John Hickenlooper – Governor
Mike King – DNR Executive Director
Jennifer Gimbel – CWCB Director

SWSI 2010 Mission Statement, Key Findings, and Recommendations

Statewide Water Supply Initiative 2010 Mission Statement

The Colorado Water Conservation Board will help Colorado maintain adequate water supplies for its citizens, agriculture, and the environment. This will be accomplished through a mix of solutions, all of which should be pursued concurrently.

Introduction

There can be no life without water. Water is indeed the life blood of any community; be it the Front Range metropolis or the farming and recreational communities within Colorado. We know that water supplies are not unlimited. Colorado's growth, development, and quality of life depend upon sustainable and secure supplies of water. The Colorado Water Conservation Board (CWCB), governed by a citizen board, is the state agency responsible for looking at this resource from a statewide perspective. Its mission is to conserve, develop, protect, and manage Colorado's water for present and future generations.

A few years ago, the CWCB, with the blessing of the General Assembly, took on the charge to better understand and prepare for Colorado's future water supply needs. In 2004, the CWCB developed the Statewide Water Supply Initiative (SWSI 1), which comprehensively identified Colorado's current and future water needs to the year 2030. SWSI 1 examined a variety of approaches Colorado could take to meet those needs. In 2006, the report was supplemented by SWSI 2 by adding to the technical work on water conservation, alternative agricultural water transfers, and environmental needs.

SWSI 1 implemented a collaborative approach to water resource issues by establishing "basin roundtables"—diverse groups of people who provide input on water issues. The basin roundtables established a grass roots effort for education and collaboration on water planning issues; those efforts were institutionalized in the Colorado Water for the 21st Century Act of 2005. The Act also created a 27-member Interbasin Compact Committee (IBCC) to facilitate conversations within and between basins.

The Act charges the basin roundtables to develop consumptive and nonconsumptive needs assessments and propose projects and methods to meet those needs. The SWSI 2010 update relies on those basin needs assessments and can inform local and regional water planning efforts; however, SWSI is not intended to replace local project planning or implementation. SWSI 2010 compiles information to develop a common understanding of existing and future water supplies and demands, both consumptive and nonconsumptive, throughout Colorado. Key elements of this update include:

- Analysis of water supply demands to 2050;
- Summary of nonconsumptive needs in each basin, as identified by the basin roundtables;
- Analysis of supply availability in the Colorado River Basin;
- Implementation elements associated with identified projects, water conservation, agricultural transfers (both permanent and nonpermanent), and development of new water supplies; and
- Development of estimated costs of implementing water supply strategies.

SWSI 2010 provides a comprehensive picture of Colorado's water needs—now and in the future. The CWCB intends SWSI to be updated and refined every few years. Also, to ensure the local perspective in this report, each basin roundtable will supplement this report with individual basin reports later in 2011. Used as a statewide planning tool, SWSI 2010 provides comprehensive information to water providers, state policy makers, and the General Assembly as they make decisions for accomplishing our next step—to work together on implementing the necessary strategies to meet our near and long-term future water supply challenges. The CWCB, its staff, and I look forward to working with the stakeholders on implementing strategies to meet the identified water needs, and will keep you up-to-date on our continued progress.

Jennifer Gimbel

Director of the Colorado Water Conservation Board

Final Draft SWSI 2010 Key Findings

Overall Key Finding

Colorado faces a shortage of water for meeting the state's consumptive and nonconsumptive water needs. In order to meet Colorado's water management objectives, a mix of local water projects and processes, conservation, reuse, agricultural transfers, and the development of new water supplies should be pursued concurrently.

Consumptive Needs

Projected Water Use

The relative proportions of Colorado's agricultural, municipal and industrial (M&I), and self-supplied industrial (SSI) gross water use in 2050 are depicted in **Figure 1**. Agriculture will continue to use the majority of Colorado's water supply, although it is projected to decline from 89 percent today to 82 percent by 2050.

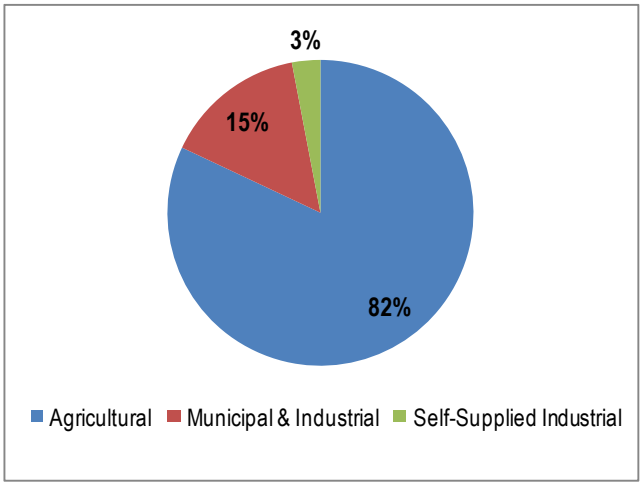


Figure 1. Projected 2050 Water Use by Sector

Agricultural Demands

Each basin faces continued shortages associated with existing agricultural demands. The current agricultural demands and agricultural shortages for each basin are represented in **Figure 2**.

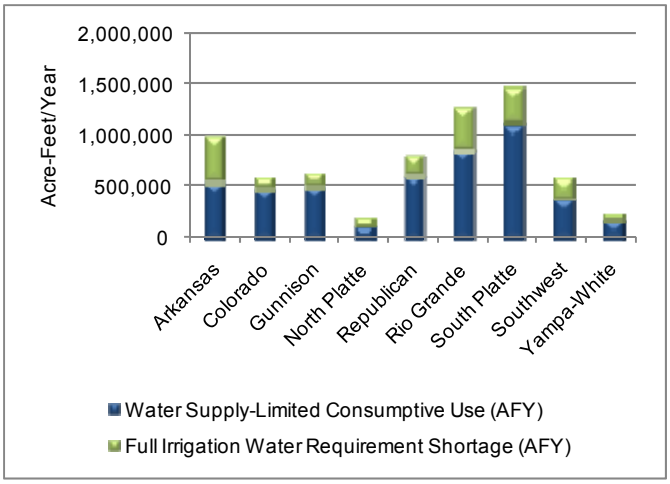


Figure 2. Colorado's Current Agricultural Demands

There are economic pressures to keep agriculture economically viable, and some basins, such as the Yampa, are seeking to expand agriculture. However, the state could also face a significant decline in irrigated acres by 2050 due to urbanization and water transfers.

As shown in **Figure 3**, between 500,000 and 700,000 irrigated acres could be dried-up by 2050 due to urbanization and urban transfers. Large-scale dry-up of irrigated agriculture has adverse economic and environmental impacts.

In 2050, Colorado's agricultural demands are projected to be approximately 4 million acre-feet, compared to 4.8 million acre-feet of current agricultural demand.

