~~As Colorado looks to the future, water conservation will play an important role in managing our finite water resources. This section illustrates that there are a number of mechanisms and tools that can be employed to create a successful water conservation approach that diminishes the gap between supply and demand. The combination of foundational measures, incentives, regulation, education, and partnerships creates a holistic approach to efficient water resource management that one or two of these approaches by themselves cannot accomplish. By creating a holistic prioritization framework, this management system can define the arena in which water efficiency can take place in the future by creating pricing incentives, monetary incentives, regulations that shape actions and education that transforms Coloradans from water customers into water stewards.~~

6.3.2 Reuse

As mentioned in Chapter 5, there are various sources of water that can be reused to extinction such as: water from transbasin diversions, agricultural-municipal water transfers, and nontributary groundwater. Reuse water will have an impact on future demands and the following describes future actions that will benefit Colorado. There are many~~a number of~~ innovative reuse projects already in existence and Colorado can also learn from several~~there are a number of~~ areas in the United States that are exploring future pathways in reuse technologies.

Nationally and internationally, research has begun to focus on potable reuse systems. In Colorado, most reuse systems have been non-potable in nature. Nevertheless,~~However, widespread unintended or~~ "de facto" potable reuse occurs where one community discharges to receiving waters that are~~is~~ used by downstream communities for potable supply. This process is controlled by water quality standards in the receiving waters (which drives discharge permits from water reclamation facilities) and Safe Drinking Water Act requirements for potable treatment. Intentional indirect potable reuse (IPR) projects are increasingly common, such as Aurora's Prairie Waters Project and Town of Parker's use of water from its water reclamation facilities to supply Rueter-Hess Reservoir.

Direct potable reuse ~~projects~~ (DPR) was~~), with no discharge to receiving waters or "environmental buffers," have recently been implemented in New Mexico and Texas, while Denver Water~~ pioneered through Denver Water's~~DPR~~ research with its potable reuse demonstration project in the 1980s. Nevertheless, there continues to be public health and environmental concerns related ~~Due~~ to brine disposal. While it~~severe drought and serious long-term water resource challenges, the Colorado River Municipal Water District (water provider for Big Springs, Texas) has undertaken an initiative to "reclaim 100 percent of the water, 100 percent of the time." This goal~~ is technically feasible to implement DPR today, it is not fully accepted by the public for reuse as drinking water. More~~but more~~ research and education will be needed to ~~assure regulators and to~~ gain public acceptance.[199] In Colorado, no utilities have seriously pursued DPR.

~~Recently, the California legislature established statewide goals for the use of recycled water and mandated a feasibility study by 2016 to investigate developing uniform water recycling criteria for DPR. The WateReuse Research Foundation, with WateReuse California, created the DPR Initiative in 2012 to advance DPR as a water supply option in California. The DPR Initiative has raised approximately $6 million to carry out innovative research, such as public acceptance, critical control points, source water control, and development of an operations plan.[200] Individual utilities~~

~~and organizations like the Water Research Foundation are also funding DPR related research. Additionally, the National Research Council has recently published a book outlining fourteen research priorities for reuse water.~~[201]

Widespread development of potable reuse will~~should~~ be an important facet of closing the future water supply-demand gap. The CWCB ~~has~~ funded research into zero liquid discharge (ZLD) over the last few years to assess the technology needed to address the challenges associated with managing residuals from advanced treatment of alternative water supplies from lower quality water sources. Most recently, Brighton and La Junta were picked as pilot sites to investigate the feasibility of technologies to minimize or eliminate brine disposal in a manner~~concentrate minimization and pilot test a concentration minimization/ZLD technology~~ suitable for Colorado. The study found that the technology produced excellent water quality and had a very high recovery rate of 96 percent and 90 percent for the La Junta and Brighton pilot sites, respectively. Although the technology reduced concentrate and increased water recovery rates, more research must be conducted to reduce costs, increase the reliability of the technology and create a more environmentally~~user~~ friendly technology before widespread adoption can occur in Colorado.[202]

On a smaller scale, the Colorado Department of Public Health and Environment's (CDPHE)~~governor signed legislation that authorized the CDPHE's~~ Water Quality Control Division (WQCD) is authorized to develop Regulation 86 with standards for the use of graywater for consideration by the Water Quality Control Commission (WQCC). Graywater is defined by the bill as wastewater collected within a building from sources other than toilets and urinals, kitchen sinks, dishwashers, and non-laundry utility sinks.[203] Following the promulgation of Regulation 86, and once the Plumbing Board adopts suitable changes, counties and municipalities may adopt local legislation to allow graywater use, subject to water rights restrictions. Graywater use is limited to the uses allowed under the well permit or water right of the original source or sources of the water. Once fully approved, graywater reuse should~~As of April 2014, the WQCD is working with the Colorado Plumbing Board to create plumbing design standards for graywater systems before developing treatment and control standards. Graywater could~~ be an important component of new construction.

In Colorado, reuse water that is used for non potable uses, such as landscape irrigation, is subject to the requirements of Regulation 84, which establishes standards to protect public health and the environment. Reuse water, which is also known as "reclaimed water" is defined in Regulation 84 as "domestic wastewater that has received secondary treatment by a domestic wastewater treatment works and such additional treatment as to enable the wastewater to meet the standards for the approved uses." As briefly described in Chapter 5, Regulation 84 has adapted over the years to accommodate changes and advances in the science of reuse water. Regulation 84 was created in 2000 and has been amended four times since then to add new uses. As Colorado plans its reuse future, continued flexibility will be paramount to addressing water resource challenges. While reusing wastewater can help close the water supply gap, appropriate public health and environmental protections must remain in place. Therefore~~However~~, Regulation 84 is~~has~~ not ~~been interpreted to be~~ the only controlling regulation concerning reclaimed water depending on the use.~~. Instead,~~ CDPHE is committed to working with stakeholders~~has determined water providers using reclaimed domestic wastewater are also subject~~ to ensure that health~~numerous other regulations~~

~~applicable to surface and groundwater discharges, which create administrative~~ and the environment are protected while water reuse expands~~economic burdens. Reuse in Colorado lags far behind many other states, especially considering Colorado's semi-arid climate~~. Reuse is critical to many municipalities in addressing identified supply gaps in Colorado, but without significant progress on the ease of implementation, the gains forecasted may not be realistic. New use approval is now a process that can take multiple years and thousands of dollars for uses that are common practice throughout the U.S. and the world. ~~Also, new regulations are in effect that were not contemplated in the original Regulation 84 that make storage, distribution, and even basic irrigation problematic for some treaters and users.~~ The application of water quality regulations to reuse water will~~should~~ be examined to identify potential change to foster permanent growth in the reuse of limited water supplies.

Currently, while there is not a specific regulatory pathway defined for DPR in Colorado, there are no regulations prohibiting or limiting a utility's pursuit of this option. At present, the Colorado should work through and approve a proposed DPR project. Despite momentum toward more reuse planning and implementation in Colorado, barriers such as public acceptance of DPR and costs of treatment for lower quality water sources are real issues that must be addressed. With this said, development of any new supplies will have implementation barriers as well. These include infrastructure capacities, losses, supply and demand timing, water quality, treatment costs and brine disposal, and regulatory requirements. Many, if not all, of these limitations must also be addressed for many of the new water supplies available to meet future demands, whether transmountain diversions, agricultural transfers, or other. They are not unique to reuse projects. Specifically, brine disposal is a challenge for trēating many lower-quality sources with reverse osmosis (RO) – as evidenced by several facilities in the state that use RO to treat groundwater supplies for potable use.

~~, costs of treatment for lower quality water sources, and regulatory uncertainties are real issues that must be addressed.~~ Additionally, the issue of reduced return flows has many water providers and agricultural users concerned about downstream impacts of increased reuse of water supplies. Reuse, like the development of other local supplies through full use of absolute rights or development of conditional water rights may reduce return flows that ~~Many~~ downstream users ~~are concerned that return flows they~~ have ~~relied upon~~ historically relied on. Nevertheless,~~will not be available~~ in combination with other water development, reuse can help mitigate impacts~~the future~~. Future research should be directed toward the possible effects~~impacts~~ on return flows from the reuse of water.

Recently, the CWCB funded a white paper, "Considering the Implementation of Direct Potable Reuse in Colorado", sponsored by the Water Environment Research Foundation and authored by HDR Engineering. The draft paper explored the technical, operational, regulatory, and public acceptance challenges of implementing DPR in Colorado. In line with Colorado's Water Plan's grassroots approach, Water Environment Research Foundation, the Water Research Foundation and WateReuse Colorado sponsored a workshop to get feedback on the white paper and discuss direct potable reuse as a new water supply. Reuse experts from across the country attended, including

first hand practitioners from Texas, California, and other states. Recommendations from the draft white paper and workshop are as follows:

- Convene a broad range of experts and interested parties to produce a roadmap to develop potable reuse in Colorado. This would include making policy, regulatory, technical, and operational recommendations.
- Sponsor a survey of Colorado utilities and water agencies to determine the extent to which DPR may be considered as a means to augment their water supply portfolios.
- Develop a program to educate the public, elected officials, and water utilities about the benefits and safety of DPR.
- Partner in research projects that advance the knowledge related to technical challenges associated with DPR including more cost-effective and environmentally acceptable RO concentrate management techniques and the evaluation of non-RO based treatment trains capable of producing water suitable for DPR.
- Investigate water quality of de facto reuse situations relative to potable reuse.
- Carry out a state funded potable reuse pilot project in Colorado to assess the impacts and benefits of potable reuse.[204]

Some of the results of this work are incorporated into the actions listed below.

Reuse Projects

There are 25 treating reuse providers of direct nonpotable recycled water in Colorado, referred to as "treaters" in Regulation No. 84. Most of these water providers are on the eastern slope along the Front Range. In addition, there are numerous examples of indirect reuse through exchange occurring around the state.

As mentioned in the IBCC's No/Low Regrets Action Plan, Colorado examples of direct and indirect reuse projects are:

Colorado Springs Utilities: Colorado Springs Utilities has produced reuse water for more than~~over~~ 50 years in the form of direct reuse for irrigation and cooling. Irrigation consists of providing water to golf courses, parks, campuses, and other properties, while cooling water is used for the cooling towers at the Drake Power Plant. According to Colorado Springs Utilities, this has yielded a savings of 1 billion gallons of drinking water per year.

Aurora Water's Prairie Waters Project: This project employs~~is~~ IPR where Aurora's fully reusable water is extracted from the South Platte River near Brighton through river bank filtration (RBF) wells, into aquifer recharge and recovery (ARR) basins, and then pumped back through 34 miles of pipeline and three pumping stations providing nearly 1000 feet of lift to the Peter D. Binney Water Purification Facility near Aurora Reservoir. The water is partially treated through natural filtration in the RBF wells and ARR basins, and then fully treated at the Binney facility before mixing with existing water resources and distributing to Aurora's~~our~~ customers. The current capacity of the system is approximately10 million gallons per day (MGD)~~,~~ expandable to 50 MGD.

Denver Water: Denver Water has an extensive nonpotable water reuse system that serves many large customers such as Xcel Energy, parks, golf courses, and the Denver Zoo. This recycled water system is a direct reuse system and has a treatment capacity of 30 million gallons per day, expandable to 45 million gallons per day. Denver Water continues to add sites to its nonpotable water distribution network towards its goal of 17,500 acre-feet per year of recycled water use.[205]

IBCC No-~~no~~ and-Low-Regrets Actions ~~low regrets actions~~

In 2013, the IBCC developed the "No and Low Regrets Action Plan" for water reuse. This strategy outlines what minimum level of water reuse should be carried out statewide (Table 6.3.2-1~~2~~).[206]

BIPs

Reuse of water has appeared in a few BIPs~~BIP drafts~~ where many basins have created the following draft goals.

Arkansas Basin

The same goals of meeting municipal water needs apply in the reuse section as the water conservation section. The Arkansas Basin has the following four goals for meeting municipal water needs that were identified by the roundtable:

- Meet the municipal supply gap in each county within the basin;
- Support regional infrastructure development for cost-effective solutions to local water supply gaps;
- Reduce or eliminate Denver Basin groundwater dependence for municipal users; and,
- Develop collaborative solutions between municipal and agricultural users of water, particularly in drought conditions.[207]

Table 6.3.2-1: IBCC No-and-Low-Regrets Actions

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) Use SWSI efforts to improve reporting of reuse IPPs b) Develop 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 incentives 4) Implement Education and Outreach Efforts a) Track public attitudes through baseline and ongoing surveys

While there are reuse projects occurring now in the Arkansas basin, such as the Southern Delivery system, and other reuse projects by Colorado Springs Utilities and Zero Liquid Discharge research in La Junta, the Arkansas Basin has outlined some of the opportunities and constraints for future reuse development. Some opportunities outlined are the creation of additional storage, including the Long-Term Excess Capacity Master Contract space in Pueblo Reservoir, and new reservoirs, which could include a lined gravel pit reservoir below the confluence with Fountain Creek to capture transbasin return flows not immediately exchangeable to Pueblo Reservoir. Constraints consisted of the difficulties of reusing more water in the already over-appropriated Arkansas River system. The needs will be met from better management of existing supplies that include transbasin water supplies but will need extensive engineering studies and legal support to be done correctly.[208]

Colorado Basin

The Colorado Basin is focusing on efforts that include developing water court process recommendations to encourage improvements in efficiency, conservation, and reuse.

This goal is supported by measurable outcomes such as revising Colorado water law to allow more flexibility in promoting stream health through conservation and achieving and sustaining a high level of conservation by all basin water providers. The Colorado Basin identified projects and methods to implement these goals such as comparing Colorado water law and procedures with other Western states to identify alternative practices to facilitate water transfers, and various local water conservation efforts happening today and those planned for the future.[209]

Gunnison Basin

The Gunnison Basin framed their reuse discussion based on criteria for new supply projects using Colorado River Basin water. Conservation, land use, and reuse are all represented in the criteria. Reuse criteria is stated as, "Entities must first reuse all legally available reusable water supplies to the maximum extent possible beforeprior to further development of Colorado River System water."[210]

North Platte and Rio Grande Basin

Neither the North Platte nor Rio Grande Basin uses reuse as a future strategy to close their supply gaps because of relatively minor water use by municipal users and low population numbers.

South Platte/Metro Basin

The South Platte/Metro Basin has an overarching theme of continuing "its leadership roleLeadership Role in efficient use and management of water"."The State's future, and the future of each of its river basins, depends on efficient, sustainable and collaborative solutions."[211]

The South Platte/Metro Basin is viewing reuse water in the context of the Colorado River. Their initial goals state, "A balanced program to plan and preserve options to responsibly develop Colorado River water to benefit both east slope and west slope consumptive and nonconsumptive, environmental and recreational water uses is needed to assure that the State's plan has equal focus

on the other three previously identified strategies including: 1) developing IPPs, 2) municipal conservation and reuse, and 3) agricultural transfers~~, and 4) new supply~~."[212]

Table 6.3.2-2: South Platte and Metro Provider's Reuse IPPs

Basin	Providers	Project	Estimated Yield (acre-feet per year)	Estimated Completion Date
Metro	Aurora	Prairie Waters Project Expansion and Storage[4]	TBD	2050
Metro	Northglenn	Northglenn Reuse Plan	700	
Metro	Thornton	Thornton Reuse	2000	2030
Metro	Denver Water	Denver Water Reuse	17,500	2023
Metro	Westminster	Westminster Reclaimed Water		
Metro	Denver Water	Downstream Reservoir Exchanges	12,000	
Metro	Castle Rock	Alternative Northern Water Supply Project	2500	
Metro	Castle Rock	Plum Creek Diversion and Water Purification Facility Upgrades	4100	
Metro	Arapahoe County Water and Wastewater Authority	Reuse of ACWWA Flow Project Deliveries	3250	
Metro	City of Brighton	South Platte and Beebe Draw Well	3,200	
Metro	South Metro Water Supply Authority, Denver Water, Aurora	WISE	7225	2021
South Platte	Erie	Erie Reclaimed Water	5390	
		TOTAL:	58,135	

They also have the following goal and measurable outcomes in relation to reuse. The South Platte River Basin "will "~~maintain and~~ enhance current levels of municipal water reuse and consider studies to quantify the effects of: 1) additional municipal water conservation on water available for reuse, 2) additional municipal water reuse in relation to water available for exchanges, and 3) reuse and successive uses of water downstream including effects on agricultural water shortages."[213] In relation to non-consumptive needs they will ensure conservation, reuse and drought management plans consider environmental and recreational focus areas and attributes.[214]

Regional cooperation on reuse projects, like the Water Infrastructure and Supply Efficiency (WISE) project in the Metro area, can help further stretch locally available supplies. WISE agreements have been executed and deliveries will begin in 2016 and reach a full delivery of 10,000 acre feet/year (on average) by 2021. The project uses~~utilizes~~ available reusable supplies from Aurora Water and Denver Water, diverted and delivered through Aurora's Prairie Waters collection and treatment system. Nevertheless~~However~~, some municipal supplies, including the Colorado-Big Thompson Project, are single use water supplies and cannot be reused by municipal water users.

The South Platte/Metro Basin raised~~did raise~~ some concerns about the limitations of reuse and how reuse affects downstream users. Some of the technical limits of reuse were infrastructure capacities, losses, supply and demand timing, water quality, treatment costs and brine disposal, and

[4] The yield of PWP expansion depends on the yield of other projects such as the Eagle River Project, Box Creek and Growth into existing supply, in addition to the future demand scenario used to calculate Aurora's remaining gap.

regulatory requirements. ~~A major issue is that most reuse will be from reusable return flows and that these flows will be constrained in the future. The amount of successive downstream water use constrains the ability to either exchange water upstream or to convey it back upstream for future water needs.~~[215] The ~~For many of the cities in the~~ South Platte~~/ and~~ Metro BIP does however advocate that the state should "direct the Colorado Water Quality Control Commission to look for ways to assist and facilitate reuse."[216] ~~Basins, achieving higher levels of reuse will require moving to some form of potable reuse, which will require more in energy, treatment, operating, and infrastructure costs.~~[217]

Southwest Basin

The Southwest Basin has a goal to "Support and implement water reuse strategies" using an educational strategy. The basin proposes to implement at least three different informational events around reuse efforts during which they will highlight tasks, tools, and strategies.[218]

Yampa/White/Green Basin

The Yampa/White/Green Basin considers reuse principally~~prinicipally~~ as a pre-condition for trans-mountain diversions, and not necessarily as a strategy for the basin to undertake firsthand.

