No/Low Regrets Action Plan

Prepared for August 6, 2013 IBCC Meeting

Introduction

Based on the dialogue and direction from November 2012, March 2013, and June 2013 Interbasin Compact Committee (IBCC) meetings, as well as numerous subcommittee meetings, a draft No and Low Regrets Action Plan has been developed. The draft document does not reflect consensus. Rather, the IBCC members have developed a menu of options, which has received initial screening by the IBCC. The IBCC was asked to eliminate any potential specific actions that they "could not live with" as options and to add any missing items. Before the actions described in the document are incorporated into the draft Colorado Water Plan (CWP), Basin Implementation Plans (BIPs), or the Statewide Water Supply Initiative (SWSI), additional input from various stakeholders will be needed. In addition, detail on how and with what funds a specific action will be implemented will be necessary for any action to be realized.

The No/Low Regrets Action Plan is based on the foundation of the Scenario Planning and Portfolio work conducted by the IBCC and the Basin Roundtables. This work has been incorporated into the draft copy of SWSI *Chapter 7: Scenario Planning and Adaptive Management*, which is available here. This work indicates that the following strategies are necessary in preparation for any future scenario.

- **Identified Projects and Processes:** Implement Identified Projects and Processes (IPPs) to yield 80 percent, equivalent to 70,000 acre-feet per year (AFY) for the West Slope and 280,000 AFY for the East Slope.

  Adaptive Capacity: Track the yield of the IPPs in meeting the gap. If IPPs are not implemented to planned levels, additional emphasis on other portfolio elements will be required.

- **Conservation:** Implement strategies to meet medium levels of conservation and apply half of that to meet the Municipal and Industrial (M&I) Gap.

  Adaptive Capacities: Track the reliability of these conservation savings in meeting the gap. If conservation does not prove to be reliable, additional emphasis on other portfolio elements will be required.

- **Agricultural Transfers:** Limit traditional "buy and dry" to the IPPs and urbanization. Initiate alternative agricultural transfer project or projects on the East Slope to yield 50,000 AFY plus an additional 25,000 AFY from reuse of that water.

  Adaptive Capacity: Preserve and plan for additional alternative agricultural transfers, should a future scenario require it. If the 50,000 AFY alternative agricultural transfer project or projects is not implemented to planned levels, additional "buy and dry" will result.

- **New Supply:** Develop 35,000 AFY of new supplies in the Colorado River system for the West Slope.

Adaptive Capacity: Preserve and plan for transbasin new supply options, should a future scenario require it.

- **Nonconsumptive:** Implement nonconsumptive projects.
- **Implement Storage and Other Infrastructure:** Implement storage and other infrastructure to maximize flexibility and reliability.

This work underscores the critical importance of implementing the no/low regrets actions within the next 10 to 15 years. Without the full implementation of these foundational actions, the gap between demands and water supplies will be much greater than originally projected. This means that even under a weak economy scenario, new water supplies would be needed. Under the scenarios in which demands for water are greater and/or supplies lower, even more new supplies and agricultural transfers would be needed beyond what was envisioned by the Basin Roundtables.

As a reminder, the IBCC concluded that the no/low regrets actions should meet the following criteria:

- Actions that are needed to meet future water needs, regardless of which 2050 scenario Colorado faces.
- Actions that are needed to preserve the water supply options described in the portfolios, which may be needed for one or more scenarios.
- Actions that should move forward in the near-term, and can serve as the initial implementation components of adaptive management, as well as the first phase of the CWP and implementation of SWSI.
- Actions that have few or no disadvantages in terms of costs and benefits, regardless of the future.

The IBCC identified the following no/low regrets goals:

1. *Minimize Statewide Acres Transferred (per Basin Goals) and Implement Agricultural Sharing Projects.*
2. *Plan and Preserve Options for Existing and New Supply.*
3. *Establish Low/Medium Conservation Strategies.*
4. *Implement Nonconsumptive Projects.*
5. *Have a High Success Rate for Identified Projects and Processes.*
6. *Implement Storage and Other Infrastructure.*
7. *Implement Reuse Strategies.*

Although the IBCC is the principal author of the No/Low Regrets Action Plan, the committee is not expected to implement the actions. Most of the implementation will likely be by project proponents, Basin Roundtables, and appropriate state agencies.

This draft of the No/Low Regrets Action Plan includes sections at various stages of revision. The sections for *"Minimize Statewide Acres Transferred and Implement Agricultural Sharing Projects"* and *"Plan and Preserve Options for Existing and New Supply"* are the third draft to the full IBCC. This is the second draft for "*Low/Medium Conservation Strategies*" and "*Implement Nonconsumptive Projects*" sections. This is the first draft that the IBCC will see for the "*Implement Storage and Other Infrastructure*" and "*High Success Rate for IPPs*" sections. In addition, the Conservation Subcommittee requested that a new no/low regret section for reuse be written. The initial draft included here has not had any additional input from the IBCC. After the August 2013 IBCC meeting, the document will be revised one more time and presented to the Colorado Water Conservation Board (CWCB) during its September 2013 board meeting, after which point additional public feedback, per the direction of the CWCB Board, will be sought on the No/Low Regrets Action Plan.

This No/Low Regrets Action Plan relies on information developed by the IBCC, the CWCB Board, and the Basin Roundtables. Each of the no/low regrets goals may consist of the following information, which will be more fully developed over time as they are integrated into the CWP, BIPs, and SWSI. The following aspects of the No/Low Regrets Action Plan may include the following for each section:

- **Potential Future Action Purpose(s):** The reason or purpose for the action and what it could accomplish. This section may include a description of the action in general.
- **Potential Specific Actions:** Specific actions to accomplish the identified purpose(s). These could be considered deliverables. This is "what" needs to be done to accomplish the intended purpose(s).
- **Immediate Action Steps:** Near-term steps that should be taken to move a specific action forward. This is the "how" the specific actions can be accomplished.
- **Measurable Outcome:** How the action will help accomplish the overall goal in a quantifiable way.
- **Timeframe:** When a specific action will be completed.
- **Partners:** Who will need to be involved to implement a given action?
- **Background:** Past work, discussions, issues, and opportunities that may inform the specific action, such as:
  - ***Challenges/Barriers.***
  - ***Opportunities.***

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1. Minimize Statewide Agricultural Acres Transferred (per Basin Goals) and Implement Agricultural Sharing Projects

As Colorado's population continues to grow in the coming decades, it is likely that there will be an increased demand for the transfer of agricultural water rights to satisfy municipal and industrial (M&I) water demands. Urbanization, compact compliance (e.g., Republican River), and augmentation requirements will place further pressure on agricultural water rights in Colorado. While it is expected that Colorado's future water demands will be met through all "four legs of the stool," the Statewide Water Supply Initiative (SWSI) 2010 report (Colorado Water Conservation Board [CWCB] 2011) and other analyses have found that irrigated acreage is expected to decline throughout the state in the coming decades. The CWCB has found that if the status quo development trend continues, the South Platte Basin is estimated to lose 301,000 to 424,000 acres of currently irrigated land by 2050.

Historically, agricultural-to-municipal water transfers have been implemented through a process commonly referred to as "buy-and-dry." In such transfers, a water provider—such as a municipal water utility—purchases agricultural water rights or shares in a ditch company, and the consumptive use (CU) water from those rights is changed in water court to allow M&I uses. Transferred agricultural water may also be used for environmental or compact compliance purposes. The formerly irrigated farmland must be permanently dried up and revegetated, or converted to dryland farming practices. In cases where the transferred parcels are located near a rural/urban interface, the land may be developed and urbanized. In this manner, large tracts of Colorado's historically irrigated lands have been lost and will continue to be lost in the future.

The status quo free market system will not be able to meet basin goals for minimizing traditional agricultural dry-up. However, creative solutions such as rotational fallowing, interruptible water supply agreements (IWSAs), water banks, purchase and lease back arrangements, deficit irrigation, and changing crop types may be able to mitigate the negative impacts associated with buy-and-dry practices while providing needed water for M&I purposes. The state has encouraged these activities primarily through incentive programs (e.g., the Alternative Transfer Methods (ATM) Grant Program), pilot projects, and other types of activities. In some cases, legislative action may be needed to initiate these activities.

Completed and Ongoing Actions	Potential Future Actions
• Implement ATM Grant Program • Ongoing CWCB and IBCC support	1) Develop an Incentives Program a) Financial incentives b) Streamlining approval processes c) Selective and systematic considerations 2) Establish ATM Pilot Projects a) Overlay district or authority b) Storage and other infrastructure c) Multi-purpose objectives d) Adequate measurement and monitoring 3) Establish Basin Goals and Track Ongoing Progress 4) Implement ATM Program 5) Identify and Implement Infrastructure and Storage See the *Storage and other Infrastructure* section

1) Develop an Incentives Program

Potential Future Action Purpose(s)

Incentives will drive alternative methods for agricultural transfers, resulting in potentially fewer acres of irrigated land being lost to traditional buy-and-dry practices. Incentives, whether they are financial or regulatory, will encourage agricultural, municipal, and environmental interests to seek creative, mutually beneficial solutions for managing and sharing limited water supplies into the future. However, such incentives will need to be selective and systematic.

Potential Specific Actions

a) **Financial incentives:** ATMs are very expensive, especially if a base supply is needed. In addition to continuing to fund the CWCB ATM Grant Program at current levels, other targeted funding options should be identified. These funding opportunities may come from local, state, or federal partnerships; the creation of a new and ongoing revenue stream (see overlay district below); and/or tax incentives. For instance, Great Outdoors Colorado (GOCO), land trusts, CWCB loan and grant programs, the conservation easement tax credit program, and municipal contributions should be explored as options for incentivizing ATM projects. In addition, funding through the Natural Resources Conservation Service (NRCS), such as the Environmental Quality Incentives Program (EQIP), or other federal resources may be available to enable certain agricultural and flow protection strategies. These financial incentives can help to keep land and water in agriculture while allowing for municipal leases during a certain number of years. If multiple funding programs were directed towards a single effort (e.g., purchasing conservation easements on significant acreage in the South Platte and developing interruptible agreements for those lands and water), the water yield could be significant.

b) **Streamlining approval processes:** Short-term leasing of agricultural water for municipal, environmental, or compact compliance purposes can serve as an important water source for dry-year water and drought recovery. To be successful, these short-term leases must be less costly and easier than traditional buy-and-dry practices. Currently, going to water court for temporary or partial agricultural transfers could expose a water right holder to unwanted risks. Administrative approval processes should be streamlined to allow for creative, innovative, and discretionary water administration. Certainty about noninjury must be provided for other

water right holders while allowing agricultural water to be put into water banks and/or leased. Identified processes that need to be simplified are:

i) Determination of historical CU.

ii) Determination of noninjury to other water right holders.

iii) Consideration of the following regulatory incentives:

(1) Disincentives for traditional buy-and-dry.

(2) Preventing penalties to farmers for decreasing CU.

(3) Facilitating agreements between M&I and agricultural interests rather than purchases.

c) **Selective and systematic considerations:** There are several possible options for developing a selective and customized incentives program. For instance, there could be incentives that encourage less productive lands to enter into an ATM. This would help preserve the most highly valued agricultural lands. This could be accomplished by funding ATM projects in less productive areas at a higher level than for other ATM projects. Alternatively, incentives could focus on encouraging farmers to move from low-value crops (e.g., alfalfa) to high-value crops (e.g., vegetables and fruits). The options and relative impacts should be explored.

Immediate Next Steps

- **Education:** Education is critical to the success of ATMs. Consistent education is needed statewide to convey the message that water is not free. CWCB should conduct periodic workshops bringing together experts (e.g., ATM applicants, Division of Water Resources (DWR) staff, CWCB staff) to discuss recent findings, explore potential solutions, and identify topics for further investigation.

- **Develop criteria and guidelines for the Irrigation Water Leasing Municipal Pilot Projects Bill (House Bill (HB) 13-1248):** The bill authorizes CWCB to administer a pilot program consisting of up to 10 pilot projects, each up to 10 years in duration, to demonstrate the practice of fallowing agricultural irrigation land and leasing the associated water rights for temporary municipal use. CWCB is charged with developing criteria and guidelines in cooperation with DWR. The guidelines should be developed prior to the 2014 irrigation season and be done in a transparent manner that incorporates public input.

- **Implement HB 13-1130: Reapprove Interruptible Water Supply Agreements:** Current law allows the State Engineer to approve the operation of an IWSA for 3 years out of a single 10-year period; once the agreement has been operated, the State Engineer cannot approve the agreement for operation in any later period. The bill allows the State Engineer to reapprove an agreement up to two additional times by following the same procedures for approval of the original agreement.

- **Implement Senate Bill (SB) 13-74: Irrigation Water Right Historical Use Acreage (passed):** The bill creates a mechanism to determine the amount of acreage for an irrigation water right for which the original decree predates 1937 and is unclear about the amount of

acreage that may be irrigated under the water right. This is considered a general incentive for change cases for a limited number of decrees by reducing the risk of going to water court.

- **Explore Additional Potential Legislative Action:**
  - Determine how legislation that was recently passed works together prior to determining if any additional legislation is needed.
  - Broaden HB 13-1248 to include additional objectives, such as pilot projects to demonstrate agricultural transfers that meet environmental or compact needs.
  - Explore legislation that would further utilize the conservation easement tax credit to incentivize coupling of conservation easements with IWSAs. This would have the potential to provide a reliable source of water and preserve agricultural productivity in perpetuity. This strategy should be researched in more detail, including an analysis of which lands and/or ditches are most amenable to the approach, identification of funding partners (e.g., GOCO, Colorado Department of Revenue/Tax Credits, federal programs such as EQIP), and an examination of applicable terms of conservation easement deeds and IWSAs.
  - Explore legislation permitting the State Engineer's Office (SEO) to initiate basin or subbasin efforts to facilitate agricultural fallowing agreements.
  - Explore other potential legislation that reduces barriers, such as those identified in the "Establish ATM Pilot Projects" section below, or further incentivizes ATMs.

2) Establish ATM Demonstration Projects

Potential Future Action Purpose(s)

ATM demonstration or pilot projects are temporary projects that will allow farmers, municipalities, environmental interests, and governmental agencies to test and explore various ATMs without committing to permanent changes in water law or policy. Pilot projects can explore and demonstrate the impacts of a number of creative approaches to ATMs, allowing agricultural, municipal, and environmental interests to identify effective methods of managing and sharing water supplies. If successful, pilot projects may become permanent.

There is considerable support for pilot ATM projects to explore cooperative projects between agricultural, urban, and environmental interests, especially in the South Platte and Arkansas Basins. There is also considerable interest from the IBCC in implementing a large pilot project. HB 13-1248 and CWCB's ATM grant program can lay the groundwork for ATM pilot projects to move forward on a larger scale. In addition, to ensure base supplies, an ATM pilot project should be able to contribute to water supply during drought. Both agricultural efficiency and agricultural conservation (decreased CU) should be supported. One important goal will be to decrease nonbeneficial CU. In addition to ATM pilot projects in the South Platte and Arkansas Basins, other basins should also be considered. This could include a West Slope Water Bank to help meet Colorado River compact needs. A water bank is a collection of IWSAs that serve a particular purpose. In Colorado, when a "water bank" is discussed, the purpose is typically to prevent or lessen the impacts of a compact compliance issue on the Colorado River.

Pilot projects could also explore agricultural transfers to enhance other beneficial uses, such as for meeting nonconsumptive needs.

Potential Specific Actions

a) **Overlay district or authority:** A new authority or overlay district that can broker ATM deals or operate a large ATM project is needed in the South Platte Basin, and perhaps other basins as well. This approach could create a stable revenue stream for ATM projects. A pilot project to explore the challenges and opportunities of a new authority or overlay district should draw from the experiences of the San Luis Valley subdistricting effort. This pilot project could examine the use of a "flex market" approach, in which farmers retain ownership of their water rights while ensuring supply for municipalities through an agreement. Alternatively, a large pilot project could explore an approach in which the ATM process is owned and/or operated by an entity or authority that includes both municipal and agricultural interests.

b) **Storage and other infrastructure:** Although pilot projects are temporary, storage and other infrastructure that may be permanent will be needed for augmentation, timing, conveyance, and drought-year supplies. Specifically, an ATM pilot project will most likely require piping and pumps, advance water quality treatment facilities, recharge ponds, storage, and optimization of current storage. Permanent agreements such as conservation easements may also be required for implementation of pilot projects.

c) **Multi-purpose objectives:** In addition to sharing agricultural water with municipalities, an ATM pilot project could also support environmental and recreational needs and be in compliance with or support interstate compacts and agreements (e.g., the three-states agreement, the South Platte River Compact, the Colorado River Compact). Conservation easements could also be explored in a multi-purpose pilot project as a mechanism to preserve high-value agricultural lands and systems along with environmental values (see "Financial incentives" in Section 1 above). A pilot project could also incorporate nonconsumptive streamflows, which are currently being studied in the Yampa~~/White~~ Basin. Finally, a pilot project could examine groundwater issues and ways to appropriately handle any brine generated by water treatment.

d) **Adequate measurement and monitoring:** Pilot projects will need to include measures that determine their impacts and effectiveness. This would include a baseline plot and study of return flows. Projects should occur in multiple basins, since what works in one basin may not work in another.

Immediate Next Steps

- **Basin Implementation Plans (BIPs):** Because ATMs are local, they should be assessed on a basin-by-basin basis. Basin Roundtables should identify goals for agricultural transfers, determine which lands are most likely to face dry-up, and act as the primary source in understanding how the selective dry-up of pending lands will likely take place. BIPs should assess irrigated lands, exchange points, open space, and existing infrastructure. Each Basin Roundtable should have a basin-initiated ATM program or project (e.g., the South Platte Water Bank).

