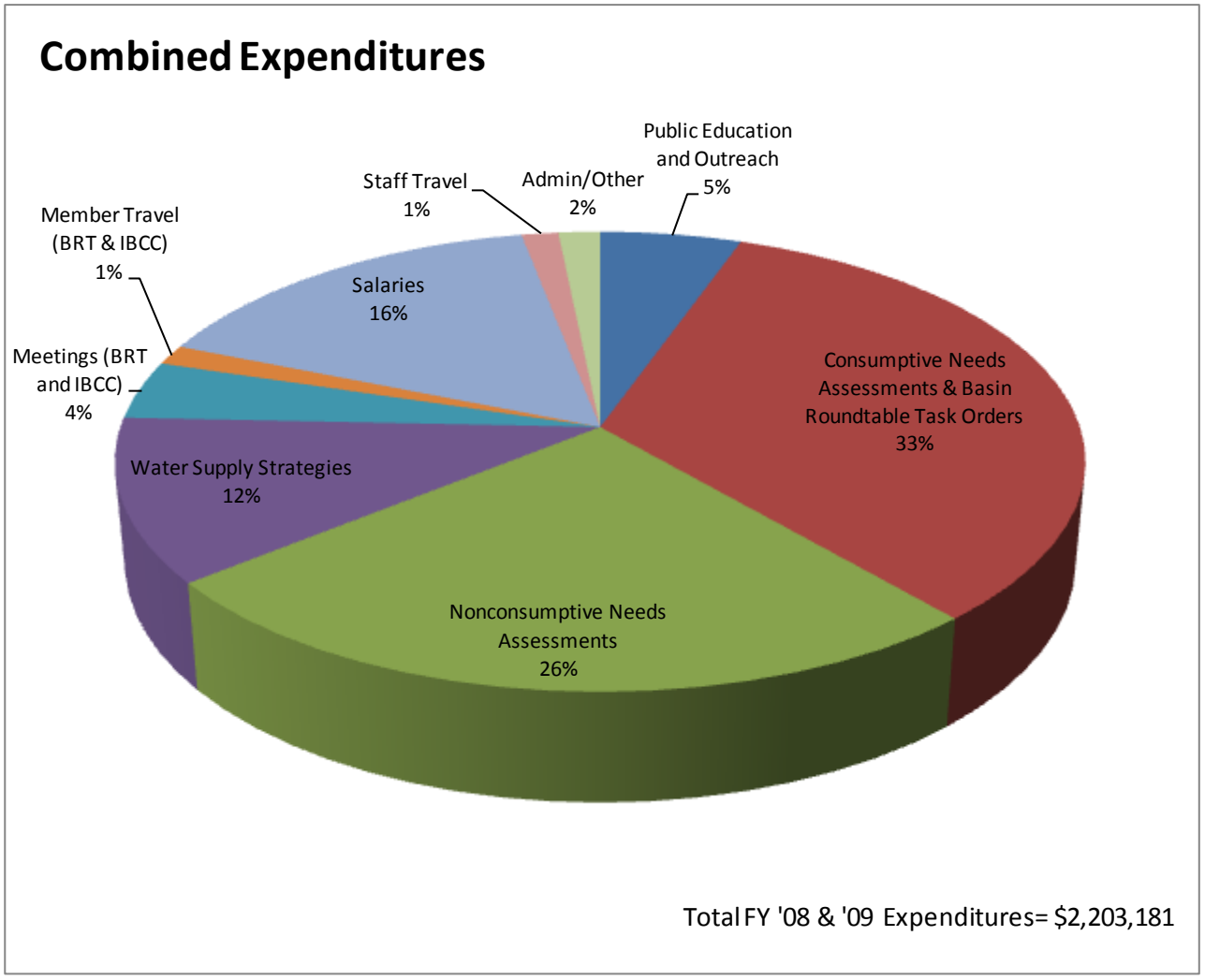


Figure 16 of 18: Fiscal Year '08 and '09 Expenditures

Finance and Expenditures (continued)