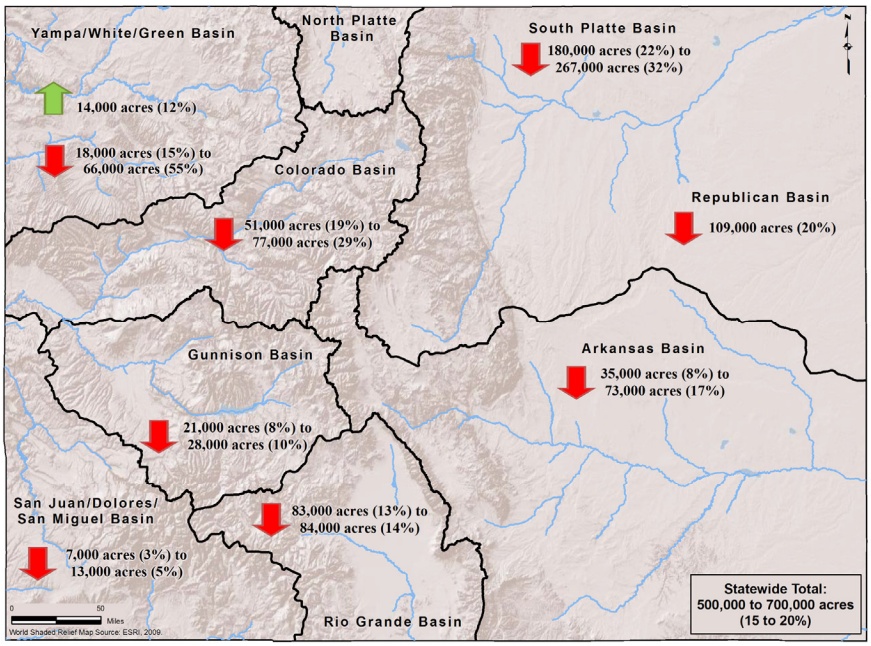


Figure 3. Potential Changes in Irrigated Acres by 2050

Municipal Demands

Significant increases in Colorado's population—together with agricultural water needs and an increased focus on recreational and environmental uses—will intensify competition for water.

- Colorado's population is projected to nearly double to between 8.6 and 10 million people by 2050.
- The Front Range of Colorado will continue to be the most populous place in Colorado with over 80 percent of the state's population residing in the Arkansas, Metro, and South Platte Basins.
- The West Slope of Colorado will grow at the fastest rate of any area in Colorado between now and 2050. Growth rates on the West Slope are as high as 240 percent, whereas on the Front Range the growth rate is approximately 70 percent. Population on the West Slope is expected to more than double in the next 40 years.
- Colorado will need between 600,000 and 1 million acre-feet/year of additional M&I water by 2050. These estimates incorporate new water demands from population growth, energy and other SSI needs (including oil shale), and replacement of nontributary groundwater.

Statewide M&I and SSI demand projections for each basin are represented in **Figure 4** in acre-feet/year. Per capita water demands have decreased by about 18 percent statewide since 2000; however, the cause and permanency of these savings is uncertain.

Energy Demands

An oil shale industry producing 1,550,000 barrels of oil/day could use between 0 to 120,000 acre-feet/year depending upon what technologies and other factors are implemented. Due to ramp up rates, by 2050 projected water use ranges from 0 to 44,000 acre-feet/year for an industry providing 550,000 barrels of oil/day. **Figure 5** summarizes projected oil shale water demands in 2050 and at buildout.

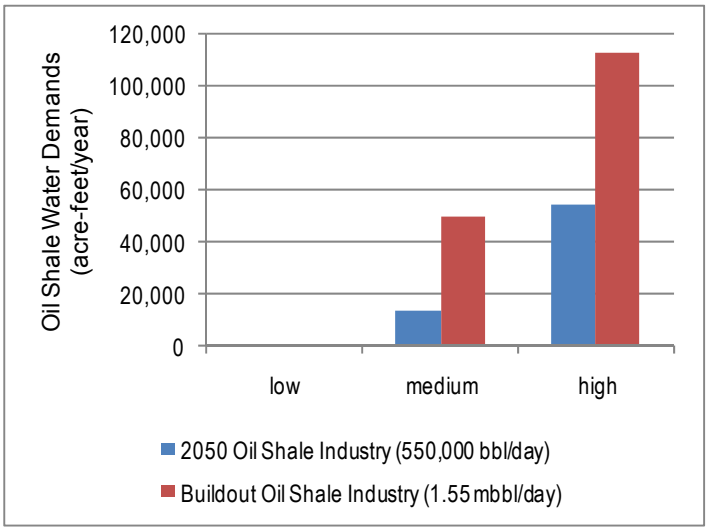


Figure 5. Projected Oil Shale Development Water Demands

Supply

Supply Availability

Supplies are not necessarily where demands are and localized shortages exist, especially in headwater areas. Colorado River compact entitlements are not fully utilized. In the South Platte, Arkansas, and Rio Grande Basins unappropriated water is extremely limited.

The Colorado River Water Availability Study confirmed planning ranges that may be available from the Colorado River system to meet future needs and identified local water availability throughout the Colorado River Basins.

Groundwater Supply

Between now and 2050, decreased reliance on nonrenewable, nontributary groundwater as a permanent water supply is necessary. Otherwise, there are reliability and sustainability concerns in some areas, particularly along the Front Range.

In addition to meeting future M&I water needs, the South Metro area and northern El Paso County will need to replace approximately 35,000 acre-feet/year of nontributary groundwater with a renewable water supply.

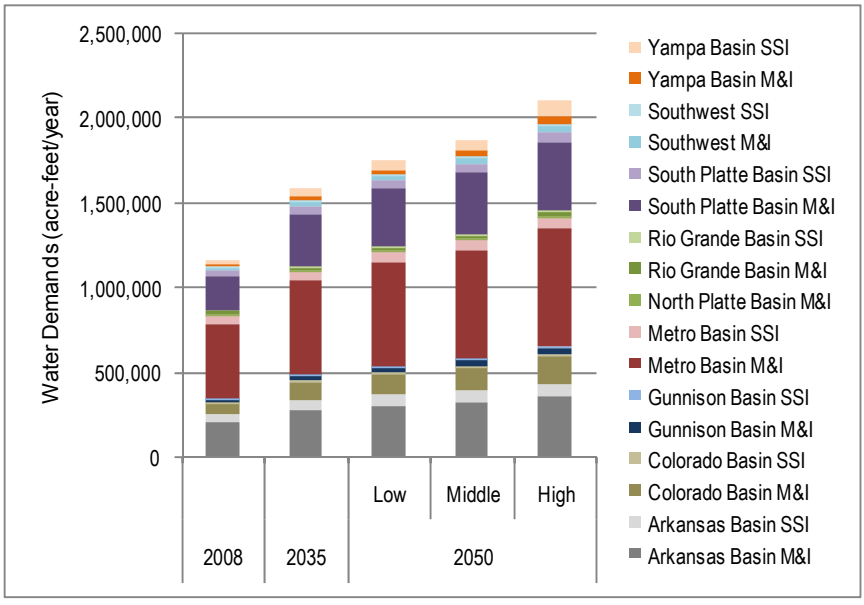


Figure 4. Colorado's Future M&I and SSI Water Demands

Nonconsumptive Needs

Environmental and recreational values will continue to be important to the state's economy and quality of life. **Figure 6** is a summary of each basin roundtable's mapping of their nonconsumptive focus areas. Although Colorado has many existing projects and methods aimed at meeting these nonconsumptive values, additional projects and methods will be needed to meet Colorado's nonconsumptive water supply needs, especially in warmer waters with endangered, threatened, and imperiled species.