- **Develop regional template and tools:** When considering an ATM pilot project, a template or set of tools should be explored to help guide CWCB, Basin Roundtables, and local project proponents as they move forward with ATM project implementation. This template or tool set should vary according to the individual needs of each basin. For instance, the Rio Grande Basin needs to reduce demands on its aquifer, the South Platte Basin needs to reduce stress from

"buy-and-dry," and the lower South Platte depends on pumping deep percolation water from upstream diversions while other basins may want to reduce deep percolation through ditch linings to keep water in the stream. The regional template or tool set could include a framework for the "flex market" approach, terms and conditions, a checklist of considerations, or administrative tools, such as those being developed for the Upper Arkansas Basin.

- **Explore and address administrative obstacles:** Pilot projects should explore and address the administrative obstacles identified in the challenges/barriers section below.
- **Additional study:**
  - Determine if there is "new" or additional water to be developed from agriculture for both base and drought supplies.
  - Encourage and fund research and development for both agricultural efficiency and conservation (e.g., deficit irrigation, canal lining, removal of phreatophytes, drip irrigation, and mulching).
  - Test economic factors for ATMs (e.g., willingness/ability to pay for water, whether incentives for drip irrigation are necessary, whether the free market is sufficient).
  - Analyze exchange/return flow.
  - Further explore both agricultural and municipal interest in participating in ATM projects in the South Platte Basin. This effort could build upon the Farmers Reservoir and Irrigation Company (FRICO) system participation interest study.

Partners

ATM pilot projects will need to involve the agricultural community, especially to help ensure noninjury. In addition to municipalities, other partners include GOCO, Ducks Unlimited (DU), and CWCB. The Colorado Water Institute could be helpful with additional needed research.

Background

Challenges/Barriers

Political Support:

Additional political support will be needed, perhaps in the form of CWCB and IBCC endorsement of projects. The IBCC can work to encourage other state agencies and departments to support pilot projects as well.

Administrative Obstacles:

- Potentially high transaction costs associated with water right transfers.
- Water right administration uncertainties and water right accounting questions.
- Certainty of long-term supply and desire for water providers to have permanent long-term supplies.
- Infrastructure needs and water quality issues.

Additional Issues Identified by the Agricultural Fallowing Policy Dialogue:

- Difficulty of developing statewide solutions due to the many differences in hydrology and the way water is used and administered in different basins throughout the state.
- Restrictions to IWSAs.
- Excessive terms and conditions on agricultural fallowing agreements.
- Because it is so risky to open up a water right in water court, there is reluctance by farmers to go to water court for a water transfer (this is especially so after the precedent set by the FRICO case).
- Farmers' concerns about losing ownership of water rights.
- Potential injury to downstream water users.
- How fallowed land will be used.

Additional Concerns Identified by the West Slope Water Bank Study

- It may not be practical to fallow meadow grasses.
- It may be difficult to get sufficient levels of participation in Colorado.

Opportunities

State Land Board lands could be used for ATM pilot projects, which would have the advantage of not involving as many competing interests. Other potential locations for ATM pilot projects are the Poudre River Basin, Lower South Platte Cooperative, and the Arkansas Valley Super Ditch.

3) Establish Basin Goals and Track Ongoing Progress

Potential Future Action Purpose(s)

Establishing basin goals and tracking progress towards these goals will be important in developing an effective plan for minimizing the transfer of agricultural land to M&I uses. Clear goals and measurable progress towards those goals will be necessary in each basin to preserve the agricultural economy and to keep agriculture viable on a statewide basis. As defined in Section 1 of the Draft Basin Implementation Plan Guidance, developing the measurable outcomes of basin goals involves setting numerical targets that are consistent with the SWSI and the Colorado Water Plan. For example, a measurable outcome for a particular basin could be the development of in-basin projects and methods that meet a defined volume of additional demand or that protect a percentage of habitat for a species such as Cutthroat Trout.

Potential Specific Actions

- Work with the IBCC and Basin Roundtables to develop basin goals. SWSI 2010 and the Portfolio Analysis and Trade-off Tool identified future agricultural transfers that may occur due to identified projects and processes (IPPs) and urbanization. These documents could be a starting point for the goal-setting process.
- Determine if incentives or regulations are necessary to accomplish the goals. Previous IBCC discussions have indicated that the free market system will not likely fully accommodate basin goals. However, incentives would still use the free market as part of driving the solution.

- Once the goals are established, utilize the CWCB's periodic irrigated lands assessment and the Basin Needs Decision Support System (BNDSS) to track planned agricultural transfers.

Immediate Action Step

Utilize BIPs to establish goals, measurable outcomes, and an approach for meeting them.

Timeframe

Analysis of potential agricultural transfer areas identified in SWSI 2010 and the Portfolio Analysis and Trade-off Tool could be completed during 2013.

Partners

CWCB, the IBCC, Basin Roundtables, and water right holders can work together to establish basin goals for minimizing agricultural transfers.

Background:

Challenges/Barriers

Information beyond what was summarized in SWSI 2010 is often not public information and data is limited.

Opportunities

SWSI 2010 and the Portfolio Analysis and Trade-Off Tool identified future agricultural transfers that may occur due to IPPs and urbanization. These amounts of agricultural transfers could be the starting point for the goal-setting process.

4) Implement ATM Program

Potential Future Action Purpose(s)

A CWCB program that provides financial and technical assistance is needed to make sure that particular ATM yields are met as part of the state planning process. An ATM program can support the development of incentives and pilot projects and help ensure that these efforts integrate with each other in a mutually supportive way.

Potential Specific Actions

The CWCB ATM program has been in place since 2007 and is tasked with finding and facilitating viable alternatives to buy-and-dry agricultural water transfers with the intent of sustaining a viable agricultural economy. This program will continue to be funded and implemented with a focus on the following action items, drawn from the CWCB's November 2012 Technical Memorandum: Alternative Agricultural Water Transfer Methods Grant Program Summary and Status Update (CWCB 2012).

- Recognizing that each municipal water system and each ditch company is unique, the CWCB should continue to promote and facilitate agreements between irrigators and municipal water providers.
- CWCB will continue to support demonstration/pilot projects to determine the feasibility of new concepts or techniques as needed through the ATM Grant Program.
- CWCB should continue its support of coupling conservation easements with IWSAs (see above).

- CWCB will advance the Colorado River Compact Water Banking Study and its focus on rotational fallowing by integration using the results from the Aspinall Water Bank Study and the Yampa~~/White~~ Basin ATM Study.
- CWCB will continue to support the Yampa~~/White~~ Basin ATM Study to determine its acceptability among ranchers and the concurrent benefits to fish habitat. These identified lands and associated water can also be used for the Compact Water Banking project and should be integrated.
- CWCB will support Basin Roundtable efforts in basin planning.

Partners

Agricultural water right holders, municipalities, and environmental interests need to work together with help from the state to overcome the identified challenges.

Background

Opportunities

CWCB's efforts through the ATM program have made significant progress in creating ATMs that are viable options for municipalities. Partnerships between the cities, farmers, land conservancies, funding partners, and environmentalists have been created through this program and appear to have great potential for success.

Basin Roundtables recognize the need to focus on basin-level planning and look for ways to increase flexibility within the system through alternative transfers, cooperative agreements, drought plans, and additional infrastructure, while respecting Colorado water law and individual property rights.

5) Identify and Implement Infrastructure and Storage

See the "Storage and Other Infrastructure" section.

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2. Plan and Preserve Options for Existing and New Supply

Several of the portfolios developed by Basin Roundtables found that additional West Slope water would be needed to meet both West Slope and East Slope needs. New supply is therefore defined here as developing unappropriated water from West Slope locations. The "Reconnaissance Level Cost Estimates for Strategy Concepts" Appendix in Statewide Water Supply Initiative (SWSI) 2010 (Colorado Water Conservation Board [CWCB] 2011) evaluates the following locations for new supply—Flaming Gorge, the Gunnison River near Blue Mesa, the Yampa River near Maybell, and the Colorado River near Green Mountain. Planning and preserving options for existing and new supply will be necessary to prepare for Colorado's uncertain water future.

Completed and Ongoing Actions	Potential Future Actions
• Strategies Report – cost estimates for new supply and agricultural transfers • Potential diversion locations • Risk management strategies – Water Bank – Aspinall Study – Adaptive Management – Alternative Process, i.e., Wild & Scenic	1) Address Environmental and Recreational Needs a) Delineate critical environmental habitats and assess new supply projects b) Develop Basin Implementation Plans c) Meet environmental and recreational needs while preserving new supply options 2) Develop Risk Management Strategies a) Develop signposts/triggers b) Develop an emergency plan c) Develop an insurance policy for new projects d) Develop strategies e) Continue existing work 3) Identify Potential Multi-purpose Components of New Supply Projects a) Develop a multi-purpose strawman for each transbasin project b) Use strawman to evaluate financial capability of state/project proponent partnerships c) Develop a cross-basin agreement or agreements 4) Identify Projects and Preserve Options a) Planning hydrology b) Acquire water rights c) Acquire rights-of-way

1) Address Environmental and Recreational Needs

Potential Future Action Purpose(s)

The Interbasin Compact Committee (IBCC) recognizes that it would be difficult to build a new supply project in an area with high value environmental and recreational attributes. Therefore, while the IBCC would prefer to see initial plans for multiple multi-purpose projects developed prior to choosing or eliminating any, it also finds that the best strategy is not to expend resources to preserve new supply development projects in such areas. Where new supply development projects could substantially mitigate any adverse effects on high value environmental and recreational attributes, the IBCC encourages proponents to design such projects as "multi-purpose," delivering benefits to nonconsumptive values, too. Potential specific actions are discussed below.

Potential Specific Actions

a) **Delineate important environmental habitats as identified by the Basin Roundtables and assess new supply projects:** Utilize metrics that quantify environmental and recreational needs to determine whether specific river reaches should be on- or off-limits for a new supply project. A starting point for quantification could be attribute maps from the Basin Roundtables. Other quantitative metrics already developed include the Endangered Fish Recovery Program's flow recommendations, as described in the Colorado River Basin Supply and Demand Study, the Watershed Flow Evaluation Tool, and the Bureau of Reclamation's (BOR) Colorado River Supply and Demand Study for recreational boating, riparian health, and other environmental attributes. Alternatively, for a qualitative approach, the IBCC could refine the considerations laid out in the IBCC's 2010 "Letter to the Governors" (IBCC 2011) for determining nonconsumptive needs. These metrics can be used to assess a strawman for each potential new supply project (see "Develop a multi-purpose strawman for each transbasin project" in Section 3 below).

b) **Develop Basin Implementation Plans:** Basin Implementation Plans (BIPs) should draw from case studies presented in SWSI Phase 2, SWSI 2010, the CWCB Draft Nonconsumptive Toolbox, and other stakeholder input to identify projects that maintain healthy environments. BIPs should also identify which elements of these projects could be incorporated into a multi-purpose project. This could be done by following the lead of the Yampa/White Basin to conduct a projects and methods study that integrates and optimizes meeting consumptive and nonconsumptive needs. This work may help in planning new supply projects that they can mitigate impacts to the identified environmental and recreational needs.

c) **Support environmental and recreational goals while preserving new supply options:** Consider utilizing existing tools that have successfully addressed environmental protection and allow for additional water development to occur in the future (e.g., the voluntary flow agreement in the Arkansas Basin, various instream flows (ISFs), and programmatic biological opinions for endangered fish flows) in those reaches that a preserved new supply project option may affect.

Timeframe

2013 to 2015

Partners

CWCB, IBCC, Basin Roundtables, Colorado Parks and Wildlife (CPW), U.S. Fish and Wildlife Service (USFWS), nonconsumptive groups, water providers, and local governments (i.e., towns, cities, and counties) are all important partners.

Background

Challenges/Barriers

Some water right owners have concerns about the development of detailed metrics for the environmental and recreational values and how these metrics could be utilized in the future.

Opportunities

Identifying key areas where it is important to maintain or restore water-dependent environmental and recreational values will make it easier to avoid them when considering options for new supply projects. If it is not possible to avoid affecting these reaches entirely during the development of a new supply project, identification of the reaches and what is necessary to maintain or restore them will make it easier to mitigate adverse effects.

2) Develop Risk Management Strategies

Potential Future Action Purpose(s)

The "Risk Assessment Scenario for Portfolio Tool" white paper developed by the Gunnison Basin Roundtable (Trampe and Gunnison Basin Roundtable 2013) has addressed two different risk management issues that they would like to see addressed:

- "How do we manage development and use of Colorado River water to prevent a compact curtailment, while allowing for full development of Colorado's entitlement?"
- "If we fail, how do we deal with a compact curtailment under full development of Colorado's compact entitlement?"

There are several other efforts underway that address how to mitigate risks for existing users. The IBCC has identified a need to maintain a dialogue with other compact states while continuing to do parallel work on Colorado's specific interests and concerns (e.g., developing available water in wet years, storage, administrative systems). The IBCC's New Supply Subcommittee has similarly indicated that there are risks associated with both the underdevelopment of Colorado's compact entitlement and risks associated with overdevelopment. The following is a list of the activities underway that address risk:

- Water banking
- Aspinall Water Bank
- Scenario planning and adaptive management
- Alternative processes to Wild & Scenic River designation
- Others

All of these strategies could be implemented if needed for either existing or future projects as circumstances dictate and if they meet the no/low regrets philosophy. The water banks may require a trigger based on hydrologic conditions and the 10-year running total at Lees Ferry to begin operation, while the remaining activities may be implemented as soon as they are operational.

The IBCC recognizes that compact curtailment is not the only risk to be considered. Risks associated with nonconsumptive needs (e.g., additional species being listed as endangered or irreversible impacts to recreation), agricultural communities, and drought are discussed in other sections of this document.

Potential Specific Actions

a) **Develop signposts/triggers:** Develop signposts/triggers that indicate risk of compact curtailment. Associated with these activities, risk management strategies should be initiated to help avoid curtailment of existing users to meet our compact obligations. For instance, a trigger could initiate the operation of a water bank. Options for signposts/triggers that maintain flexibility while approaching an uncertain future should be explored.

b) **Develop a compact compliance plan:** Develop a plan to meet compact obligations in a crisis.

c) **Develop an insurance plan or requirement for new projects:** Have new projects develop an insurance plan to meet critical demands during times of low water supply to prevent a compact compliance issue for existing users.

d) **Develop strategies:** Develop risk management strategies that are not dependent on how much water is available.

e) **Continue existing work:** Continue existing work on the Water Bank Feasibility Study, Aspinall Water Bank Study, scenario planning and adaptive management, alternative processes to Wild & Scenic River designation, and other risk management work that is currently underway (see "Background" in this section for more detail).

Immediate Action Step

Further explore the BOR Colorado River Supply and Demand Study for risk management concepts.

Background

Challenges/Barriers

Colorado is discussing options with the other Upper Basin states regarding Colorado River Compact issues. It is important that Colorado's efforts allow for flexibility in these conversations.

Opportunities

Water Banking to Avoid Curtailment to Meet Compact Obligations

The Water Bank Study, now underway for the Colorado River and major tributaries located in Water Divisions 4 to 7, has not reached any final conclusions regarding the feasibility of the Water Bank. The Water Bank is being evaluated to determine if senior pre-compact irrigation water rights could be used to allow critical post-compact water rights to continue to divert rather than be curtailed in the event the 10-year running total falls below 75 million acre-feet (AF). The concept for the Water Bank is that willing agricultural pre-compact water right owners would temporarily remove lands from irrigation (fallow) and the historical consumptive use (CU) from the fallowed lands would flow to the state line to offset the depletions by the post-compact water rights that are allowed to divert out-of-priority. The senior water right owners would be compensated for the fallowing of their lands by post-compact water providers participating in the Water Bank.

Assuming that the Water Bank Study finds that the concept is feasible, then rules for operation of the bank could be finalized or promulgated depending on the final structure of the Water Bank. Once the

rules are in place and contracts with pre-compact water rights owners are final, then the Water Bank could be implemented if and when an agreed upon trigger using the 10-year running total at Lees Ferry requires action. Such an arrangement would have to allow for both small municipal users on the West Slope and the larger transbasin diverters to participate.

Aspinall Water Bank Study

The Aspinall Water Bank Study is not complete and no decision has been reached on its feasibility. The concept for the Aspinall Water Bank is similar to the water bank described above in that senior pre-compact irrigation water rights would be fallowed so that the historical CU could be stored in unused space in Blue Mesa Reservoir. The water would be accumulated over a number of years in advance of a potential compact curtailment demand from the Lower Basin and then released to mitigate or offset the need for curtailment of critical post-compact water rights. Again, the senior pre-compact irrigation water right owners would be compensated by those water providers participating in the bank.

Scenario Planning and Adaptive Management

Adaptive management strategies are also a way to address risk and uncertainty (including the risk of curtailment) and could include a number of potential actions. A draft of the SWSI Chapter 7: Scenario Planning and Adaptive Management is available here.

The Metro Basin Roundtable has suggested in its "Water Supply Paper" (Metro Basin Roundtable 2012, Draft 5-14-2012) that an adaptive management approach that allows for the full development of Colorado's Colorado River Compact entitlement be explored. This would be preferable to a limit or a cap on water development. The concept includes both an agricultural and a new supply project to be developed and operated in tandem to provide maximum flexibility and reliability given the hydrology. In some wet years, storage of water in aquifers or reservoirs is conceived, while in dry years, agricultural water and groundwater is more relied upon. The paper also suggests voluntary demand reductions be explored.

The use of interruptible water supply agreements (IWSAs) on the East Slope that would operate based upon some agreed-upon hydrologic trigger was suggested in the "Risk Assessment Scenario for Portfolio Tool" white paper developed by the Gunnison Basin Roundtable (Trampe and Gunnison Basin Roundtable 2013) and could reduce the reliance of East Slope water providers on West Slope water. The IWSAs could be approved by the State Engineer in advance and would operate up to 3 years out of every 10 by fallowing senior irrigation water rights. IWSAs were enacted after the 2002 drought to allow some flexibility for water providers.