The basin states that "Prior to undertaking development of a new trans-mountain diversion, the Front Range must first integrate all other water supply solutions including conservation, reuse, and maximize use of its own native water resources and existing trans-mountain supplies."[219]

Actions

1. **Explore regional reuse options:** Over the course of the next three years, the CWCB will conduct a technical review of regional reuse options and provide grants to support regional reuse plans and projects.

Improve quantification, planning and tracking for potential reuse projects: Over the next two years, the CWCB will

~~1.~~2. ~~The State of Colorado should~~ conduct more research on how much water is currently being reused, how much potential there is for reuse, and how much water providers plan to reuse. As a future planning effort, regional reuse plans and projects should be explored to use economies of scale. As part of this work, the CWCB will work with partners to map all wastewater and potable infrastructure, water rights, needs, cost, and benefits to assess feasibility of potable reuse projects in Colorado. In addition, potential impacts to return flows will be examined.

Clarify~~Research and development of additional reuse options~~

~~The State of Colorado should encourage and provide incentives for research and development in reuse water for food crop irrigation, IPR expansion, and DPR projects.~~

~~Improve~~ the regulatory environment: Over the next two years, the CWCB and the CDPHE will work with stakeholders to

~~2.~~3. ~~The State of Colorado should~~ examine the application of water quality regulations to reuse water to identify potential change that fosters~~to foster~~ permanent growth in the reuse of limited water supplies and that protects public health and the environment.~~ As Colorado~~

~~plans its reuse future, continued flexibility will be paramount to addressing water resource challenges.~~

Provide financial incentives for reuse innovation: As recommended in the DPR white paper, over the next year, the CWCB will proactively seek applicants to ~~**Explore incentives and funding**~~

4. ~~The CWCB should~~ use WSRA grant funds for expanded research and innovation related to the technical challenges and solutions of reuse. This includes exploring~~expand research into~~ areas such as ZLD~~zero liquid discharge~~, IPR, and DPR, examining regional opportunities, increasing the reliability of the technology, on site reuse of water, development of reuse water for food crop irrigation, and the ability to share reuse water. Such research also includes support for continued development of more cost-effective and environmentally acceptable RO concentrate management techniques and the evaluation of non-RO based treatments capable of producing water suitable for DPR.[220]

5. **Encourage the Examining Board of Plumbers to adopt the International Plumbing Code to allow for graywater.** The CWCB will encourage the Colorado Plumbing Board to adopt and incorporate the appropriate graywater provisions from the chapter or appendix of the International Plumbing Code to allow for graywater piping within structures.

~~3.~~6. **Expand loan programs:** The CWCB will explore expanding its loan~~The CWCB Loan~~ program to include loans for innovative or~~should be considered for expansion into these types of supply projects and could be used for developing~~ regional reuse projects. The DNR will work with the General Assembly to institute this modification during the 2016 legislative session. ~~Additionally, State Revolving Fund loans, Bureau of Reclamation Title XVI Water Reclamation and Reuse Programs, and other Federal WaterSmart grants could be used to support more reuse development in the future.~~

Support reuse education: As recommended in the DPR white paper, the CWCB will

~~4.~~7. ~~The State of Colorado should~~ support stronger education to describe the benefits of reuse water as an integral part of a water supply system for the potential of reuse to be fully realized. Specific recommendations are to sponsor a survey of Colorado utilities and water agencies to determine the extent to which DPR may be considered as a means to augment their legally reusable water supply portfolios and to develop a program to educate the public, elected officials and water utilities about the benefits and safety of DPR.[221] More detail regarding specific education and outreach recommendations are detailed in Section 9.5. ~~Researchers have studied how people understand drinking water reuse in the context of the urban water cycle and whether education would increase acceptance of drinking water reuse projects.[222]~~

Examine~~Consider~~ mechanisms to improve the ability to market, sell, and share reusable supplies: Through a stakeholder process, the CWCB will

~~5.~~8. ~~The State of Colorado should~~ investigate mechanisms to~~incentives that~~ better allow for reuse water to be marketed to water providers outside a service area and could make building a reuse project more desirable.

6.3.3 Land Use

As Colorado grows, land~~-~~use planning and water planning will become more closely connected

Efficiency Grant Program will be required beyond current levels of $500,000, and should consistently total $2,000,000 per year. In addition, the CWCB's loaning ability should be expanded to encompass conservation actions. The DNR will work with the General Assembly to institute these changes over the next two legislative cycles.

11. **Market for conserved consumptive use water:** To use conserved consumptive use water to the greatest extent possible, the CWCB will investigate legal and administrative barriers to the use or sharing of conserved consumptive use water through a stakeholder process. If barriers can be addressed through acceptable legislative modification, the DNR will work with the Water Resources Review Committee to propose legislative action.
12. **Develop an alternative process for smaller entities to create water conservation plans and report water use data to the CWCB:** The CWCB will provide technical and financial support on this and will work to formalize this process into the CWCB Municipal Water Efficiency Guidance document.
13. **Continue implementation of state conservation programs**
    a. The CWCB will continue reviewing and approving locally adopted water conservation plans to encourage long-term water conservation planning and quantification of water savings, and to ensure that water providers document their water conservation goals.
    b. The CWCB will continue using 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.
    c. The CWCB will focus on opportunities for water conservation planning in areas where there are covered entities or many small water providers that can create a regional water conservation plan. This will 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.

6.3.2 Reuse

As mentioned in Chapter 5, there are various sources of water that can be reused to extinction such as: water from transbasin diversions, agricultural-municipal water transfers, and nontributary groundwater. Reuse water will have an impact on future demands and the following describes future actions that will benefit Colorado. There are many innovative reuse projects already in existence and Colorado can also learn from several areas in the United States that are exploring future pathways in reuse technologies.

Nationally and internationally, research has begun to focus on potable reuse systems. In Colorado, most reuse systems have been non-potable in nature. Nevertheless, "de facto" potable reuse occurs where one community discharges to receiving waters that are used by downstream communities for potable supply. This process is controlled by water quality standards in the receiving waters (which drives discharge permits from water reclamation facilities) and Safe Drinking Water Act requirements for potable treatment. Intentional indirect potable reuse (IPR) projects are increasingly common, such as Aurora's Prairie Waters Project and Town of Parker's use of water from its water reclamation facilities to supply Rueter-Hess Reservoir.

Direct potable reuse (DPR) was pioneered through Denver Water's research with its potable reuse demonstration project in the 1980s. Nevertheless, there continues to be public health and environmental concerns related to brine disposal. While it is technically feasible to implement DPR today, it is not fully accepted by the public for reuse as drinking water. More research and education will be needed to gain public acceptance.[173] In Colorado, no utilities have seriously pursued DPR.

Widespread development of potable reuse will be an important facet of closing the future water supply-demand gap. The CWCB funded research into zero liquid discharge (ZLD) over the last few years to assess the technology needed to address the challenges associated with managing residuals from advanced treatment of alternative water supplies from lower quality water sources. Most recently, Brighton and La Junta were picked as pilot sites to investigate the feasibility of technologies to minimize or eliminate brine disposal in a manner suitable for Colorado. The study found that the technology produced excellent water quality and had a very high recovery rate of 96 percent and 90 percent for the La Junta and Brighton pilot sites, respectively. Although the technology reduced concentrate and increased water recovery rates, more research must be conducted to reduce costs, increase the reliability of the technology and create a more environmentally friendly technology before widespread adoption can occur in Colorado.[174]

On a smaller scale, the Colorado Department of Public Health and Environment's (CDPHE) Water Quality Control Division (WQCD) is authorized to develop Regulation 86 with standards for the use of graywater for consideration by the Water Quality Control Commission (WQCC). Graywater is defined by the bill as wastewater collected within a building from sources other than toilets and urinals, kitchen sinks, dishwashers, and non-laundry utility sinks.[175] Following the promulgation of Regulation 86, and once the Plumbing Board adopts suitable changes, counties and municipalities may adopt local legislation to allow graywater use, subject to water rights restrictions. Graywater use is limited to the uses allowed under the well permit or water right of the original source or sources of the water. Once fully approved, graywater reuse should be an important component of new construction.

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Colorado, but without significant progress on the ease of implementation, the gains forecasted may not be realistic. New use approval is now a process that can take multiple years and thousands of dollars for uses that are common practice throughout the U.S. and the world. The application of water quality regulations to reuse water will be examined to identify potential change to foster permanent growth in the reuse of limited water supplies.

Currently, while there is not a specific regulatory pathway defined for DPR in Colorado, there are no regulations prohibiting or limiting a utility's pursuit of this option. At present, the Colorado should work through and approve a proposed DPR project. Despite momentum toward more reuse planning and implementation in Colorado, barriers such as public acceptance of DPR and costs of treatment for lower quality water sources are real issues that must be addressed. With this said, development of any new supplies will have implementation barriers as well. These include infrastructure capacities, losses, supply and demand timing, water quality, treatment costs and brine disposal, and regulatory requirements. Many, if not all, of these limitations must also be addressed for many of the new water supplies available to meet future demands, whether transmountain diversions, agricultural transfers, or other. They are not unique to reuse projects. Specifically, brine disposal is a challenge for treating many lower-quality sources with reverse osmosis (RO) – as evidenced by several facilities in the state that use RO to treat groundwater supplies for potable use.

Additionally, the issue of reduced return flows has many water providers and agricultural users concerned about downstream impacts of increased reuse of water supplies. Reuse, like the development of other local supplies through full use of absolute rights or development of conditional water rights may reduce return flows that downstream users have historically relied on. Nevertheless, in combination with other water development, reuse can help mitigate impacts. Future research should be directed toward the possible effects on return flows from the reuse of water.

Recently, the CWCB funded a white paper, "Considering the Implementation of Direct Potable Reuse in Colorado", sponsored by the Water Environment Research Foundation and authored by HDR Engineering. The draft paper explored the technical, operational, regulatory, and public acceptance challenges of implementing DPR in Colorado. In line with Colorado's Water Plan's grassroots approach, Water Environment Research Foundation, the Water Research Foundation and WateReuse Colorado sponsored a workshop to get feedback on the white paper and discuss direct potable reuse as a new water supply. Reuse experts from across the country attended, including first hand practitioners from Texas, California, and other states. Recommendations from the draft white paper and workshop are as follows:

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- Sponsor a survey of Colorado utilities and water agencies to determine the extent to which DPR may be considered as a means to augment their water supply portfolios.
- Develop a program to educate the public, elected officials, and water utilities about the benefits and safety of DPR.

- Partner in research projects that advance the knowledge related to technical challenges associated with DPR including more cost-effective and environmentally acceptable RO concentrate management techniques and the evaluation of non-RO based treatment trains capable of producing water suitable for DPR.
- Investigate water quality of de facto reuse situations relative to potable reuse.
- Carry out a state funded potable reuse pilot project in Colorado to assess the impacts and benefits of potable reuse.[176]

Some of the results of this work are incorporated into the actions listed below.

Reuse Projects

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As mentioned in the IBCC's No/Low Regrets Action Plan, Colorado examples of direct and indirect reuse projects are:

Colorado Springs Utilities: Colorado Springs Utilities has produced reuse water for more than 50 years in the form of direct reuse for irrigation and cooling. Irrigation consists of providing water to golf courses, parks, campuses, and other properties, while cooling water is used for the cooling towers at the Drake Power Plant. According to Colorado Springs Utilities, this has yielded a savings of 1 billion gallons of drinking water per year.

Aurora Water's Prairie Waters Project: This project employs IPR where Aurora's fully reusable water is extracted from the South Platte River near Brighton through river bank filtration (RBF) wells, into aquifer recharge and recovery (ARR) basins, and then pumped back through 34 miles of pipeline and three pumping stations providing nearly 1000 feet of lift to the Peter D. Binney Water Purification Facility near Aurora Reservoir. The water is partially treated through natural filtration in the RBF wells and ARR basins, and then fully treated at the Binney facility before mixing with existing water resources and distributing to Aurora's customers. The current capacity of the system is approximately10 million gallons per day (MGD), expandable to 50 MGD.

Denver Water: Denver Water has an extensive nonpotable water reuse system that serves many large customers such as Xcel Energy, parks, golf courses, and the Denver Zoo. This recycled water system is a direct reuse system and has a treatment capacity of 30 million gallons per day, expandable to 45 million gallons per day. Denver Water continues to add sites to its nonpotable water distribution network towards its goal of 17,500 acre-feet per year of recycled water use.[177]

IBCC No-and-Low-Regrets Actions

In 2013, the IBCC developed the "No and Low Regrets Action Plan" for water reuse. This strategy outlines what minimum level of water reuse should be carried out statewide (Table 6.3.2-1).[178]

BIPs

Reuse of water has appeared in a few BIPs where many basins have created the following draft goals.

Arkansas Basin

The same goals of meeting municipal water needs apply in the reuse section as the water conservation section. The Arkansas Basin has the following four goals for meeting municipal water needs that were identified by the roundtable:

- Meet the municipal supply gap in each county within the basin;
- Support regional infrastructure development for cost-effective solutions to local water supply gaps;
- Reduce or eliminate Denver Basin groundwater dependence for municipal users; and,
- Develop collaborative solutions between municipal and agricultural users of water, particularly in drought conditions.[179]

Table 6.3.2-1: IBCC No-and-Low-Regrets Actions

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) Use SWSI efforts to improve reporting of reuse IPPs b) Develop 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 incentives 4) Implement Education and Outreach Efforts a) Track public attitudes through baseline and ongoing surveys

While there are reuse projects occurring now in the Arkansas basin, such as the Southern Delivery system, and other reuse projects by Colorado Springs Utilities and Zero Liquid Discharge research in La Junta, the Arkansas Basin has outlined some of the opportunities and constraints for future reuse development. Some opportunities outlined are the creation of additional storage, including the Long-Term Excess Capacity Master Contract space in Pueblo Reservoir, and new reservoirs, which could include a lined gravel pit reservoir below the confluence with Fountain Creek to capture transbasin return flows not immediately exchangeable to Pueblo Reservoir. Constraints consisted of the difficulties of reusing more water in the already over-appropriated Arkansas River

system. The needs will be met from better management of existing supplies that include transbasin water supplies but will need extensive engineering studies and legal support to be done correctly.[180]

Colorado Basin

The Colorado Basin is focusing on efforts that include developing water court process recommendations to encourage improvements in efficiency, conservation, and reuse.

This goal is supported by measurable outcomes such as revising Colorado water law to allow more flexibility in promoting stream health through conservation and achieving and sustaining a high level of conservation by all basin water providers. The Colorado Basin identified projects and methods to implement these goals such as comparing Colorado water law and procedures with other Western states to identify alternative practices to facilitate water transfers, and various local water conservation efforts happening today and those planned for the future.[181]

Gunnison Basin

The Gunnison Basin framed their reuse discussion based on criteria for new supply projects using Colorado River Basin water. Conservation, land use, and reuse are all represented in the criteria. Reuse criteria is stated as, "Entities must first reuse all legally available reusable water supplies to the maximum extent possible before further development of Colorado River System water."[182]

North Platte and Rio Grande Basin

Neither the North Platte nor Rio Grande Basin uses reuse as a future strategy to close their supply gaps because of relatively minor water use by municipal users and low population numbers.

South Platte/Metro Basin

The South Platte/Metro Basin has an overarching theme of continuing "its leadership role in efficient use and management of water"[183]

The South Platte/Metro Basin is viewing reuse water in the context of the Colorado River. Their initial goals state, "A balanced program to plan and preserve options to responsibly develop Colorado River water to benefit both east slope and west slope consumptive and nonconsumptive, environmental and recreational water uses is needed to assure that the State's plan has equal focus on the other three previously identified strategies including: 1) developing IPPs, 2) municipal conservation and reuse, and 3) agricultural transfers."[184]

They also have the following goal and measurable outcomes in relation to reuse. The South Platte River Basin will "enhance current levels of municipal water reuse and consider studies to quantify the effects of: 1) additional municipal water conservation on water available for reuse, 2) additional municipal water reuse in relation to water available for exchanges, and 3) reuse and successive uses of water downstream including effects on agricultural water shortages."[185] In relation to non-consumptive needs they will ensure conservation, reuse and drought management plans consider environmental and recreational focus areas and attributes.[186]

Table 6.3.2-2: South Platte and Metro Provider's Reuse IPPs				
Basin	**Providers**	**Project**	**Estimated Yield (acre-feet per year)**	**Estimated Completion Date**
Metro	Aurora	Prairie Waters Project Expansion and Storage[d]	TBD	2050
Metro	Northglenn	Northglenn Reuse Plan	700	
Metro	Thornton	Thornton Reuse	2000	2030
Metro	Denver Water	Denver Water Reuse	17,500	2023
Metro	Westminster	Westminster Reclaimed Water		
Metro	Denver Water	Downstream Reservoir Exchanges	12,000	
Metro	Castle Rock	Alternative Northern Water Supply Project	2500	
Metro	Castle Rock	Plum Creek Diversion and Water Purification Facility Upgrades	4100	
Metro	Arapahoe County Water and Wastewater Authority	Reuse of ACWWA Flow Project Deliveries	3250	
Metro	City of Brighton	South Platte and Beebe Draw Well	3,200	
Metro	South Metro Water Supply Authority, Denver Water, Aurora	WISE	7225	2021
South Platte	Erie	Erie Reclaimed Water	5390	
		TOTAL:	58,135	

Regional cooperation on reuse projects, like the Water Infrastructure and Supply Efficiency (WISE) project in the Metro area, can help further stretch locally available supplies. WISE agreements have been executed and deliveries will begin in 2016 and reach a full delivery of 10,000 acre feet/year (on average) by 2021. The project uses available reusable supplies from Aurora Water and Denver Water, diverted and delivered through Aurora's Prairie Waters collection and treatment system. Nevertheless, some municipal supplies, including the Colorado-Big Thompson Project, are single use water supplies and cannot be reused by municipal water users.

The South Platte/Metro Basin raised some concerns about the limitations of reuse and how reuse affects downstream users. Some of the technical limits of reuse were infrastructure capacities, losses, supply and demand timing, water quality, treatment costs and brine disposal, and regulatory requirements. [187] The South Platte/Metro BIP does however advocate that the state should "direct the Colorado Water Quality Control Commission to look for ways to assist and facilitate reuse."[188]

Southwest Basin

The Southwest Basin has a goal to "Support and implement water reuse strategies" using an educational strategy. The basin proposes to implement at least three different informational events around reuse efforts during which they will highlight tasks, tools, and strategies.[189]

[d] The yield of PWP expansion depends on the yield of other projects such as the Eagle River Project, Box Creek and Growth into existing supply, in addition to the future demand scenario used to calculate Aurora's remaining gap.