- Nonconsumptive focus areas were identified on 33,000 miles of streams and lakes in the state with water related environmental and recreational values. Nearly one-third of these focus areas have an identified project or method to support one or more of the nonconsumptive values in the area.
- The focus areas include 12,000 stream miles that have cold water fisheries (e.g., Cutthroat Trout species and Important Fishing Areas). Of these, nearly 50 percent have an identified project or method to support those values.
- The focus areas include 11,000 stream miles that have warm water fisheries (e.g., Colorado River endangered fish, and species of special concern, such as Roundtail Chub and Arkansas Darter). Of these, approximately 30 percent have an identified project or method to support those values.

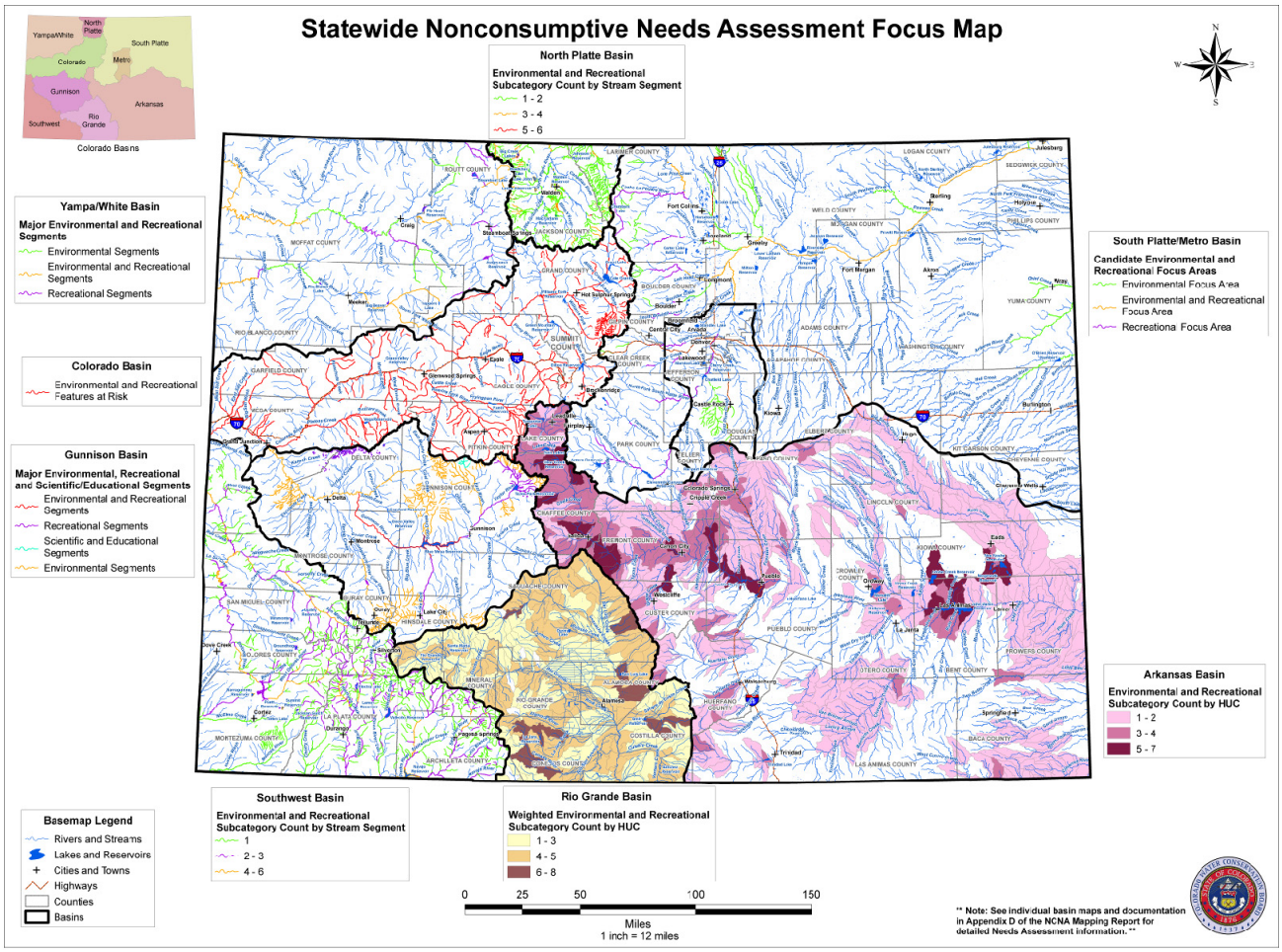


Figure 6. State of Colorado Nonconsumptive Needs Focus Areas

Addressing the M&I Gap

Identified Projects and Processes

As part of SWSI 2010, CWCB gathered more detailed Identified Project and Processes (IPPs) information than was developed for SWSI 1. IPPs are defined as projects and methods local water providers are counting on to meet future water supply needs. The following categories were used:

- Agricultural water transfers
- Reuse of existing fully consumable supplies
- Growth into existing supplies
- Regional in-basin projects
- New transbasin projects
- Firming in-basin water rights
- Firming transbasin water rights

Note that passive conservation is not included in the categorized IPPs since it is factored into the 2050 demand forecasts. This is consistent with the approach used in SWSI 1.

If 100 percent of the IPPs are successfully implemented they would provide 430,000 to 580,000 acre-feet/year. The largest categories of IPP yields by volume are projected to be regional in-basin projects and growth into existing supplies.

IPPs, if successfully implemented, have the ability to meet some, but not all of Colorado's 2050 M&I water needs. Implementation of these local projects and processes are critical to meeting Colorado's future water supply needs.

M&I Gap

Colorado faces a significant M&I water supply gap in 2050. The M&I gap is defined as the difference between the projected M&I water demands and supplies from existing sources and the supplies from the IPPs. The M&I gap varies between 190,000 and 630,000 acre-feet depending on the success rate of the IPPs. By 2050, Colorado's M&I gap could be between 32 percent and 66 percent of new demands.

The M&I gaps for a medium growth scenario in 2050 are illustrated in **Figure 7** and **Figure 8**. In Figure 8, the relative percent of 2050 new water needs met by IPPs are represented in blue, the percent of gap is represented in red, and the size of the pie chart represents new M&I water needs.