There are other adaptive management strategies that can be implemented by creative water managers on both the East and West Slopes, provided there is encouragement and support by the state through the IBCC, CWCB, and DWR.

~~Alternative Processes Related to Wild & Scenic River Designation~~

~~The Metro Roundtable "Water Supply Paper" (Metro Roundtable 2012, Draft 5-14-2012) recommends that an allowance for new water supply projects be included in Wild & Scenic River processes, Recreational In-Channel Diversion (RICD) water rights, and other alternative environmental protection plans. The protected flows would not be affected until a new project is actually built and the new project would be designed to minimize impacts and, where possible, enhance instream values.~~

Others

There are additional efforts that address risk associated with new supply development underway that have not been specifically referenced in this document, including:

- Compact Compliance Study: The Colorado General Assembly directed the CWCB to identify issues associated with administration of state water rights with respect to the Colorado River compacts. The study is to look at options to avoid or delay the curtailment of water uses, if possible, and evaluate options for administering a potential curtailment.
- Colorado River Water Availability Study (CRWAS) – Phase 2: The CWCB is conducting the multi-phase CRWAS to determine how much water from the Colorado River Basin System is available to meet Colorado's future water needs under alternate hydrologies.

3) Identify Potential Multi-Purpose Components of New Supply Projects

Potential Future Action Purpose(s)

The IBCC determined that multi-purpose components in new supply projects can help in risk-sharing but will take significant financial resources. Many group members are in favor of identifying a project quickly and garnering support, because projects are occurring now while the IBCC tries to find consensus. The group also discussed how BIPs can be used to identify needs and opportunities for potential multi-purpose water supply projects.

As listed in the CWCB Strategies Report (CWCB 2010), some potential multi-purpose components of new supply projects include:

- **Headwater enhancements:** Exchanges with current transbasin diverters for additional flows in Colorado headwaters (e.g., the Colorado River Cooperative Agreement, Grand County Streamflow Management Plan, Blue River Flow Enhancement).
- **Conservation:** Front Range entities will need to prove extensive demand management. This could include: 1) proof of a water conservation program approved by CWCB as being in compliance, and/or 2) a conservation program designed to achieve a high level of conservation compared to average gallons per capita per day use.
- **West Slope growth:** Assurances will need to be made that the West Slope growth and needs can be met and that West Slope basins can develop at their own pace. A socio-economic compensation fund could also be an important multi-purpose component of a new supply project, along with compensatory storage and other requirements of conservation and conservancy districts.
- **Endangered species:** A new supply project will need to ensure that the project does not lead to further federal action on federally threatened or endangered species or the listing of additional species. The project would need to have environmental and recreational protections, including mitigation and/or enhancements for the environmental and recreational economies.

These concepts were also explored as part of the IBCC's 2010 "Letter to the Governors," (IBCC 2011) the work of the IBCC New Supply Subcommittee, the Basin Roundtable Project Exploration Committee, and several other groups.

In addition, as part of the risk management strategies (see above), storage, compact compliance, and agricultural water could be components of a multi-purpose project.

Potential Specific Actions

a) **Develop a multi-purpose strawman for each potential transbasin project:** Develop a strawman for each new supply project or package of projects to incorporate pumpbacks, pipelines, and/or innovative management techniques in a way that benefits multiple uses. For instance, the project should mitigate or enhance environmental and recreational attributes and provide benefits to agriculture in a manner consistent with Section 1 described above. In other words, each strawman would define what some refer to as a "good project." Utilize BIPs as appropriate. Provide for feedback from Basin Roundtables during the strawman development process.

b) **Use strawman to evaluate financial capability of state/project proponent partnerships:** New supply projects will be very expensive to construct and operate. In addition to the configuration of the project, a strawman should be utilized to consider how a potential project will be financed, managed, and implemented. This research could also include the identification of funding options and incentives at the local, state, and federal levels. The "Strategies for Colorado's Water Supply Future" report discusses financial capabilities and can be used in this context. This and other work on financing options has been incorporated into Appendix B.

c) **Develop a cross-basin agreement or agreements:** Develop an interbasin agreement or agreements, using the lessons learned through other Colorado stakeholder processes. Some recent examples include the Colorado River Cooperative Agreement (CRCA); the Windy Gap Agreement; the Clinton Agreement; Water, Infrastructure, and Supply Efficiency (WISE) partnership; and the criteria used to develop Wolford Mountain Reservoir (e.g., environment, neighbors, and project purposes). Such an agreement could determine an amount of water to be used in both wet, average, and dry years and differing future hydrologies. There is some disagreement regarding how specific such an agreement needs to be at this point in time. If the agreement was qualitative and somewhat general, additional detail from the CRWAS continuation would not be needed. The agreement could define qualitative goals and then allow for water associated with a new supply project to be developed if certain conditions were met. During its June 5, 2014 meeting, the IBCC agreed to move forward with a new supply discussion as a way to preserve future new supply options.

   Discussion at the March 5, 2013 IBCC meeting touched on several guidelines for potential interbasin agreements regarding new supply, which are highlighted below:

   i) Risk management needs to occur first and should be done in such a way that risk should be shared between beneficiaries.

   ii) The partnership and the rules under which a new supply project operates should be defined.

   iii) Both West Slope and Front Range agriculture should be preserved.

   iv) Consideration of the project being a "State Water Project."

   v) Include compensatory projects for the West Slope.

vi) Include native species and other nonconsumptive considerations.

vii) Dialogue should develop incremental and immediate next steps.

viii) Agreements should build on the 2010 Letter to the Governors.

ix) The project can be part of a multi-purpose package/portfolio.

x) Recreational In-Channel Diversions (RICDs), Wild & Scenic River designations, and other nonconsumptive flow projects in areas where a new supply project may be built need to have an allowance for the project to proceed.

xi) Implement low hanging fruit first (e.g., identified projects and processes [IPPs], alternative transfer methods [ATMs], conservation).

~~The April 22, 2010 IBCC meeting also included discussion about interbasin agreements for new supply. West Slope representatives indicated that they would need several commitments before being supportive of this type of multi-purpose project. These included:~~

xii) Continued viability of West Slope economies.

xiii) Certainty that water would be available for development in each West Slope basin.

xiv) A commitment from Front Range communities regarding conservation and reuse.

These elements could be met through a combination of water-related benefits for the West Slope subbasins and/or socio-economic compensation.

Water-Related Benefits for West Slope Subbasins

Even though a diversion may not occur directly in each basin, different elements could be included to distribute statewide benefits, ensure continued viability of the West Slope's economy, and provide certainty. The "Reconnaissance Level Cost Estimates for Strategy Concepts" appendix in SWSI 2010 includes these suggested water-related benefits for individual basins.

Yampa/White

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

Colorado

- Exchanges with current transbasin diverters for additional flows in Colorado headwaters (Grand County Streamflow Management Plan; Blue River Flow enhancement).
- Maintenance of Dillon Reservoir levels.
- Use of Wolcott Reservoir for future West Slope water demands, additional yield to the Grand Valley, some or all of the 10,825 AF obligation to the 15-mile reach.

- Potential abandonment of Eagle River Rights.

Gunnison

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

Southwest

- Financial assistance with several of their IPPs.

Socio-Economic Compensation (Development Fund)

A socio-economic compensation fund was envisioned in the "Reconnaissance Level Cost Estimates for Strategy Concepts" appendix in SWSI 2010 and in the 2010 "Letter to the Governors" (IBCC 2011). If such a fund were instituted only on new supply projects, then it would further incentivize agricultural dry-up. This is not the intention of the fund, and additional discussion would be necessary to mitigate this impact prior to the development of a socio-economic fund.

In addition, funds may not be sufficient to meet the needs of the West Slope. Compensatory storage and other enhancements and mitigation may also be required.

- Generally, the most useful form of compensation would be unrestricted monetary compensation to be used by the West Slope to compensate unprotected parties and for whatever other purposes its citizenry prefers. Rather than committing to specific projects, a development fund could be established. The money from this fund would be available to provide assistance for future water needs (see above) or other economic development on the West Slope.
- The fund could be financed by a charge placed on users of the multi-purpose project water (perhaps indexed to the current price of water in the South Platte Basin). The fund would be held by the state (CWCB) or potentially the Colorado River Water Conservation District. Expenditures would be made against the fund for projects proposed by municipalities, conservancy districts, and other public entities on the West Slope. Appropriate expenditures could be water related. Appropriate expenditures could also include economic development projects similar to the Department of Local Affairs severance tax grant program.

Background

Challenges/Barriers

- Components of the project may need to be changed (or other components added) if Colorado is in a low supply scenario. The low supply scenario does not mean "do nothing" as there will likely be challenges for meeting existing water use. This may involve more reallocation, flexibility, and reliability built into a highly variable system. There could be common elements between this multi-purpose project and one developed for the low supply scenario.
- Potential endangered fish and depletion issues downstream of the diversion would need to be analyzed.

- Multi-purpose new supply projects would require enlargement or construction of additional storage in the South Platte or Arkansas Basins. This storage could be surface water storage or underground storage.
- Large energy requirements would be required, although some renewable energy may be available, and multi-purpose projects may require less energy than the other concepts.
- Water rights administration could be complex in the event of compact compliance.

Opportunities

- Front Range municipalities could get 150,000 AF of high quality, firm yield reusable water.
- New water supply development would minimize the loss of irrigated acres in the South Platte and Arkansas Basins. Transfers of East Slope agricultural land would no longer be the dominant strategy for meeting Front Range water needs. East Slope agriculture could participate in the project and receive additional yields (either directly or through "second use" of fully consumable return flows).
- Multi-purpose components of new supply projects could result in acceptable water quality that may not require advanced water treatment.
- Multi-purpose components of new supply projects would allow for the development of new water supplies and utilization of Colorado's compact entitlements while protecting recreational and environmental flows on the West Slope, particularly in the headwaters.
- Depending upon the location of the diversion, multi-purpose new supply projects could diversify the state's municipal and industrial (M&I) water supplies. Although the previous version of the CRWAS indicated that climate change impacts are less severe in northern basins such as the Yampa and Green, updated models may have different results and will need to be integrated with the new work as part of the CRWAS continuation.

4) Identify Projects and Preserve Options

Potential Future Action Purpose(s)

The purpose of this action is to ensure that if a new supply project is needed in the future, it will be available.

The following potential specific actions could be applied to one or all of the conceived new supply projects, but have financial ramifications associated with them. Some members of the IBCC are concerned that the new focus on immediate action is causing some walls to come up between members. Developing a multi-purpose strawman for each project, evaluating projects with regard to environmental and other considerations, and having the cross-basin dialogue to establish criteria and/or an agreement described in Potential Future Action #3 would need to occur prior to acquiring water rights and rights-of-way.

Potential Specific Actions

a) **Planning hydrology:** The CRWAS Phase 1 and Phase 2, along with a range of hydrology represented in the scenarios, can provide a basis for this analysis.

b) **Acquire water rights:** Any new proposed project will need conditional water rights in order to establish an appropriation date. This will protect the water right from other projects that may develop later but could obtain a water right senior to the proposed project. These other projects could include RICD water rights or industrial water rights. One option, which could be informed by the cross-basin discussion described in Potential Future Action #3 above, could include having the state file for a water right for a new supply project, but only utilize it if it is paired with basin-of-origin protections or if the relevant terms and the conditions described in the agreement were met. The Metro Basin Roundtable in its "Water Supply Paper" (Metro Basin Roundtable 2012) suggests that the IBCC process be used as a starting point. The IBCC would determine where water rights may be needed to protect future supply projects, when the water rights should be filed, how they should be filed, who should file and hold the water rights, and how the water rights would be maintained for the long-term. The "Water Supply Paper" also states that there may be a need for legislation to establish a mechanism for this type of conditional water right, which may involve multiple partners and the State of Colorado.

c) **Acquire rights-of-way:** Acquisition of rights-of-way could be performed in a similar fashion to the methods described for acquiring a water right.

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3. Establish Low/Medium Conservation Strategies

Conservation is a major piece of the larger water supply portfolio and will be an important tool for meeting future municipal and industrial (M&I) demands. Conservation efforts should strive to meet the projected 2050 M&I supply gap while preventing substantial changes to quality of life, minimizing agricultural dry-up, and maintaining important environmental and recreational values. The portfolios developed by the Interbasin Compact Committee (IBCC) and Basin Roundtables indicated a desire to at least reach low to medium conservation levels statewide, regardless of what future scenario may arise. However, when it came to the amount of conserved water that could be applied to the projected 2050 water supply gap, the portfolios reflected a wide range of possibilities—0 percent to 60 percent.

The Colorado Water Conservation Board (CWCB) defines water conservation as those methods and programs that enable measurable and verifiable permanent water savings (CWCB 2010). The conservation strategy outlined in the Statewide Water Supply Initiative (SWSI) seeks to periodically update the range of potential future water conservation savings to meet a projected 2050 M&I water supply gap. While trajectories of water providers' conservation savings may currently appear on the path to achieve the medium conservation levels described in SWSI 2010, without active support, medium levels will most likely not be achieved.

Additionally:

- The nearly 20 percent demand reduction attained statewide since the early 2000s may not be fully maintained.
- Passive water conservation savings occur independently of water provider interventions and occur as the result of outside actions (e.g., federal plumbing standards). Recent indications suggest that the passive conservation levels predicted in SWSI 2010 are not being realized at the anticipated pace and therefore more active support is needed. Local or statewide ordinances/legislation needed to achieve medium or high conservation levels are not being widely adopted and require additional support.
- It is not clear how much, if any, of the potential water savings from active conservation could be incorporated into reducing base demands (i.e., a portion of the M&I gap). Significant concerns remain about the reliability of future conservation savings and the ability to share these savings at the right time and location to meet additional municipal demands.

Nonetheless, based on Basin Roundtable portfolio work, discussion at the Statewide Conservation "mini-summit," work of the IBCC Conservation Subcommittee, SWSI 2010 (see Appendix A for a summary of the findings), and other discussions, it has been determined that implementing the action items associated with medium conservation should be a no/low regrets strategy. The potential future actions described below should help make conservation savings a more reliable part of the solution to meeting Colorado's future water needs.

Completed and Ongoing Actions	Potential Future Actions
• Collect House Bill (HB) 1051 data • Implement Executive Order for state agencies to develop water and energy conservation plans • Support CWCB Conservation Program and state-approved water provider conservation plans • Created and distributed Metro Roundtable Conservation • Established IBCC Conservation Subcommittee • Support Water Conservation Technical Advisory Group (WCTAG) • Implement CWCB Conservation Planning Program and Technical Support, including: – SWSI Conservation Levels Analysis – SWSI M&I Water Conservation Strategies – Guidebook of Best Practices for Municipal Water Conservation in CO – Municipal Water Efficiency Plan Guidance Document and Sample Plan • Held joint Basin Roundtable meetings and a statewide roundtable conservation mini-summit in 2012 • Encourage communities at current low levels of conservation to achieve higher levels with financial and technical assistance	1) Improve Tracking, Quantification, and Reliability a) Implement HB 1051 b) Develop Basin Implementation Plans (BIPs) 2) Establish a Statewide Conservation Goal with Intermittent Benchmarks a) Develop general political support for a statewide conservation goal b) Develop statewide agreement tying conservation to new supply development and agricultural transfers c) Encourage local entities to outline and report their own approaches to help achieve the statewide goal d) Explore best approach to implementation of standards to achieve goal e) Develop and implement conservation standards 3) Continue to Support Local Implementation of Best Practices a) Continue implementation of state conservation programs b) Encourage use of levels framework and best practices guidebook 4) Promote Enabling Conditions for Use of Conserved Water a) Maintain and develop storage and infrastructure for the use of conserved water b) Promote incentives for the use of conserved water c) Identify and, where possible, resolve legal and administrative barriers to the use of conserved water d) Identify and explore barriers to sharing conserved water 5) Develop New Incentives for Conservation a) Explore funding options in support of the Water Efficiency Grant Program b) Develop professional education and certification programs c) Develop new eligibility requirements for state grants and loans that include certain conservation levels or indications of commitment to conservation d) Develop regulatory incentives e) Support and encourage land use practices that help reduce water consumption 6) Explore Legislative Concepts and Develop Support a) Explore legislative options and support for indoor plumbing code standards b) Explore legislative options and support for outdoor water efficiency standards c) Engage in outreach and education efforts to explain the need for legislation; develop political support 7) Implement Education and Outreach Efforts a) Track public attitudes through baseline and ongoing surveys b) Develop statewide messaging and use focus groups to refine and guide implementation c) Develop decision-maker outreach strategies d) Pursue a coordinated media campaign

1) Improve Tracking and Quantification of Conservation

Potential Future Action Purpose(s)

The Basin Roundtable portfolios exhibit large variation in the amount of conserved water that is expected to be available for application to the projected 2050 water supply gap. The predicted amount ranges from 0 percent from low conservation strategies to 60 percent from high conservation strategies. There was general agreement among portfolios that the strategies that support medium conservation should be implemented in order to reduce impacts to agricultural and nonconsumptive needs. However, several Basin Roundtables and water providers are deeply concerned about the reliability of using conserved water to sustainably meet a portion of the gap. Much of the water conservation savings achieved over the last decade rely on the behaviors of customers, and water providers are concerned that new people moving to Colorado may not exhibit similar conservation behaviors. In addition, many of the rapidly growing areas that need additional water supplies do not have a lot of conservation potential but could use conserved water from other water providers. Unfortunately, there are several constraints to sharing conserved water. For instance, many water rights do not allow a water provider to share conserved water beyond its service area, and there is lack of infrastructure to move conserved water where and when it is needed. For these reasons, tracking how and if conservation savings are able to be realized and continue to reduce water demands is critical. In addition, efforts to help increase the reliability of conservation savings may also be critical.

These future efforts will seek to refine our knowledge of concrete conservation savings that can meet current and future supply needs. A summary of SWSI conservation findings are provided in Appendix A, which describes the estimates of potential future water conservation for three distinct strategies—low, medium, and high water conservation savings.