Yampa/White/Green Basin

The Yampa/White/Green Basin considers reuse principally as a pre-condition for trans-mountain diversions, and not necessarily as a strategy for the basin to undertake firsthand.

The basin states that "Prior to undertaking development of a new trans-mountain diversion, the Front Range must first integrate all other water supply solutions including conservation, reuse, and maximize use of its own native water resources and existing trans-mountain supplies."[190]

Actions

1. **Explore regional reuse options:** Over the course of the next three years, the CWCB will conduct a technical review of regional reuse options and provide grants to support regional reuse plans and projects.
2. **Improve quantification, planning and tracking for potential reuse projects:** Over the next two years, the CWCB will conduct more research on how much water is currently being reused, how much potential there is for reuse, and how much water providers plan to reuse. As a future planning effort, regional reuse plans and projects should be explored to use economies of scale. As part of this work, the CWCB will work with partners to map all wastewater and potable infrastructure, water rights, needs, cost, and benefits to assess feasibility of potable reuse projects in Colorado. In addition, potential impacts to return flows will be examined.
3. **Clarify the regulatory environment:** Over the next two years, the CWCB and the CDPHE will work with stakeholders to examine the application of water quality regulations to reuse water to identify potential change that fosters permanent growth in the reuse of limited water supplies and that protects public health and the environment.
4. **Provide financial incentives for reuse innovation:** As recommended in the DPR white paper, over the next year, the CWCB will proactively seek applicants to use WSRA grant funds for expanded research and innovation related to the technical challenges and solutions of reuse. This includes exploring areas such as ZLD, IPR, and DPR, examining regional opportunities, increasing the reliability of the technology, on site reuse of water, development of reuse water for food crop irrigation, and the ability to share reuse water. Such research also includes support for continued development of more cost-effective and environmentally acceptable RO concentrate management techniques and the evaluation of non-RO based treatments capable of producing water suitable for DPR.[191]
5. **Encourage the Examining Board of Plumbers to adopt the International Plumbing Code to allow for graywater.** The CWCB will encourage the Colorado Plumbing Board to adopt and incorporate the appropriate graywater provisions from the chapter or appendix of the International Plumbing Code to allow for graywater piping within structures.
6. **Expand loan programs:** The CWCB will explore expanding its loan program to include loans for innovative or regional reuse projects. The DNR will work with the General Assembly to institute this modification during the 2016 legislative session.
7. **Support reuse education:** As recommended in the DPR white paper, the CWCB will support stronger education to describe the benefits of reuse water as an integral part of a water supply system for the potential of reuse to be fully realized. Specific recommendations are to sponsor a survey of Colorado utilities and water agencies to

determine the extent to which DPR may be considered as a means to augment their legally reusable water supply portfolios and to develop a program to educate the public, elected officials and water utilities about the benefits and safety of DPR.[192] More detail regarding specific education and outreach recommendations are detailed in Section 9.5.

8. **Examine mechanisms to improve the ability to market, sell, and share reusable supplies:** Through a stakeholder process, the CWCB will investigate mechanisms to better allow for reuse water to be marketed to water providers outside a service area and could make building a reuse project more desirable.

6.3.3 Land Use

As Colorado grows, land-use planning and water planning will become more closely connected through integration of principles from both disciplines. Integration does not mean the dilution of local control. Private property rights, 1041 powers, and local zoning and development control will not be diminished by connecting these planning disciplines. The potential exists for financial incentives, best practices, partnerships, and technical resources to better coordinate and enhance both land-use and water planning.

The manner by which Colorado develops into the future will have a strong influence on Colorado's future water supply gap and vice versa. This topic is relevant today as illustrated by the fact that six boards of county commissioners (from eastern and western slopes), including Boulder, the city and county of Denver, Eagle, Grand , Pitkin, Summit, as well as elected officials from the city and county of Broomfield collaborated to craft comments for Colorado's Water Plan on land-use-water integration. The importance of water-sensitive land-use planning was stated as, "1. Decrease the water supply Gap. As Colorado's population continues to grow, well thought out, effective, sustainable, and predictable land-use planning is essential. 2. Provide low cost alternatives for meeting the Gap. Water sensitive land-use often results in less stress on water systems, indoor and outdoor water savings, and reduction in expensive long-term capital outlay. 3. Protect the values of Colorado, including vibrant economies, agriculture, open space, and recreation. Local land-use planning should be among the first points of consideration to protect and support all of Colorado's values and economic drivers. 4. Create more predictability and reliability as well as reduce risk in water supply planning, in turn creating more sustainability for current and future residents. 5. Encourage shared solutions including best management practices, collaborative physical projects and practical land-use models to address water quality and quantity challenges. 6. Result in benefits that reduce infrastructure and service costs, and enhance a community's quality of life". [193]

sought state assistance or approval. Increasing the number of communities that have active drought management plans in place will increase the state's overall resilience to drought.~~Funding and technical assistance for local communities also exist.~~

Technical and financial support for healthy watersheds, which can help reduce the risk of catastrophic fires and buffer against the effects of other natural disasters, can also be found. This is further described in Section 7.1, Watershed Health and Management. State agencies work closely with local and federal agencies on fire mitigation, response, and recovery. Because many watersheds are on federal lands, our intergovernmental collaboration is vital for protecting those resources. Additionally, as a headwaters state, our downstream neighbors have a vested interest in maintaining our healthy watersheds that contribute to their water quantity and quality. Building on these relationships may also contribute to better long-term protection of the resource.

Although much preparation exists for the eventualities of floods, drought, and wildfires, these events rarely unfold exactly as predicted. That is why flexibility is critical in fostering effective and efficient response to natural disasters when they occur. -Colorado flood, drought, and wildfire plans are all updated regularly and make up part of the State's Natural Hazard Mitigation Plan, which is approved by both the Governor and the Federal Emergency Management Agency. These updates incorporate lessons learned, new policies, updated program information and, together with the working partnerships, enable Colorado to respond better to future natural disasters. Existing technical tools such as Colorado's Flood Threat Bulletin are useful for helping state agencies and effected~~impacted~~ communities prepare for substantial~~significant~~ precipitation events. Future enhancements to tools such as~~like~~ these could provide even further benefits.

Actions

1. The state of Colorado will continue to support and expand where appropriate drought, flood, and wildfire preparedness and response programs.
2. The state of Colorado will actively encourage local communities to develop drought preparedness plans by providing tools and resources for development and implementation.
3. The CWCB and the Colorado Recovery and Resiliency Office will implement the actions identified in the Colorado Resiliency Framework to build communities that are more resilient to natural disasters.

7.3 Water Quality

Colorado's Water Plan promotes waters fully supporting their classified uses by 2050~~encourages the integration of water quantity and water quality concerns~~ through ~~the following approach:~~
~~Recognizing the inter-relationship between quality and quantity,~~ strategies designed to meet Colorado's current and future consumptive, recreational, and environmental water needs that~~will~~ incorporate~~,~~ as a key objective, the protection and restoration of water quality.

Coloradans have a strong connection to water. The quality of water in the state needs to be

protected, and in some cases restored to support Colorado's heritage, communities, and way of life - now and into the future. Executive Order D 2013-005 recognizes this by stating "Colorado's water quantity and quality questions can no longer be thought of separately. Each impacts the other and our state water policy should address them conjunctively." The executive orderExecutive Order also lists "a strong environment that includes healthy watersheds, rivers and streams and wildlife" as one of three core Colorado values. In addition, recent public survey results highlight the value Coloradans place on safe, clean water. These surveys indicate Coloradans believe the quality of both surface and groundwater is very important as a source of drinking water. Coloradans also believe the quality of water in streams and lakes is very important to support recreational uses. The surveysurveys shows public health is the most compellingmotivating reason to improve water quality, followed by wildlife and fish habitat.[38, 39]

As Colorado plans for its water future, better integration of water quality and quantity planning and management activities is critical. –Opportunities to address existing water quality impacts and minimize future impacts must be prioritized to ensure Coloradans continue to have access to safe and clean water.– Balancing increasing quantity demands with water quality protection and restoration requires on-going dialogue with all Coloradans and collaboration at all levels of government.– Colorado's Water Plan offers a framework for moving forward with the quality and quantity conversations.

The following information is a starting point for an ongoing conversation. The discussion describes how quality and quantity are related to create a foundation for understanding this complex subject. It also identifies an integration goal to improve relationships in support of protecting and restoring water quality. Current water quality management is described as context for identifying ways to improve coordination and recommendations are made to move forward with meeting the integration goal. The water quality foundation for this conversation is in legislation and the Water Quality Control Commission (WQCC) and the Water Quality Control Division (WQCD) goals established to meet the intent of this legislation.

Water Quality and Quantity Relationships

Water quality in Colorado is protected by state and associated federal statutes as well as local, state and federal regulations. The WQCCWater Quality Control Commission adopts regulations, guidance and policies required by the federal Clean Water Act (CWA), the federal Safe Drinking Water Act, and the , the Colorado Water Quality Control Act and the federal Safe Drinking Water Act. The Colorado Department of Public Health and Environment, Water Quality Control Division, is the primary agency implementing these regulations, guidance and policies. This water quality management structure is different from what is in place for water quantity management. Understanding the existing relationships between these distinct management frameworks and looking for opportunities to improve coordination and integration is important for protecting the state's water resources.

Water Quality and Quantity Connections

Managing water quantity may cause a change in water quality. When water is diverted to farms or cities, stored for future use or flood control, or managed as return flows to address downstream water rights, water quality can be affected. For example:

Figure 7.3-1: Black Lake No. 1 and No. 2*

***The lakes** were enlarged so that stream flows could be maintained during snowmaking season.

- Recreational fishing is a way of life in Colorado and is important to local and state economies. Deep reservoirs tend to thermally stratify in summer, with cold water settling to the bottom of the reservoir. Many reservoirs release water downstream from the bottom where the stratified water is very cold. There are places where cold water releases from the bottom of reservoirs have impacted downstream native fish and aquatic life. However, most of Colorado's Gold Medal Fisheries, which are managed by Colorado Parks and Wildlife (CPW), are located downstream of dams. Other surface water structures such as diversions to canals and off-stream reservoirs can also impact water quality and fisheries. Such modifications can result in low stream flows that can cause low oxygen concentrations, high water temperatures and higher concentration of pollutants. In Colorado, solutions are explored during project planning to address these types of water quality impacts that can be caused by surface water modifications.
- One option for addressing future municipal water supply needs is through alternative agricultural transfers such as rotational fallowing and interruptible supply options. However, high concentration of salts and other pollutants from this source water may require advanced water treatment technologies such as reverse osmosis to make the water useable for communities. The waste product from reverse osmosis has very high salt levels and cannot be discharged into the stream. Other disposal options for the waste product are limited. If a municipal provider has higher quality source water to blend with lower quality sources then this issue can be avoided. For example, Aurora Water recently completed the Prairie Waters Project where both natural and constructed treatment allows potable water reuse to proceed without requiring new CWA~~Clean Water Act~~ permits.
- Implementing and maintaining drinking water and wastewater treatment in a semi-arid environment is challenging today and will continue to be in the future. Treatment infrastructure is critical to protecting public health and the environment. The ability of the stream to accept pollutants in wastewater without a negative impact to quality depends on the amount of water flowing in the stream. Water diversions upstream can result in fluctuating stream levels and therefore affect water quality. Changes in treatment process necessary to meet new, more stringent discharge limits or needed upgrades to aging

infrastructure can increase operational costs for wastewater treatment facilities. However, protecting water quality through wastewater treatment and other measures can result in cost savings for downstream drinking water treatment facilities because it results in higher quality source water that could require less treatment.

- The Colorado Water Conservation Board (CWCB) is responsible for the appropriation, acquisition, protection, and monitoring of instream flow and natural lake level water rights to preserve and improve the natural environment to a reasonable degree. These water rights are established exclusively by the CWCB for nonconsumptive, in-channel or in-lake water uses to support minimum flows amongbetween specific points on a stream or levels in natural lakes. The rights are administered within the state's water right priority system. While Colorado law explicitly prohibits the WQCC and the WQCDWater Quality Control Commission and Water Quality Control Division from taking any action that requires minimum instream flows, the program has provided tangible water quality benefits across the state specifically for aquatic life classified uses.

Figure 7.3-2: Gross Reservoir*

***Expansion of Gross Reservoir** is part of the proposed Moffat Collection Expansion Project. This project will require 401 certification.

Water quality and quantity cause-and-effect connections are integral to making sound water management decisions. These connections are considered during decision-making processes that are dependent on water quality and quantity statutory, regulatory and management relationships.

Statutory and Regulatory Relationships

At the state level, water quality and quantity are managed separately based on different constitutional, statutory and regulatory provisions. However, state and federal statutes that protect in-stream water quality recognize the importance of protecting water rights while still providing the authority to impose water pollution controls. The federal statute protecting drinking water quality also recognizes integration with water quantity by including protections for source water that reduces treatment costs.

Many state and federal water quality-specific regulations intersect with quantity management. The quantity of water available is essential for establishing water quality standards and ensuring standards are attained as required in state and associated federal water quality regulations. Water quality is also recognized in state regulations by addressing the quality of substitute water supplies used in exchanges and substitute water supply plans. Regulations governing reuse also support integration between water quality and quantity management.

One of the primary examples of the regulatory quality and quantity relationship is the WQCD'sWater Quality Control Division's water quality certification of federal permits and licenses

under Section 401 of the CWA~~federal Clean Water Act~~ as implemented through WQCC~~Water Quality Control Commission~~ Regulation No. 82 (known as 401certification~~401 certification~~). Section 401 of the CWA~~Clean Water Act~~ directs states to certify that activities needing federal permits and licenses, such as many water development projects, comply with the applicable provisions of the state's water quality use classifications, standards and designation program during both construction and operation over time. WQCC~~Water Quality Control Commission~~ Regulation No. 82 gives the WQCD~~Water Quality Control Division~~ three certification options for federal permits or licenses including the ability to certify, conditionally certify through identified mitigation measures or deny certification. Certification by the WQCD~~Water Quality Control Division~~ means that when the federal permit or license is implemented, the proposed project will comply with applicable surface and groundwater standards regulations, classifications and all other applicable water quality requirements for the affected waters. For example, if a project requires a CWA~~Clean Water Act~~ Section 404 individual permit from the Army Corps of Engineers, a 401 water quality certification is required from the WQCD.~~Water Quality Control Division.~~ Section 9.4 discusses the 401 water quality certification in more detail.

The WQCC's~~The Water Quality Control Commission's~~ adoption of site-specific standards and designations is another example of a quantity and quality regulatory relationship. Site-specific standards and designations may reflect a lower level of water quality than would have existed before a hydrologic modification such as a dam, diversion or return flows associated with exercising water rights.

The WQCC~~The Water Quality Control Commission~~ is solely responsible for the adoption of water quality standards and classifications; however, local government regulations can also have a water quality and quantity connection. For example, local governments are given permit authority over certain matters under the Areas and Activities of State Interest Act. Under the act, local governments can adopt regulations that address the impact of municipal and industrial water projects. These regulations, referred to as 1041 regulations, often require mitigation of water quality impacts from water projects. Associations of local governments also prepare Regional Water Quality Management Plans that establish water quality goals and recommendations for regional water quality management. Typically, local 1041 regulations require new water projects to comply with these plans.

Water Management Relationships

The roles and responsibilities defined in statutes and regulations are shared by many~~a number of~~ entities, which create~~creates~~ a complex system for overseeing the state's water resources. At the state level alone, there are many entities involved with protecting water quality which requires coordination and integration to make sure water resources are appropriately managed.

The WQCC and the WQCD~~The Water Quality Control Commission and Water Quality Control Division~~ have defined water quality roles and responsibilities. The Colorado Water Quality Control Act also identifies several additional water quality implementing agencies:

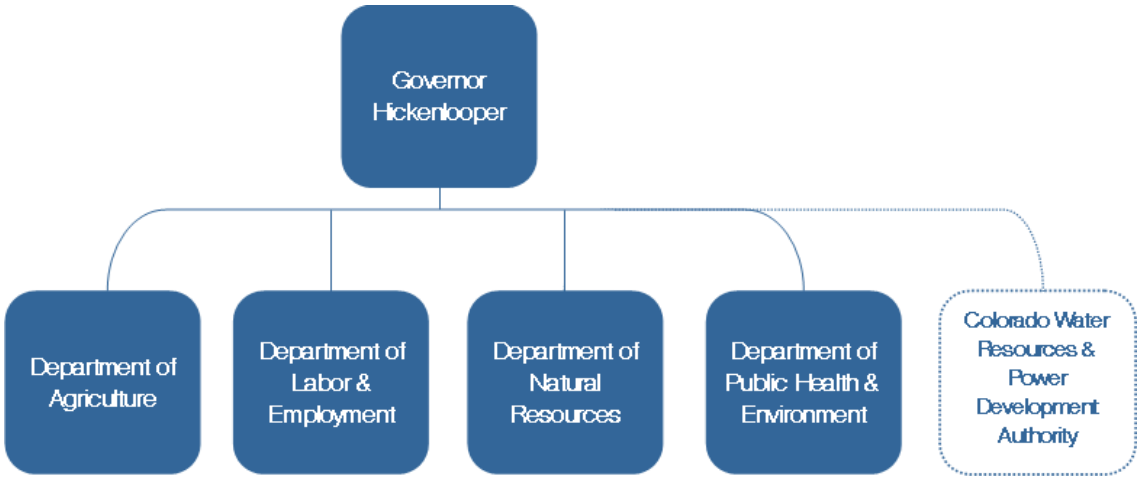
- The Division of Reclamation, Mining and Safety~~.~~

- The State Engineer.
- The Oil and Gas Conservation Commission.
- The Colorado Department of Public Health and Environment - Hazardous Materials and Waste Management Division.
- The Division of Oil and Public Safety at the Department of Labor and Employment.

These agencies have initial responsibility for implementing groundwater quality classifications and standards adopted by the WQCC.Water Quality Control Commission. These implementing relationships are defined through a Memoranda of Agreement. The WQCCWater Quality Control Commission can intervene in the event that it determines an implementing agency is not assuring compliance with water quality classifications and standards.