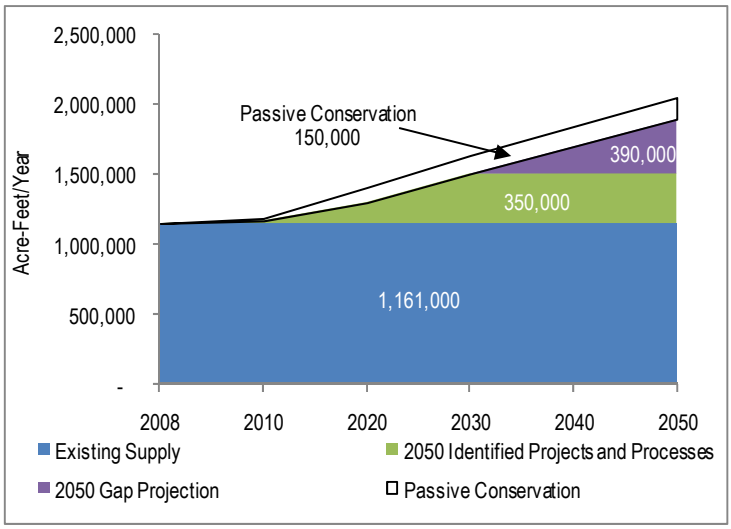


Figure 7. 2050 M&I Gap for Medium Scenario

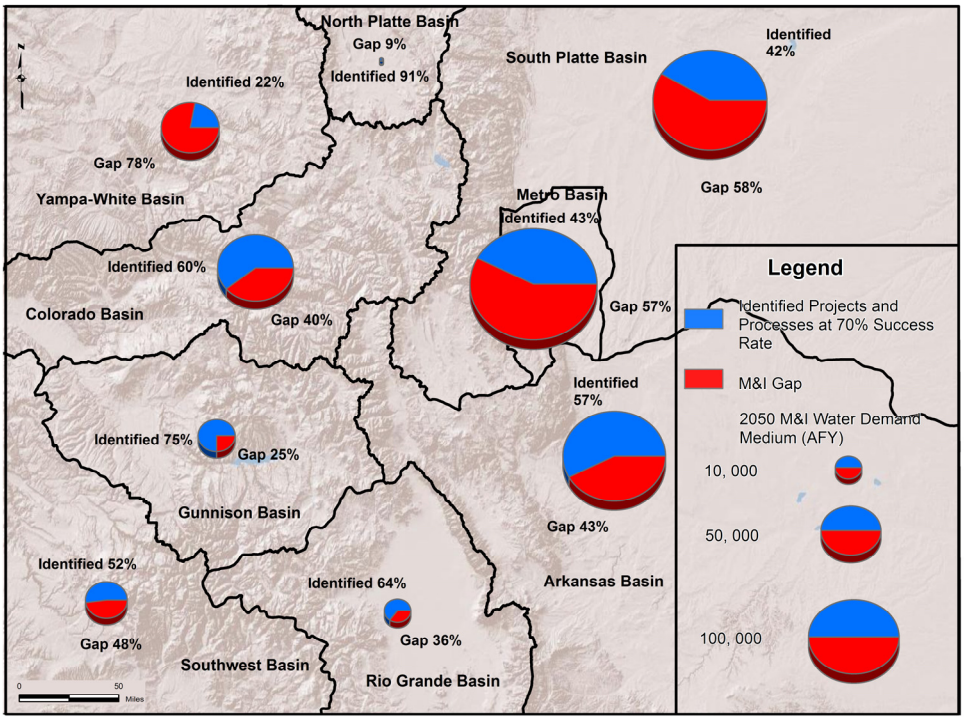


Figure 8. Colorado's 2050 M&I Gaps

Portfolios and Strategies for Meeting the Gap

A mix (i.e., portfolio) of solutions will be necessary for addressing the M&I gap and all elements of the portfolio should be pursued concurrently. This will include the implementation of IPPs, agricultural transfers, new water supply development in the Colorado River system, reuse, and both passive and active conservation as shown in **Figure 9**. No one strategy alone will meet Colorado's future water supply needs, and portfolios explore possible mixes of strategies to weigh the trade-offs that must be made. An example portfolio is shown in **Figure 10**.

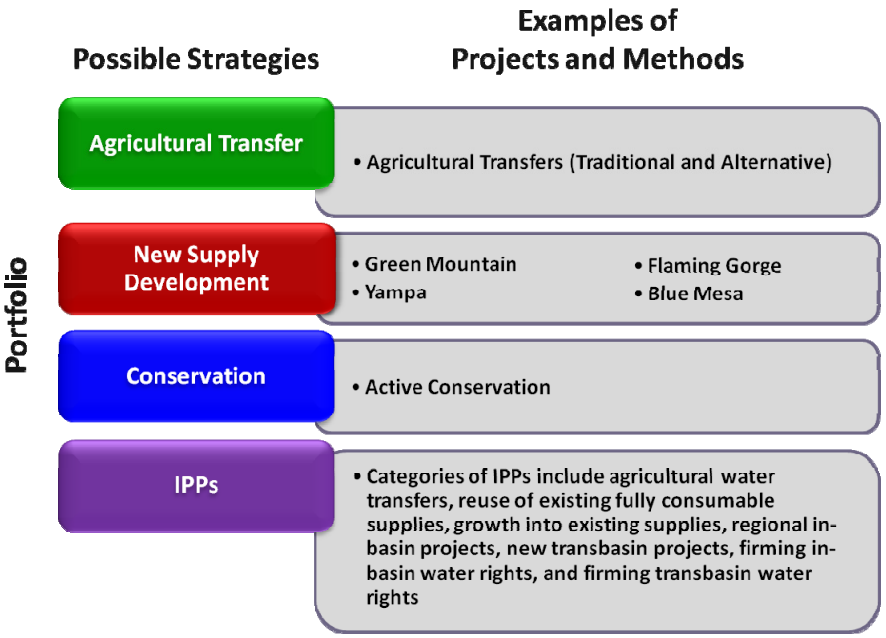


Figure 9. Example Strategies and Projects and Methods to Address Colorado's Future M&I Gaps

Conservation

Water conservation will be one of several important tools for meeting future M&I demands. The SWSI 2010 report provides reconnaissance-level estimates of the statewide water conservation potential. It provides information regarding technical potential for water savings but does not determine how the saved water may be used, which is determined at a local level by water providers taking into account the economic feasibility as well as the political will necessary to accomplish higher savings.

Agricultural water conservation or increasing irrigation efficiency has limited potential to address the M&I gap due to the ability to transfer only the historic consumptive use in most locations due to the requirement that return flow patterns be maintained. There may be some limited opportunities where there are no downstream water right holders (i.e., near the stateline) where more efficient delivery systems (e.g., sprinkler, drip, canal lining) could potentially produce water for other uses.

Land Use Planning

Local entities should consider a closer connection between land use planning and water supply planning with encouragement and support from the state.