Potential Specific Actions

a) **Implement HB 1051:** Implementing the water conservation data collection efforts required by HB 1051 will allow for ongoing quantification of program effectiveness and reliability. HB 1051 requires covered entities—those water providers who deliver 2,000 acre-feet (AF) or more per year—to participate by providing data. CWCB should also encourage noncovered entities, particularly those that are likely to reach the 2,000 AF threshold by 2050, to voluntarily participate. This data will be used as part of SWSI to track conservation savings and how much can be used to meet M&I needs.

b) **Develop Basin Implementation Plans:** Ongoing development of the BIPs and updates to SWSI will include updated conservation data in the analysis. Basin Roundtables should quantify what in-basin conservation actions will be used to meet future M&I needs.

Immediate Action Steps

Background

Challenges/Barriers

Collection of data through HB 1051 and the BIPs will be long-term and iterative. It may take a number of years to gain insight as to the reliability of water conservation practices using the data collected through the HB 1051 process.

Opportunities

Through tracking and quantification, the reliability of water conservation practices can be verified over time and water conservation's role for meeting the M&I supply gap can be better defined.

2) Establish a Statewide Conservation Goal with Intermittent Benchmarks

Potential Future Action Purpose(s)

By decreasing the amount of water that is needed to meet M&I needs, conservation can reduce the amount of water that is transferred out of agriculture and help retain water in Colorado's streams for environmental and recreational needs. Certain types of conservation, specifically those practices that reduce consumptive use (CU), ~~also~~ can reduce~~s~~ the amount of additional water resources needed to meet future M&I demand, thereby reducing the water supply "gap." The majority of conservation efforts occur at the local level, but some additional work is needed statewide to maximize momentum toward conservation. Creating a statewide conservation goal can unite the entire state in a common effort that invites, encourages, and/or requires action at the individual, family, community, provider, and even basin levels. It distributes the responsibility for conservation equally across the state but also allows for personal choice and local autonomy in how to participate in the achievement of the goal. Intermittent benchmarks will help individuals, providers, basins, and the state as a whole understand if we are doing enough separately and together to meet our growing demand while also protecting our agricultural heritage and nonconsumptive values.

Potential Specific Actions

a) **Develop general political support for a statewide conservation goal:** Work with Basin Roundtables, the IBCC, water providers, the Governor, and other thought leaders to increase understanding of the importance of a shared vision and goal for the state and a statewide ethic of water conservation (e.g., "we are all in the same boat"). Messaging should stress how conservation can help slow down agricultural dry-up, meet the water supply gap, and protect nonconsumptive needs.

b) **Develop statewide agreement tying conservation to new supply development and agricultural transfers:** Through the IBCC and in consultation with the Basin Roundtables and other stakeholders as needed, develop a statewide agreement that links minimum conservation levels to the development of new supply and the conversion of agricultural water to municipal use (e.g., "if, then" statements indicating commitments from Front Range water providers to increase conservation before building new transmountain diversions and commitments from West Slope and agricultural leaders to support or remain neutral on new supply projects if certain conservation thresholds are met).

c) **Encourage local entities to outline and report their own approaches to help achieve the statewide goal:** As part of the BIP effort, providers should be encouraged to define and pursue an approach to their participation in the achievement of the statewide conservation goal. Providers should work with the IBCC, Basin Roundtables, and CWCB to outline how they will increase conservation in their own systems and how they will measure success in this effort.

d) **Explore the best approach to implementation of standards to achieve goal:** Through research on approaches used in other states and/or on other issues within Colorado, assess whether standards will be more successful (both politically and in terms of water conserved) if implemented through local approaches, an agreement signed by water providers, statewide approaches, legislation, support from the Governor, an Executive Order from the Governor,

municipal code, incentives, etc. Initial consideration by the IBCC Conservation Subcommittee suggests that if the standard is voluntary, perhaps adopted through a legislative resolution or by the CWCB and IBCC, then it would need to be paired with incentives. If it is determined that the best approach is a legislative mandate, then this should likely only be applied to covered entities.

e) Develop and implement conservation standards, such as:

- **Best practices standard:** Standards based on which water conservation best practices have been implemented by the local utility/community (e.g., tiered rates, metering, and leak detection for all water providers, and a higher level for covered entities). By definition, these could be adapted to meet local needs.
- **Water use standard:** Statewide water use standard could be regionalized (e.g., residential gallons per capita per day, size and number of water taps, localized evapotranspiration rates).
- **Percent reduction standard:** Percent reduction in per capita demands and associated target date. This could allow for local decisions on which best practices to implement.
- **New water project standards:** The CWCB and IBCC could establish standards for proponents of new projects to implement conservation measures to at least the medium level in order to gain IBCC support.

Immediate Action Steps

Background

Challenges/Barriers

Water consumers who do not sufficiently reduce use through adoption of conservation technologies and/or behavioral changes will experience higher water rates. This presents a formidable political problem. While conservation has the potential to reduce a water provider's revenue requirements through avoided costs, it also has the potential to increase the per-unit cost of water (rate) due to the typical large fixed cost investments water providers assume. It can also lead to damaging revenue shortfalls if not accurately measured and predicted.

Opportunities

The ability to conserve water can be one of the most easily implemented strategies as well as an extremely effective overall water management strategy for water providers.

3) Continue to Support Local Implementation of Best Practices

Potential Future Action Purpose(s)

Local implementation of conservation best practices allows communities, providers, and basins to identify and execute appropriate, nuanced mechanisms for achieving water conservation goals. Taken together, local implementation of conservation best practices will reduce Colorado's projected M&I water supply gap, lessen the need for agricultural dry-up, and protect the state's rivers and streams. The purpose of this section is to describe how state efforts can continue to support local entities through application of its tools and resources.

According to SWSI 2010, total municipal water use in Colorado is split fairly evenly between outdoor water use (46 percent) and indoor water use (54 percent). Indoor water use is roughly 5 percent consumptive, with the remainder available for reuse directly or through a downstream diversion. Outdoor water use, by contrast, is roughly 70 to 85 percent consumptive and is mostly used for landscape irrigation. Subsequently, best practices that limit municipal outdoor water use have the greatest potential for reducing the projected M&I supply gap. Each of the potential specific actions can address outdoor water use.

Potential Specific Actions

a) **Continue implementation of state conservation programs:** Continued implementation of state conservation programs include:

- Conservation plan review and approval: Continue reviewing and approving locally adopted water conservation plans in order to encourage long-term water conservation planning and quantification of water savings, and to ensure that water providers document their water conservation goals.
- Water Efficiency Grant Fund: Utilize the Water Efficiency Grant Fund to ensure the implementation of water conservation best practices and to assist water providers with targeting their resources as efficiently as possible.
- Targeting of communities with strategic conservation potential: Focus on opportunities for water conservation planning in areas where there are covered entities or a number of small water providers that can create a regional water conservation plan. This should especially be the case when conservation in such communities could help reduce the M&I water supply gap or lessen the need for agricultural dry-up or impacting nonconsumptive values.

b) **Encourage use of levels framework and best practices guidebook:** Encourage water providers to use the Water Conservation Levels Analysis framework developed by the CWCB to move beyond the foundational base levels of conservation by providing a clear prioritization of future local conservation efforts. This framework can be used as a guide for which conservation best practices are appropriate, considering the goals of a water provider's conservation program. The levels framework establishes increasing levels of conservation efforts by water providers, including technical support, education, and local ordinances.

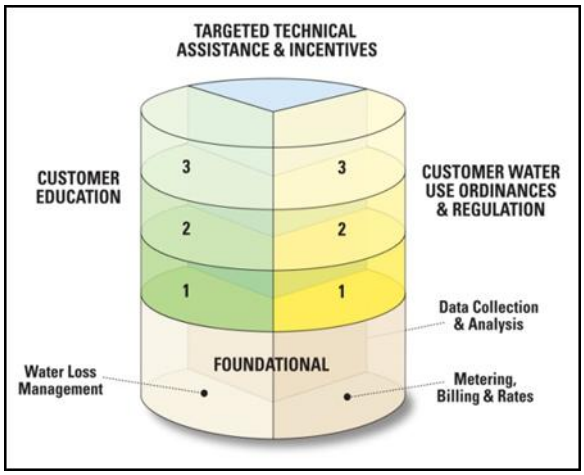

Figure 1. CWCB Conservation Levels Framework

Water loss management and metering, billing, and rates (including water budgets) are examples of foundational water conservation best practices.

Water loss control is the practice of system auditing, loss tracking, infrastructure maintenance, leak detection, and leak repair for water utilities. Water loss control is a major emerging issue due to extensive aging infrastructure throughout the state. Similar to HB 1051, there should be

further consideration of legislation that would require entities above a certain size to report their audit data of their distribution system water loss.

Conservation-oriented rates, tap fees, or water budgets can be implemented, along with customer categorization within the billing system and full metering. Numerous studies have shown that conservation-oriented rates and tap fees effectively reduce water demands. Conservation pricing is often applied to manage a customer's demand for water by pricing discretionary water uses (such as landscape irrigation) at a higher rate than water used for basic human needs (such as drinking water and sanitation) (Pacific Institute/Alliance for Water Efficiency 2012). Conservation oriented rate structures can be inclining block rates, seasonal rates, and/or water budget-based rate structures. Water budget-based rate structures can produce demand reductions on the order of 10 to 30 percent based on the experience of some utilities (Mayer, et al. 2008)

There are numerous other examples of best practices; many of these are discussed in Appendix A.

Immediate Action Steps

4) Promote Enabling Conditions for Use of Conserved Water

Potential Future Action Purpose(s)

Developing appropriate storage and infrastructure will be necessary to utilize water conservation savings effectively. This "hardware" will need to be supplemented by "software" in the form of reduced legal and administrative barriers to using conserved water. Sharing conserved water between entities is a particularly challenging area when it comes to legal and administrative constraints. However, there are also significant barriers for entities hoping to save conserved water for their own future use. Entities wishing to share conserved water should be encouraged to explore creative business mechanisms, not just transfers of water rights.

Potential Specific Actions

a) **Maintain and develop storage and infrastructure for the use of conserved water:**

b) **Promote incentives for the use of conserved water:**

c) **Identify and, where possible, resolve legal and administrative barriers to the use of conserved water:**

d) **Identify and explore barriers to sharing conserved water:**

Immediate Action Steps

5) Develop New Incentives for Conservation

Potential Future Action Purpose(s)

Enhanced incentives to encourage water conservation could prove to be an effective and universally accepted strategy if properly structured. Current incentive programs, such as the Water Efficiency Grant Program, could be modified, and new programs could be created. Incentives for water

conservation may include funding, regulatory benefits, or other methods. Incentives may have a link to various legislative concepts in the following section, as noted.

Potential Specific Actions

a) **Explore funding options in support of the Water Efficiency Grant Program:** Expand and target funds in support of the Water Efficiency Grant Program to create more incentives for water conservation.

- **Target Funding:** Funding could be targeted at communities with strategic conservation potential, as described above (under "Continue implementation of state conservation programs").
- **Acquire Additional Funding:** Other grant/loan programs could be modified or created to supplement the Water Efficiency Grant Program. For instance, CWCB's loan program could be modified to allow loans for improvements to water provider distribution systems to minimize water loss. Additional funding could also be added to the grant program.

b) **Develop professional education and certification programs:** Landscape professionals and plumbers could be required to receive training and certification in water conservation practices and technologies.

c) **Develop new eligibility requirements for state grants and loans that include certain conservation levels or indications of commitment to conservation:** CWCB could develop new rules for state grants and loans that require providers seeking financial assistance to demonstrate a minimum level of conservation and/or a plan to increase conservation (i.e., by fixing leaks, implementing tiered pricing, educating customers, etc.).

d) **Develop conservation standards for communities planning to use agricultural transfers or new supply for future water needs:** A minimum set of water conservation standards should be developed for adoption by those communities planning to use agricultural transfers or new supply for future water needs in order to ensure the maximum efficient use of that water. Potential standards include conservation oriented rate structures, maximum amount of turf grass allowed per residential lot, maximum per capita use rates, or water efficient irrigation and landscape standards.

e) Develop regulatory incentives that incorporate the following concepts:

- **Base level of conservation:** A base level of conservation could be required for all water providers, regardless of size or location.
- **Assess issues, benefits, and drawbacks of the current definition of "covered entities":** Consider increasing levels of conservation beyond that base level for "covered entities," defined as those water providers that deliver over 2,000 AF of water annually. The "covered entity" label could be expanded to include communities expected to grow into a 2,000 AF water system by 2050, even if they are smaller than that now.
- **Water markets:** Potential water right adjustments to allow structured markets to better share conserved water (CU savings only) regionally without adverse water rights implications if certain conservation standards are met.

- **Small community support:** Additional funding, training, or other support from the state and/or larger water providers and agencies could help support and advance water conservation in smaller communities throughout the state.
- **Permitting incentives.** Water providers that meet a certain threshold of conservation savings or best practices implementation could be offered state support and/or the facilitation of certain permitting approvals.

f) **Support and encourage land use practices that help reduce water consumption:** In 2010, CWCB produced a report titled Colorado Review: Water Management and Land Use Planning Integration. Several local actions that could be used more broadly stemmed out of that report. These include:

- **Expedited permitting:** Permitting for buildings and developments could be expedited if the project incorporates certain water efficiency measures or high levels of density.
- **Tax incentives:** There could be tax breaks if the project incorporates certain water efficiency measures or high levels density.
- **Structure impact (tap) fees:** Use impact fees to promote water-wise developments and in-fill. These fees could be structured to penalize water inefficient or sprawling developments and/or to reward sustainable/dense developments.
- **Regional collaborative planning:** Localized solutions are often not effective, since water demand may be transferred from one jurisdiction to one or many others. Therefore, regional solutions are critical and should be further explored. Some opportunities exist, such as engaging Council of Governments in water/land use discussions, identification of related regional planning efforts that are underway and including water issues, and the use of intergovernmental agreements.
- **Integration:** Many other efforts are currently underway that could reduce regional water demand, but are not specifically aimed at achieving that purpose. There are many opportunities for developing partnerships with other water conservation efforts, sustainable/walkable neighborhood developments, energy conservation and CO_2 reduction programs, water quality programs, food security programs, transportation projects, market drivers, comprehensive plans, and many others.

Immediate Action Steps

6) Explore Legislative Concepts and Develop Support

Potential Future Action Purpose(s)

Conservation is considered an important part of meeting our future water supplies statewide. However, most water providers do not believe that medium or high levels of conservation can be achieved without statewide legislation. Without such legislation, there will continue to be concerns regarding the reliability of conservation and how much can be applied to meet future water needs. While most of the large Front Range water providers agree that statewide legislation is needed, and the "Letter to the Governors" in 2010 also suggested such language, some stakeholders are skeptical that state legislation can be flexible enough to meet local operational needs. The large Front Range

water providers have argued that many of their conservation efforts are approaching the maximum amount of conservation possible. In order to achieve the next levels of conservation, state support, perhaps in the form of legislation, will be needed to apply significant amounts of conservation to meet future M&I needs. Without such statewide support, there could be customer and voter backlash and communities may compete even more for development and growth opportunities, since one community could keep new housing costs down by not adopting a local ordinance. The purpose of this section is to explore legislation that does not force individual water providers to increase their funding of conservation initiatives or conduct a specific conservation practice, but to allow for broad-based solutions that are largely supported by the plumbing, landscaping, and retail communities.

Potential Specific Actions

a) **Explore legislative options and support for indoor plumbing code standards**

- The state should adopt and require water efficiency standards that meet or exceed WaterSense for indoor building codes for all new construction and renovation.
- These standards could be strengthened and/or geared to new construction.

b) **Explore legislative options and support for outdoor water efficiency standards**

- The state should adopt and require water efficiency standards that meet or exceed WaterSense for outdoor use for all new construction and major landscape renovations.
- These standards could be strengthened and/or geared to new construction.

c) **Engage in outreach and education efforts to explain the need for legislation; develop political support**

- Consult with IBCC, Basin Roundtables, and CWCB regarding legislation; include messaging components from education and outreach efforts (see Potential Future Action #6).
- If there is support from IBCC, Basin Roundtables, and CWCB, consult with other stakeholders (providers, Colorado Municipal League, Colorado Counties, Inc., Club 20, Green Industries of Colorado, etc.).
- Draft language for legislation or model ordinance language for further consideration and consultation with stakeholders.
- If there is statewide support and success seems likely, proceed accordingly—find a sponsor, garner support, etc.

Immediate Action Steps

Timeframe

- Any legislation should allow lead time for implementation and should be built on dialogue and consensus before moving forward.

7) Implement Education and Outreach Efforts

Potential Future Action Purpose(s)

Education is critical to conservation, since many of the savings require behavior changes. If legislation is required to implement water conservation measures, a significant education initiative will be needed.

Potential Specific Actions

a) **Track public attitudes through baseline and ongoing surveys:**

- Forthcoming results from the state's value of water survey, the communications roadmap document, and other efforts will be used to inform conservation outreach, policy, and educational efforts.
- Resurvey the public in the future with consistent questions to gauge understanding and support for water conservation in Colorado.

b) **Develop statewide messaging and use focus groups to refine and guide implementation:** Encourage a culture of water conservation similar to the ethic of recycling that currently exists through local education. This could also be accomplished by initiating statewide education and messaging about water conservation with a simple unified message. Since Colorado residents will be the ones who implement conservation, the message must reach them. While there are several options for how to do this, one approach could be to develop tools to support conservation and water education. This could include coordination with the WaterWise Council's current effort on creating a value of water toolbox for provider or regional outreach efforts. The Value of Water survey suggests that regional groups are the most trusted source by the public.

c) **Develop decision-maker outreach strategies:**

- **Water provider summit:** A water provider summit could be developed where water providers with sophisticated water conservation programs can help interested water providers further improve their programs.
- **PEPO decision-maker outreach strategy:** The Public Education, Participation, and Outreach (PEPO) workgroup of the IBCC has developed a strategy that supports Basin Roundtable efforts to reach out to decision-makers in their communities and engage in additional statewide outreach efforts.
- **Coordinated outreach efforts to help local jurisdictions adopt ordinances and/or conservation best practices:** Determine which communities could use assistance and work with them to explore solutions that will work for them.
- **CWCB statewide water efficiency workshops:** CWCB will conduct statewide water efficiency workshops in Fall 2013 and Spring 2014, centered around the CWCB Conservation Planning and Technical Support Program (SWSI Levels Framework, Best Practice Guidebook and the Municipal Water Efficiency Plan Guidance Document and Sample Plan).

d) **Pursue a coordinated media campaign (either statewide or by individual utilities):** Entities throughout the state (including CWCB, providers on both sides of the Divide, and nongovernmental organizations) could work together to implement a coordinated media campaign that seeks to develop a statewide water conservation ethic similar to past efforts to develop a common recycling ethic.