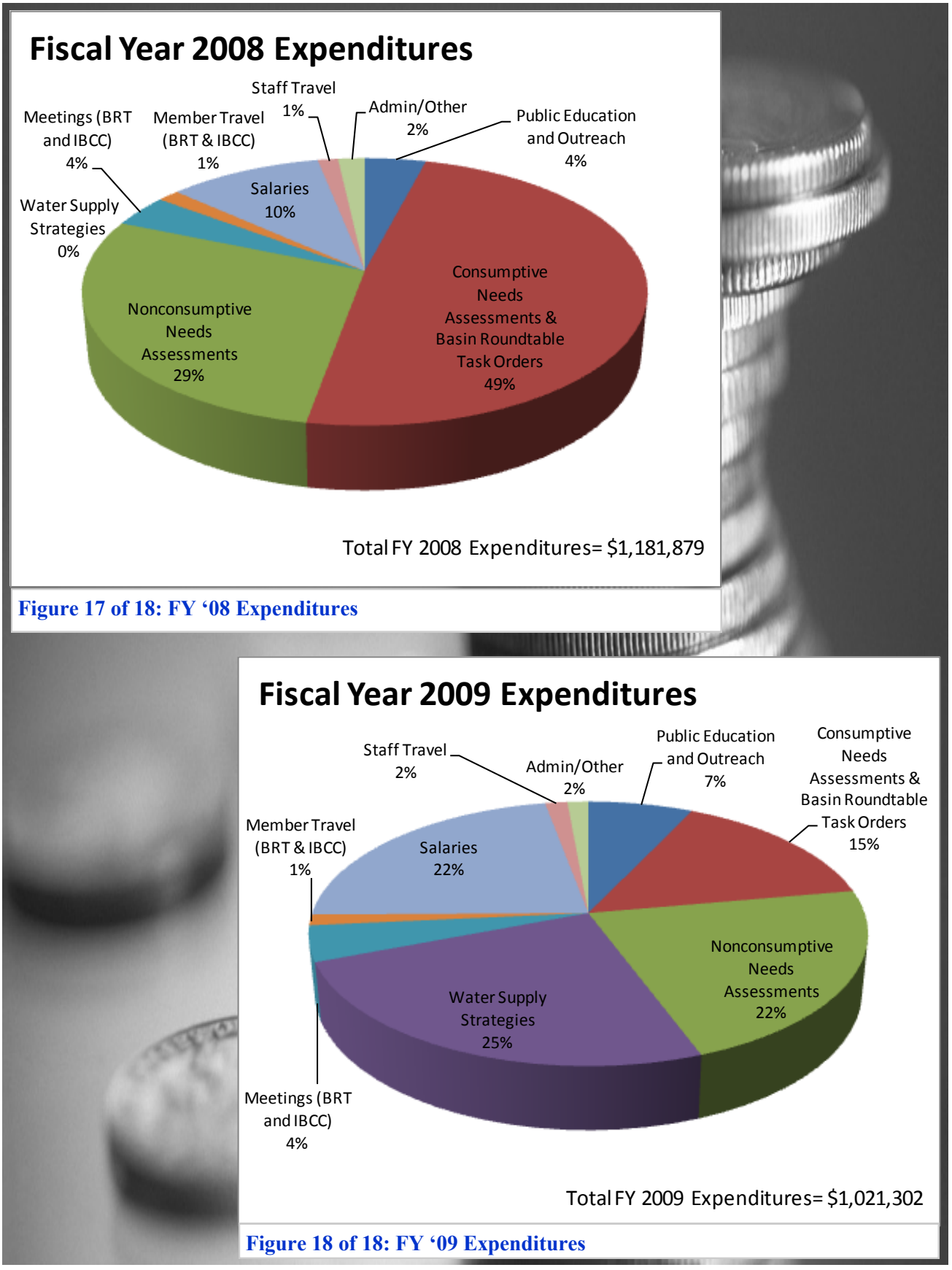


Figure 17 of 18: FY '08 Expenditures

Figure 18 of 18: FY '09 Expenditures

COLORADO
DEPARTMENT OF NATURAL RESOURCES

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Ronald Shaver, At-Large Representative
Scott Stoddard, U.S. Army Corps of Engineers (liaison)
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Steve Glazer, Environmental Representative
Thomas Alvey, North Fork Water Conservancy District
Tom Brubaker, At-Large Representative
Tom Kenyon, Mesa County
Tyler Martineau, Gunnison Muni

METRO BRT MEMBERSHIP LIST

Alan Berryman, Non-Voting At Large Member
Barbara Biggs, CWCB Member
Bill Ray, Jefferson Muni
Carl Wilson, CSU Extension Service (liaison)
Chips Barry, Legislative Appointment
Courtney Brand, El Paso County
Dana Ehlen, Aurora Muni
David Nickum, Environmental Representative
Ed Warner, BOR (liaison)
Gary Thompson, Upper South Platte Water Conservancy District
Janet Bell, At-Large Representative