New Water Supply Development

New water supplies from the West Slope will be needed for West Slope and Front Range M&I use. How much depends on numerous factors.

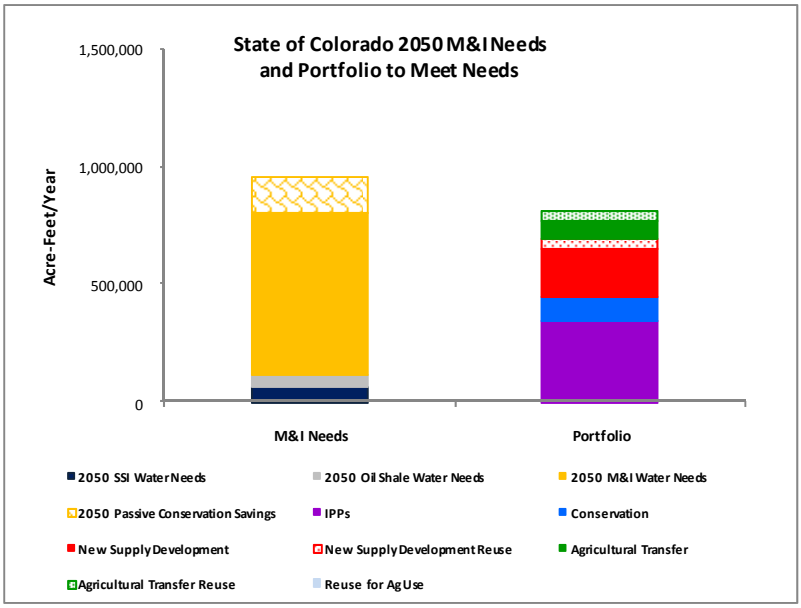


Figure 10. Example Portfolio to Address Colorado's 2050 M&I Demands

Alternative Agricultural Transfers

Alternatives to permanent agricultural water transfers appear to be viable means for meeting a portion of the M&I water supply gap. However, there are significant hurdles to implementing these programs such as high transaction costs, water rights administration, and the certainty of long-term supply for municipalities.

Collaboration

Developing new water supplies in the Colorado River Basin for use on both the East and West Slope can reduce the need for agricultural transfers. This can only be accomplished through continued dialogue. A multi-purpose project could address the consumptive and nonconsumptive water supply needs for the East and West Slope. Water supplies can also be better utilized by water providers working together to seek opportunities for shared facilities and infrastructure.

Water Management Objectives

The Board sees the following as Colorado's water management objectives:

- Meet M&I Demands
- Meet Agricultural Demands
- Meet Colorado's Environmental and Recreational Demands
- Promote Cooperation Between Water Supply Planners and Land User Planners
- Promote More Cooperation Among all Colorado Water Users
- Optimize Existing and Future Water Supplies
- Promote Cost-Effectiveness
- Minimize the Net Energy Used to Supply Water
- Protect Cultural Values Linked to Water Resources
- Provide Operational Flexibility and Coordinated Infrastructure
- Promote Increased Fairness When Water is Moved Between Areas
- Comply With all Applicable Laws and Regulations
- Educate all Coloradoans on the Importance and Scarcity of Water

Cost of Meeting Future Needs

Meeting Colorado's future water supply needs will require significant investment. Preliminary funding analysis indicates that implementing a portfolio of solutions to address Colorado's 2050 medium M&I water supply needs (approximately an additional 800,000 acre-feet/year) will cost around $15 billion under status quo assumptions. These costs will increase if Colorado experiences high M&I demands and will decrease if Colorado experiences low M&I demands or implements an alternative portfolio to the "status quo."

The costs associated with the status quo portfolio could be reduced if a coordinated approach, incorporating fewer but larger multi-use projects were used. However, while a coordinated approach would save the citizens of Colorado billions of dollars, it would require a higher level of state involvement including significant state funding.

In addition to meeting M&I needs, state funding will continue to be needed to meet agricultural and environmental water supply needs. Without a mechanism to fund environmental and recreational enhancement beyond the project mitigation measures required by law, conflicts among M&I, agricultural, recreational, and environmental users could intensify.

The ability of smaller, rural water providers and agricultural water users to adequately address their existing and future water needs is also significantly affected by their financial capabilities, and many of them rely on state funding to help meet their water supply needs.

Costs for Water Supply Infrastructure

SWSI 2010 analyzed example projects that transport water from the lower South Platte and Arkansas to the Front Range, as well as pumpback projects from the Yampa Basin, Gunnison Basin via Blue Mesa Reservoir, and Green River Basin via Flaming Gorge Reservoir. A reconnaissance analysis of capital costs for these projects range from $5 to $9 billion for 250,000 acre-feet of water. The cost for developing 250,000 acre-feet increases if developed incrementally through several smaller projects. The costs presented here represent only one part of the portfolio needed to address Colorado's future M&I demands, and are based on projects that have been discussed in the past but may or may not be implemented.

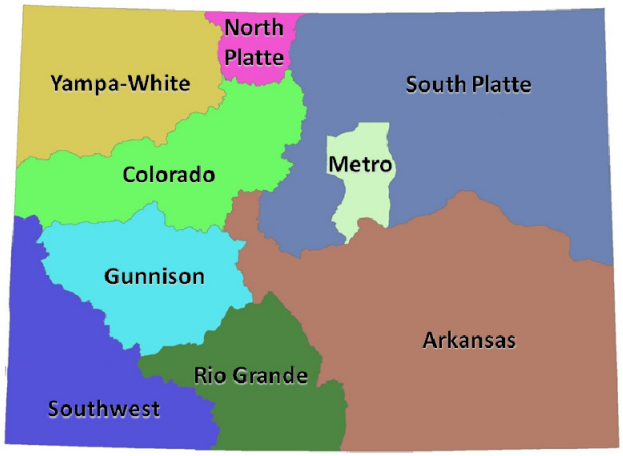
Gross Reservoir, located in the foothills southwest of Boulder, Colorado

Final Draft SWSI 2010 Recommendations

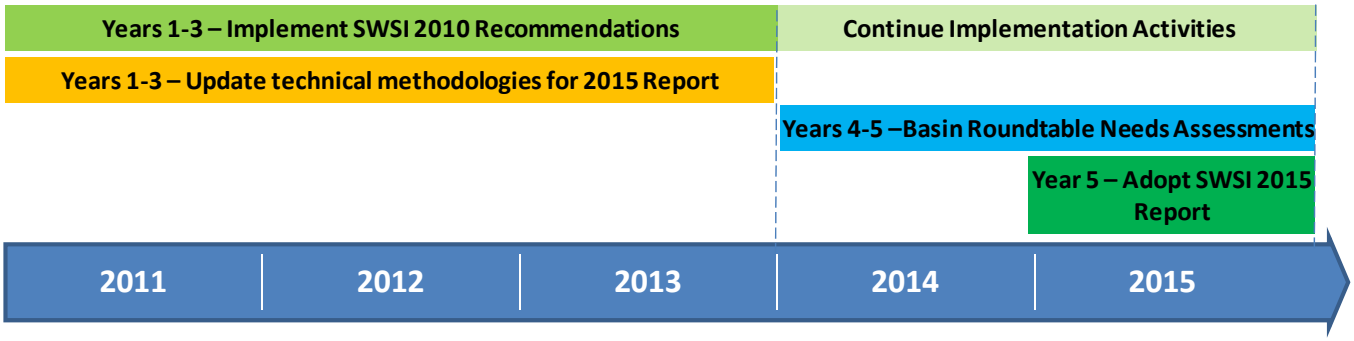
Overall Recommendation

With the 2010 SWSI update, CWCB has confirmed and updated its analysis of the state's water supply needs. CWCB, the IBCC, and basin roundtables should now enter an implementation phase to determine and pursue projects and methods to help meet the state's consumptive and nonconsumptive water supply needs. This will be accomplished through the implementation of the following recommendations by the CWCB.