The Department of Natural Resources plays a critical role in managing water quantity in the state. The Division of Water Resources within the Department of Natural Resources is responsible for water administration, while the CWCB, another division within the Department of Natural Resources, sets water policy, completes water planning and reviews state wildlife mitigation plans. The Department of Natural Resources' Colorado Parks and Wildlife develops state wildlife mitigation plans, which address fish and wildlife resources affected by the construction, operation or maintenance of water diversion, delivery or storage facilities.

Figure 7.3-3: Colorado State Agencies and Quasi-governmental Organizations with Quantity and Quality Responsibilities



The WQCCWater Quality Control Commission and the WQCDWater Quality Control Division are required by the Colorado Water Quality Control Act to consult with the CWCB before making any decision or adopting any rule or policy that has the potential to cause material injury to water rights. The CWCB receives copies of all WQCCWater Quality Control Commission rulemaking hearing notices and all notices include a provision requesting information from the public regarding potential impacts on water rights.

Water Quality and Quantity Integration Goal

Executive Order D 2013-005 states "Colorado's water quantity and quality questions can no longer be thought of separately. Each impacts the other and our state water policy should address them conjunctively." ~~As section 7.3.1 described, the quality of Colorado's waters is important for consumptive, recreational, and environmental water needs.~~ To this end, it is important to establish a goal related to quantity and quality integration between now and 2050. To develop this goal, many~~a number of~~ documents were reviewed including the CWA, ~~federal Clean Water Act,~~ federal Safe Drinking Water Act, the U.S. Environmental Protection Agency's (EPA) strategic plan, Colorado's Water Quality Control Act, the WQCD's~~Water Quality Control Division's~~ strategic goals, the WQCC's~~Water Quality Control Commission's~~ strategic water quality goal and the Basin ~~Roundtable~~ Implementation Plans (BIPs).~~.~~ These laws, goals and plans focus on broader actions than quality and quantity integration yet provide important insight for developing a quality and quantity integration goal as part of Colorado's Water Plan.

It is important to establish a goal related to quantity and quality integration between now and 2050.

The CWA~~federal Clean Water Act~~ sets a national goal "to restore and maintain the chemical, physical and biological integrity of the Nation's waters,"~~"~~, with interim goals that all waters be fishable and swimmable where possible. The federal Safe Drinking Water Act authorizes the EPA~~U.S. Environmental Protection Agency~~ to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water. The EPA~~U.S. Environmental Protection Agency~~ states, and water systems work together to make sure that these standards are met. The EPA's~~U.S. Environmental Protection Agency's~~ current strategic plan has a goal regarding protecting America's waters to "protect and restore waters to ensure that drinking water is safe and sustainably managed, and that aquatic ecosystems sustain fish, plants, wildlife, and other biota, as well as economic, recreational and subsistence activities."

The legislative declaration of the Colorado Water Quality Control Act includes the following goals:

- Achieve the maximum practical degree of water quality in the waters of the state.
- Provide that no pollutant be released into any state waters without first receiving treatment or other corrective action necessary to reasonably protect the legitimate and beneficial uses of such waters; to provide for the prevention, abatement and control of new or existing water pollution; and to cooperate with other states and the federal government in carrying out these objectives.

In addition, there are several Colorado Water Quality Control Act provisions that are related to water quantity and water rights:

- A primary goal of the Water Quality Control Act is protect, maintain and improve the quality of state waters for beneficial uses including domestic, wildlife and aquatic life, agricultural, industrial and recreational uses.

- Dischargers of pollutants may be required to meet a high degree of treatment to protect water rights.
- The WQCC and the WQCD must consult with the CWCB before making any decision or adopting any rule or policy that has the potential to cause material injury to water rights.
- Nothing in the state act is to be construed or applied to cause or result in material injury to water rights.
- The WQCC and WQCD shall not require an instream flow for any purpose.

The WQCD's mission is to protect and restore water quality for public health and the environment in Colorado. The WQCD's strategic plan states that it will achieve its mission by pursing the following goals:

- Prevent waterborne disease and reduce chronic public health risks from drinking water through improved implementation of the federal Safe Drinking Water Act and Colorado's drinking water statutes and regulations.
- Protect all designated uses by attaining water quality standards through improved implementation of the CWA and Colorado Water Quality Control Act and associated regulations.
- Restore impaired water quality to attainable standards through improved implementation of the CWA and Colorado Water Quality Control Act and associated regulations.

Finally, the WQCC's strategic water quality goal is that Colorado's waters will fully support their classified uses by 2050 and these uses could include drinking water, agriculture, recreation, aquatic life and wetlands.

Better integration of water quality and quantity is required to address the Water Quality Commission's overall goal for water quality. Based on review of the laws, goals and plans summarized above, a quality and quantity integration goal was developed.

Recognizing the inter-relationship between quality and quantity, strategies designed to meet Colorado's current and future consumptive, recreational and environmental water needs will incorporate, as a key objective, the protection and restoration of water quality.

The following steps further refine and advance this goal:

- The basin roundtables~~Basin Roundtables~~ are encouraged to actively incorporate water quality into decision making processes for consumptive, recreational and environmental projects. To help facilitate this effort, the WQCD~~Water Quality Control Division~~ will provide basin-scale water quality information to the basin roundtables~~Basin Roundtables~~ for their use in updating their future BIPs~~Basin Roundtable Implementation Plans~~. This information was originally developed as part of the Statewide Water Quality Management Plan.
- Project proponents must understand the nexus between water quality and quantity and work to avoid or mitigate water quality impacts of a project through the implementation of

best management practices, whether associated with 401 water quality certifications or otherwise. The WQCD~~The Water Quality Control Division~~ will support this effort by developing guidance on the 401 water quality certification process and best management practices identification.

- The WQCD~~The Water Quality Control Division~~, in concert with other stakeholders including watershed groups and those with point and nonpoint discharges, will continue to employ available programs to maintain, and in some cases, improve water quality at a basin-scale. Progress will be documented over time in the WQCD's~~Water Quality Control Division's~~ Integrated Report and WQCD's~~Water Quality Control Division's~~ Statewide Water Quality Management Plan~~. (discussed in 7.3.3).~~ The Integrated Report is typically updated every two years and will be used to track progress on the quality portion of the integration goal over time. ~~By 2016, the Water Quality Control Division will develop a baseline for tracking water quality improvements.~~
- The information reported in the WQCD's~~Water Quality Control Division's~~ Integrated Report should also be used in the CWCB's scenario planning efforts when evaluating the status of future *signposts* (see Chapter 6.1). By tracking this information through time, water quality and quantity managers will know if efforts to integrate water quantity and quality are successful and can make course corrections as part of the adaptive management plan efforts.

Current Water Quality Conditions

As plans for meeting consumptive, recreational and environmental needs are produced that recognize the many interactions of statute, regulation and management activities, it is important to understand current water quality conditions in the state. Understanding current water quality conditions is also fundamental for ensuring compliance with water quality regulations as they pertain to water supply planning and implementation activities.

Evaluating the status of surface water quality in Colorado requires understanding the classified uses for waterbodies throughout the state. A classified use is a specific type of use for an identified waterbody and can include domestic water supply, agriculture, recreation, aquatic life and wetlands. The WQCC~~The Water Quality Control Commission~~ assigns classified uses to stream segments and adopts water quality standards for many different pollutants to protect these waterbody-specific uses.

The state is also required to have an antidegradation policy as part of its water quality standards. Antidegradation protects the value of high quality surface waters. Colorado's antidegradation policy establishes that, at a minimum for all surface waters, the existing classified uses and the water quality necessary to protect those uses must be maintained; these are *use protected waters*. The antidegradation policy also provides extra levels of protection for two other types of waters that are designated by the commission. *Outstanding waters* receive the highest level of protection requiring that quality must be maintained at current levels (no degradation). *Reviewable waters* are high quality waters which receive an intermediate level of protection. The rules for antidegradation

review require a public process before the natural capacity of a waterbody to dilute and absorb pollutants and prevent harmful effects is completely allocated to a project or permit where a new or increased impact is proposed. Use of such capacity is allowed if the review shows it would accommodate important economic or social development for the area in which the waters are located.

Standards are the basis for evaluating the status of water quality for each waterbody. When available data show water quality standards are not being met, the waterbody is identified in regulation as impaired. These impaired waterbodies, as well as other information about water quality in the state, must be identified in a biennial report to the EPA~~U.S. Environmental Protection Agency~~ (Integrated Water Quality Monitoring and Assessment Report [~~(~~Integrated Report]~~).))~~.

For waters that attain water quality standards, the challenge is to maintain the existing good water quality ~~in order~~ to protect classified uses such as drinking water supplies, robust fisheries and recreational opportunities.

For waters not meeting water quality standards, the most common causes of river and stream impairments are selenium, pathogens such as E. coli, and iron. For lakes and reservoirs, the most common causes of impairment are selenium, mercury and dissolved oxygen saturation. When water quality standards are not attained, the ability to use water for domestic water supply, agriculture, aquatic life or recreation can be impacted.

Figure 7.3-4: Current Water Quality Conditions[40]

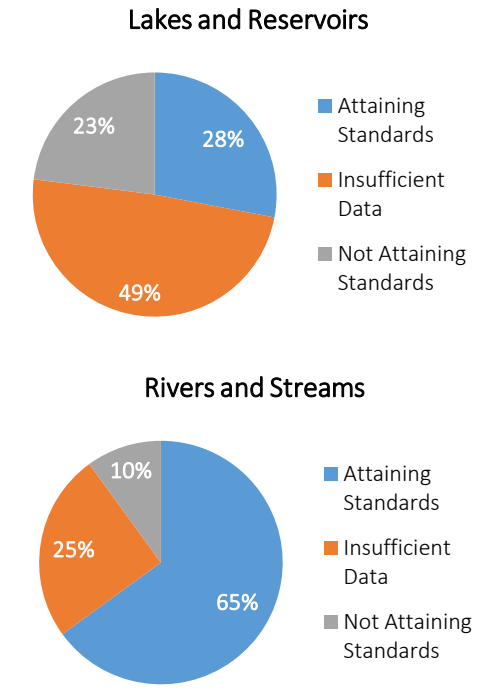


Figure 7.3-4 presents~~is~~ statewide information and is based on available water quality data. Different regions or basins within the state have varying water quality conditions and may have unique water quality challenges. Water quality impairments may also exist in streams or lakes that either have little to no available data or have yet to be assessed through the Integrated Report process.

Future Water Quality Conditions

Many changes will happen over the next 35 years that have the potential to affect both regional and statewide water quality. Understanding these changes is important as plans are under development for addressing the municipal and industrial supply gap as well as meeting recreational and environmental needs over the next 35 years.

Future water quality conditions will not only be affected by water quantity decisions but will also be influenced by changing water quality regulations. Currently, there are additional proposed

regulations designed to further protect and restore water quality. Examples include increased nutrient controls, more stringent arsenic standards and a revised selenium standard. There is also renewed emphasis on implementing actions that will produce measureable, positive changes in water quality. Recognizing the possibilities associated with potential change, both water quantity and quality managers need to seek opportunities to protect and enhance water quality in the future.

Other factors affecting future water quality conditions~~condition~~ are also important. As the economy and population grow and land uses change, there will be increased water quantity demands and additional stressors on water quality. Future land use decisions are a substantial factor as water quality can be impacted by increased urbanization and associated stormwater runoff, volumes of discharged municipal wastewater and industrial discharges including those from the energy sector. As streams are depleted from additional diversions, existing concentrations of pollutants increase, and water treatment and wastewater treatment processes relying on those streams will become more difficult. New issues may also arise from emerging contaminants or interactions among~~between~~ different constituents that are not now known. These potential effects~~impacts~~ could be negative though there can also be opportunities for positive change, which reinforces the critical nature of informed and integrated water resource management decisions.

The potential for future positive or negative water quality impacts is compounded by climate change. Predicted effects from a changing climate on water quality include:[41]

- Potential streamflow volume decreases in the Rockies and interior southwest, and increases in the east and southeast coasts.
- Higher peak streamflow will increase erosion and sediment transport; loads of nitrogen and phosphorus are also likely to increase in many watersheds.
- Many watersheds are likely to experience substantial~~significant~~ changes in the timing of streamflow and pollutant delivery. In particular, there will be a tendency to shift from snowmelt-dominated spring runoff systems to rain-dominated systems with greater winter runoff.
- Changes in nutrient and sediment loads are generally correlated with changes in hydrology.
- Warming air temperature can directly raise stream and lake temperatures, which can harm aquatic organisms that live in coldwater habitats, such as trout. Additionally, warmer water can increase the range of non-native fish species, permitting them to move into previously coldwater streams. The population of native fish species often decreases as non-native fish prey on and out-compete them for food.

Planning for water quality impacts from these potential fundamental system shifts is challenging and highlights the need to make measurable progress on the water quality and quantity integration goal.

Water Quality Management

Current water quality decisions are made in the context of a management system based on statutes, regulations and implementation processes. This system defines the boundaries to protect and

restore water quality, and it also offers opportunities for flexible, integrated approaches for meeting consumptive, recreational and environmental needs. The existing water quality management system is a starting point for finding opportunities and maximizing them to facilitate improved integrated water resource management decisions.

The statutory and regulatory framework for water quality discussed in Subsections 2.4 and earlier in 7.3.1 establishes the requirements for protecting and restoring water quality in the state. This framework is implemented through processes at the state and local level. ClassifiedSubsection 7.3.2 discusses classified uses and the water quality standards established to protect these uses are also discussed. Both are critical to protecting and restoring water quality in the state and are established through WQCCWater Quality Control Commission processes with public input.

Water quality management processes also include monitoring, data assessment and reporting. Monitoring and data assessment are essential to identifying and characterizing water quality problems, revising water quality standards, and developing and evaluating the results of control programs. Monitoring is completed in conjunction with many statewide partners. The WQCD usesThe Water Quality Control Division utilizes its own data as well as partners' data in assessments that support evaluating the status of statewide and basin-scale water quality with respect to meeting water quality standards. Information about attainment of water quality standards is provided in the Integrated Report discussed in 7.3.2 and is also identified in regulation (WQCCWater Quality Control Commission Regulation No. 93, Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List); both are adopted by the WQCCWater Quality Control Commission through public processes.

When streams and lakes are identified that do not meetmeeting water quality standards, a restoration plan is produced that defines how much of the pollutant causing the impairment can be in the stream or lake to still ensure that water quality standards are attained. The allowable amount of the pollutant is then divided amongbetween all the different sources of the pollutant, both point and nonpoint. A point source is a sewage treatment plant or industrial facility discharge and nonpoint sources are diffuse sources of pollution such as runoff from agricultural field or abandoned mines. This restoration plan is called a Total Maximum Daily Load (TMDL).. There is a public notice process associated with TMDLTotal Maximum Daily Load development that provides the opportunity for input as the restoration plan is produced. Once the TMDLTotal Maximum Daily Load is approved by the EPAU.S. Environmental Protection Agency, the TMDLTotal Maximum Daily Load is the basis for implementing necessary actions to bring the stream or lake back into attainment. As an alternative to implementing controls to meet existing water quality standards, TMDLsTotal Maximum Daily Loads can also result in a re-evaluation of standards and sometimes classifications. Implementation actions can be defined in a TMDLTotal Maximum Daily Load implementation plan, in a locally driven watershed plan or in a locally driven regional water quality management plan (208 plan). Watershed plans and 208 plans identify stressors to water quality and address other water quality improvement and protection activities necessary to meet local and regional goals. The WQCDThe Water Quality Control Division works with local partners and local

plans to implement priority projects to restore and maintain water quality at a watershed or regional scale.

The WQCD isWater Quality Control Division also actively engaged in promoting and supporting source water protection planning across Colorado through the Source Water Assessment and Protection (SWAP) Program. The program is designed to define drinking water supply areas and identify potential water quality and contaminant risks to drinking water systems. The SWAP program, in collaboration with the Colorado Rural Water Association, provides technical and financial support to encourage voluntary local planning efforts and the implementation of best management practices (BMP's) to minimize source water quality impacts. This effort is a collaborative stakeholder process that contributes to protecting and restoring water quality in the state.

The WQCD uses information from all these local plans to support its own planning efforts. For example, the WQCDWater Quality Control Division produces a Statewide Water Quality Management Plan for approval by the WQCCWater Quality Control Commission. The Statewide Water Quality Management Plan compiles water quality information at a statewide and basin scale in support of implementation activities. This compilation, as well as the Integrated Report, WQCCWater Quality Control Commission policies, and other WQCDWater Quality Control Division documents, supports the WQCD'sWater Quality Control Division's strategic planning that promotes progress toward national water quality goals and provides specific metrics for measuring that progress.

The purpose of these plans, at different scales by numerous partners, is defining and prioritizing actions for the improvement, restoration and protection of water quality. Implementation tools usedutilized by the WQCDWater Quality Control Division include Section 401 water quality certifications (discussed in Sectionsection 9.3), permits that allow discharges to streams and lakes, as long as certain limits or control measures are met, and funding support for partners. The federal CWAClean Water Act prohibits the discharge of pollutants from a point source to surface water without a permit. Because the state has developed a program that meets the requirements of the federal CWAClean Water Act, the primary discharge permit program in Colorado is administered by the WQCDWater Quality Control Division rather than by the EPAU.S. Environmental Protection Agency. The permits issued to point sources specify the limits or controls that are required to meet Colorado's water quality standards.

Implementation tools often require the development of strategies or best management practices that when completed result in the improvement, restoration and protection of water quality. Strategies are also used to address consumptive and nonconsumptive needs. These are summarized in Sectionssections 6.3 through 6.6 of this plan. Examples of strategies that have a quality and quantity nexus include, but are not limited to:

- Water reuse including direct potable reuse, indirect potable reuse, non-potable reuse and graywater use. These strategies are further described in Sectionsection 6.3.
- Storage including reservoirs and aquifer storage and recovery.