Immediate Action Steps

4. Implement Nonconsumptive Projects and Methods

There is statewide acknowledgement that supporting environmental and recreational attributes is important for local economies, quality of life, and for Colorado's image. Through the work with the Interbasin Compact Committee (IBCC), it has become clear that the Basin Roundtables must do much of the work needed to protect nonconsumptive needs in their Basin Implementation Plans (BIPs), with proper support by the Colorado Water Conservation Board (CWCB). In addition, meeting nonconsumptive needs will require some state assistance, such as targeted funding and technical support.

Environmental and recreational values exist at the reach level, the basin level, and across the state. The statewide environmental benefits provided by Colorado's streams and lakes, as well as the $10 billion that recreation contributes to the state economy, requires that the state play a role in protecting nonconsumptive needs. For example, for the majority of species that are not contained within a single basin, the state must ensure that BIPs, taken together, meet the needs of such species statewide. Similarly, while there are hotspots for certain kinds of recreation (e.g., rafting on the Upper Arkansas River), it benefits the state to have healthy multi-faceted recreational economies on both the Front Range and on the West Slope.

To support these nonconsumptive values, the IBCC developed several principles, which were used as a guide in developing the potential future actions outlined below. These principles were developed as part of the IBCC's 2010 Letter to Governor Ritter and Governor-Elect Hickenlooper ("Letter to the Governors") and are outlined in the excerpt below:

> It is clear that we will need to agree to protecting existing water bodies that are in good health, and to restoring important environmental, wildlife, and recreational values, while we also support the development of properly mitigated water supply projects. In meeting Colorado's nonconsumptive water supply needs it is important to: (a) protect identified environmental and recreational values and restore environmental values; (b) promote recovery and sustainability of endangered, threatened, and imperiled species; (c) protect and enhance economic values to local and statewide economies derived from environmental and recreational water uses; (d) pursue projects and other strategies, including the CWCB's Instream Flow (ISF) Program, that benefit consumptive water users, the riparian and aquatic environments, and stream recreation; and (e) recognize the importance of environmental and recreational benefits derived from agricultural water use, storage reservoirs, and other consumptive water uses and water management.

Completed and Ongoing Actions	Potential Future Actions
• Implement Endangered Species Act recovery programs • Implement basin nonconsumptive projects • Develop draft Nonconsumptive Toolbox • Put Wild & Scenic alternatives in place • Implement CWCB ISF program • Implement Colorado Watershed Restoration Program • Implement Species Conservation Trust Fund • Implement Colorado Parks and Wildlife Management Plans	1) Develop Statewide Goals and Measurable Outcomes to Incorporate into Basin Implementation Plans a) Develop goals and measurable outcomes for federally-listed endangered and threatened species b) Develop goals and measurable outcomes for imperiled species c) Develop goals and measurable outcomes for economically important nonconsumptive uses d) Develop goals and measurable outcomes for multi-purpose projects and methods 2) Pursue Projects and Methods to Meet Nonconsumptive Needs as Part of the Basin Implementation Plans a) Develop basinwide goals b) Develop measurable outcomes c) Identify needs and opportunities d) Utilize the decision process to determine projects and methods 3) Track Nonconsumptive Projects and Methods a) Conduct nonconsumptive surveys and analysis b) Create web portal c) Use existing database d) Use the Basin Needs Decision Support System (BNDSS) 4) Develop Targeted Incentives, including Funding for Projects and Methods in the Nonconsumptive Focus Areas a) Assess funding needs b) Target existing funding sources and programs to provide enhanced levels of support for implementation of nonconsumptive needs. c) Explore additional incentives, including funding options 5) Develop Environmental Metrics that can be Used to Evaluate Future Projects (see New Supply section) 6) Manage Existing Storage to Benefit Recreation and the Environment (see Storage section)

1) Develop Statewide Goals and Measurable Outcomes to Incorporate into Basin Implementation Plans

Potential Future Action Purpose(s)

The following guiding principles were developed as part of the "Letter to the Governors" and can be used as a basis for developing nonconsumptive goals and measurable outcomes that have statewide significance. These principles can then be considered by the Basin Roundtables when they are developing their own goals and measurable objectives. Nonconsumptive goals and measurable outcomes should:

- Promote recovery and sustainability of endangered, threatened, and imperiled species.
- Protect and enhance economic values to local and statewide economies derived from environmental and recreational water uses.

- Pursue nonconsumptive projects and methods that also benefit consumptive water users.

Based upon the above principles, statewide goals and measurable outcomes may be developed for:

- Federally-listed endangered and threatened species
- Imperiled species
- Economically important nonconsumptive uses
- Multi-purpose projects and methods

Existing nonconsumptive goals and measurable outcomes should be used when they are available, such as those included in fish recovery programs.

Potential Specific Actions

a) **Develop goals and measurable outcomes for federally-listed endangered and threatened species:** These goals and measurable outcomes can be based on existing recovery programs for endangered and threatened species.

b) **Develop goals and measurable outcomes for imperiled species:** Goals and measurable outcomes can be developed for imperiled species. This would include species that are candidates or potential candidates for becoming listed as federally threatened or endangered. These goals and outcomes may be based on Colorado Parks and Wildlife (CPW) management plans, or other plans, such as the Colorado Natural Heritage Program.

c) **Develop goals and measurable outcomes for economically important nonconsumptive uses:** Identify the most critical areas in the state that derive economic benefit from stream-dependent recreational activities, such as boating and fishing, and develop goals and measurable outcomes that will benefit these areas.

d) **Develop goals and measurable outcomes for multi-purpose projects and methods:** Identify some of the best opportunities for multi-purpose projects that can benefit both nonconsumptive and consumptive needs. Develop initial goals and measurable objectives for these potential projects. This action relates to one of the recommendations of the IBCC from November 2011: "Identify one or more pilot projects [in each basin] that integrate nonconsumptive with consumptive projects/needs. The pilot … projects … [should] clearly meet the nonconsumptive needs gap."

Potential Measurable Outcome

Basin Roundtables should incorporate statewide goals and measurable outcomes into their BIPs. BIPs will play a key role in helping Colorado to meet its statewide targets.

Timeframe

Develop statewide goals and measurable outcomes by December 2013.

Partners

CWCB Board and staff, statewide stakeholders interested in nonconsumptive needs, Basin Roundtables, CPW, U.S. Fish and Wildlife Service (USFWS), endangered species recovery programs, conservation and recreation nongovernmental organizations, and businesses.

Background

Opportunities

There are a considerable number of goals and measurable outcomes already developed by various agencies operating in Colorado. Much of this work is summarized in Appendix B of the Nonconsumptive Toolbox.

2) Pursue Projects and Methods to Meet Nonconsumptive Needs as Part of the Basin Implementation Plans

Potential Future Action Purpose(s)

As requested by the IBCC at the end of 2011, CWCB has produced a draft Nonconsumptive Toolbox to help Basin Roundtables develop the nonconsumptive portion of their BIPs. These plans are meant to address one of the key aspects of House Bill (HB) 1177, which is to "propose projects or methods, both structural and nonstructural, for meeting [the identified] needs" 37-75-104 (2)(c).

Each Basin Roundtable has determined where their nonconsumptive needs are and the locations of projects and methods that offer some protection to those attributes. The draft Nonconsumptive Toolbox provides a framework for how to develop and pursue projects and methods to meet each Basin Roundtable's identified nonconsumptive needs and will build upon Potential Future Action #1.

This potential future action will draw directly from the methodology outlined in the Nonconsumptive Toolbox and allow for the implementation of three other recommendations the IBCC made at its November 2011 meeting, which have been revised and are included below:

- **Develop nonconsumptive implementation plan:** Building on information previously compiled for the Statewide Water Supply Initiative (SWSI) 2010, identify nonconsumptive geographic and/or seasonal gaps and then suggest and prioritize projects and methods that can fill those gaps in a strategic manner. Using the Nonconsumptive Toolbox, the projects should identify initial cost estimates, potential partners, and whether any entity has agreed to take the lead.

- **Initiate three to five nonconsumptive projects by the end of 2014:** Each Basin Roundtable should use the basin's nonconsumptive identified projects and processes (IPPs) list to select and begin to implement three to five nonconsumptive projects or methods that meet the basin's identified nonconsumptive needs by the end of 2014. Thereafter, each basin should implement additional nonconsumptive projects and methods to meet the basin's nonconsumptive needs consistent with the Basin Roundtable's BIP.

- **Technical questions:** Define technical questions related to nonconsumptive needs that continue to need answers for a basin to finalize and implement its BIP. Basin Roundtables can work with staff and the technical team to search the CWCB nonconsumptive database for some answers, e.g., how many projects support a particular attribute, or how a portfolio may affect flows in a given reach, etc.

Potential Specific Actions

The Nonconsumptive Toolbox framework is organized around four steps that provide the resources and information to encourage comprehensive planning for nonconsumptive needs in each basin.

a) **Develop basinwide goals:** Develop basin-level goals for the mapped attributes identified in the Statewide Nonconsumptive Needs Assessment Focus Area Map.

Example: Maintain enough populations of a native fish in the basin that the species is sustainable within its range to help prevent additional federal listings.

b) **Develop measurable outcomes:** Establish quantifiable, measurable basin-wide or sub-basin outcomes for the nonconsumptive goals.

Example: Sustain 10 populations of bluehead sucker in 10 different river locations.

Basin Implementation Plans

c) **Identify needs and opportunities:** Using the projects and methods database, identify needs and opportunities for protecting targets and attributes and strategically plan to meet those nonconsumptive needs.

Example: Based on analyses of existing levels of protection and where attributes occur, there are five populations of bluehead sucker that are protected. As a result, the basin has identified five additional populations that need projects and methods to meet its established measurable outcomes.

d) **Utilize the decision process to determine projects and methods:** Use the decision tree outlined in Figure 6 of the draft Nonconsumptive Toolbox to determine what actions need to be taken to meet nonconsumptive needs and implement projects.

Example: For one of the five locations where protection of bluehead sucker populations is limited, moving through the decision template may result in the determination that reservoir reoperation could achieve desired outcomes.

Potential Measurable Outcome

Developing goals and measurable outcomes as part of the Nonconsumptive Toolbox methodology will clarify and define what the nonconsumptive needs are in each basin. The difference between what is currently being protected or restored and the goal/measurable outcome is the "nonconsumptive gap." BIPs will then address unmet nonconsumptive needs.

Additional work will be needed to track whether, how, and when nonconsumptive projects are implemented, which is the subject of Potential Future Action #3.

Timeframe

This work will be incorporated into the BIPs. Drafts are due in January 2015, and the final plans will be completed by May 2015.

Partners

Basin Roundtables will partner with CWCB and the technical team, local nonconsumptive project proponents and experts, water users and providers, and may utilize additional consultants.

Background

Opportunities

The CWCB Board will consider finalizing the Nonconsumptive Toolbox during its July 2013 board meeting. The Toolbox has already been reviewed by the IBCC Nonconsumptive Subcommittee, which includes members of the nonconsumptive, municipal, and agricultural communities. In addition, a public comment period for the Toolbox ended May 20th, 2013 and the comments received will be summarized for the CWCB Board at its July 2013 board meeting.

3) Track Nonconsumptive Projects and Methods

Potential Future Action Purpose(s)

Tracking nonconsumptive projects and methods is important to determine if goals are being met and whether strategies should be adjusted.

Potential Specific Actions

a) **Conduct nonconsumptive surveys and analyses:** CWCB could work with the Basin Roundtables to periodically survey nonconsumptive project and method proponents. This would be similar to the effort taken as part of SWSI 2010, in which CWCB developed a survey to collect information on existing and planned nonconsumptive projects, methods, and studies from nonconsumptive project proponents.

b) **Create web portal:** Create a web portal or other mechanism that allows proponents to update information about their nonconsumptive projects and methods. A web portal would also allow basin roundtables to track progress on meeting their nonconsumptive needs and would help potential project proponents to understand where there may be opportunities to help meet the needs of their basin.

c) **Use existing database:** Continue to track the existing and planned projects and methods in the nonconsumptive projects and methods database (see "Background" section below). The responses from this effort will be added to the database and mapped. As part of this task, the nonconsumptive projects and methods database likely needs to be updated so that it is more user-friendly. This work could be incorporated into the ISF decision support system.

d) **Use the Basin Needs Decision Support System:** Incorporate nonconsumptive needs into the BNDSS, which can be used to track environmental projects. The BNDSS currently consists of a prototype database and tools to assist CWCB staff in the tracking and analysis of consumptive projects and methods required by updates to SWSI. Time series data can be stored for providers and projects, counties, basins, and for the state. Water development projects and processes can be tracked to understand their impact on the water supply gap. Other tools are available to facilitate bulk loads, exports, and quality control of data and to perform a prototype gap analysis. The BNDSS currently houses data collected during the SWSI 2010 process. Data will be updated via input from the Basin Roundtables, data collected from the HB-1051 process, and other survey methods during the forthcoming SWSI Update and BIP processes.

Potential Measurable Outcome

Tracking nonconsumptive projects and methods will help determine whether there is progress being made on achieving nonconsumptive goals and measurable outcomes for each Basin Roundtable.

Timeframe

Ongoing.

Partners

CWCB, Basin Roundtables, water providers, nonconsumptive project proponents, CPW, USFWS, U.S. Forest Service, Bureau of Land Management, U.S. Environmental Protection Agency, etc.

Background

Opportunities

CWCB staff synthesized information from the nonconsumptive surveys and analyses and compiled it into a nonconsumptive projects and methods database. Studies were included, as they may recommend or inform the implementation of projects or methods that will provide protection or enhancement of environmental and recreational attributes. CWCB and the technical team also supplemented the survey data with information from CWCB's grant programs, the ISF program, and protection guidelines established by public and private land management agencies.

Basin Roundtables can access the nonconsumptive projects and methods database and work with CWCB staff to ask questions about the locations of planned and existing projects and the resulting level of protection for a given attribute. The 2010 survey and resulting nonconsumptive projects and methods database will help Basin Roundtables focus on locations that may be the most strategic for executing nonconsumptive projects and methods.

In addition to identifying the spatial extent and status of the identified projects and methods, CWCB also examined what type of protection the project or method may provide to a given environmental or recreational attribute. CWCB has classified the projects as having direct or indirect protections based on a given environmental or recreational attribute. The definitions used for direct and indirect protections are as follows:

- **Direct protection:** Direct protection consists of projects and methods with components designed intentionally to protect a specific attribute. For example, ISFs provide direct protection of fish attributes, and recreation in-channel diversions (RICDs) can do the same for community kayaking. Additionally, restoration of a stream channel would provide direct protection of aquatic species.
- **Indirect protection:** Indirect protection consists of projects and methods with components that were not designed to directly protect the specific attribute but may still provide protection. For example, flow protection that benefits a fish species—whether from an appropriated ISF, an ISF lease, or a release from a reservoir as part of its operations to move water downstream to a consumptive user—may also indirectly protect riparian vegetation that is located in the protected stream reach. Other examples include protective land stewardship or a wetland or bank stabilization effort that could indirectly protect aquatic species.

The direct and indirect protections included in the nonconsumptive projects and methods database can be analyzed by river, basin, or at the statewide level as they relate to environmental and recreational attributes.

Additionally, the nonconsumptive Focus Area Maps created by the Basin Roundtables (available online and in Section 2 of SWSI 2010) can be used in combination with the nonconsumptive projects and methods database to devise a strategic, comprehensive plan that sets targets and measurable

outcomes for protecting environmental and recreational attributes. To start, Basin Roundtables should ask what they want to achieve for each river segment on their Focus Area Maps. Is the measurable outcome to sustain all attributes in all focal segments? Are there some attributes or segments that are more important than others? Are there attributes that will be maintained or improved only on an opportunistic basis?

Maps of projects and methods for each basin have been superimposed on top of the Focus Area Maps. Basin Roundtable members or other stakeholders may want to identify what types of projects or methods could be implemented on these segments to sustain the nonconsumptive values.

This overlay enables the users to ask a series of questions, including:

- For each focus segment, are there protections in place for the attributes?
- If protections are in place, are they sufficient to maintain/sustain the attributes?
- If protections are either insufficient or are not present, what additional action can be taken to maintain the attributes?

4) Develop Targeted Incentives, including Funding for Projects and Methods in the Nonconsumptive Focus Areas

Potential Future Action Purpose(s)

Funding is a critical component in meeting nonconsumptive needs, whether it is to ensure that existing funding sources are used strategically, or to identify additional funds to recover threatened and endangered species, maintain and improve habitats, and support stream-based recreation.

As stated in the relevant portions of the "Letter to the Governors," there are two main ways to use funding to meet these goals:

- **Current funding:** Target funding toward reaches and sub-watersheds that support the guiding principles.
- **Additional funding:** Find sustainable funding for projects that help meet nonconsumptive needs.