1. **Establish a 5-year planning cycle for assessing Colorado's long-term consumptive and nonconsumptive water needs and support the implementation of projects and methods to meet those needs.**
   a) Years one through three (2011 through 2013) the CWCB will implement the SWSI 2010 Recommendations (detailed below). Interim progress reports will be provided to the Board each year, describing achievements under each recommendation. A progress document describing what was accomplished and what lessons were learned will be produced by 2015.
   b) Years one through three (2011 through 2013) the CWCB will review and update the technical methodologies for the 2010 SWSI report in preparation for a 2015 SWSI report.
      i. Establish technical review committees to recommend and review methodologies for SWSI 2015, incorporating diverse stakeholders and basin roundtable representation.
      ii. By 2013, the CWCB will approve a set of methodologies to be used for updating the needs assessments and calculating the water supply gaps.
   c) Years four and five (2014 and 2015) update basin roundtable needs assessments and SWSI including an analysis of each basin's:
      i. Consumptive water needs (municipal, industrial, agricultural, and energy),
      ii. Nonconsumptive water needs (environmental and recreational),
      iii. Available water supplies, and
      iv. Proposed projects and methods to meet the basin's consumptive and nonconsumptive needs, including strategies and projects to fill the gap.
   d) Year five (2015) CWCB will finalize and adopt the SWSI 2015 update, incorporating basin roundtable and statewide implementation strategies to address future water supply needs.
2. **Continue to lead the dialogue and foster cooperation among water interests in every basin and between basins for the purpose of implementing solutions to Colorado's water supply challenges.**



   a) Support the ongoing implementation of the Colorado Water for the 21st Century Act by providing staff support and technical assistance to the nine basin roundtables and the IBCC.
   b) Encourage the establishment of basin roundtable subcommittees with broad stakeholder involvement to review technical work and implementation strategies.
   c) Because of the interdependency of Colorado's water supplies, encourage cross-basin discussions/ negotiations by supporting joint basin roundtable meetings by initiating quarterly or bi-monthly meetings and hosting a joint IBCC/basin roundtable statewide summit.
   d) Establish quarterly call-in meetings with roundtable chairs to discuss issues/successes within their basins and issues/successes in running the meetings.
3. **Actively encourage new projects to address multiple purposes, including municipal, industrial, environmental, recreational, agricultural, risk management, and compact compliance needs.**
   a) Explore the advantages and disadvantages of implementing a state water project.
   b) Explore opportunities to develop state/local partnerships in M&I gap areas and for encouraging new projects to address multiple purposes (projects that meld consumptive and nonconsumptive needs).



5-Year Planning Cycle Timeline

i. Pursue local in-basin state/local partnerships in gap areas. Target CWCB support for reservoir rehabilitation projects as one method for meeting local water supply needs.
ii. Continue to explore options for utilizing the Animas-La Plata project water to benefit the state.
iii. Building on CWCB's role with Chatfield Reallocation Project, determine if offering to be the federal loan signatory on future projects would be helpful to water providers, especially where there are multiple partners and the project is providing multiple benefits.

c) Work with willing project proponents to identify opportunities and funding for expanding a project's scope to facilitate multi-purpose projects and bring in multiple partners.

4. Support water project proponents and opponents in resolving conflict and addressing concerns associated with implementing IPPs that will reduce the M&I water supply gap. Identify IPPs that could feasibly move forward by 2020.

a) Advocate creating a joint agency task force as outlined in the IBCC recommendations by 2013 and actively participate in the joint agency task force.
b) If the joint agency task force is not created by 2013, CWCB will be a cooperating agency in all water supply National Environmental Policy Act compliance processes within Colorado.
c) Identify IPPs where there is disagreement about a proposed project and, if the project proponent requests it, convene stakeholders to help facilitate the resolution of conflicts around the IPP.
d) Work with federal permitting agencies on best methods to address common obstacles in the permitting process and coordinate with federal, state, and local agencies on permitting for IPPs.
i. Support collaboration with Department of Natural Resources (DNR)/CWCB and the federal permitting entities to establish basic guidelines around demand calculations, conservation, hydrologic modeling, cumulative impacts, alternatives, and reliability factors by 2015.
ii. Explore with the permitting entities and water providers if there are ways to create incentives for multi-purpose projects and regional cooperation.
iii. Address permitting disincentives that inadvertently drive agricultural dry-up.
iv. Explore the possibility of developing regional permitting for small enlargements, maintenance, and improvements of existing reservoirs where the nationwide permit does not apply.
e) Track each basin's IPPs through the ongoing implementation of Basin Needs Decision Support System (BNDSS) and associated surveys and interviews. Report to the Board each year on the status of the IPPs, which IPPs are implemented, and how much they are yielding.
f) Identify the major phases for developing water supply projects. Work with willing project proponents to identify ways CWCB can help at each stage, identify opportunities for multiple partners, and facilitate multi-purpose projects. This is to be accomplished by 2012.
g) Target loan and grant programs to help implement the IPPs and fill the remaining M&I water supply gaps.