IBCC and BRT Members

Jay Skinner, Division of Wildlife (liaison)
Jim Reasoner, Central Colorado River Water Conservancy District
John Hendrick, Local Domestic Water Provider Representative
Jonathon Kahn, Recreational Representative
Julia Murphy, At-Large Representative
Julio Iturreria, Arapahoe County
Larry Cerrillo, Non-Voting At Large Member
Manuel Montoya, Non-Voting At Large Member
Mark Koleber, Adams Muni
Mark Uppendahl, Division of Wildlife (liaison)
Mark Harding, Non-Voting At Large Member
Michael Glade, Industrial Representative
Pete Conovitz, Division of Wildlife (liaison)
Peter Nichols, At-Large Representative
Phyllis Thomas, Non Voting At Large Member
Polly Hays, Forest Service (liaison)
Ralf Topper, Colorado Geological Survey (liaison)
Randal Ristau, CO. Water Quality Control Division (liaison)
Rob Sakata, Agriculture Representative
Robert Coney, Adams County
Rod Kuharich, Douglas Municipality
Roy Laws, Jefferson County
Scott Ludwig, Forest Service (liaison)
Tim Murrell, Douglass County
Tim Carey, U.S. Army Corps of Engineers (liaison)
Tom Acre, At-Large Representative/Metro Liaison
Tracy Bouvette, Non-Voting At Large Member

NORTH PLATTE BRT MEMBERSHIP LIST

Ann Timberman, Fish and Wildlife Services (liaison)
Barbara Vasquez, Environmental Representative
Bob Burr, Jackson County Water Conservancy District
Bonie Pate, CO. Water Quality Control Division (liaison)
Carl Trick, CWCB Member
David Meyring, At-Large Representative
Deb Alpe, CSU Extension Service (liaison)
Dirk Ramsey, Local Domestic Water Provider Representative
Ed Perkins, Division of Wildlife (liaison)
Erin Light, Division of Water Resources (liaison)
Hal Hagen, Recreational Representative
Jaci Gould, BOR (liaison)
Jay Skinner, Division of Wildlife (liaison)
Jim Baller, Michigan River Water Conservancy District
John Rich, Jackson County
Kent Crowder, Legislative Appointment
Lucy Meyring, At-Large Representative
Michael Wright, Forest Service (liaison)
Mike Allnutt, Agricultural Representative
Mike Hohnholz, At-Large Representative
Paula Belcher, BLM (liaison)
Pete Conovitz, Division of Wildlife (liaison)
Peter Barkmann, Colorado Geological Survey (liaison)
Richard Wyatt, Jackson Muni
Sandra Knox, At-Large Representative
Tom Hackleman, At-Large Representative
Ty Wattenberg, At-Large Representative

RIO GRANDE BRT MEMBERSHIP LIST

Allen Brown, Hinsdale County
Arnie Valdez, At-Large Representative
Cathee Wilson, NRCS (liaison)
Charles Spielman, Rio Grande Muni
Charles Stillings, At-Large Representative
Dale Pizel, Mineral County
Dan Dallas, Forest Service (liaison)
Dennis Garcia, U.S. Army Corps of Engineers (liaison)
Doug Shriver, At-Large Representative
Ed Warner, BOR liaison)
Edwin Nielsen, Saguache County
Fred Bauder, Local Domestic Water Provider Representative
Fred Bunch, National Park Service (liaison)
Glen Wiescamp, Costilla Muni
Greg Higel, Alamosa County
J.B. Alexander, Mineral Muni
Jay Skinner, Division of Wildlife (liaison)
Jerry Gallegos, Costilla County
John Shawcroft, Alamosa La Jara CD
John Tonko, Division of Wildlife (liaison)
Kathleen Reilly, CO. Water Quality Control Division (liaison)
Maclovio Martinez, Costilla Water Conservancy District
Melvin Getz, Industrial Representative
Mike Blenden, Fish and Wildlife Services (liaison)
Mike Gibson, San Luis Valley Water Conservancy District
Mike Sullivan, Division of Water Resources (liaison)