- Source water protection best management practices such as proper storage and disposal of pesticides and proper management of septic systems.
- Stormwater best management practices including retention and detention can improve the quality and quantity of this supply and could be incorporated into water management practices. In Colorado, stormwater has not typically been considered a source of supply but this could be explored in the future.
- Nonpoint source best management practices will be critical to improving water quality for recreational, environmental and consumptive needs in the future. Examples of nonpoint source best management practices include mine tailings removal, riparian buffers, constructed wetlands and habitat restoration.
- Green~~The concept of green~~ infrastructure is being discussed at a national level and application of this concept is being explored in Colorado. The focus of the green infrastructure concept is to weave natural processes into the built environment, which can provide stormwater management, flood mitigation, air quality management and riparian zone restoration.
- Water quality trading is based on the fact that sources in a watershed can face very different costs and regulatory requirements in the control of the same pollutant. Trading programs allow facilities facing higher pollution control costs to meet their regulatory obligations by purchasing environmentally equivalent (or superior) pollution reductions from another source at a lower cost, thus achieving the same water quality improvement at a lower overall cost.

Funding and financing is discussed in detail in Chapter 9; however, the WQCD~~Water Quality Control Division~~ provides various financial assistance opportunities to assist with efforts to protect public health and the environment. The WQCD administers the following financial~~Financial~~ assistance programs: ~~administered by the Water Quality Control Division include:~~

- State revolving funds provide low-interest loans to governmental entities for drinking water and water quality improvement projects.
- The Water Quality Improvement Fund provides grant funds for water quality improvement projects using civil penalties from water quality violations. State House Bill 11-1026 amended the statute to authorize grants for stormwater management training and best practices training to prevent or reduce the pollution of state waters.
- Source water protection grants provide funding for pilot planning projects and development and implementation projects.
- The small system training and technical assistance set-aside provides grant funding to assist with the costs of planning and design for small drinking water systems serving less than 10,000 people.
- State statutes 25-8-703 and 25-1.5-201 authorize funding, when appropriated by the legislature, for small community domestic wastewater and drinking water projects. These programs provide grants to municipalities for costs associated with planning, design and construction of drinking water and wastewater treatment plants.

- Nonpoint source grant funds are distributed through a competitive process to local project sponsors to implement projects which restore impaired waters, prevent future impairments or raise public awareness.

In addition, the Water Supply Reserve Account administered by the CWCB is another financial tool that provides grants to assist Colorado water users in addressing their critical water supply issues and interests. The funds help eligible entities complete water activities, which may include competitive grants for:

- Technical assistance regarding permitting, feasibility studies and environmental compliance.
- Studies or analysis of structural, nonstructural, consumptive and nonconsumptive water needs, projects or activities.
- Implementation of structural~~Structural~~ and nonstructural water projects or activities.

Water Quality and BIPs

The various basin roundtables have addressed water quality in the BIPs in two major ways: through quality-related basin goals and measurable outcomes, or through identification of projects and methods with a water quality nexus. In many basins across the state, public water systems, municipal governments, and communities have developed source water protection plans with specific water quality prevention strategies. Many basins also have watershed plans in place that identify priority actions necessary to both protect and restore water quality. These prevention, protection, and restoration strategies and actions should be considered during the project development and prioritization stage. The WQCD~~The Colorado Water Quality Control Division~~ can provide information about protection and watershed plans that are in progress or completed.

Every basin roundtable addressed water quality in goals and measurable outcomes. Several basins addressed water quality issues in the context of greater watershed health, while others look to established water quality standards as a potential measureable outcome. The Rio Grande Basin Roundtable~~roundtable~~ established the following goal: "Make progress toward meeting applicable water quality standards throughout the Basin."[42] ~~This standards-based goal is accompanied with measurable outcomes, describing actions in pursuit of this goal: mitigating particular water quality impairments, and recommending improvements to monitoring efforts within the basin.[43]~~ This approach demonstrates how the basin may use the planning process to work closer with the Colorado Department of Public Health and Environment~~CDPHE~~, to make progress toward meeting established standards.

The Yampa/White/Green Basin Roundtable~~roundtable~~ references water quality, as it relates to uses within the basin, in their goals~~Goals~~: "Maintain and consider the existing natural range of water quality that is necessary for current and anticipated water uses."[44] This water quality-centric goal follows the strong BIP theme of protecting existing uses within the basin and providing for future development, recognizing the importance of both quality and quantity. This type of goal seeks to establish how water quality fits within their vision of the basin's future.

Basin roundtables have also addressed water quality issues through identification of projects and methods which have a water quality nexus. For example, the South Platte/Metro BIP identifies 18 projects with a connection to water quality, ranging~~: these range~~ from assessment of wildfire restoration, to sediment mitigation projects, to mine remediation.[45] These projects address water quality issues at the source, seeking to improve quality through implementation.

The Gunnison Basin identifies currently ongoing projects and methods which address water quality issues. These include several programs related to Colorado River water quality, such as the Gunnison Basin Selenium Management Plan, and projects funded through the Colorado River Basin Salinity Control Forum.[46] Additional localized projects for improving municipal infrastructure also have benefits for water quality.

Through these goals, outcomes, and identified projects and methods, the basins seek to address water quality concerns at a more local level. Future efforts of the roundtables will prioritize projects and methods by basin goals, and water quality overall will benefit from this incorporation of quality concerns into the goals and outcomes framework.

Actions

The WQCD~~Water Quality Control Division~~ worked with the Colorado Water Quality Forum and the WQCC~~Water Quality Control Commission~~ to develop recommendations. As Colorado's Water Plan is updated in the future, these recommendations serve as a starting point for implementation efforts focused on:

A. Integrated water quality and quantity management.
B. Policy considerations.
C. Financial considerations.
D. Stakeholder and public outreach.

In addition, these recommendations need to be assigned to a responsible party and prioritized for implementation over time.

Integrated Water Quality and Quantity Management Actions

~~The Water Quality Control Division's mission is to protect and restore water quality for public health and the environment in Colorado. The Water Quality Control Division's strategic plan states that it will achieve its mission by pursuing the following goals:~~

- ~~Prevent waterborne disease and reduce chronic public health risks from drinking water through improved implementation of the federal Safe Drinking Water Act and Colorado's drinking water statues and regulations.~~
- ~~Protect all designated uses by attaining water quality standards through improved implementation of the federal Clean Water Act and Colorado Water Quality Control Act and association regulations.~~
- ~~Restore impaired water quality to attainable standards through improved implementation of the federal Clean Water Act and Colorado Water Quality Control Act and associated regulations.~~

~~Integrated water quality and quantity management actions~~

Recommendations to promote increased integration of water quality and quantity management include:

1. Evaluate water quality impacts associated with proposed solutions and scenarios presented in the BIPs and in Sections 6.3 through 6.6 of Colorado's Water Plan. Identification of impacts will help define the scope of strategies that need to be explored to protect and restore water quality. Information developed about these impacts will be shared among~~between~~ all involved parties.
2. Define opportunities in cooperation with basin roundtables, the~~Basin Roundtables,~~ CWCB and others for projects or processes that restore and enhance existing water quality conditions to address potential water quality effects~~impacts~~ resulting from implementing water quantity solutions. An initial step to implement this recommendation is to assist the basin roundtables~~Basin Roundtables~~ in developing water quality goals, objectives and measurable outcomes based on current water quality information for each basin to use when updating their BIPs. This collaboration supports the basin roundtables~~Basin Roundtables~~ in identifying projects and methods that integrate water quality and quantity management to protect and restore water quality.
3. Define green infrastructure approaches for the arid west and explore how green infrastructure can be used~~utilized~~ to address Colorado's consumptive and nonconsumptive gaps. For example, green infrastructure in the arid west can go beyond stormwater management activities and low impact development methods to include landscape-scale land use planning that addresses where activities should occur on the landscape ~~in order~~ to meet dynamic goals, including protecting and restoring water quality. Existing information developed by green building and stormwater management groups provides a starting point for developing and maintaining a library of green infrastructure options.
4. Evaluate new water supply projects and the potential for multiple benefits, including water quality protection and enhancement. Strive to ensure that all water quality benefits are incorporated into the project plans.
5. Examine how new or existing supply projects can be designed and operated~~and/or operated~~ to advance water quality objectives. Actively pursue incorporation of these design and operation considerations into proposed projects.
6. Identify the role of reuse by developing a library of reuse examples such as direct potable reuse, indirect potable reuse, non-potable reuse, graywater use and the associated water quality issues that need to be addressed for each type of reuse. Ensure that these issues are addressed in any initiative that desires to use~~utilize~~ these resources. Reuse and identified actions are discussed further in Section 6.3.
7. Promote the use of aquifer storage and recovery since water quality impacts associated with this storage strategy are minimal.
8. Explore the role of stormwater management from both a quality and quantity perspective to determine if stormwater is a viable additional source of supply to address consumptive needs.

9. Address nonpoint sources through on-going management activities that play an important role in protecting and restoring water quality for the benefit of future water uses. These activities should include cataloguing and evaluating local government land use planning tools that minimize nonpoint source pollution associated with development. A comprehensive approach to nonpoint source management including water quality trading should be explored.
10. Identify the risks of climate change as they relate to integrated water quality and water quantity management. Develop specific recommendations for addressing these risks.
11. Explore how the CWA requirements and Safe Drinking Water Act~~SDWA~~ requirements can be most efficiently and cost effectively integrated. Develop specific recommendations for implementation.

Policy Considerations

Chapter 10 of Colorado's Water Plan summarizes legislative recommendations. In addition to the legislative recommendations, policy considerations related to quality and quantity integration include:

1. Continue to engage in creative, solution oriented actions such as site-specific standards, temporary modifications, discharger specific variances, pollutant trading and conditional 401 water quality certifications. Use all available means to improve water quality and protect the high quality waters that are better than necessary to support classified uses. Maintain ongoing, non-regulatory programs including nonpoint source management and source water protection planning. These solution orientated actions will also be necessary when addressing impacts from climate change.
2. Establish a more complete understanding of the concept of net environmental benefit as wastewater reuse continues to be maximized in Colorado. This concept is focused on the demonstration that the ecological value of using effluent to support riparian and aquatic habitats exceeds the ecological benefits of removing the discharge from the waterbody.
3. Review and appropriately modify existing regulations, guidance and policy documents for new types of wastewater reuse so that revisions will protect public health and the environment while also providing sufficient flexibility for water suppliers to develop new water reuse projects across the state.
4. Consider and document the water rights implications of water quality strategies and the water quality implications of water development strategies as they both pertain to integrated water quality and quantity management. For example, integrated stormwater management may have effects~~impacts~~ on downstream flows and possible water rights impacts would have to be understood and addressed before such a strategy could be implemented.
5. Continue to work with neighboring states to address interstate water quality and quantity issues to protect Colorado's compact entitlements.
6. Continue statewide monitoring that supports assessment of the quality and quantity integration goal and measures.

Financial Considerations

Future efforts to integrate water quality and quantity will require funding. The recommendations outlined below may be further detailed in Chapters 9 and 10 of Colorado's Water Plan.

1. Continue to fund nonpoint source pollution management efforts. Identify new funding opportunities and nonpoint source pollution control strategies.
2. Identify costs and funding sources for implementation of green infrastructure and reuse.
3. Pursue state funding of regional watershed-based water quality planning to better integrate current and future water quantity efforts.
4. Develop and implement state funding mechanisms for future water projects that implement consumptive and nonconsumptive strategies consistent with Colorado's Water Plan. Emphasis should be placed on funding those portions of projects that result in a public benefit.
5. Develop and implement state funding mechanisms for implementation of mitigation activities required under a state water court water rights decision or a federal or state water quality protection regulatory action.
6. Develop and implement funding mechanisms for the protection, restoration or enhancement of water quality values in river or stream reaches.
7. Explore ways to facilitate innovative treatment and engineering solutions through technology transfer and liability management techniques.

Stakeholder and Public Outreach

Stakeholder and public outreach is critical to meeting the water quality and quantity integration goal. The recommendations outlined below may be further detailed in Chapter 9.5 of Colorado's Water Plan.

1. Use a watershed approach for outreach and community engagement around water quality, ways to protect water quality and solutions to address water quality issues. Colorado's many watershed groups already use~~utilize~~ this approach to effectively plan for and implement actions that protect and restore water quality. The approach can be used when developing and implementing strategies that integrate water quality and quantity management.
2. Monitor public attitudes and opinions about water quality as it relates to domestic water supply as well as environmental and recreational uses of water to refine future water quality goals and measurable outcomes.
3. Develop additional water quality goals and performance measures based on the completed BIPs from the basin roundtables~~Basin Roundtables~~.
4. Conduct joint CWCB and WQCC~~Water Quality Control Commission~~ meetings at least annually to discuss water quality and quantity integration issues.
5. The WQCC~~The Water Quality Control Commission~~ should consider holding workshops as part of its annual basin rulemaking process. Workshops should have participation from basin roundtable representatives for the basin that is the subject of the annual rulemaking

hearing to gather input and share information related to progress on water quality and quantity integration efforts.

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3. The CWCB and the Colorado Recovery and Resiliency Office will implement the actions identified in the Colorado Resiliency Framework to build communities that are more resilient to natural disasters.
4. The CWCB and CDPHE will work with utilities, federal agencies, and others to proactively identify and address regulatory barriers to climate preparedness and adaption.

7.3 Water Quality

Colorado's Water Plan promotes waters fully supporting their classified uses by 2050 through strategies designed to meet Colorado's current and future consumptive, recreational, and environmental water needs that incorporate as a key objective, the protection and restoration of water quality.

Coloradans have a strong connection to water. The quality of water in the state needs to be protected, and in some cases restored to support Colorado's heritage, communities, and way of life - now and into the future. Executive Order D 2013-005 recognizes this by stating "Colorado's water quantity and quality questions can no longer be thought of separately. Each impacts the other and our state water policy should address them conjunctively." The executive order also lists "a strong environment that includes healthy watersheds, rivers and streams and wildlife" as one of three core Colorado values. In addition, recent public survey results highlight the value Coloradans place on safe, clean water. These surveys indicate Coloradans believe the quality of both surface and groundwater is very important as a source of drinking water. Coloradans also believe the quality of water in streams and lakes is very important to support recreational uses. The survey shows public health is the most compelling reason to improve water quality, followed by wildlife and fish habitat.[3738]

As Colorado plans for its water future, better integration of water quality and quantity planning and management activities is critical. Opportunities to address existing water quality impacts and minimize future impacts must be prioritized to ensure Coloradans continue to have access to safe and clean water. Balancing increasing quantity demands with water quality protection and restoration requires on-going dialogue with all Coloradans and collaboration at all levels of government. Colorado's Water Plan offers a framework for moving forward with the quality and quantity conversations.

The following information is a starting point for an ongoing conversation. The discussion describes how quality and quantity are related to create a foundation for understanding this complex subject. It also identifies an integration goal to improve relationships in support of protecting and restoring water quality. Current water quality management is described as context for identifying ways to improve coordination and recommendations are made to move forward with meeting the integration goal. The water quality foundation for this conversation is in legislation and the Water Quality Control Commission (WQCC) and the Water Quality Control Division (WQCD) goals established to meet the intent of this legislation.

Water Quality and Quantity Relationships

Water quality in Colorado is protected by state and associated federal statutes as well as local, state and federal regulations. The WQCC adopts regulations, guidance and policies required by the federal Clean Water Act (CWA), the federal Safe Drinking Water Act, and the Colorado Water Quality Control Act. The Colorado Department of Public Health and Environment, Water Quality Control Division, is the primary agency implementing these regulations, guidance and policies. This water quality management structure is different from what is in place for water quantity management. Understanding the existing relationships between these distinct management frameworks and looking for opportunities to improve coordination and integration is important for protecting the state's water resources.

Water Quality and Quantity Connections

Managing water quantity may cause a change in water quality. When water is diverted to farms or cities, stored for future use or flood control, or managed as return flows to address downstream water rights, water quality can be affected. For example:

Figure 7.3-1: Black Lake No. 1 and No. 2*

*The lakes were enlarged so that stream flows could be maintained during snowmaking season.

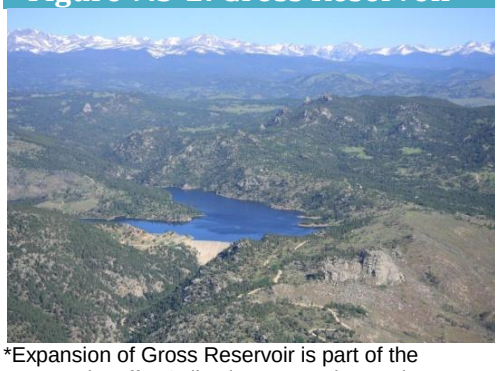
- Recreational fishing is a way of life in Colorado and is important to local and state economies. Deep reservoirs tend to thermally stratify in summer, with cold water settling to the bottom of the reservoir. Many reservoirs release water downstream from the bottom where the stratified water is very cold. There are places where cold water releases from the bottom of reservoirs have impacted downstream native fish and aquatic life. However, most of Colorado's Gold Medal Fisheries, which are managed by Colorado Parks and Wildlife (CPW), are located downstream of dams. Other surface water structures such as diversions to canals and off-stream reservoirs can also impact water quality and fisheries. Such modifications can result in low stream flows that can cause low oxygen concentrations, high water temperatures and higher concentration of pollutants. In Colorado, solutions are explored during project planning to address these types of water quality impacts that can be caused by surface water modifications.
- One option for addressing future municipal water supply needs is through alternative agricultural transfers such as rotational fallowing and interruptible supply options. However, high concentration of salts and other pollutants from this source water may require advanced water treatment technologies such as reverse osmosis to make the water useable for communities. The waste product from reverse osmosis has very high salt levels and cannot be discharged into the stream. Other disposal options for the waste product are limited. If a municipal provider has higher quality source water to blend with lower quality sources then this issue can be avoided. For example, Aurora Water recently completed the

Prairie Waters Project where both natural and constructed treatment allows potable water reuse to proceed without requiring new CWA permits.

- Implementing and maintaining drinking water and wastewater treatment in a semi-arid environment is challenging today and will continue to be in the future. Treatment infrastructure is critical to protecting public health and the environment. The ability of the stream to accept pollutants in wastewater without a negative impact to quality depends on the amount of water flowing in the stream. Water diversions upstream can result in fluctuating stream levels and therefore affect water quality. Changes in treatment process necessary to meet new, more stringent discharge limits or needed upgrades to aging infrastructure can increase operational costs for wastewater treatment facilities. However, protecting water quality through wastewater treatment and other measures can result in cost savings for downstream drinking water treatment facilities because it results in higher quality source water that could require less treatment.
- The Colorado Water Conservation Board (CWCB) is responsible for the appropriation, acquisition, protection, and monitoring of instream flow and natural lake level water rights to preserve and improve the natural environment to a reasonable degree. These water rights are established exclusively by the CWCB for nonconsumptive, in-channel or in-lake water uses to support minimum flows among specific points on a stream or levels in natural lakes. The rights are administered within the state's water right priority system. While Colorado law explicitly prohibits the WQCC and the WQCD from taking any action that requires minimum instream flows, the program has provided tangible water quality benefits across the state specifically for aquatic life classified uses.