5. Support meeting Colorado's nonconsumptive water needs by working with Colorado's water stakeholders to help:

- **Promote recovery and sustainability of endangered, threatened, and imperiled species in a manner that allows the state to fully use its compact and decreed entitlements.**
- **Protect or enhance environmental and recreational values that benefit local and statewide economies.**
- **Encourage multi-purpose projects that benefit both water users and native species.**
- **Pursue projects and other strategies, including CWCB's Instream Flow Program, that benefit consumptive water users, the riparian and aquatic environments, and stream recreation.**
- **Recognize the importance of environmental and recreational benefits derived from agricultural water use, storage reservoirs, and other consumptive water uses and water management.**

a) Expand the BNDSS to track and monitor nonconsumptive IPPs.
b) Work with roundtables to determine projects and methods to address "nonconsumptive gap" areas that define where existing or planned projects/methods are not present for addressing the basin roundtable approved nonconsumptive attributes and areas. (FY 2012)
c) Target funding towards the focus areas. Specific consideration should be given to planned and ongoing projects and methods as well as additional projects and methods meant to serve the nonconsumptive gap areas. (Ongoing)
d) Pursue opportunities for instream flow appropriations and acquisitions in the nonconsumptive gap areas.
e) Work within CWCB, DNR, and other agencies and nonprofits to address nonconsumptive gap areas. (Ongoing)
f) Work with basin roundtables to determine opportunities to address the remaining nonconsumptive gap areas (including a best practices guide to which projects work best in specific situations), which nonconsumptive IPPs to support, and the sufficiency of existing protections.
g) Incorporate nonconsumptive needs into portfolio development and multi-purpose projects.
h) Educate water providers on areas that could benefit from mitigation as part of a water supply project. (FY 2012)
i) Examine technical methods to determine measures for how much of a specific attribute should be protected and work to ensure sufficient habitat is available and has enough connectivity to meet the attribute's needs (FY 2015).
j) For SWSI 2015, continue to provide technical support to:
i. Update areas with important nonconsumptive attributes,
ii. Update the projects and methods that exist or are planned to quantify, protect, or benefit those attributes, and

iii. Update analysis of a nonconsumptive projects gap.

6. **Help meet Colorado's agricultural water supply needs by incorporating agricultural water needs into the development of water supply portfolios and supporting the implementation of multi-purpose agricultural water supply projects.**
   a) Expand the BNDSS to track and monitor agricultural IPPs.
   b) Pursue opportunities to incorporate agricultural needs into portfolio development and multi-purpose projects.
   c) Partner with the Colorado Department of Agriculture, Colorado Farm Bureau, Colorado Springs Utilities, CAWA, and other agricultural interests to:
      i. Support projects that help sustain irrigated agriculture and where appropriate, leverage CWCB funds with other funding programs.
      ii. Determine the level of interconnectedness of agriculture across the state.
      iii. Encourage maintaining agriculture on the rural/urban border for the benefit of open space and food security.
      iv. Ensure coordination and communication between the CWCB and the agricultural community.
   d) Impacts to irrigated agriculture and rural economies should be minimized by supporting alternative agricultural transfer methods for filling a portion of the M&I water supply needs. Specific recommendations include:
      i. By 2012 build upon findings from past work on alternatives to permanent agricultural transfers, and implement next round of grant funding authorized in SB 2009-125 to facilitate the development of alternative transfer methods in Colorado.
      ii. By 2014 develop and help implement options for the Board's consideration of a potential new state role in implementing alternative transfer methods. Examples of options include operating water banks, grant and loan funds for infrastructure, and/or an alternative to traditional agriculture dry-up project.
      iii. Continue working with water interests to develop and support legislation facilitating the implementation of alternative agricultural transfers.
      iv. Continue financial support for alternative transfer method program leading to the development of demonstration projects that prove the concept can be successfully implemented.
   e) Pursue opportunities for agricultural water conservation, including the next steps outlined in the 2008 "Opportunities and Challenges Associated with Potential Agricultural Water Conservation Measures" report.

7. **In order to determine the right mix of strategies (conservation, reuse, agricultural transfers, and the development of new water supplies) to fill the M&I water supply gap, CWCB will determine what it considers is achievable for each portfolio element and how those portfolio elements could be implemented.**
   a) Work with water users and other stakeholders to define reasonable expectations of water yielded from each portfolio element for the next 20 years, in a revolving manner.
   b) By 2015 recommend a set of portfolios representing low, medium, and high demand and supply scenarios. Assess common elements between portfolios and identify specific projects and methods that need to be implemented.
   c) Continue technical analysis of strategies (conservation, reuse, agricultural transfers, and new supply development) for meeting the gap.

8. **By 2015 evaluate specific multi-purpose projects or packages of projects to develop new water supplies for use on the West Slope and the Front Range.**
   a) Continue to protect Colorado's ability to fully use its compact and decree entitlements by participating in federal and interstate processes and negotiations that may affect Colorado's ability to fully use these entitlements.

9. **Develop risk management strategies so that Colorado can fully use its compact and decree entitlements to best balance Colorado's diverse water needs.**
   a) Define risk management.
   b) Complete the Compact Compliance Study to provide the basis for developing strategies to avoid the need for compact administration, to reduce the effects of compact administration should it occur, and to analyze different compact administration methods.
   c) Work with oil shale companies to utilize produced water and other technologies to minimize water demands associated with oil shale.
   d) Support the development of risk management strategies to minimize the impacts of curtailment due to a compact call on the Colorado River system. Examples include additional storage, one or more water banks involving temporary agricultural transfers/interruptible supply agreements, conjunctive use, and integrated operations and infrastructure of water supplies.
   e) Encourage municipal providers to adopt drought mitigation plans to ensure critical needs are met during drought years.

10. **Support, encourage, and incentivize (through grants) water providers in planning for and implementing M&I active conservation best management practices and other demand management strategies.** Specific recommendations include:
    a) During the next 5-year SWSI planning cycle, the CWCB in consultation with water providers and other stakeholders will evaluate the full costs of water conservation strategies including utility costs and customer costs as well as the benefits to both.
    b) By 2014 develop standardized annual M&I water use data reporting through the implementation of HB 2010-1051. Coordinate this data reporting with the ongoing implementation of the BNDSS and associated surveys.
    c) During the next 5-year SWSI planning cycle, the CWCB, in consultation with water providers and the IBCC, will determine how much active water conservation savings can be applied to meeting future demands.
    d) The CWCB, in consultation with water providers and stakeholders, will investigate the relationship between long-term conservation and drought response.
    e) The CWCB, in consultation with water providers and stakeholders, will continue to examine whether and to what extent current water conservation savings will persist and be permanent. Additionally, the CWCB will examine the current rate of market saturation of these

water conservation measures.

f) Education and promoting the stewardship of water resources that recognizes water's critical role in supporting the quality of life and economic prosperity of all Coloradoans. Develop unified statewide messaging about water and water conservation that is consistent, sustained, and simple.

g) Adopting water efficiency standards which meet or exceed Environmental Protection Agency's WaterSense fixture and appliance specifications in all indoor building codes; and periodically update such codes to include new product specifications adopted by WaterSense.

h) Issuing an Executive Order for all state agencies to prepare and implement a water use reduction and conservation plan to reduce water demand by X percent by (date certain) and annually report on each agency's success in meeting its plan to the Governor's Office along with annual budget requests.

i) CWCB will work with other State and local agencies to encourage and support integration of land use and water planning at the local government level.

   i. Study potential savings from changes in density patterns and other land use practices by working with counties and municipalities to confirm and update potential water savings from increases in density.

   ii. Educate counties, municipalities, and land use planning professionals about the potential water savings.

   iii. Partner with Department of Local Affairs (DOLA) to coordinate planning grant programs.

   iv. Work with DOLA to determine if additional water supply considerations should be incorporated into their model land use code.