IBCC and BRT Members

Mike Willett, Conejos Water Conservancy District
Nathan Cherpeski, Alamosa Muni
Paul Robertson, At-Large Representative
Pete Stagner, Saguache Muni
Peter Barkmann, Colorado Geological Survey (liaison)
Raymond Valdez, Agriculture Representative
Raymond Wright, Legislative Appointment
Rick Basagoitia, Colorado Division of Wildlife (liaison)
Rio de la Vista, Environmental
Robert Bagwell, Conejos County
Steve Vandiver, Rio Grande Water Conservation District
Travis Smith, CWCB Member
Zeke Ward, At-Large Representative

SOUTH PLATTE BRT MEMBERSHIP

Allyn Wind, Morgan County
Bert Weaver, Clear Creek County
Bill Ray, Jefferson Muni
Bill Buckhanan, Teller County
Bob Streeter, Environmental Representative
Brent Nation, Morgan Muni
Brett Gracely, Non-Voting At Large Member
Bruce Gerk, Sedgwick Muni
Carl Chambers, Forest Service (liaison)
Chuck Powell, Sedgwick County
Clay Hurst, Elbert Muni
Dave Little, Non-Voting At Large Member
David Colver, Phillips Muni
Dennis Kaan, CSU Extension Service (liaison)
Douglas Rademacher, Agriculture Representative
Earl Mortemeyer, Park Muni
Ed Perkins, Division of Wildlife (liaison)
Eric Wilkinson, CWCB Board Rep
Eugene Bauerle, Republican River Water Conservation District
Forrest Whitman, Gilpin County
Frank Eckhardt, Central Colorado River Water Conservancy District
Fred Walker, At-Large Representative
Fred Rios, U.S. Army Corps of Engineers (liaison)
Gary Herman, At-Large Representative
Gene Manuello, Agricultural Representative
Harold Evans, Weld County Municipal
Jaci Gould, BOR (liaison)
James Ford, Gilpin Municipality
Jay Skinner, Division of Wildlife (liaison)
Jim Yahn, At-Large Representative
Jim Hall, Division of Water Resources (liaison)
Joe Kiolbasa, Logan Muni
Joe Frank, Lower South Platte Water Conservancy District
Joel Schneekloth, CSU Extension Service (liaison)
John Shipper, Elbert County
John Wolforth, Jefferson County
John Stencel, Legislative Appointment
John Tighe, Park County
Julio Iturreria, Arapahoe County
Ken Huson, Boulder Muni
Kent Swedlund, Logan County
Kevin Lusk, El Paso County
Larry Howard, Larimer Muni
Leon Allen, Cheyenne County
Les Williams, St. Vrain Left Hand Water Conservancy District
Lisa McVicker, Center of Colorado Conservancy District
Mike Shimmin, At-Large Representative
Paul Czarnecki, Industrial Representative
Pete Conovitz, Division of Wildlife (liaison)
Ralf Topper, Colorado Geological Survey (liaison)
Randal Ristau, CO. Water Quality Control Division (liaison)
Richard Mann, Kit Carson Muni
Rick Anderson, Adams County
Robin Wiley, Yuma County
Sean Conway, Weld Muni
Stan Holmes, Yuma Muni
Stephen Spann, Upper South Platte Water Conservancy District
Steve Meakins, Phillips County
Webster Jones, Local Domestic Water Provider Representative
William Burnidge, At-Large Representative

SOUTHWEST BRT MEMBERSHIP

Bonie Pate, CO. Water Quality Control Division (liaison)
Bruce Smart, Montezuma Muni
Carrie Campbell, San Juan Conservancy District
Charles Lawler, Southern Ute Indian Tribe DNR
Chuck Wanner, Environmental Representative
Daniel Fernandez, CSU Extension Service (liaison)
David Graf, Division of Wildlife (liaison)
Donald Schwindt, CWCB Member
Ed Warner, BOR (liaison)
Fred Kroeger, La Plata County