Water quality and quantity cause-and-effect connections are integral to making sound water management decisions. These connections are considered during decision-making processes that are dependent on water quality and quantity statutory, regulatory and management relationships.

Figure 7.3-2: Gross Reservoir*



*Expansion of Gross Reservoir is part of the proposed Moffat Collection Expansion Project. This project will require 401 certification.

Statutory and Regulatory Relationships

At the state level, water quality and quantity are managed separately based on different constitutional, statutory and regulatory provisions. However, state and federal statutes that protect in-stream water quality recognize the importance of protecting water rights while still providing the authority to impose water pollution controls. The federal statute protecting drinking water quality also recognizes integration with water quantity by including protections for source water that reduces treatment costs.

Many state and federal water quality-specific regulations intersect with quantity management. The quantity of water available is essential for establishing water quality standards and ensuring standards are attained as required in state and associated federal water quality regulations. Water

quality is also recognized in state regulations by addressing the quality of substitute water supplies used in exchanges and substitute water supply plans. Regulations governing reuse also support integration between water quality and quantity management.

One of the primary examples of the regulatory quality and quantity relationship is the WQCD's water quality certification of federal permits and licenses under Section 401 of the CWA as implemented through WQCC Regulation No. 82 (known as 401certification). Section 401 of the CWA directs states to certify that activities needing federal permits and licenses, such as many water development projects, comply with the applicable provisions of the state's water quality use classifications, standards and designation program during both construction and operation over time. WQCC Regulation No. 82 gives the WQCD three certification options for federal permits or licenses including the ability to certify, conditionally certify through identified mitigation measures or deny certification. Certification by the WQCD means that when the federal permit or license is implemented, the proposed project will comply with applicable surface and groundwater standards regulations, classifications and all other applicable water quality requirements for the affected waters. For example, if a project requires a CWA Section 404 individual permit from the Army Corps of Engineers, a 401 water quality certification is required from the WQCD. Section 9.4 discusses the 401 water quality certification in more detail.

The WQCC's adoption of site-specific standards and designations is another example of a quantity and quality regulatory relationship. Site-specific standards and designations may reflect a lower level of water quality than would have existed before a hydrologic modification such as a dam, diversion or return flows associated with exercising water rights.

The WQCC is solely responsible for the adoption of water quality standards and classifications; however, local government regulations can also have a water quality and quantity connection. For example, local governments are given permit authority over certain matters under the Areas and Activities of State Interest Act. Under the act, local governments can adopt regulations that address the impact of municipal and industrial water projects. These regulations, referred to as 1041 regulations, often require mitigation of water quality impacts from water projects. Associations of local governments also prepare Regional Water Quality Management Plans that establish water quality goals and recommendations for regional water quality management. Typically, local 1041 regulations require new water projects to comply with these plans.

Water Management Relationships

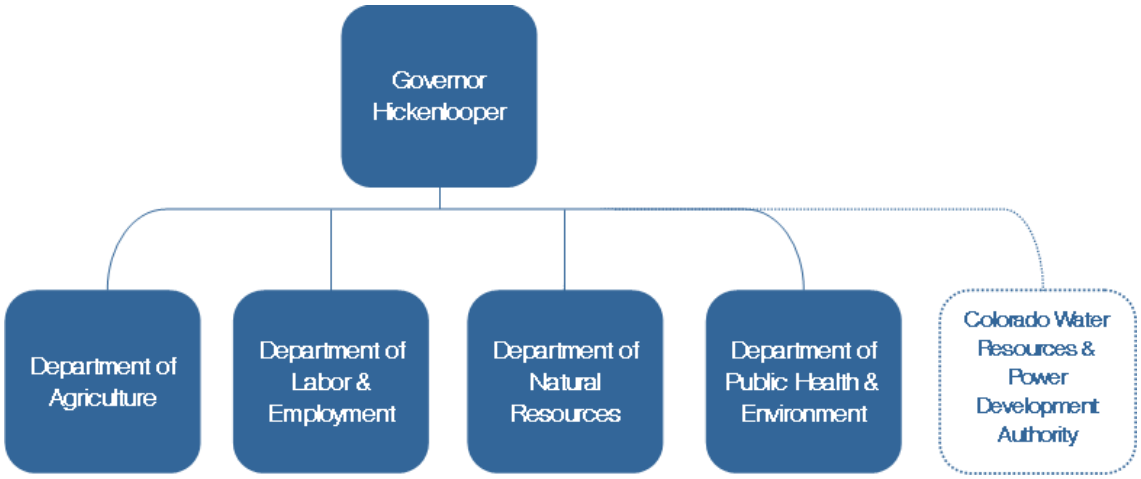
The roles and responsibilities defined in statutes and regulations are shared by many entities, which create a complex system for overseeing the state's water resources. At the state level alone, there are many entities involved with protecting water quality which requires coordination and integration to make sure water resources are appropriately managed.

The WQCC and the WQCD have defined water quality roles and responsibilities. The Colorado Water Quality Control Act also identifies several additional water quality implementing agencies:

- The Division of Reclamation, Mining and Safety
- The State Engineer

- The Oil and Gas Conservation Commission
- The Colorado Department of Public Health and Environment - Hazardous Materials and Waste Management Division
- The Division of Oil and Public Safety at the Department of Labor and Employment

Figure 7.3-3: Colorado State Agencies and Quasi-Governmental Organizations with Quantity and Quality Responsibilities



These agencies have initial responsibility for implementing groundwater quality classifications and standards adopted by the WQCC. These implementing relationships are defined through a Memoranda of Agreement. The WQCC can intervene in the event that it determines an implementing agency is not assuring compliance with water quality classifications and standards.

The Department of Natural Resources plays a critical role in managing water quantity in the state. The Division of Water Resources within the Department of Natural Resources is responsible for water administration, while the CWCB, another division within the Department of Natural Resources, sets water policy, completes water planning and reviews state wildlife mitigation plans. The Department of Natural Resources' Colorado Parks and Wildlife develops state wildlife mitigation plans, which address fish and wildlife resources affected by the construction, operation or maintenance of water diversion, delivery or storage facilities.

The WQCC and the WQCD are required by the Colorado Water Quality Control Act to consult with the CWCB before making any decision or adopting any rule or policy that has the potential to cause material injury to water rights. The CWCB receives copies of all WQCC rulemaking hearing notices and all notices include a provision requesting information from the public regarding potential impacts on water rights.

Water Quality and Quantity Integration Goal

Executive Order D 2013-005 states "Colorado's water quantity and quality questions can no longer be thought of separately. Each impacts the other and our state water policy should address them conjunctively." To this end, it is important to establish a goal related to quantity and quality integration between now and 2050. To develop this goal, many documents were reviewed including the CWA, federal Safe Drinking Water Act, the U.S. Environmental Protection Agency's (EPA) strategic plan, Colorado's Water Quality Control Act, the WQCD's strategic goals, the WQCC's strategic water quality goal and the Basin Implementation Plans (BIPs). These laws, goals and plans focus on broader actions than quality and quantity integration yet provide important insight for developing a quality and quantity integration goal as part of Colorado's Water Plan.

It is important to establish a goal related to quantity and quality integration between now and 2050.

The CWA sets a national goal "to restore and maintain the chemical, physical and biological integrity of the Nation's waters," with interim goals that all waters be fishable and swimmable where possible. The federal Safe Drinking Water Act authorizes the EPA to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water. The EPA states, and water systems work together to make sure that these standards are met. The EPA's current strategic plan has a goal regarding protecting America's waters to "protect and restore waters to ensure that drinking water is safe and sustainably managed, and that aquatic ecosystems sustain fish, plants, wildlife, and other biota, as well as economic, recreational and subsistence activities."

The legislative declaration of the Colorado Water Quality Control Act includes the following goals:

- Achieve the maximum practical degree of water quality in the waters of the state.
- Provide that no pollutant be released into any state waters without first receiving treatment or other corrective action necessary to reasonably protect the legitimate and beneficial uses of such waters; to provide for the prevention, abatement and control of new or existing water pollution; and to cooperate with other states and the federal government in carrying out these objectives.

In addition, there are several Colorado Water Quality Control Act provisions that are related to water quantity and water rights:

- A primary goal of the Water Quality Control Act is protect, maintain and improve the quality of state waters for beneficial uses including domestic, wildlife and aquatic life, agricultural, industrial and recreational uses.
- Dischargers of pollutants may be required to meet a high degree of treatment to protect water rights.
- The WQCC and the WQCD must consult with the CWCB before making any decision or adopting any rule or policy that has the potential to cause material injury to water rights.
- Nothing in the state act is to be construed or applied to cause or result in material injury to water rights.

- The WQCC and WQCD shall not require an instream flow for any purpose.

The WQCD's mission is to protect and restore water quality for public health and the environment in Colorado. The WQCD's strategic plan states that it will achieve its mission by pursing the following goals:

- Prevent waterborne disease and reduce chronic public health risks from drinking water through improved implementation of the federal Safe Drinking Water Act and Colorado's drinking water statutes and regulations.
- Protect all designated uses by attaining water quality standards through improved implementation of the CWA and Colorado Water Quality Control Act and associated regulations.
- Restore impaired water quality to attainable standards through improved implementation of the CWA and Colorado Water Quality Control Act and associated regulations.

Finally, the WQCC's strategic water quality goal is that Colorado's waters will fully support their classified uses by 2050 and these uses could include drinking water, agriculture, recreation, aquatic life and wetlands.

Better integration of water quality and quantity is required to address the Water Quality Commission's overall goal for water quality. Based on review of the laws, goals and plans summarized above, a quality and quantity integration goal was developed.

> **Recognizing the inter-relationship between quality and quantity, strategies designed to meet Colorado's current and future consumptive, recreational and environmental water needs will incorporate, as a key objective, the protection and restoration of water quality.**

The following steps further refine and advance this goal:

- The basin roundtables are encouraged to actively incorporate water quality into decision making processes for consumptive, recreational and environmental projects. To help facilitate this effort, the WQCD will provide basin-scale water quality information to the basin roundtables for their use in updating their future BIPs. This information was originally developed as part of the Statewide Water Quality Management Plan.
- Project proponents must understand the nexus between water quality and quantity and work to avoid or mitigate water quality impacts of a project through the implementation of best management practices, whether associated with 401 water quality certifications or otherwise. The WQCD will support this effort by developing guidance on the 401 water quality certification process and best management practices identification.
- The WQCD, in concert with other stakeholders including watershed groups and those with point and nonpoint discharges, will continue to employ available programs to maintain, and in some cases, improve water quality at a basin-scale. Progress will be documented over time in the WQCD's Integrated Report and WQCD's Statewide Water Quality Management

Plan. The Integrated Report is typically updated every two years and will be used to track progress on the quality portion of the integration goal over time.

- The information reported in the WQCD's Integrated Report should also be used in the CWCB's scenario planning efforts when evaluating the status of future *signposts* (see Chapter 6.1). By tracking this information through time, water quality and quantity managers will know if efforts to integrate water quantity and quality are successful and can make course corrections as part of the adaptive management plan efforts.

Current Water Quality Conditions

As plans for meeting consumptive, recreational and environmental needs are produced that recognize the many interactions of statute, regulation and management activities, it is important to understand current water quality conditions in the state. Understanding current water quality conditions is also fundamental for ensuring compliance with water quality regulations as they pertain to water supply planning and implementation activities.

Evaluating the status of surface water quality in Colorado requires understanding the classified uses for waterbodies throughout the state. A classified use is a specific type of use for an identified waterbody and can include domestic water supply, agriculture, recreation, aquatic life and wetlands. The WQCC assigns classified uses to stream segments and adopts water quality standards for many different pollutants to protect these waterbody-specific uses.

The state is also required to have an antidegradation policy as part of its water quality standards. Antidegradation protects the value of high quality surface waters. Colorado's antidegradation policy establishes that, at a minimum for all surface waters, the existing classified uses and the water quality necessary to protect those uses must be maintained; these are *use protected waters*. The antidegradation policy also provides extra levels of protection for two other types of waters that are designated by the commission. *Outstanding waters* receive the highest level of protection requiring that quality must be maintained at current levels (no degradation). *Reviewable waters* are high quality waters which receive an intermediate level of protection. The rules for antidegradation review require a public process before the natural capacity of a waterbody to dilute and absorb pollutants and prevent harmful effects is completely allocated to a project or permit where a new or increased impact is proposed. Use of such capacity is allowed if the review shows it would accommodate important economic or social development for the area in which the waters are located.

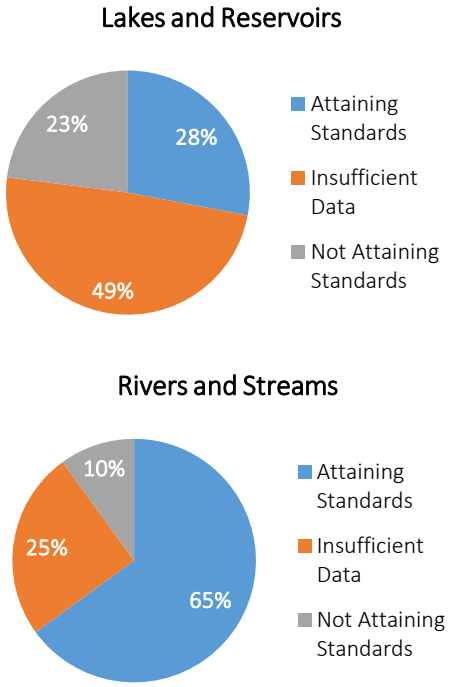
Standards are the basis for evaluating the status of water quality for each waterbody. When available data show water quality standards are not being met, the waterbody is identified in regulation as impaired. These impaired waterbodies, as well as other information about water quality in the state, must be identified in a biennial report to the EPA (Integrated Water Quality Monitoring and Assessment Report [Integrated Report]).

For waters that attain water quality standards, the challenge is to maintain the existing good water quality to protect classified uses such as drinking water supplies, robust fisheries and recreational opportunities.

For waters not meeting water quality standards, the most common causes of river and stream impairments are selenium, pathogens such as E. coli, and iron. For lakes and reservoirs, the most common causes of impairment are selenium, mercury and dissolved oxygen saturation. When water quality standards are not attained, the ability to use water for domestic water supply, agriculture, aquatic life or recreation can be impacted.

Figure 7.3-4 presents statewide information and is based on available water quality data. Different regions or basins within the state have varying water quality conditions and may have unique water quality challenges. Water quality impairments may also exist in streams or lakes that either have little to no available data or have yet to be assessed through the Integrated Report process.

Figure 7.3-4: Current Water Quality Conditions[39]



Future Water Quality Conditions

Many changes will happen over the next 35 years that have the potential to affect both regional and statewide water quality. Understanding these changes is important as plans are under development for addressing the municipal and industrial supply gap as well as meeting recreational and environmental needs over the next 35 years.

Future water quality conditions will not only be affected by water quantity decisions but will also be influenced by changing water quality regulations. Currently, there are additional proposed regulations designed to further protect and restore water quality. Examples include increased nutrient controls, more stringent arsenic standards and a revised selenium standard. There is also renewed emphasis on implementing actions that will produce measureable, positive changes in water quality. Recognizing the possibilities associated with potential change, both water quantity and quality managers need to seek opportunities to protect and enhance water quality in the future.

Other factors affecting future water quality conditions are also important. As the economy and population grow and land uses change, there will be increased water quantity demands and additional stressors on water quality. Future land use decisions are a substantial factor as water quality can be impacted by increased urbanization and associated stormwater runoff, volumes of discharged municipal wastewater and industrial discharges including those from the energy sector. As streams are depleted from additional diversions, existing concentrations of pollutants increase, and water treatment and wastewater treatment processes relying on those streams will become more difficult. New issues may also arise from emerging contaminants or interactions among different constituents that are not now known. These potential effects could be negative though

there can also be opportunities for positive change, which reinforces the critical nature of informed and integrated water resource management decisions.

The potential for future positive or negative water quality impacts is compounded by climate change. Predicted effects from a changing climate on water quality include:[40]

- Potential streamflow volume decreases in the Rockies and interior southwest, and increases in the east and southeast coasts.
- Higher peak streamflow will increase erosion and sediment transport; loads of nitrogen and phosphorus are also likely to increase in many watersheds.
- Many watersheds are likely to experience substantial changes in the timing of streamflow and pollutant delivery. In particular, there will be a tendency to shift from snowmelt-dominated spring runoff systems to rain-dominated systems with greater winter runoff.
- Changes in nutrient and sediment loads are generally correlated with changes in hydrology.
- Warming air temperature can directly raise stream and lake temperatures, which can harm aquatic organisms that live in coldwater habitats, such as trout. Additionally, warmer water can increase the range of non-native fish species, permitting them to move into previously coldwater streams. The population of native fish species often decreases as non-native fish prey on and out-compete them for food.

Planning for water quality impacts from these potential fundamental system shifts is challenging and highlights the need to make measurable progress on the water quality and quantity integration goal.

Water Quality Management

Current water quality decisions are made in the context of a management system based on statutes, regulations and implementation processes. This system defines the boundaries to protect and restore water quality, and it also offers opportunities for flexible, integrated approaches for meeting consumptive, recreational and environmental needs. The existing water quality management system is a starting point for finding opportunities and maximizing them to facilitate improved integrated water resource management decisions.

The statutory and regulatory framework for water quality discussed in Subsections 2.4 and earlier in 7.3 establishes the requirements for protecting and restoring water quality in the state. This framework is implemented through processes at the state and local level. Classified uses and the water quality standards established to protect these uses are also discussed. Both are critical to protecting and restoring water quality in the state and are established through WQCC processes with public input.

Water quality management processes also include monitoring, data assessment and reporting. Monitoring and data assessment are essential to identifying and characterizing water quality problems, revising water quality standards, and developing and evaluating the results of control programs. Monitoring is completed in conjunction with many statewide partners. The WQCD uses its own data as well as partners' data in assessments that support evaluating the status of statewide and basin-scale water quality with respect to meeting water quality standards. Information about

attainment of water quality standards is provided in the Integrated Report discussed in 7.3.2 and is also identified in regulation (WQCC Regulation No. 93, Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List); both are adopted by the WQCC through public processes.