Potential Specific Actions

a) **Assess funding needs:** Determine the amount of funding needed to meet nonconsumptive needs, as identified in the BIPs.

b) **Target existing funding sources and programs to provide enhanced levels of support for implementation of nonconsumptive needs:** There are several existing funding sources and programs available to meet nonconsumptive needs; these are listed in the Nonconsumptive Toolbox. Efforts could be made to ensure that funds and programs incentivize meeting the needs identified in the nonconsumptive focus areas.

c) **Explore additional incentives, including funding options:** Explore and pursue options for additional funding sources, if needed. Options are included in Appendix B.

Partners

CWCB, other state agencies, Great Outdoors Colorado (GOCO), Basin Roundtables, conservation and recreation interests, water providers, and many others if additional funding sources are sought.

Background

Challenges/Barriers

It will be difficult to develop additional funding sources, if they are required.

Opportunities

The Nature Conservancy and the Tamarisk Coalition have already conducted reports on potential funding options. In addition, CWCB already utilizes the nonconsumptive focus areas to support ISF appropriations and watershed restoration grants.

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5. Have a High Success Rate for IPPs

Identified projects and processes (IPPs) are defined as currently planned projects and methods that water providers will use to meet their future water needs. IPPs represent one of the four broad water supply strategies being considered to meet the projected 2050 water supply gap and if successfully implemented have the potential to generate at least 350,000 acre-feet (AF) of additional supplies. IPPs will be a significant component of a Colorado Water Plan (CWP) and may reduce the pace of agricultural transfers and new supply projects that are required to meet the gap. While the Basin Roundtables and Interbasin Compact Committee (IBCC) hope that the success rate of IPPs will be as high as possible, they have determined that approximately 80 percent of the yield associated with IPPs is likely to be achieved. This success rate will require considerable local and state efforts. IPPs include:

- 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

In the 2010 "Letter to the Governors," the IBCC identified several strategies to ensure the success of IPPs through active state support and collaboration. These strategies include the following:

- Create a joint agency task force, which should include representatives from all state agencies involved with water supply development.

- The State of Colorado and its constituent agencies should seek to solve problems and help identify ways to overcome obstacles related to water projects by coordinating multiple state agencies' evaluations, responses, and other efforts regarding water supply projects early in a project's life and in an ongoing and regular fashion.

- The State of Colorado should actively and regularly confer with and educate federal agencies and the state's Congressional delegation about Colorado's water supply needs and the importance of local water projects and processes to address those needs.

- The State of Colorado through the Legislature and directed agencies should continue to provide funding for IPPs.

- In cases where there is local and/or stakeholder disagreement about a proposed project, if the project proponent requests it, the State of Colorado and/or IBCC should initiate efforts to convene stakeholders in a process that aims to resolve conflicts and address concerns.

- Once the joint agency task force has substantially completed its process and achieved consensus that a proposed project should proceed, and the stakeholder process in #5, if any, has reached a conclusion, then the State of Colorado and its constituent agencies should become public advocates for a project.

Recent activities and the request of the Governor's Executive Order mandating the development of a CWP substantively meet many of these requirements. Specifically, the Executive Order directs the CWP to:

- Align state water projects, studies, funding, and other efforts.
- Align the state's role in water project permitting and review processes.
- Streamline the state role in the approval and regulatory processes regarding water projects and expedite permitting processes for projects that stress conservation, innovation, collaboration, and other criteria as determined by the Colorado Water Conservation Board (CWCB).
- Coordinate CWCB's efforts in crafting the CWP with its sister agencies within the Colorado Department of Natural Resources (DNR) as well as the Colorado Department of Public Health and Environment, the Colorado Water Resources and Power Development Authority, the Colorado Department of Agriculture, the Colorado Energy Office, and other relevant state agencies as needed.

The Executive Order further emphasizes that projects included in the CWP should align with the following goals and values:

- A productive economy that supports vibrant and sustainable cities; viable and productive agriculture; and a robust skiing, recreation, and tourism industry.
- Efficient and effective water infrastructure promoting smart land use.
- A strong environment that includes healthy watersheds, rivers and streams, and wildlife.

To further address successful implementation of IPPs, CWCB formed the Cooperative Agencies on Water Supply (CAWS) group, which includes representative federal agencies (e.g., Bureau of Reclamation, U.S. Environmental Protection Agency, and U.S. Army Corps of Engineers) to discuss permitting issues. As part of the directive of the Executive Order, CWCB plans to reconvene this group to educate and partner with federal permitting agencies to expedite the permitting process. Additionally, Basin Implementation Plans (BIPs) will play a major role in incorporating IPPs into the state water planning process.

Considering the recent progress that has been made and the work yet to be done under the directives of the Executive Order and BIPs, many of the IBCC's requests are underway.

Completed, Existing, and Ongoing Actions	Potential Future Actions
• Make policy recommendations in support of IPP implementation through the 2010 "Letter to the Governors" • Establish the CAWS group to improve communication among state and federal agencies about permitting issues • Support key IPPs (e.g., the Chatfield Reallocation Project; Water, Infrastructure, and Supply Efficiency (WISE); the Colorado River Cooperative Agreement) • Coordinate DNR responses to IPPs through the DNR Executive Director's Office • Provide technical and financial support to project proponents through Water Supply Reserve Account (WSRA) grants	1) Support Local Implementation of IPPs a) Provide technical and financial support, including facilitation, to BIPs b) Support the conversion of single-purpose IPPs into multi-purpose IPPs when appropriate c) Streamline state permitting processes for IPPs that meet values of the CWP d) Continue state coordination with the federal permitting entities e) Encourage cooperative projects through BIPs 2) Update Tracking and Data Collection via the Basin Needs Decision Support System (BNDSS) a) Support basin roundtables in providing updated IPP data as part of their BIPs b) Track and analyze impacts of IPPs on the projected water supply gap 3) Optimize Funding Sources for IPPs a) Assess funding needs b) Target existing funding sources towards IPPs c) Identify new funding sources for IPPs 4) Generate Political Support for IPPs a) Facilitate and encourage regular, active communication about IPPs between CWCB, IBCC, and Basin Roundtables b) Convene a facilitated dialogue among stakeholders, project proponents, and state agency representatives if there is disagreement about a proposed project or process c) Conduct outreach and education about IPPs and the state water planning process d) Develop an approach for determining whether a project meets the values of the CWP and has broad stakeholder support e) Encourage legislative resolutions in support of IPPs that meet the values of the CWP f) Publicly advocate for IPPs that meet the values of the CWP and have stakeholder support

1) Support Local Implementation of IPPs

Potential Future Action Purpose(s)

Needs assessment work conducted as part of the Statewide Water Supply Initiative (SWSI) determined that every basin in Colorado will have a gap in water supply by 2050. Basin Roundtables are currently in the process of developing BIPs to proactively address this projected gap through a variety of localized projects and processes. Some IPPs are currently well-established and/or underway and will not require further review. However, it is expected that new IPPs will be identified and initiated through the BIPs and every effort should be made to ensure that these projects are in line with the values of the CWP. Technical and financial assistance will be necessary to support Basin

Roundtables as they identify implementation strategies tailored to the unique needs and constraints of their region. Similarly, expedited permitting processes for IPPs that are in line with the values of the CWP will ensure that important projects move forward in a timely manner.

Potential Specific Actions

a) **Provide technical and financial support, including facilitation, to BIPs:** The State of Colorado should continue to provide technical and financial support to Basin Roundtables in the development of their BIPs. These plans will incorporate new IPPs and should be supported in partnership with project proponents. Specifically, the state can assist in the technical development of BIPs by providing skilled contractors to work with each basin. Alternatively, the state can provide funds for basins to invest in local contractors and facilitators they have identified as well-suited to their individual needs. In all cases, supported new IPPs should be developed in a way that ensures their alignment with the values of the CWP.

b) **Support the conversion of single-purpose IPPs into multi-purpose IPPs when appropriate:** Upon request from a project proponent, the state can play an important role in providing financial or technical assistance to expand a single-purpose project into one that meets multiple needs, provides sufficient flexibility to meet multiple future scenarios, and is in line with the values of the CWP. In doing so, the state should work to facilitate a dialogue between stakeholders to identify how multi-purpose projects can best serve a variety of interests. The state should also continue to support multi-purpose IPPs that are currently underway.

c) **Streamline state permitting processes for IPPs that meet values of the CWP:** The Executive Order directs the CWP to help expedite permitting at the state level. The state should develop an approach to permitting IPPs that efficiently moves projects through the process and toward an outcome, whether positive or not, while ensuring sufficient protection of nonconsumptive and other values. Public engagement and community outreach regarding water supply needs may need to increase in affected communities to facilitate an efficient permitting process.

d) **Continue state coordination with the federal permitting entities:** The state should continue to meet with federal permitting agencies and look for opportunities to make the existing permitting processes more efficient, especially for projects that meet the values of the CWP and are needed across multiple scenarios. Efficiency would not dictate whether the outcome for a project is positive or not. A potential opportunity for increased efficiency in federal permitting could be found in addressing the "purpose and need" section of an Environmental Impact Statement (EIS). Several water providers have indicated that re-addressing this section of an EIS when water use data is modified is counter-productive. If water projects are needed across a broad range of scenarios, the state could explore a memorandum of understanding with permitting agencies that the "purpose and need" section of an EIS will not have to be reconsidered under these conditions.

e) **Encourage cooperative projects through BIPs:** CWCB should encourage Basin Roundtables to work with water providers and communities that anticipate having a water supply gap in the future (or that have one now) to partner with neighboring providers and communities to find creative solutions to their water needs. In particular, water-short communities should work with their surrounding communities to examine whether they can be integrated into current systems or upcoming IPPs. Expanding the number of water users served by IPPs that are

already planned or underway can help limit or delay the need for new supply or agricultural transfer projects.

Immediate Action Steps

2) Update Tracking and Data Collection via the BNDSS

Potential Future Action Purpose(s)

The BNDSS consists of a prototype database and toolset that currently houses data collected during the SWSI 2010 process. Time series data can be stored in the system for providers and projects, counties, basins, and for the state. The database can also be used to perform a gap analysis. Providing continued updates to BNDSS and other technical tools will allow data about IPPs to be consistently tracked and analyzed on a local and statewide basis. Monitoring and evaluating the success of IPPs will be important in gauging their success and integrating this component with the other four "legs of the stool."

Potential Specific Actions

a) **Support Basin Roundtables in providing updated IPP data as part of their BIPs:** CWCB should continue to provide technical assistance and financial support for Basin Roundtables as they work to update the IPPs in their basin, by providing the existing IPP lists, and supporting Basin Roundtables in their outreach to water providers throughout the basins. This new data will be used to update the BNDSS.

b) **Track and analyze impacts of IPPs on the projected water supply gap:** CWCB should work with water providers and Basin Roundtables to regularly assess the impacts and benefits of IPPs (and any other developments) on projected water supplies. These impacts should be assessed statewide, at the basin level, and at the sub-basin level. Sub-basin assessments are particularly helpful in understanding future water supply needs and whether there is potential to integrate specific providers or communities into IPPs in other, neighboring areas.

Immediate Action Steps

3) Optimize Funding Sources for IPPs

Potential Future Action Purpose(s)

Financial support is critical to meet the state's water needs. Governor Hickenlooper's Executive Order has directed CWCB to align funding sources to the greatest extent possible when a potential project or process meets the values of the CWP. The WSRA, administered by the CWCB, has leveraged local and federal funds to assist hundreds of important projects that provide water for long-term consumptive and nonconsumptive needs. Continuing to optimize existing funding while identifying new sources will be an important component of ensuring the success of future IPPs.

Potential Specific Actions

a) **Assess funding needs:** In the previous SWSI update, a cost estimate for implementing the portfolios, including IPPs, was included. However, no assessment was performed concerning whether or not additional funds will be needed. CWCB should build upon previous efforts and work with the Basin Roundtables to evaluate the amount of funding needed to move critical

IPPs forward in water short areas that have funding shortfalls. Determining preliminary funding requirements of selected IPPs may also be useful in culling IPPs that prove to be financially infeasible or are not consistent with the BIPs. Other IPP funding needs should be determined once these preliminary efforts are completed. Considerable attention to leveraging state funds with local matching funds should be continued.

b) **Target existing funding sources towards IPPs:** CWCB should continue its current effort to focus funding on IPPs and project implementation, including funding of components of projects that are multi-purpose in nature. If funding for additional studies or nonimplementation work is requested by Basin Roundtables, they should be asked to explain how such efforts contribute to the advancement of IPPs in their basin.

c) **Identify new funding sources for IPPs:** CWCB should work with the IBCC, other state agencies, the Governor's Office, and the Legislature to identify new sources of funding for IPPs. Linkage fees, targeted new taxes, or other creative ideas should be explored and discussed, even if they are not currently possible or political palatable.

Immediate Action Steps

4) Generate Political Support for IPPs

Potential Future Action Purpose(s)

Governor Hickenlooper's Executive Order directing CWCB to develop the CWP is partially aimed at generating political support for a comprehensive, holistic approach to managing limited water resources into the future. Continued political and social acceptance of projects and processes that meet the values of the CWP will be important to ensure their success. Transparent communication and collaboration with stakeholders and the public will be critical in continuing the momentum generated by the Executive Order and ensuring that important projects and processes can proceed expeditiously.

Potential Specific Actions

a) **Facilitate and encourage regular, active communication about IPPs between CWCB, IBCC, and Basin Roundtables:** CWCB and the IBCC should actively seek out opportunities to discuss the status of IPPs with each other and with the Basin Roundtables. These conversations should include an in-depth exploration of any challenges or barriers that are inhibiting the progress of IPPs and ways that CWCB, the IBCC, or other state entities can be of assistance in overcoming the obstacles and helping projects get to completion.

b) **Convene a facilitated dialogue among stakeholders, project proponents, and state agency representatives if there is disagreement about a proposed project or process:** As stated in the 2010 "Letter to the Governors," CWCB, the IBCC, and/or the Basin Roundtables should convene stakeholder dialogues in situations where disagreement about an IPP is standing in the way of implementation. Such stakeholder dialogues should be carefully designed and implemented to ensure that they are geared toward problem solving and increasing the ability of the project to meet diverse needs rather than toward problem making and delaying the implementation of a project.

c) **Conduct outreach and education about IPPs and the state water planning process:** Water providers, Basin Roundtables, the IBCC, and CWCB should all increase their investments in

stakeholder outreach and public education. These investments should be targeted at increasing understanding of the water supply gap and the ability of IPPs to help address it, both statewide and in specific basins or sub-basins. Stakeholder outreach and public education should be coordinated to ensure consistent messaging and efficient use of resources.

d) **Develop an approach for determining whether a project meets the values of the CWP and has broad stakeholder support:** Determining whether a project or process meets the values of the CWP and has broad stakeholder support will be an important factor in deciding which IPPs receive financial and political support. The Joint Agency Task Force proposed in the 2010 "Letter to the Governors" might be an appropriate body to develop an approach for identifying projects that merit the political support and advocacy outlined below.

e) **Encourage legislative resolutions in support of IPPs that meet the values of the CWP:** CWCB and the IBCC should work with the Legislature to develop and pass resolutions in support of specific IPPs that meet the goals and values of the CWP and have demonstrated broad stakeholder support. However, legislative resolutions supporting specific IPPs should not occur until the project 1) aligns with the goals of the CWP, 2) has broad stakeholder support, and 3) has substantively completed the state permitting process. These resolutions can be simple statements of support or more complex efforts to help specific projects through the permitting process, but they should not seek to override or supplant local decision-making or the protection of nonconsumptive or other values.

f) **Publicly advocate for IPPs that meet the values of the CWP and have stakeholder support:** CWCB, members of the IBCC and the Basin Roundtables, and the Governor should actively and publicly advocate for IPPs that meet the values of the CWP and have demonstrated broad stakeholder support. However, public advocacy for specific IPPs should not occur until the project 1) aligns with the goals of the CWP, 2) has broad stakeholder support, and 3) has substantively completed the state permitting process. This advocacy should seek to convince decision-makers at all levels and the general public that permitting and implementing these IPPs is critical to meeting Colorado's water supply needs while maintaining our agricultural heritage, healthy environment, and recreational economies.

Immediate Action Steps

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6. Implement and Assess Storage and Other Infrastructure

The Interbasin Compact Committee (IBCC) has defined storage and other infrastructure as a critical cross-cutting topic. Storage can help water users maximize supplies by re-timing water availability. This allows users to capitalize on average and wet years and may increase the possibility of sharing water resources when possible. Storage and infrastructure are also important for minimizing agricultural losses, maximizing the use of conservation and reuse savings, and allowing for additional new supplies. In addition, storage can play a critical role in supporting the environment, particularly in support of endangered and threatened species recovery programs. Moreover, storage is an important element in protecting Colorado's interstate water rights pursuant to its compacts and equitable apportionment decrees. As Colorado plans for its water future and looks ahead to a projected 2050 supply gap, new storage and infrastructure will be needed to share, transfer, store, and convey water for the benefit of all. Additionally, new opportunities for existing storage and infrastructure should be explored to provide maximum utilization for all purposes and ensure compact compliance.

Completed and Ongoing Actions	Potential Future Actions
• Identify needed storage	1) Manage and Develop Strategic Storage and Infrastructure a) Identify storage and other infrastructure opportunities through Basin Implementation Plans (BIPs) b) Manage and improve storage and infrastructure to effectively use conserved water c) Prepare for uncertainty in hydrology and climate change d) Explore and implement aquifer storage and recovery e) Explore and implement storage and other infrastructure to support meeting Colorado's compact obligations 2) Identify and Prioritize Multi-purpose Storage and Infrastructure Opportunities a) Manage and improve storage, infrastructure, and reservoir operations to benefit environmental and recreational values b) Support basin roundtables in identifying feasible multi-purpose projects c) Prioritize implementation of multi-purpose projects that meet values of the Colorado Water Plan (CWP) d) Identify partners for permitting, funding, and constructing multi-purpose projects 3) Analyze Infrastructure Needs for Storage of Alternative Agricultural Transfer Methods (ATM) water a) Analyze existing storage and infrastructure for opportunities to increase exchange capacity b) Develop water quality treatment infrastructure c) Manage and improve agricultural storage and infrastructure

1) Manage and Develop Strategic Storage and Infrastructure

Potential Future Action Purpose(s)

The IBCC and Basin Roundtables have highlighted the importance of additional storage and infrastructure projects to better manage the State of Colorado's limited water resources and to prepare for uncertain hydrologic futures. In addition to their traditional and existing uses, storage and other infrastructure can help water providers fully utilize and share conserved water. Unique methods, such as aquifer storage and recovery, can also be used to maximize water supplies for future use.