IBCC and BRT Members

Gary Kennedy, Mancos Water Conservancy District
Gerald Koppenhafer, Montezuma County
Hal Pierce, At-Large Representative
James Fisher, Dolores Water Conservancy District
Jay Skinner, Division of Wildlife (liaison)
Jennifer Russell, San Miguel County and Municipalities
Jerry McCaw, Agricultural Representative
Jim Siscoe, Montezuma Valley Representative
John Ey, Florida Water Conservancy District
John Taylor, Hinsdale County
John Porter, Southwestern Water Conservation District
Kara Hellige, U.S. Army Corps of Engineers (liaison)
Kay Hartman, San Miguel Water Conservancy District
Kelly Palmer, BLM (liaison)
Ken Beegles, Industrial Representative
Larry Deremo, Dolores County
Leo Large, Montrose County
Mark Ragsdale, At-Large Representative
Mary Helen de Koevend, Montrose Muni
Michael Preston, At-Large Representative
Monte Naslund, At-Large Representative
Pat Greer, Animas-La Plata Water Conservancy District
Pat Page, BOR (liaison)
Peter Barkmann, Colorado Geological Survey (liaison)
Peter Ortego, Ute Mountain Ute Tribe
Raymond Keith, Local Domestic Water Provider Representative
Robert Wolff, La Plata Muni
Robin Schiro, Archuleta County
Ronald Shaver, At-Large Representative
Russell Kennedy, La Plata Water Conservancy District
Scott Brinton, Division of Water Resources (liaison)
Stephen Fearn, San Juan County
Steven Harris, Legislative Appointment
Tim Hunter, Recreational Representative
Vern Harrell, BOR (liaison)

YAMPA/WHITE/GREEN BRT MEMBERSHIP LIST

Bill Haffner, Non-Voting At Large Member
Bob Lange,
Bruce Lindahl, At Large Representative
CJ Mucklow, CSU Extension Service (liaison)
Dan Birch, Colorado River Water Conservation District
Dan Craig, Routt Muni
Darryl Steele, Juniper Water Conservancy District
David Graf, Division of Wildlife (liaison)
David Smith, Rio Blanco County
Don Jones, Moffat Muni
Doug Monger, Routt County
Douglas Wellman, Yellow Jacket Water Conservation District
Ed Warner, BOR (liaison)
Erin Light, Division of Water Resources (liaison)
Forrest Luke, Industrial Representative
Geoff Blakeslee, Environmental Representative
Jay Skinner, Division of Wildlife (liaison)
Jeff Comstock, At-Large Representative
Jeff Devere, Rio Blanco Muni
Jon Hill, At Large Representative
Kai Turner, Alt. Rio Blanco County
Kent Vertrees, Recreational Representative
Kevin McBride, Non-Voting At Large Member
Mary Brown, Agricultural At-Large Representative
Mike Brennan, At-Large Representative
Mike Camblin, At-Large Representative
Nate Dieterich, BLM (liaison)
Patty Schrader Gelatt, Fish and Wildlife Service (liaison)
Paul Strong, Legislative Appointment
Peggy Rector, Rio Blanco Water Conservancy District
Peter Barkmann, Colorado Geological Survey (liaison)
Ren Martyn, At Large Representative
Robert Weiss, At-Large Representative
Scott Stoddard, U.S. Army Corps of Engineers liaison)
Stephen Colby, Local Domestic Water Provider Representative
T. Wright Dickinson, At-Large Representative Green River Basin
Tom Gray, Moffat County
Tom Sharp, Upper Yampa Water Conservancy District
Traute Parrie, BLM (liaison)

IBCC and BRT Members

IBCC MEMBERS

Director of Compact Negotiations
Alex Davis (Acting)

Arkansas Basin Representatives
Jay Winner
Jeris Danielson

Colorado Basin Representatives
Carlyle Currier
Stanley Cazier

Gunnison Basin Representatives
Bill Trampe
Marc Catlin

Metro Representatives
Chips Barry
Rod Kuharich

North Platte Basin Representatives
Carl Trick
Kent Crowder

Rio Grande Basin Representatives
Raymond Wright
Steve Vandiver

South Platte Basin Representatives
Eric Wilkinson
Mike Shimmin

Southwest Basin Representatives
John Porter
Steven Harris

Yampa/White Basin Representatives
Dan Birch
Jeff Devere

Governor Appointments
Melinda Kassen
Peter Nichols
R. Eric Kuhn
T. Wright Dickinson
Taylor Hawes
Wayne Vanderschuere

Senate Agriculture Committee
Vacant

House Agriculture Committee
Representative Kathleen Curry

Fall in Hunter Creek Valley— photo by Jacob Bornstein

A Guide to Water Resource Acronyms

House Bill 2005-1177 (*HB 05-1177*): The Colorado Water for the 21st Century Act provides a permanent forum for broad-based water discussions in the state. It creates two new structures: 1) the Interbasin Compact Committee, and 2) the Basin Roundtables. There are nine Basin Roundtables based on Colorado's eight major river basins and the Denver metro area.