When streams and lakes are identified that do not meet water quality standards, a restoration plan is produced that defines how much of the pollutant causing the impairment can be in the stream or lake to still ensure that water quality standards are attained. The allowable amount of the pollutant is then divided among all the different sources of the pollutant, both point and nonpoint. A point source is a sewage treatment plant or industrial facility discharge and nonpoint sources are diffuse sources of pollution such as runoff from agricultural field or abandoned mines. This restoration plan is called a Total Maximum Daily Load (TMDL). There is a public notice process associated with TMDL development that provides the opportunity for input as the restoration plan is produced. Once the TMDL is approved by the EPA, the TMDL is the basis for implementing necessary actions to bring the stream or lake back into attainment. As an alternative to implementing controls to meet existing water quality standards, TMDLs can also result in a re-evaluation of standards and sometimes classifications. Implementation actions can be defined in a TMDL implementation plan, in a locally driven watershed plan or in a locally driven regional water quality management plan (208 plan). Watershed plans and 208 plans identify stressors to water quality and address other water quality improvement and protection activities necessary to meet local and regional goals. The WQCD works with local partners and local plans to implement priority projects to restore and maintain water quality at a watershed or regional scale.

The WQCD is also actively engaged in promoting and supporting source water protection planning across Colorado through the Source Water Assessment and Protection (SWAP) Program. The program is designed to define drinking water supply areas and identify potential water quality and contaminant risks to drinking water systems. The SWAP program, in collaboration with the Colorado Rural Water Association, provides technical and financial support to encourage voluntary local planning efforts and the implementation of best management practices (BMP's) to minimize source water quality impacts. This effort is a collaborative stakeholder process that contributes to protecting and restoring water quality in the state.

The WQCD uses information from all these local plans to support its own planning efforts. For example, the WQCD produces a Statewide Water Quality Management Plan for approval by the WQCC. The Statewide Water Quality Management Plan compiles water quality information at a statewide and basin scale in support of implementation activities. This compilation, as well as the Integrated Report, WQCC policies, and other WQCD documents, supports the WQCD's strategic planning that promotes progress toward national water quality goals and provides specific metrics for measuring that progress.

The purpose of these plans, at different scales by numerous partners, is defining and prioritizing actions for the improvement, restoration and protection of water quality. Implementation tools used by the WQCD include Section 401 water quality certifications (discussed in Section 9.3),

permits that allow discharges to streams and lakes, as long as certain limits or control measures are met, and funding support for partners. The federal CWA prohibits the discharge of pollutants from a point source to surface water without a permit. Because the state has developed a program that meets the requirements of the federal CWA, the primary discharge permit program in Colorado is administered by the WQCD rather than by the EPA. The permits issued to point sources specify the limits or controls that are required to meet Colorado's water quality standards.

Implementation tools often require the development of strategies or best management practices that when completed result in the improvement, restoration and protection of water quality. Strategies are also used to address consumptive and nonconsumptive needs. These are summarized in Sections 6.3 through 6.6 of this plan. Examples of strategies that have a quality and quantity nexus include, but are not limited to:

- Water reuse including direct potable reuse, indirect potable reuse, non-potable reuse and graywater use. These strategies are further described in Section 6.3.
- Storage including reservoirs and aquifer storage and recovery.
- Source water protection best management practices such as proper storage and disposal of pesticides and proper management of septic systems.
- Stormwater best management practices including retention and detention can improve the quality and quantity of this supply and could be incorporated into water management practices. In Colorado, stormwater has not typically been considered a source of supply but this could be explored in the future.
- Nonpoint source best management practices will be critical to improving water quality for recreational, environmental and consumptive needs in the future. Examples of nonpoint source best management practices include mine tailings removal, riparian buffers, constructed wetlands and habitat restoration.
- Green infrastructure is being discussed at a national level and application of this concept is being explored in Colorado. The focus of the green infrastructure concept is to weave natural processes into the built environment, which can provide stormwater management, flood mitigation, air quality management and riparian zone restoration.
- Water quality trading is based on the fact that sources in a watershed can face very different costs and regulatory requirements in the control of the same pollutant. Trading programs allow facilities facing higher pollution control costs to meet their regulatory obligations by purchasing environmentally equivalent (or superior) pollution reductions from another source at a lower cost, thus achieving the same water quality improvement at a lower overall cost.

Funding and financing is discussed in detail in Chapter 9; however, the WQCD provides various financial assistance opportunities to assist with efforts to protect public health and the environment. The WQCD administers the following financial assistance programs:

- State revolving funds provide low-interest loans to governmental entities for drinking water and water quality improvement projects.

- The Water Quality Improvement Fund provides grant funds for water quality improvement projects using civil penalties from water quality violations. State House Bill 11-1026 amended the statute to authorize grants for stormwater management training and best practices training to prevent or reduce the pollution of state waters.
- Source water protection grants provide funding for pilot planning projects and development and implementation projects.
- The small system training and technical assistance set-aside provides grant funding to assist with the costs of planning and design for small drinking water systems serving less than 10,000 people.
- State statutes 25-8-703 and 25-1.5-201 authorize funding, when appropriated by the legislature, for small community domestic wastewater and drinking water projects. These programs provide grants to municipalities for costs associated with planning, design and construction of drinking water and wastewater treatment plants.
- Nonpoint source grant funds are distributed through a competitive process to local project sponsors to implement projects which restore impaired waters, prevent future impairments or raise public awareness.

In addition, the Water Supply Reserve Account administered by the CWCB is another financial tool that provides grants to assist Colorado water users in addressing their critical water supply issues and interests. The funds help eligible entities complete water activities, which may include competitive grants for:

- Technical assistance regarding permitting, feasibility studies and environmental compliance.
- Studies or analysis of structural, nonstructural, consumptive and nonconsumptive water needs, projects, or activities.
- Implementation of structural and nonstructural water projects or activities.

Water Quality and BIPs

The various basin roundtables have addressed water quality in the BIPs in two major ways: through quality-related basin goals and measurable outcomes, or through identification of projects and methods with a water quality nexus. In many basins across the state, public water systems, municipal governments, and communities have developed source water protection plans with specific water quality prevention strategies. Many basins also have watershed plans in place that identify priority actions necessary to both protect and restore water quality. These prevention, protection, and restoration strategies and actions should be considered during the project development and prioritization stage. The WQCD can provide information about protection and watershed plans that are in progress or completed.

Every basin roundtable addressed water quality in goals and measurable outcomes. Several basins addressed water quality issues in the context of greater watershed health, while others look to established water quality standards as a potential measureable outcome. The Rio Grande Basin Roundtable established the following goal: "Make progress toward meeting applicable water quality standards throughout the Basin."[41] This approach demonstrates how the basin may use the

planning process to work closer with the Colorado Department of Public Health and Environment, to make progress toward meeting established standards.

The Yampa/White/Green Basin Roundtable references water quality, as it relates to uses within the basin, in their goals: "Maintain and consider the existing natural range of water quality that is necessary for current and anticipated water uses."[42] This water quality-centric goal follows the strong BIP theme of protecting existing uses within the basin and providing for future development, recognizing the importance of both quality and quantity. This type of goal seeks to establish how water quality fits within their vision of the basin's future.

Basin roundtables have also addressed water quality issues through identification of projects and methods which have a water quality nexus. For example, the South Platte/Metro BIP identifies 18 projects with a connection to water quality, ranging from assessment of wildfire restoration, to sediment mitigation projects, to mine remediation.[43] These projects address water quality issues at the source, seeking to improve quality through implementation.

The Gunnison Basin identifies currently ongoing projects and methods which address water quality issues. These include several programs related to Colorado River water quality, such as the Gunnison Basin Selenium Management Plan, and projects funded through the Colorado River Basin Salinity Control Forum.[44] Additional localized projects for improving municipal infrastructure also have benefits for water quality.

Through these goals, outcomes, and identified projects and methods, the basins seek to address water quality concerns at a more local level. Future efforts of the roundtables will prioritize projects and methods by basin goals, and water quality overall will benefit from this incorporation of quality concerns into the goals and outcomes framework.

Actions

The WQCD worked with the Colorado Water Quality Forum and the WQCC to develop recommendations. As Colorado's Water Plan is updated in the future, these recommendations serve as a starting point for implementation efforts focused on:

A. Integrated water quality and quantity management.
B. Policy considerations.
C. Financial considerations.
D. Stakeholder and public outreach.

In addition, these recommendations need to be assigned to a responsible party and prioritized for implementation over time.

A. Integrated Water Quality and Quantity Management Actions

Recommendations to promote increased integration of water quality and quantity management include:

1. Evaluate water quality impacts associated with proposed solutions and scenarios presented in the BIPs and in Sections 6.3 through 6.6 of Colorado's Water Plan. Identification of

impacts will help define the scope of strategies that need to be explored to protect and restore water quality. Information developed about these impacts will be shared among all involved parties.

2. Define opportunities in cooperation with basin roundtables, the CWCB and others for projects or processes that restore and enhance existing water quality conditions to address potential water quality effects resulting from implementing water quantity solutions. An initial step to implement this recommendation is to assist the basin roundtables in developing water quality goals, objectives and measurable outcomes based on current water quality information for each basin to use when updating their BIPs. This collaboration supports the basin roundtables in identifying projects and methods that integrate water quality and quantity management to protect and restore water quality.
3. Define green infrastructure approaches for the arid west and explore how green infrastructure can be used to address Colorado's consumptive and nonconsumptive gaps. For example, green infrastructure in the arid west can go beyond stormwater management activities and low impact development methods to include landscape-scale land use planning that addresses where activities should occur on the landscape to meet dynamic goals, including protecting and restoring water quality. Existing information developed by green building and stormwater management groups provides a starting point for developing and maintaining a library of green infrastructure options.
4. Evaluate new water supply projects and the potential for multiple benefits, including water quality protection and enhancement. Strive to ensure that all water quality benefits are incorporated into the project plans.
5. Examine how new or existing supply projects can be designed andoperated to advance water quality objectives. Actively pursue incorporation of these design and operation considerations into proposed projects.
6. Identify the role of reuse by developing a library of reuse examples such as direct potable reuse, indirect potable reuse, non-potable reuse, graywater use and the associated water quality issues that need to be addressed for each type of reuse. Ensure that these issues are addressed in any initiative that desires to use these resources. Reuse and identified actions are discussed further in Section 6.3.
7. Promote the use of aquifer storage and recovery since water quality impacts associated with this storage strategy are minimal.
8. Explore the role of stormwater management from both a quality and quantity perspective to determine if stormwater is a viable additional source of supply to address consumptive needs.
9. Address nonpoint sources through on-going management activities that play an important role in protecting and restoring water quality for the benefit of future water uses. These activities should include cataloguing and evaluating local government land use planning tools that minimize nonpoint source pollution associated with development. A comprehensive approach to nonpoint source management including water quality trading should be explored.

10. Identify the risks of climate change as they relate to integrated water quality and water quantity management. Develop specific recommendations for addressing these risks.
11. Explore how the CWA requirements and Safe Drinking Water Act requirements can be most efficiently and cost effectively integrated. Develop specific recommendations for implementation.

B. Policy Considerations

Chapter 10 of Colorado's Water Plan summarizes legislative recommendations. In addition to the legislative recommendations, policy considerations related to quality and quantity integration include:

1. Continue to engage in creative, solution oriented actions such as site-specific standards, temporary modifications, discharger specific variances, pollutant trading and conditional 401 water quality certifications. Use all available means to improve water quality and protect the high quality waters that are better than necessary to support classified uses. Maintain ongoing, non-regulatory programs including nonpoint source management and source water protection planning. These solution orientated actions will also be necessary when addressing impacts from climate change.
2. Establish a more complete understanding of the concept of net environmental benefit as wastewater reuse continues to be maximized in Colorado. This concept is focused on the demonstration that the ecological value of using effluent to support riparian and aquatic habitats exceeds the ecological benefits of removing the discharge from the waterbody.
3. Review and appropriately modify existing regulations, guidance and policy documents for new types of wastewater reuse so that revisions will protect public health and the environment while also providing sufficient flexibility for water suppliers to develop new water reuse projects across the state.
4. Consider and document the water rights implications of water quality strategies and the water quality implications of water development strategies as they both pertain to integrated water quality and quantity management. For example, integrated stormwater management may have effects on downstream flows and possible water rights impacts would have to be understood and addressed before such a strategy could be implemented.
5. Continue to work with neighboring states to address interstate water quality and quantity issues to protect Colorado's compact entitlements.
6. Continue statewide monitoring that supports assessment of the quality and quantity integration goal and measures.

C. Financial Considerations

Future efforts to integrate water quality and quantity will require funding. The recommendations outlined below may be further detailed in Chapters 9 and 10 of Colorado's Water Plan.

1. Continue to fund nonpoint source pollution management efforts. Identify new funding opportunities and nonpoint source pollution control strategies.
2. Identify costs and funding sources for implementation of green infrastructure and reuse.

3. Pursue state funding of regional watershed-based water quality planning to better integrate current and future water quantity efforts.
4. Develop and implement state funding mechanisms for future water projects that implement consumptive and nonconsumptive strategies consistent with Colorado's Water Plan. Emphasis should be placed on funding those portions of projects that result in a public benefit.
5. Develop and implement state funding mechanisms for implementation of mitigation activities required under a state water court water rights decision or a federal or state water quality protection regulatory action.
6. Develop and implement funding mechanisms for the protection, restoration or enhancement of water quality values in river or stream reaches.
7. Explore ways to facilitate innovative treatment and engineering solutions through technology transfer and liability management techniques.

D. Stakeholder and Public Outreach

Stakeholder and public outreach is critical to meeting the water quality and quantity integration goal. The recommendations outlined below may be further detailed in Chapter 9.5 of Colorado's Water Plan.

1. Use a watershed approach for outreach and community engagement around water quality, ways to protect water quality and solutions to address water quality issues. Colorado's many watershed groups already use this approach to effectively plan for and implement actions that protect and restore water quality. The approach can be used when developing and implementing strategies that integrate water quality and quantity management.
2. Monitor public attitudes and opinions about water quality as it relates to domestic water supply as well as environmental and recreational uses of water to refine future water quality goals and measurable outcomes.
3. Develop additional water quality goals and performance measures based on the completed BIPs from the basin roundtables.
4. Conduct joint CWCB and WQCC meetings at least annually to discuss water quality and quantity integration issues.
5. The WQCC should consider holding workshops as part of its annual basin rulemaking process. Workshops should have participation from basin roundtable representatives for the basin that is the subject of the annual rulemaking hearing to gather input and share information related to progress on water quality and quantity integration efforts.

policies are developed and implemented, the state will defend Colorado's water allocation and management system, to the extent that proposed federal actions may interfere with and potentially undermine water rights as decreed and administered within the state.

D. The State of Colorado will continue to work within Colorado's local structure.

1. In proposing innovative strategies to meet Colorado's existing and future water needs, the CWCB will continue to work collaboratively with local governments, recognizing the authority of the state's counties and municipalities in making water development and management decisions.

E. The State of Colorado will support strategies to maximize use of compact water while actively avoiding a Colorado River Compact deficit.

1. The CWCB will continue to support water banking efforts and prioritize the development of the programmatic approach as described over the next several years. This development will require extensive stakeholder participation and educational efforts statewide.
2. Future study and collaborative stakeholder input by the CWCB will gauge the potential for a programmatic approach to meet existing and future needs while maintaining equitable distribution of the reduced consumptive use. Multiple types of water use and locations on eastern and western slopes should share the burdens of demand management.

As the CWCB begins technical investigation of a potential collaborative program, a key issue to be resolved will be the potential scope of demand management: the greater the amount of existing uses to be covered by such a collaborative program, the greater the number of voluntary reductions and compensation that will be necessary.

9.2. Economics and Funding~~& funding~~

Colorado's Water Plan coordinates existing funding sources and explores additional funding opportunities.

Introduction

Investing in the long-term sustainable supply and delivery of water is critical to Colorado's future. Even in robust economic times, the difficulties inherent in financing large, long-term and sustainable water projects can create community apprehension and political controversy.

Over the years, the CWCB has partnered with various water providers throughout Colorado to conserve, develop, and protect Colorado's water for future generations. The CWCB has provided funding through grants and loans for critical multi-purpose and multi-partner projects, such as the Chatfield Reallocation Project, the Animas-La Plata Project, the Rio Grande Cooperative Project, and the Elkhead Reservoir Enlargement Project. For these projects alone, the CWCB contributed over $200 million. These projects supplied over 100,000 acre–feet of water to help water providers meet

their water supply and storage needs, while also improving stream health, promoting shared uses, sustaining agriculture, and providing long-term recreational benefits.[b] ~~7~~

Financing long-term sustainable water supplies and infrastructure projects requires a collaborative effort involving water users and providers, as well as federal, state, and local entities. Colorado will need to secure funding ~~needed~~ to meet water demands~~needs~~ in the long-term through a combination of constructive legislation, partnerships, and state and federal grant and loan programs. It is the CWCB's intent to promote, and potentially support financially and politically, projects that evaluate water supply, storage, and conservation efforts from a regional, multi-purpose, multi-partner, multi-benefit basis and projects that evaluate the consolidation of services where practical, feasible and acceptable.

This section provides: 1) a description of existing financial need; 2) an overview of financial assistance programs; and 3) recommendations and suggested approaches to develop an integrated water infrastructure financing model that could assist in addressing Colorado's short and long-term water needs.

Statewide Water Infrastructure Financing Need~~water infrastructure financing need~~

The BIPs for the major river basins within the state are a critical component of Colorado's Water Plan. In general, each BIP looked at balancing long-term municipal, industrial, agricultural, environmental, and recreational needs within the respective basins, and among basins.~~.~~ As part of the BIPs, the basin roundtables identified a list of projects and methods~~that~~ they believe address the long-term needs of their basin. An initial summary of the costs identified in the BIP's is included in Table 9.2-1. It needs to be emphasized that at this time the vast majority of projects identified did not have costs associated with them. In addition to these projects, the BIPs include other activities that require financial support including education, outreach, conservation programs, flow agreements, alternative agricultural transfer methods, important legal investigations, and programs that manage various risks and vulnerabilities throughout the state.