Potential Specific Actions

a) **Identify storage and other infrastructure opportunities through BIPs:** Each Basin Roundtable should identify storage and other infrastructure needs and opportunities that meet the values in the CWP. These tools, if built, should be able to help municipal and industrial (M&I) water users meet water supply shortages and gaps, assist water providers in cooperatively managing and sharing water supplies, meet multi-purpose objectives, and provide flexibility in meeting multiple future scenarios.

b) **Manage and improve storage and infrastructure to effectively use conserved water:** The use of conserved water is limited by the ability to time that water for use and also by the ability to share conserved water with other entities. Storage and infrastructure should be analyzed through the BIPs and managed and improved to optimize the use of conserved water. See the "Conservation" Section for additional detail under Section 3-4.

c) **Prepare for uncertainty in hydrology and climate change:** Determining increased storage and infrastructure needs for future climate change scenarios will help to ensure the state's ability to meet current and future agricultural, M&I, environmental, and recreational needs. This analysis could include carry-over storage for drought conditions or capturing a shorter run-off period.

d) **Explore and implement aquifer storage and recovery:** New storage that can be used in a conjunctive manner with groundwater should also be considered. This storage could be in surface water reservoirs that would capture runoff from above average years and some of this water could then be stored in aquifers in the Denver Basin through injection/recharge. During drought years, this water along with the Denver Basin groundwater could be used when surface water supplies are limited. The Metro Basin Roundtable has studied this aquifer storage and recovery using the Water Supply Reserve Account funding.

e) **Explore and implement storage and other infrastructure to support meeting Colorado's compact obligations:** As an element of the BIPs and the continuing work of SWSI, new storage and infrastructure, as well as new opportunities for existing storage and infrastructure, should be explored to protect Colorado's interstate water rights pursuant to its interstate compacts and equitable apportionment decrees, while meeting the values of the CWP.

Immediate Action Steps

Background

Opportunities

Basin planning efforts may provide a good venue for this activity. Storage allows for multi-purpose benefits, including environmental and recreational values, as demonstrated with the Chatfield Reallocation Project. The Arkansas Basin Roundtable is working on identifying what the agricultural gap is in that basin. The North Platte and Yampa/White Basins have already identified additional acres that could be productive. Storage and other infrastructure that meets the needs identified in these reports should be explored.

2) Identify and Prioritize Multi-Purpose Storage and Infrastructure Opportunities

Potential Future Action Purpose(s)

Storage and infrastructure projects that support agricultural, municipal, and industrial demands along with nonconsumptive needs will allow for efficient use of limited water resources as well as obtaining more support from sponsors and partners. Multi-purpose storage and infrastructure projects also add flexibility, reduce pinch points, and help to prepare for uncertain hydrologic futures.

Potential Specific Actions

a) **Manage and improve storage, infrastructure, and reservoir operations to benefit environmental and recreational values:** Water supplies for nonconsumptive needs are often short during the late summer and early fall, and water temperatures during these months are often too high for native fish species. Especially at these critical times, storage can be an important tool in managing water supplies and timing releases for the benefit of native fish species, as well as for recreational needs. Through BIPs, opportunities should be explored to utilize existing and planned storage and infrastructure to support nonconsumptive needs. For instance, current reservoir operations should be analyzed to identify opportunities to increase benefits to environmental and recreational values.

b) **Support Basin Roundtables in identifying feasible multi-purpose projects:**

c) **Prioritize implementation of multi-purpose projects that meet values of the CWP:**

d) **Identify partners for permitting, funding, and constructing multi-purpose projects:**

Timeframe

This process could require significant time to evaluate and prioritize multi-purpose projects so it would most likely be completed in 2015.

Partners

CWCB, IBCC, Basin Roundtables, water providers, agricultural water users, and environmental organizations.

Background

Challenges/Barriers

The ability to reach consensus on a prioritized list of multi-purpose projects that meet the no regrets philosophy along with permitting and funding will be a challenge.

Opportunities

This potential future action will allow the CWCB, IBCC, and Basin Roundtables to function as envisioned under the Colorado Water for the 21st Century Act to meet future water needs.

3) Analyze Infrastructure Needs for Storage and of Alternative Transfer Methods Water

Potential Future Action Purpose(s)

Analysis of the representative portfolios indicate that at least 50,000 acre-feet (AF) of base supplies from agricultural to municipal uses will be needed annually on the Front Range; 25,000 AF of additional water will be needed from reuse. In addition to supply base supplies, ATMs may be needed during times of drought. Because of the potentially large impacts traditional agricultural transfers may have to agricultural and rural economies, ATMs will be needed to lessen the impacts. As part of this effort, significant storage and other infrastructure will be needed. ATM projects will require piping and pumps, advance water quality treatment facilities, recharge ponds, new storage, and optimization of current storage to be successfully implemented. In the South Platte and Arkansas Basins, where exchange potential is limited (especially during irrigation season), infrastructure and storage can serve to move water to Front Range municipalities for both base and drought supplies. Infrastructure and/or storage will also be needed to move water from areas where there may be unappropriated water, usually in the lower part of a river basin.

Potential Specific Actions

a) **Analyze existing storage and infrastructure for opportunities to increase exchange capacity:** Infrastructure can be leveraged to increase exchange capacity or address nonconsumptive needs in river systems such as the South Platte.

b) **Develop water quality treatment infrastructure:** Agricultural transfers usually require significant water treatment, whether through reverse osmosis or through a purification system like Prairie Waters. More treatment infrastructure will be needed to handle increased agricultural transfers. There will also need to be significant efforts to mitigate the brine and other potential water quality impacts from additional treatment.

c) **Manage and improve agricultural storage and infrastructure:** Storage and other infrastructure should be rehabilitated and maintained to avoid losing more agriculture. In addition, infrastructure should be increased in areas that have been identified as needing additional agriculture, such as the Yampa and the North Platte Basins, or in those areas that do not have sufficient storage and other infrastructure to support agriculture and municipal sharing projects. This includes needed augmentation. Storage and other infrastructure should be analyzed through the BIPs and managed and improved to support agricultural needs and opportunities to promote agriculture and municipal water sharing.

Immediate Action Step

BIPs should identify storage and infrastructure opportunities in each basin.

Background

Challenges/Barriers

There are numerous challenges associated with the development of new storage, including funding and permitting.

Opportunities

Basin planning efforts may provide a good venue for this activity. Storage allows for multi-purpose benefits, including environmental and recreational values, as demonstrated with the Chatfield Reallocation Project. The Arkansas Basin Roundtable is working on identifying what the agricultural gap is in that basin. The North Platte and Yampa/White Basins have already identified additional acres that could be productive. Storage and other infrastructure that meets the needs identified in these reports should be explored

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7. Implement Reuse Strategies

Examining new and existing reuse opportunities, water reuse could become a pertinent factor in narrowing the supply gap, especially for the East Slope basins. The reuse of existing supplies has been projected to provide 43,000 to 61,000 acre-feet per year (AFY) of water, which accounts for about 10 percent of the total Identified Projects and Processes (IPP) projected yield (Statewide Water Supply Initiative [SWSI] 2010). These projections only account for reuse of the existing supplies, and do not account for potential creation of reuse projects associated with new transbasin diversions or agricultural transfers.

Colorado water law defines what water supplies can be reused, and to the extent each source can be reused. Currently there are a limited number of sources that can legally be reused in Colorado:

- **Nonnative water:** Water imported into a basin through a transbasin diversion can be reused to extinction. Transbasin diversions account for a substantial quantity of the total reusable supply in Colorado.
- **Agricultural-Municipal Water Transfers:** Agricultural transfers are generally available for reuse; however, reuse is limited to the historic consumptive use of the original agricultural water right decree. Reuse is applicable for water from traditional purchase of agricultural water rights and alternative transfer methods (ATMs).
- **Nontributary groundwater:** Reuse of nontributary groundwater is allowable.
- **Other Diverted Water:** Any water right with a decreed reuse right may be reused to the extent described in the decreed reuse right.

There are two ways in which these different source types can be reclaimed for reuse:

1. **Direct Reuse:** This is the process in which the return flows from the various supplies are physically reclaimed either for potable or nonpotable uses. An example of this can be found in Aurora's Sand Creek Water Reuse Facility (detailed later).
2. **Indirect Reuse:** This process entails the exchange or substitution of the return flows from a reusable source. The most common form of Indirect Reuse is through river exchanges, where a utility lets the reusable water flow downstream, and diverts an equal amount of water from an upstream source.

The ways in which this reclaimed water can be used are described by Regulation 84, which was developed by the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Commission (WQCC). Through this regulation, the reclaimed water is placed into one of three categories based on what treatment the reclaimed water is subjected to. Reclaimed water categories and approved uses can be found in Appendix A.

An examination into current implementations of water reclamation and reuse will provide a framework for other basins and water providers to plan and implement their own reuse strategies. Potential future actions will also help in the improvement and development of previous and new reclamation and reuse programs.

The East Slope basins represent the majority of water reuse throughout the State of Colorado. Much of Colorado's water reuse occurs in the Arkansas River Basin, which accounts for over half of the total water reuse throughout the state. Currently, the Colorado River Basin is the only West Slope basin to participate in water reuse. In addition to the reuse facilities described below, it should also be mentioned that Arapahoe County and Westminster also participate in water reuse programs.

Colorado Springs Utilities (CSU) created their first water reuse system in 1961, and has continued their water reuse operations by establishing a nonpotable master plan, as well as completing an additional water reuse facility in 2007.

Most of the water reused in this facility is for non-potable purposes in the form of direct reuse. Treated water is diverted back into the system for irrigation of golf courses, parks, campuses, and other properties. The non-potable water is also used in the cooling towers for the Drake Power Plant. According to CSU, this has yielded a savings of 1 billion gallons of drinking water per year. 13% of CSU's water portfolio consists of non-potable water (www.csu.org). In addition, CSU also has an active reuse by exchange program.

Aurora has been providing reuse water for irrigation of golf courses, open space, and city parks for about 30 years. This reuse has been utilized during the summer months. The Sand Creek facility helps effectively reduces the demand for potable water as an irrigation supply throughout these months. During the winter months, the reuse water is discharged back into the stream (www.colorado.gov).

The Sand Creek reuse facility in Aurora discharges about 5 million gallons per day (mgd). The water is treated with biological nutrient removal, upflow tertiary filtration, and ultraviolet disinfection. Aurora's Prairie Waters Project also allows for Aurora to reclaim potable water. The Prairie Waters Project utilizes an aquifer recharge and recovery (ARR) project, three pumping stations, 34 miles (54.7 kilometers) of pipeline, and a 50-mgd water purification facility, known as Peter D. Binney Purification Facility.

Denver Water's Robert W. Hite Wastewater Treatment Plant has a capacity to provide 30 mgd of reuse water, but is expandable to 45 mgd. This reclaimed water undergoes an extensive treatment process.

- Source water is treated with a biologically aerated filter process, where microorganisms are used to remove suspended solids.
- The water is then mixed with coagulants to capture suspended solids and nutrients.
- Flocculation then occurs to increase contact of the solids with the coagulant, which allows for larger solid particles to form and then settle out of the mixture.
- Anthracite is then utilized to filter out any remaining solids.
- Finally, the water enters contact basins for chemical disinfection and corrosion control.

Once the water is treated, it is distributed to the customers for irrigation, industrial use, and for lakes and ponds with city parks and golf courses.

There are several issues that are associated with the reuse of water supplies ranging from cost to public acceptance, water quality, and agricultural concerns. In order for reuse to solidify its place as a sustainable water supply option for the Front Range, these concerns must also be addressed.

Completed and Ongoing Actions	Potential Future Actions
• Continue to support current reuse IPPs. • Continue to incorporate reuse in the state water planning process. • Continue the study of zero liquid discharge reverse osmosis plants through the Water Supply Reserve Account (WSRA) program	1) Improve Tracking, Quantification, and Planning a) Utilize SWSI efforts to improve reporting of reuse IPPs b) Develop Basin Implementation Plans (BIPs) that incorporate reuse 2) Establish a Statewide Reuse Goal with Intermittent Benchmarks a) Develop general political support for a statewide reuse goal b) Develop statewide agreement tying reuse to new supply development and agricultural transfers c) Encourage relevant local entities to outline and report their own approaches to help achieve the statewide goal 3) Develop New Incentives for Reuse a) Explore funding options in support of the WSRA grant program b) Pursue breakthroughs in research c) Develop regulatory incentives 4) Implement Education and Outreach Efforts a) Track public attitudes through baseline and ongoing surveys

1) Improve Tracking, Quantification, and Planning

Potential Future Action Purpose(s)

The Water, Infrastructure, and Supply Efficiency (WISE) partnership between Denver Water, Aurora, and members of the South Metro Water Supply Authority has highlighted how much can be accomplished by looking at reuse from a regional perspective. However, there is a lack of reliable data on how much water is currently being reused, how much water could be reused, and how much water is planned on being reused. Additional data could help water providers and Basin Roundtables identify additional opportunities to increase reuse water.

Potential Specific Actions

a) **Utilize SWSI efforts to improve reporting of reuse IPPs:** As part of SWSI and other efforts to gather information on existing and planned projects, an effort to collect more data on reuse should be emphasized. Such data could be used to assess reuse potentials compared to existing and planned reuse. As part of this effort, understanding limitations in sharing and fully consuming reuse water should be incorporated.

b) **Develop BIPs that incorporate reuse:** Reuse should be incorporated in BIPs where applicable. This is primarily for the three East Slope roundtables. Opportunities for regional reuse projects utilizing existing, planned, new, or transferred water supplies should be part of this effort, and should take into account water quality concerns and needed storage and other infrastructure. Lastly, impacts of reuse of existing supplies on agriculture should also be considered as part of this effort. For more detail on storage and other infrastructure, see Section 6.

Immediate Action Steps

2) Establish a Statewide Reuse Goal with Intermittent Benchmarks

Potential Future Action Purpose(s)

Developing a statewide consensus on how much reuse can and should be part of Colorado's water future could be helpful in gaining the momentum necessary for establishing additional reuse projects.

Potential Specific Actions

a) **Develop general political support for a statewide reuse goal:** Such political support should be limited only to those areas and water providers where reuse is applicable. Such a goal should address potential impacts of reuse, as described above.

b) **Develop statewide agreement tying reuse to new supply development and agricultural transfers:** New agricultural transfers and transbasin diversions should have aggressive reuse associated with them. Such reuse should be codified in a statewide agreement.

c) **Encourage relevant local entities to outline and report their own approaches to help achieve the statewide goal:**

Immediate Action Steps

3) Develop New Incentives for Reuse

Potential Future Action Purpose(s)

Because of the costs, environmental impacts, and regulatory barriers, direct reuse projects are difficult to implement. Incentives are needed to further support the development of additional reuse projects.

Potential Specific Actions

a) **Explore funding options in support of the WSRA grant program:** The creation and maintenance of a water reuse facility can be quite costly. These costs range depending on whether the water is direct or indirect reuse, and whether or not it will be used for potable or nonpotable purposes. The Colorado Water Conservation Board (CWCB) estimates that for direct nonpotable reuse, the cost is about $7,000/acre-foot (AF). Indirect nonpotable uses are estimated to cost $13,500/AF. The costs of potable supplies are even higher, and depend on the ability of water providers to blend reuse water. Currently, the WSRA grant program has the ability to fund reuse projects; however, CWCB's loan program currently cannot fund reuse projects. Although the Colorado Water and Power Authority can fund such projects, incorporating a grant/loan combination or lower interest rates for reuse projects should be explored. This should especially be the case when they are regional in nature.

b) **Pursue breakthroughs in research:** In order to reduce reuse's water quality impacts, high energy costs, and other potential challenges, new treatment methods must be researched. A grant exploring zero liquid discharge for reverse osmosis was funded through the CWCB's WSRA. This treatment technique greatly reduces, and almost eliminates, the brine that is usually associated with this treatment method. Grants should continue to support such research.

c) **Develop regulatory incentives:** Regulatory incentives should be explored. For instance, many water providers are limited in their ability to share reuse water. Regulatory incentives that

better allow for reuse water to be marketed to water providers outside a service area could make building a reuse project more desirable.

Immediate Action Steps

4) Implement Education and Outreach Efforts

Potential Future Action Purpose(s)

Public acceptance of reclaimed water is a vital aspect of water reuse, especially when considering the possibility of potable water reuses. Many water providers have experienced difficulty getting their customers to overcome the "yuck factor." Through an educational outreach, the public can be made aware of treatment and management techniques implemented by the providers. This will help to ensure the public consumers that the water is indeed safe for potable uses.

Potential Specific Actions

a) **Track public attitudes through baseline and ongoing surveys:** As part of the "Value of Water" survey efforts, public attitudes toward reuse should be incorporated. This should also include ways in which reuse water can be packaged in such a way as to gain public trust and acceptance.

Immediate Action Steps

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Appendix A: Summary of Statewide Water Supply Initiative Findings on Water Conservation

Conservation Strategies: Implementation Rates and Savings Levels

Table 1 presents a comparison of the low, medium, and high conservation strategies. Savings and measures for each water use sector are presented and the key demand reduction modeling assumptions for each sector are shown in **bold blue** font. The conservation strategy measures that apply to each sector are listed as bullet points beneath each demand reduction assumption. Table 1 includes the implementation/penetration levels and ranges that are assumed to be achieved by 2050 to accomplish the demand reductions.