11. Work with water providers to identify opportunities where additional water could be made available in the Front Range by increased regional cooperation, storage, exchanges, and other creative opportunities.

a) Examine exchange potential in the lower South Platte.

b) Support cooperative infrastructure projects, including the sharing of existing infrastructure and water resources.

c) Support conjunctive use, aquifer storage recharge, and other storage opportunities on the Front Range.

12. Continue the evaluation of Colorado's water supply availability in all basins to help provide water users with viable analysis tools.

a) Further develop and maintain the Colorado Decision Support Systems (CDSS) as a statewide tool for determining baseline water availability.

   i. Continue to maintain and operate the CDSS tools, data, and software to help water users have access to hydrologic related data.

   ii. Complete Arkansas Basin DSS.

   iii. Complete South Platte Basin DSS, including North Platte components.

   iv. Continue development of CDSS for the Yampa, White, Colorado, Gunnison, Southwest, and Rio Grande Basins.

   v. Produce annual CDSS newsletter to share progress.

   vi. Update basin model datasets for 2014 by 2015.

b) Complete the CRWAS.

   i. Address all comments for CRWAS Phase I.

   ii. Make modeling tools available to basin roundtables, CWCB, and the IBCC for determining water availability trade-offs between strategy alternatives. Potential topics may include:

   - Model IPPs, 2050 irrigated acres, and nonconsumptive projects.
   - Model any new strategies identified by the CWCB or IBCC, such as increased West Slope conservation and new supply projects to determine strategy alternatives that optimize statewide benefit.
   - Model additional projects, if any, that reduce risks and conflicts within the state. One example may be modeling potential triggers associated with allowable diversion of a new water supply project on the West Slope. This would help determine the affects different alternatives may have on the new diversion and existing users.

   iii. Discuss the need and timing of CRWAS Phase II by 2012 in relation to basin roundtables, CWCB, and the IBCC needs, such as the examples discussed above in 12.b.ii.

   iv. Determine the impact of results of the Bureau of Reclamation's Colorado River Basin Study on Colorado.

13. Help safeguard Colorado's water supply during times of drought by incorporating drought mitigation and response in statewide and local water supply planning.

a) The CWCB will support the following eight goals set forth in the 2010 Drought Mitigation and Response Plan:

   i. Improve water availability monitoring and drought impact assessment.

   ii. Increase public awareness and education about the importance of drought preparedness.

   iii. Augment water supply through mechanisms to transfer water from areas of surplus to areas of shortage during a drought.

   iv. Coordinate and provide technical assistance for state, local, and watershed planning efforts.

   v. Reduce water demand/encourage conservation.

   vi. Reduce drought impacts to Colorado's economy, people, state assets, and environment.

   vii. Develop intergovernmental and interagency stakeholder coordination.

   viii. Further evaluate potential impacts from climate change on drought.

b) The following actions will be implemented during the next 5-year SWSI planning cycle to achieve these goals:

   i. Expand the BNDSS to track and monitor drought impacts data and information

   ii. CWCB will work with other state agencies and non-governmental agencies to continue implementation of drought preparedness initiatives.

   iii. CWCB will work with stakeholders including the IBCC to assess specific water sector vulnerabilities and begin developing policies to provide additional response flexibility during drought.

   iv. Standardize drought vulnerability data statewide.

   v. Develop state policy encouraging M&I providers to develop local drought plans.

vi. Develop a means to characterize water supply reliability at a more local level (i.e., by district) in future M&I drought vulnerability studies.
vii. CWCB will work with stakeholders, including other state agencies, to develop a monitoring network that decreases redundancy and best utilizes limited State resources.

14. Support local water supply planning.

a) Encourage Integrated Resource Plans (IRPs) and increased regional planning.
b) Assist roundtables in developing implementation plans for their consumptive and nonconsumptive needs.
c) Work with basin roundtables to create measurable goals towards meeting their consumptive and nonconsumptive water supply needs.
   i. Use the portfolio tool with each basin to derive an M&I water supply portfolio (i.e., a mix of conservation, IPP success rates, agricultural transfers, and the development of new water supplies).
   ii. Incorporate each basin roundtable's portfolio into an overall state portfolio and facilitate cross-basin discussions as needed.
   iii. Track progress towards these individual basin goals by tracking at a basin and state level amounts of conservation, successfully implemented IPPs, agricultural transfers, and progress towards the development of new water supplies.
   iv. Provide technical support to have joint roundtable meetings to resolve issues that cross basins.
   v. Work with the IBCC to revise the WSRA criteria and guidelines as needed to help direct WSRA funding for each basin towards meeting these individual basin goals.

15. The CWCB, in consultation with other state agencies, shall develop and implement a plan, pursuant to the recommendations outlined in the CWCB-approved Colorado Water Education Task Force 2008 Final Report, to educate and promote stewardship of water resources that recognizes water's critical role in supporting the quality of life and economic prosperity of all Coloradoans.

a) Develop a public relations campaign that results in a unified, consistent, and audience-appropriate message that increases the public's awareness, understanding, and stewardship of Colorado's water resources and their multiple uses and benefits.
b) Coordinate efforts between the Colorado Water Institute (CWI); the Public Education, Participation, and Outreach workgroup of the IBCC; the Colorado Foundation for Water Education (CFWE), and other state educational efforts (including those of other state agencies, local governments, and non-governmental organizations).
c) Promote and support the development of a statewide initiative to improve the professional development and training of Colorado's future water leaders (including the CFWE Water Leaders Program, the CWCB/CWI internship program, and other efforts).
d) Maximize education opportunities by cross-collaborating with those working to educate about other natural resource issues (e.g., climate change, energy, wildlife, etc.)
e) Participate in education efforts for the public, municipal, and county planning authorities, decisionmakers, and elected officials, on Colorado's future water supply needs and the potential solutions. Specific actions are:
   i. Support development and implementation of basin roundtable education action plans to provide sufficient understanding in support of in-basin solutions. The first round of educational events will be completed by the end of 2011.
   ii. CWCB will participate in forums and conferences locally, statewide, regionally, nationally, and internationally.
   iii. Utilize the education efforts being developed for Water 2012 to educate stakeholders, including Colorado citizens, on Colorado's future water supply needs and solutions. This action would not repeat efforts identified for implementation in the basin roundtable education action plans.

16. Utilize existing and new funding opportunities to assist in implementing projects and methods to meet Colorado's consumptive and nonconsumptive water supply needs.

a) Work with the Governor, Joint Budget Committee, and the General Assembly to maintain CWCB's existing funding opportunities since the state's water supply challenges are immediate and implementing. Solutions to Colorado's water supply challenges will cost billions of dollars over the next 40 years.
b) Explore new funding mechanisms to help meet Colorado's water supply infrastructure needs including new funding streams and new state roles in water projects (i.e., building off successes, like the Arkansas Valley Conduit, which maximizes a state loan and grant with federal matches, and the Chatfield Reallocation Project, where the State carries the loan guarantee to support water providers).

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