Interbasin Compact Committee (*IBCC*): A 27-member committee established to facilitate conversations between basins and to address statewide issues. The IBCC is made up of two representatives from each roundtable, six governor appointments, a member each from both the Senate and House Agriculture Committees, and the Director of Compact Negotiations.

Basin Roundtable (*BRT*): The nine Basin Roundtables bring over 300 citizens into water discussions across the state. The diversity of Basin Roundtable membership broadens the range of stakeholders who are actively participating in Colorado's water decisions. The Basin Roundtables are each made up of a set of designated members (county, municipal, and water district representation), ten at-large members (agricultural, recreational, domestic water provider, industrial, environmental, and water right holder representation), non-voting members, agency liaisons, and the CWCB board member from that basin.

Colorado Department of Natural Resources (*DNR*): The department oversees parks, forests, wildlife, water resources, geology, mining, and soil management. DNR's mission is to develop, preserve and enhance the state's natural resources for the benefit and enjoyment of current and future citizens and visitors.

Colorado Water Conservation Board (*CWCB*): An agency within DNR, which was created in 1937 for the purpose of aiding in the protection and development of the waters of the state. The agency is responsible for water project planning and finance, stream and lake protection, flood hazard identification and mitigation, weather modification, river restoration, water conservation and drought planning, water information, and water supply protection.

Intrastate Water Management & Development Section (*IWMD*): HB06-1385 created CWCB's IWMD Section, which implements the Statewide Water Supply Initiative, the Water Supply Reserve Account, develops reconnaissance level water supply alternatives, tracks and supports water supply projects and planning processes, and supports the IBCC and BRTs.

Statewide Water Supply Initiative (*SWSI*): In 2003, the CWCB commissioned SWSI, an 18-month study to explore, basin by basin, existing water plans, supplies, and existing and project demands through 2030, as well as a range of potential options to meet that demand.

Water Supply Reserve Account (*WSRA*): In 2006, to help address Colorado's future water needs, the Colorado General Assembly passed Senate Bill 06-179, which establishes the WSRA. The WSRA provides money for grants to complete water activities. Water activities are broadly defined and include water supply and environmental projects and/or studies. Requests for monies from the WSRA must be approved by the local Basin Roundtables. Once approved by the Basin Round table the request is forwarded to the CWCB to evaluate and make decisions regarding funding.

Nonconsumptive Needs Assessment (*NCNA*): HB 05-1177 indicated that each roundtable should produce a nonconsumptive, or environmental and recreational, water supply needs assessment.

Watershed Flow Evaluation Tool (*WFET*): A tool piloted in Colorado to assist in the quantification of nonconsumptive needs.

Identified Projects & Processes (*IPPs*): A term developed in SWSI to specify planned methods to meet water supply needs by water providers.

Municipal and Industrial (*M&I*): A term referring to the water needs of cities and towns throughout Colorado.

Self Supplied Industrial (*SSI*): A term referring to those industries that typically provide their own water, such as power plants and snowmaking facilities.

Colorado Division of Water Resources (*DWR*): An agency within DNR providing water rights administration.

Decision Support System (*DSS*): A general term referring to a tool that integrates a broad set of data and modeling to allow for better decision making at a regional scale.

Colorado Decision Support System (*CDSS*): A water management system developed by the CWCB and DWR. The goal of this system is to assist in making informed decisions regarding historic and future use of water.

Basin Needs Decision Support System (*BNDSS*): Formerly known as the IPP database, the BNDSS will provide a database for consumptive and nonconsumptive projects and methods and assist in calculating the water supply gap.

Colorado River Water Availability Study (CRWAS**):** Examines what water may be available within the Colorado River Basin in the future. The study models future hydrologies based off tree ring and climate change data. It then considers what water is available to meet existing and future demands.

Department of Local Affairs (*DOLA*): The Department works in cooperation with local communities to help build on the strengths, unique qualities and priorities of Colorado. It does so through financial and technical assistance, emergency management services, property tax administration and programs addressing affordable housing and homelessness.

For more information, please contact:

Colorado Water Conservation Board, IWMD
1580 Logan St., Suite 200
Denver, CO 80203
Phone: 303-866-3441
Email: ibc@state.co.us
http://cwcb.state.co.us