Table 1 - Comparison of 2050 Implementation and Penetration Level for Three Conservation Strategies and Demand Reductions Used in Forecasts

Measure	Implementation or Penetration Level by 2050		
	Low Strategy	Medium Strategy	High Strategy
Systemwide conservation measures with potential to impact all customers			
Public information and education	~100%	~100%	~100%
Integrated resources planning	~100%	~100%	~100%
Conservation-oriented water rates	~100%	~100%	~100%
Water budget-based water rates	<=10% of utilities implement	<=30% of utilities implement	<=50% of utilities implement
Conservation-oriented tap fees	0 - 5% of utilities implement	5 - 10% of utilities implement	<=50% of utilities implement
Smart metering with leak detection	<=10% of pop.	<=50% of pop.	50 - 100% of pop.
Residential indoor savings and measures			
Reduction in Residential Per Capita Indoor Use	**Res. Indoor gpcd = 40**	**Res. Indoor gpcd = 35**	**Res. Indoor gpcd = 30**
Conservation-oriented plumbing and building codes, green building, rules for new residential construction	30-50% of state impacted	50-70% of state impacted	70-100% of state impacted
High efficiency toilets, clothes washers, faucets, and commercial, industrial, and institutional equipment	Passive ~100%	Passive ~100%	Passive ~100%
Submetering of new multi-family housing	0%	~50%	~100%
Reduction in customer side leakage	33% savings - passive from toilet replacement	37% savings - passive from toilet replacement and active repairs	43% savings - passive from toilet replacement and active repairs
Nonresidential indoor savings and measures			
Reduction in Nonresidential Per Capita Indoor Use	**15% reduction**	**25% reduction**	**30% reduction**
High efficiency toilets, urinals, clothes washers, faucets, and showers	Passive ~100%	Passive ~100%	Passive ~100%
Conservation-oriented plumbing and building codes, green building, rules for new nonresidential construction	30-50% of state impacted	50-70% of state impacted	70-100% of state impacted
Specialized nonresidential surveys, audits, and equipment efficiency improvements	0-10% of utilities implement	10-50% of utilities implement	50-80% of utilities implement

Table 1 - Comparison of 2050 Implementation and Penetration Level for Three Conservation Strategies and Demand Reductions Used in Forecasts

Measure	Implementation or Penetration Level by 2050		
	Low Strategy	Medium Strategy	High Strategy
Landscape conservation savings and measures[1]			
Landscape water use restrictions (residential and nonresidential)	**15% reduction**	**22-25% reduction**	**27-35% reduction**
Targeted audits for high demand landscape customers	0-30% of utilities implement	30-50% of utilities implement	50-80% of utilities implement
Landscape transformation of some high water requirement turf to low water requirement plantings	<=20% of landscapes	20-40% of landscapes	>50% of landscapes
Irrigation efficiency improvements	<=10% of landscapes	<=50% of landscapes	50-100% of landscapes
Utility Water Loss Control			
Improved utility water loss control measures	**<=7% real losses**	**<=6% real losses**	**<=6% real losses**

[1] Landscape water demand reductions include the anticipated impact of urban densification.

Water Savings in 2050 Under Three Conservation Strategies

The total estimated water savings that may be achieved through implementation of the three conservation strategies are presented in Table 2. In Table 2 the water savings from each Statewide Water Supply Initiative (SWSI) 2010 strategy builds upon the previous strategy starting with the passive savings.

Table 2 - Statewide Forecast Water Savings Potential from SWSI 1, SWSI 2, and SWSI 2010[1]

Project	Level	2030 Forecast Savings[2] (AFY)	2050 Forecast Savings[2] (AFY)
SWSI 1	Level 1 (Passive)	101,900	NA
	Level 2	170,533	
	Level 3	272,852	
	Level 4	443,385	
	Level 5	699,183	
SWSI 2	Low	287,000	NA
	Mid	372,000	
	High	459,000	
SWSI 2010	Passive[3]	131,000	154,000
	Low	209,000	314,200
	Medium	264,000	485,200
	High	328,100	615,300

Notes:

[1] Total water savings potential included, which does not decipher the portion of the savings that may be available to meet future demands versus other planning uses such as drought reserve. In addition, this analysis does not address issues such as the spatial, temporal, and legal availability of the potential savings.

[2] Volumes savings estimates are total cumulative and include passive savings (e.g., SWSI 1, Level 3 savings build upon Levels 1 and 2; SWSI 2010, medium savings build upon low savings).

[3] From SWSI levels analysis (CWCB 2010).

The SWSI levels analysis of statewide passive water conservation potential showed that by 2050, demands will likely be reduced by about 150,000 acre-feet per year (AFY) through the natural replacement of toilets, clothes washers, and other standard domestic fixtures (Colorado Water Conservation Board [CWCB] 2010). In Table 2, these passive savings are embedded in all three

conservation strategies. The SWSI 2010 conservation strategies add savings from active conservation program efforts to the passive savings estimates.

If successfully implemented to the levels described, in 2050, the low strategy plus passive savings results in estimated statewide water savings of 314,200 AFY. In 2050, the medium strategy plus passive savings results in estimated statewide water savings of 485,200 AFY and the high strategy plus passive savings results in estimated statewide water savings of 615,300 AFY.

In Table 3, the passive and active water savings estimates are presented separately to help ensure double counting of water savings does not occur in the future as these estimates are used.

Table 3 - Statewide Forecast Water Savings (Separating Passive and Active) Potential from SWSI 1 and SWSI 2010[1]

Project	Level	2030 Forecast Savings[2] (AFY)	2050 Forecast Savings[2] (AFY)
SWSI 1	Level 1 (Passive)	101,900	NA
	Level 2 (active only)	68,633	
	Level 3 (active only)	170,952	
	Level 4 (active only)	341,485	
	Level 5 (active only)	597,283	
SWSI 2010	Passive[3]	131,000	154,000
	Low (active only)	78,000	160,200
	Medium (active only)	133,000	331,200
	High (active only)	197,100	461,300

Notes:

[1] Total water savings potential included, which does not decipher the portion of the savings that may be available to meet demands associated with new population versus other planning uses such as drought reserve. In addition, this analysis does not address issues such as the spatial, temporal, and legal availability of the potential savings.

[2] Volumes savings estimates are total cumulative and include passive savings (e.g., SWSI 1, Level 3 savings build upon Levels 1 and 2; SWSI 2010, Medium savings build upon Low savings).

[3] From SWSI Levels analysis (CWCB 2010).

Assumptions and Limitations

There are important caveats and assumptions regarding the water conservation strategies that should be understood so that the results are not misinterpreted or misapplied.

Conditional Statewide Strategies to Assess Conservation Potential – These three strategies were used to prepare a conditional demand forecast. The savings estimates presented are expected to be achieved if the programs and measures described are implemented at the specified level across the entire state. The medium and high strategies in particular will require a significant and sustained effort in order to achieve the forecast water savings. The forecasting assumptions do not reflect differences that exist between individual water providers. Each water provider in Colorado is distinct and it is anticipated that over the next 40 years water conservation will be implemented differentially across the state. In order to prepare statewide forecasts of conservation potential it was assumed that the potential to conserve water may exist irrespective of an individual water provider's need or desire to conserve. In reality, some providers will need little if any conservation savings to meet future demands while others will seek substantial demand reductions.

Permanency of Existing Conservation Efforts – The water savings projections in this report are conditioned on post-drought baseline demands, and assume water conservation savings since the

2002 drought period will be sustained into the future. The permanency of post-drought related reductions in water use is uncertain. Some of this uncertainty may be resolved as additional water utility-level data are obtained and further investigated. Additional and improved data is anticipated through future utility water conservation plans and under data reporting requirements established in Colorado House Bill (HB) 10-1051.

Climate Change Not Considered – The impacts of climate change on water demands were not included in this analysis. Time and budgetary limitation did not allow for this complexity to be included. Climate change is an important factor for consideration in conjunction with future water demands and should be included in subsequent forecasting efforts.

The Future is Uncertain and Water Use May Change – It is impossible to predict all of the technological and cultural changes that could occur over the next 40 years, which might impact water use. The trends over the past 15 years have been towards greater efficiency and lower use and at this moment in time, there is no indication that these trends will not continue (Coomes et al. 2010). However, it is possible that new uses for water could emerge in the future, which might increase municipal demand (e.g., increased use of evaporative cooling, increased installation rates of swimming pools, spas, and/or multi-headed showering systems). Unanticipated demand increases could counteract some of the savings estimated in this report, even if conservation programs are implemented at the specified levels. Similarly, technology could also serve to reduce future water demands below those estimated here. Updating the baseline condition and demand forecasts regularly is the best way to incorporate unanticipated future changes.

Uses of Conserved Water Are Not Assumed – No assumptions have been made about the portion of the water savings forecast in this report that could potentially be utilized toward water supply, serving new customers, or meeting the municipal and industrial (M&I) gap. Each water provider must decide how best to apply water garnered from demand reductions within their individual water supply portfolio. Utilities will need to make these decisions based on their integrated water resources planning efforts, consideration of their system's reliability throughout drought periods, impacts of conservation on their return flows and availability of reusable supplies, effectiveness of water rates and impacts to their revenue streams, and other local considerations. Subsequent efforts will be needed to help determine what portion of active conservation savings can be applied to the M&I gap.

Impacts from New Construction – A substantial number of new homes and businesses will be constructed throughout the State of Colorado between now and 2050. The projections provided for this basin-level planning effort do not distinguish between savings that will be achieved from existing versus new construction. Actual savings may be attributed more to higher efficiency new construction in portions of the State, particularly where more dense development occurs.

Influences on Water Use

Estimated demand reductions relate to three basic processes or influences on water use:

- Passive saving reductions related to the natural replacement of customer water using fixtures and appliances;
- Other changes in water use behaviors (e.g., state legislation, changes in land use, drought impacts, etc.); and

- Active water conservation program impacts related to implementation of water conservation programs sponsored by water utilities and special districts.

Noteworthy is that current water demand is trending downward due to a combination of these three influences. Similarly, future demand reductions will require that water utilities, nongovernmental organizations, water customers, and state and local officials work together to support and ensure that meaningful, permanent water conservation programs are developed and implemented.

This shared responsibility for future water conservation does not dismiss the important role of water utilities to act as good stewards of the state's water resources. But the work of managing water in Colorado is not solely the responsibility of our water utilities. It requires the cooperation and collaboration between all members of the water community. (Source: Metro Basin Roundtable Conservation Strategy.)

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Appendix B. Potential Funding Options

Whether it is exploring how to fund nonconsumptive, agricultural sharing, or new supply projects, many of the no/low regrets actions summarized in this document requires significant funding. This appendix describes several opportunities for additional funding. It is recognized that most of the opportunities would be controversial.

For a new supply project the "strawman" described in Section II should be use to evaluate financial capability of state/project proponents partnerships. In addition to the configuration of the project, a "strawman" should be utilized to consider how a potential project will be financed, managed, and implemented. This research could also include the identification of funding options and incentives at the local, state, and federal levels. The "Strategies for Colorado's Water Supply Future" report discusses financial capabilities and can be used in this context.

For most of the other items, such as nonconsumptive or agricultural sharing projects, the Basin Implementation Plans (BIPs) should be used to understand the costs necessary for implementation.

Funding options to be considered and further explored include:

1. A federal/state partnership similar to the Central Arizona Project.
2. A state water project similar to the California State Water Project.
3. A state/local partnership in which the state facilitates the project, but the end-users finance and manage it.
4. A public/private partnership similar to those used to build transportation projects (e.g., E 470).
5. Enactment of a "water" mill levy (the assessed property tax rate used to raise revenue). Though Colorado has not had a statewide property tax since 1964, and the Taxpayer Bill of Rights (TABOR) amendment to the State Constitution currently prohibits imposition of a statewide property tax, the General Assembly could refer a measure to the electorate that would repeal that portion of TABOR prohibiting statewide property taxes. Subsequently, in order to remain compliant with TABOR's single-subject constitutional amendment provision, the General Assembly could refer another measure to the voters to approve a statewide sales tax that would generate revenue into a cash fund (as opposed to the General Fund) for consumptive and nonconsumptive water projects and methods. Examples include:

    a. Determine how much a one (1) mill levy would generate statewide. Total property values in Colorado were over $89 billion in 2012. A 1 mill levy, equivalent to 0.001 * total property value, would generate over $89 million dollars annually.

    b. A two (2) mill property tax on the nine largest Front Range counties would generate about $107 million/year. (Adams $9 million; Arapahoe $15.2 million; Boulder $11 million; Denver $20.2 million; Douglas $8.6 million; El Paso $11.6 million; Jefferson $14.4 million; Larimer $7.6 million; Weld $9 million). As a point of comparison, most fire districts collect an 8+ mill. An additional 2 mills might incentivize linking land use planning and water supply planning in the "Big 9."

c. Half of the 2 mill levy (about $54 million/year) could fund rural economic development. This could be done either through a development fund as described below, or it could be divided between the West Slope counties.

d. The other half could fund construction of the multi-purpose project.

6. Additional bonding authority for the State of Colorado should be explored. (This was referred to by some members of the Interbasin Compact Committee (IBCC) as "Referendum A, Version 2"). Projects could be backed by general obligation or revenue bonds. General obligation bonds are backed by the full faith, credit, and taxing powers of the state, and revenue bonds are backed by revenues other than from a statewide tax, such as revenues generated from selling or leasing water from the project. Referendum A in 2003 was for a revenue bond. Part of this work should include understanding the current bonding authority held by the state. Currently the Colorado Water Resources & Power Development Authority has the ability to grant revenue bonds, which are designated for water-related projects that do not qualify for funding from the Drinking Water Revolving Funds (DWRF) and Water Pollution Control Revolving Fund (WPCRF) programs. Loans up to $500 million are available to Colorado cities, towns, counties, water districts, water and sanitation districts, metropolitan districts, water conservancy and water conservation districts, and irrigation districts and associated enterprises. Projects eligible for this type of funding include water and wastewater treatment plants, pump stations, dams/reservoirs, water rights, pipelines, hydroelectric projects, wells, meters, reuse, storage tanks, and more.

7. Severance tax increases. Long a source of support for the Construction Fund and the Perpetual Base Account at CWCB, severance taxes paid on the extraction of certain mineral resources currently are reduced annually in accordance with the application of a somewhat complex formula of credits linked to payment of local taxes. Such credits could be reduced or eliminated to increase annual severance tax collections, with some share of the increase being designated for both consumptive and nonconsumptive water-related projects and methods. Colorado's severance tax is currently considered to be the lowest in the region.

8. A statewide sales tax. In 2011, net taxable sales in Colorado were nearly $68 billion. A 0.01 sales tax (one penny for every dollar spent) would generate nearly $677 million statewide. A 0.02 and 0.03 sales tax would generate $1.4 and $2.0 billion, respectively. Colorado's current state sales tax is 2.9 percent, the lowest nonzero state-level sales tax rate in the nation according to data assembled by the Tax Foundation. A modest increase in this rate, designated into a cash fund (as opposed to the General Fund) for use for both consumptive and nonconsumptive water projects and methods could generate several tens of millions of dollars without making Colorado less competitive relative to other states.

9. Federal funding options. Federal loan guarantees and other federal support and assistance could be explored. U.S. Environmental Protection Agency funds may be available for certain municipal efficiency and infrastructure strategies.

10. Expand authority of Great Outdoors Colorado (GOCO) funding. GOCO currently generates more than $50 million per year and has been tremendously successful statewide, returning approximately $6 in benefits for every dollar spent. GOCO should be encouraged to continue its thoughtful consideration of how to effectively spend funds in support of the nonconsumptive principles, including purchasing or leasing water for flow protection or restoration.

11. Farm Bill. Create specific Farm Bill initiatives that appropriate funds for enhancing agricultural operations while supporting nonconsumptive needs. Examples of this type of program are the Republican River Conservation Reserve Enhancement Program (CREP) and the San Luis Valley CREP. A "Colorado River Initiative," which would cover parts of the West Slope, could also be formulated.

12. Regional taxing. Create regional districts with regional property taxing authority (e.g., forest protection districts, water conservancy sub-districts). Colorado statutes currently authorize the submission of ballot questions to certain identified electors to create regional governmental structures in the form of special districts or sub-districts of existing governmental structures, such as conservancy districts or water conservation districts. Based on careful statewide prioritization of water-related environmental and recreational projects and methods, the IBCC and the Governor's office could work with these existing governmental entities and other stakeholders to establish these special districts or sub-districts for purposes of collecting revenue to support consumptive and nonconsumptive projects and methods.

13. Statewide user fee. Water supply and delivery organizations abound throughout Colorado. Incentives, such as state-subsidized borrowing rates to pay for infrastructure (paid for by—and therefore leveraging—other revenue sources such as severance taxes), could be made available to those organizations that agree to collect a modest user fee from customers. Alternatively, a user fee associated with hotel stays, boating, or other tourism-related activities could be instituted either on a voluntary or mandatory basis.

14. Statewide tax on internet-based transactions. Currently, internet-based transactions are not taxed and Colorado foregoes a substantial amount of potential tax revenue as a result. With the U.S. Congress making substantial headway on the Marketplace Fairness Act, which would create a nationally uniform Internet-based transaction taxing environment, Colorado's General Assembly likely will enact such taxes to benefit the state. A fraction of the revenue stream that would be collected from this source could be designated into a cash fund for purposes of supporting consumptive and nonconsumptive water projects and methods.

15. Debt financing (debt backed by existing or newly created revenue source). The state has employed many acceptable and legal mechanisms that function similarly to more traditional issuance of state revenue or general obligation bonds. These mechanisms could be employed in conjunction with one or more of the revenue sources identified above to capitalize a nonconsumptive projects and methods fund that could be used in the near-term while consumptive projects go through requisite planning and permitting processes.

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