Table 9.2-1: Project Costs Identified in the Basin Implementation Plans*

Basin	Single purpose projects & methods			Multi-purpose projects	Total
	Env., rec., or water quality	Municipal & industrial	Agricultural		
Arkansas	$30,000	$20,000,000		$65,000,000	**$85,000,000**
Colorado	$1,500,000	$4,000,000		$132,000,000	**$137,000,000**
Gunnison	$8,000,000	$46,000,000	$9,000,000	$423,000,000	**$486,000,000**
North Platte	*Forthcoming*	*Forthcoming*	*Forthcoming*	*Forthcoming*	***Forthcoming***
Rio Grande	*Forthcoming*	*Forthcoming*	$80,000	$130,000,000	**$131,000,000**
South Platte / Metro	*Forthcoming*	*Forthcoming*	*Forthcoming*	*Forthcoming*	***Forthcoming***

[b] Chatfield Reallocation Project ($62 million CWCB Investment - $80 million Loans), Animas- La Plata Project ($37 million Water Purchase) Rio Grande Cooperative Project ($5 million Grant – $15 million Loan/Grant), and Elkhead Enlargement Project ($11 million)

Southwest	$60,000,000	*Forthcoming*	*Forthcoming*	*Forthcoming*	**$60,000,000**
Yampa/White/Green	$5,000,000	*Forthcoming*	*Forthcoming*	*Forthcoming*	**$5,000,000**
TOTAL	**$74,530,000**	**$70,000,000**	**$9,080,000**	**$750,000,000**	**$904,000,000**
Percent of total	**8%**	**8%**	**1%**	**83%**	

* Most identified projects did not have associated costs. Therefore, additional cost estimating and refinement of existing project costs will be forthcoming to develop an overall statewide summary of water project funding needs. Costs were rounded to three significant figures.

The Statewide Water Supply Initiative (SWSI)~~It is~~ estimated that between $17 billion and $19 billion will be needed for municipal and industrial water infrastructure improvements by 2050.[8, c] In addition, approximately $150,000 is needed per mile of stream for smaller scale river restoration work, but could cost $240,000 or even $500,000 per mile for substantial~~significant~~ structural changes or channel reconfiguration.[9] To better determine the amount of river restoration work and other similar types of work that may be required~~;~~, up to 90 watershed or stream management~~level master~~ plans are necessary at an estimated cost of $18 million statewide.[10] As basins and stakeholders identify their environmental and recreational needs, further projects and methods will need to be developed and funded to meet those needs. For planning purposes, however, one could estimate a $2 billion to $3 billion environmental and recreational statewide need or approximately 10 to 15 percent of the municipal and industrial water infrastructure cost estimates. Additionally, the long term funding to support the sustainability of agriculture will need to be developed based on further identification of projects and methods. Funding for agriculture should not only include legal and engineering support alternatives to reduce agricultural dry-up, but also water infrastructure to deliver water from agricultural areas to urban areas on a shared basis~~recreational and agricultural needs, further projects and methods will need to be developed and funded to meet those needs~~.

Further refinement and identification~~Future calculated level~~ of ~~financial~~ water infrastructure financial needs through~~to be identified in~~ the BIP process will be required~~BIP's,~~ as we move forward. The~~further discussed and refined in 2015. In 2015,~~ CWCB will review the results of these efforts~~BIPs~~ to develop a list of project priorities~~priority projects~~. The criteria for a priority project include funding, if it is multiple-purpose, if it has multiple partners, or if it provides multiple benefits, and is regional in nature. The~~has shared uses.~~ CWCB will identify projects that have the potential to move forward quickly, have cross-basin and statewide benefits, and have a possible funding plan. This is discussed further in Section 9.2.4.

Note that estimated overall funding needs of approximately $20 billion is associated with meeting the municipal and industrial (M&I) gap and maintaining current infrastructure. Specifically, these funds would support:

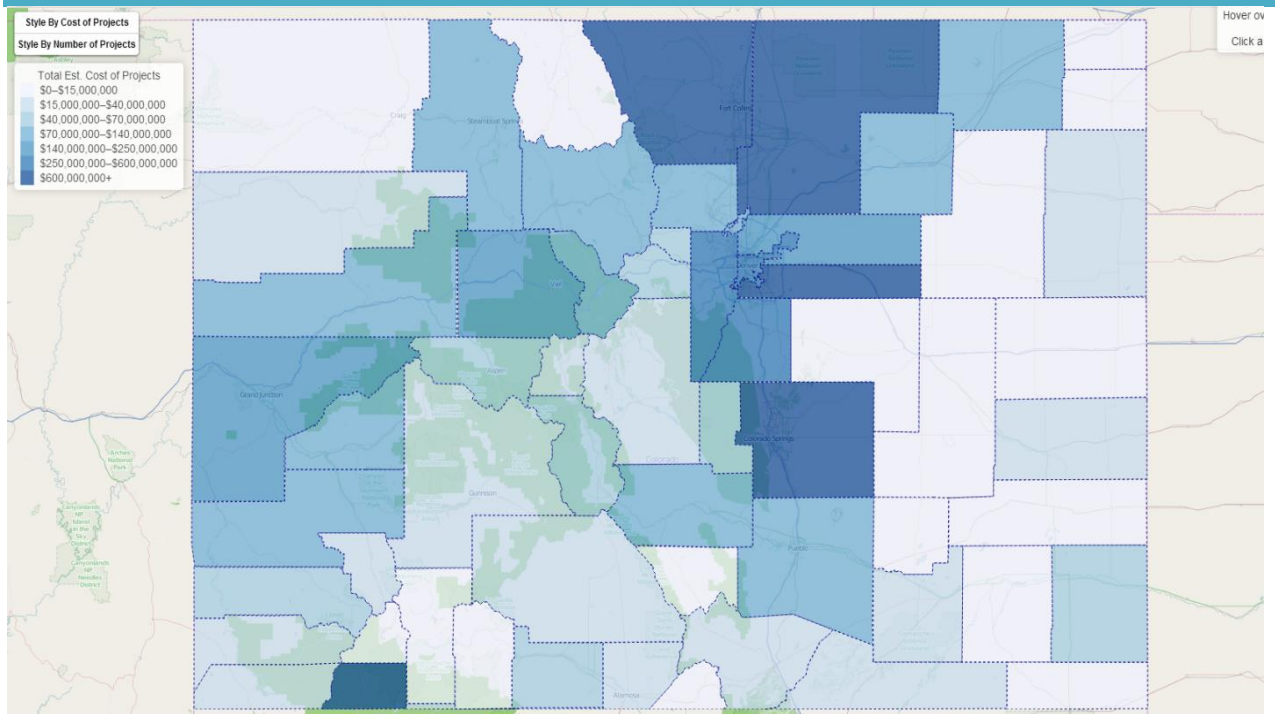
1. The Identified Projects and Processes (IPP) identified in the SWSI,
2. Short and long term maintenance needs of existing water delivery systems,
3. Alternatives to agricultural transfers

[c] This number is based on an estimated $14 billion to 16 billion of identified M&I needs calculated in the Portfolio and Trade-off tool (CWCB, 2011), plus an additional $3 billion estimated need for maintaining existing M&I infrastructure. The ~~. However, the~~ numbers, however, are being refined based off the BIPs~~.~~.

4. Active water conservation.

Additionally, financial support is needed to address environment and recreational needs throughout the State and to support agricultural viability. Treated water projects, such as drinking water treatment and distribution as well as waste water treatment, is not included in this number.

Figure 9.2-1: Estimated Near-Term Infrastructure Need[11]



Economics

When Colorado's land, labor, and capital combine with available water, the result is economic prosperity and opportunity. Managing water operations is challenging because of the wide variation in supply and demand. Water providers need to ensure the delivery of quality water to all customers as demand rises and falls at a cost that people can afford and are willing to pay. Water is also extremely mobile and by the nature of its physical properties can move around in streams, seep into soils, move underground, evaporate, be stored in reservoirs or even bottled and transported. The inherent consequence of mobility is that there can be many sequential uses from the same molecule of water since it is rarely consumed fully by a particular user and what is left is available for other uses. To expand even further, another critical feature of water is the overall variability of where it is located, the quality, quantity, and for what duration. Colorado is a perfect example of the mobility of water, given that 89~~70~~ percent of its population resides east of the continental divide, yet 70 percent of the state's water supply originates~~lies~~ west of the continental divide.[12]

Water can be considered both a private and public good, which makes it difficult to assess its economic value. Water is capital–intensive when compared to other public utilities such as natural gas or electricity, given its weight, viscosity, and volume.[13] The public perceives water as an affordable, accessible, and continually available resource.[14] On average, most families pay less than one percent of their household income for water, so they do not understand the true cost of water when compared to other living expenses, such a fuel, electricity, food, etc.[15,d] Twelve ounces of bottled water at the store costs $1.00, but tap water that is treated and delivered across Colorado to a house costs approximately $3.00 per one thousand gallons.[16] This lack of awareness of the true cost of water could be either an issue with what the public is willing to pay~~can afford~~ or a learned response to the apparent low cost that consumers have historically paid for treated water delivered to their homes. With the current demand and future increased demands on water supplies, it is important to focus on education. Water users need to be aware of the true costs inherent in providing water.

State Funding Resources~~funding resources~~ and Other Funding Opportunities~~other funding opportunities~~

Current Funding Opportunities~~funding opportunities~~

Though the statewide funding needs for both the consumptive and non-consumptive water projects is substantial~~significant~~, a planned, phased approach with existing and potential alternate funding sources could address a majority, if not all of the state's needs~~, if not all~~, depending on how aggressive and successful the approach is. The State recognizes that water providers are in control of their own short- and long-term capital investments, operation and maintenance costs, and customer base. Therefore, use rates and tap fees could be the primary source of funding where the end user is directly connected with the costs and investment. There are opportunities, however, when broader public interests are in play, where combining financial resources and infrastructure can solve complex water supply challenges~~problems~~ and accelerate the construction of a project. The Water Infrastructure and Supply Efficiency (WISE) Project is a perfect example where several~~over eighteen~~ entities, including South Metro Water Supply Authority members, Denver Water, Aurora, and the CWCB, shared infrastructure, water, and financing to provide critical renewable water to offset well usage in Douglas County.[17]

There are many~~a number of~~ existing State funding sources or programs that can assist in meeting the state's long-term water infrastructure needs. These include: the CWCB Water Project Loan Program, the CWCB's Water Supply Reserve Account (WSRA) Fund, the Species Conservation Trust Fund, Non-consumptive funding programs as identified in SWSI 2010 Non-consumptive Toolbox, and the Water Resources and Power Development Authority's (Authority) Water Revenue Bond Program (WRBP). Though these programs cannot solely meet the financial water needs of the state, they can assist in bridging funding gaps when combined with other funding sources.

[d] Colorado average household income, 2008 to 2012 = $58,224. Based on 9,000 gallon monthly household water use (108,000 gallons/yr.) and inside city limit use, Denver - $35/month, Longmont - $22.50/mo, and Ute Water Conservancy District - $42.00 monthly billing rate. Average of three entities = $33/month water bill.

The CWCB Water Project Loan Program

Recognizing the importance of funding raw water projects, the Colorado General Assembly, in 1971 created the Water Project Loan Program, which is comprised of two funds: the Construction Fund and the Severance Tax Trust Fund, in 1971: codified at section 37-60-120 in the Colorado Revised Statutes.[18] Annual revenues to the Construction Fund come from principal and interest (P&I) on existing loans and a portion of Federal Mineral Lease revenues that are paid to the State. Approximately $18 million to $20 million is available annually for water project loans from this fund.[19] In addition to the Construction Fund, in 1995, the Severance Tax Trust Fund was created under section 39-29-109, which directs 25 percent of the State's severance tax revenues into this fund, which is currently capped at $50 million annually.[20] Annual severance tax revenues provided to the CWCB range from $20 million to $50 million.[21] A portion of available Severance Tax Trust Fund revenues could be directed to assist in meeting investment return obligations on impact bonds issued in support of environmental and recreation needs throughout the State.to $50 million.[22]

The Water Project Loan Program has, on average, between $50 million andto $60 million available annually for loans for various water projects throughout the state. The combined fund equity from the Construction Fund and Severance Tax Trust Fund exceeds $700 million.[23]

Water Supply Reserve Account (WSRA)

WSRA Fund

This state grant program provides funding at the local basin level to address a variety of short- and long-term water needs. Current funding level is capped at $10 million annually, which is split between the Statewide and Basin Accounts. Funding comes from annual severance tax revenues to the State, and has varied from $5.7 million to $10 million annually.[24] This Program has distributed over $40 million in grant funds to date for a variety of water related studies and projects.[25]

The WSRA roundtables process has proven to be a grassroots platform for engaging local basin, regional, and cross-basin discussions on water issues. Continued support and additional funding should be considered to maintain and enhance this successful program. The existing process and structure of how the WSRA grant funds are distributed from the basin and statewide accounts should be re-evaluated to encourage multi-benefit and multi-partnering projects, and to promote planning and technical support to smaller communities and water providers. A collaborative, regional approach should always be encouraged and considered in the planning process for projects that are funded through this program.

Watershed Restoration Program

The CWCB's Watershed Restoration Program provides grants for watershed/stream restoration and flood mitigation projects throughout the State. Over the years it has leveraged substantial outside entity dollars to promote watershed health. It has had an annual funding allocation of $250,000, but has recently seen a substantial increase in funding, because of legislation approved for phreatophyte control and flood and fire mitigation. The 2015 CWCB Projects Bill also approved an additional $1 million in funding for this program to assist with funding stream management plans, as discussed in Section 6.6. If additional revenues sources were successfully developed to

support environmental and recreational projects, this program could serve as the program to managed and disburse those funds.

Species Conservation Trust Fund

The Native Species Conservation Trust Fund was created in 1998, pursuant to HB98-1006. This fund is used by the CWCB and Colorado Parks and Wildlife (CPW)~~CPW~~ for programs associated with: recovering species listed as threatened and endangered under state law; recovering and protecting federal candidate species; conducting scientific studies related to the listing or delisting of any species; and evaluating genetic, habitat and declining species baseline data. The Species Conservation Trust Fund authorizes millions of dollars of work by the CWCB and CPW each year, and this authorization occurs through the annual Species Conservation Trust Fund legislation.

Water Resources and Power and Development Authority (Authority)

The Authority is a quasi-governmental organization created by section 37-95-101 in the Colorado Revised Statutes to provide low-cost financing for water and wastewater related infrastructure projects to municipalities and special districts. The Authority has four main financing programs: the Drinking Water Revolving Fund, the Water Pollution Control Revolving Fund (WPCRF), the Small Hydropower Loan Program, and the Water Revenue Bond Program (WRBP).~~WRBP.~~[26]

The WRBP provides funds up to $500 million for individual projects, without legislative review, to public entities for water and wastewater projects. The Authority's WRBP rates are consistent with private municipal bond market rates, with the distinction being that they provide bond issuance subsidies, up to a total of $250,000, for each of up to four projects in any given year. Note~~It should be noted~~ that the WRBP can provide funding well above $500 million with legislative approval.[27]

The Drinking Water Revolving~~Revoling~~ Fund and the WPCRF are both part of the State Revolving Funds, which are operated in every state. These funds are primarily used for water quality projects, and are capitalized by state and federal funds whereby states contribute 20 cents for every federal dollar. These funds are often used to leverage other funds through the issuance of municipal bonds.

The Small Hydropower Loan Program is a joint program operated in coordination with the CWCB. Loans from this program are limited to up to $2 million per governmental agency, for eligible projects of five megawatts or less.[28] Agencies seeking more than the first $2 million available through the Authority can apply through the CWCB.

Grant Programs

The CWCB also offers many~~a number of~~ grant programs for various water related efforts, such as water efficiency, alternatives to agricultural transfers, emergency drought response, phreatophyte control, and others. Annual combined funding for these various grant programs is in excess of $4 million.[29] A list of these various grant programs can be found here.

A list of federal, state and private funding opportunities for environmental and recreational needs can be found in the Nonconsumptive Toolbox.[30] The total amount of funds available from state resources that are dedicated to these efforts on an annual basis is approximately $11 million.[31]

Some of these funds are extremely competitive, while others are hard to qualify for, and are therefore not fully utilized.

There are currently limited funding sources available for education, outreach, environmental resources, recreation, and other important water related activities that do not involve construction of projects. Though these efforts have strong support from non-governmental organizations, they are typically funded through charitable donations, as opposed to tax revenue. Additionally, much of this type of work has been funded through the WSRA program, which requires approval by the basin roundtables and the CWCB. Therefore, it may be necessary to identify additional funding sources to fully meet the environmental and recreational water needs in the state.

CWCB Program Overview

~~Potential future funding opportunities~~

Initial estimates suggest that municipalities will primarily need state, federal, or bond market loans to fund their projects. Over the next 35 years, based on current funding levels, the state expects to have nearly $2 billion available in CWCB loans for municipal, industrial and agricultural projects.[32] Compared to the statewide water infrastructure financing needs discussed above, this amount suggests a potential public financing gap. To~~In order to~~ support innovative water projects, such as multi-use, alternative agricultural transfers, or a new transmountain diversion with a sufficient back-up supply on the eastern slope, combined with substantial~~significant~~ environmental and recreational enhancements that meet the criteria of the Interbasin Compact Committee (IBCC)~~,~~ consensus and additional state funds may be necessary. Environmental and recreational projects primarily rely on grants for financial support, since those projects are not typically ratepayer supported. Current capacity to fund environmental and recreational projects and methods over the next 35 years is $385 million, based on current funding levels.[33] This suggests that it may be difficult to fund projects that promote environmental and recreational interests. Beyond the CWCB loan programs, an additional $490 million is available from the ~~Water Supply Reserve Account (~~WSRA~~)~~ and another grant programs for meeting future needs.[34]

Federal Funding Options

Federal funding options are also a potential source for meeting financial needs. For scientific and research-based projects, the Bureau of Reclamation's (BOR~~BOR's~~) WaterSMART program, managed through Landscape Conservation Cooperatives, has funded several programs throughout the region. For certain agricultural efficiency projects, the Colorado River Basin Salinity Control Forum has brought a substantial~~significant~~ amount of federal funding to Colorado, aimed at improving the water quality of the Colorado River.

In addition, the Upper Colorado River Basin Fund is a federal fund comprised of funds appropriated from the U.S.~~US~~ Treasury for capital projects, as well as proceeds from the sale of hydroelectric power, transmission services and M&I water service sales. The Basin Fund is used to fund important work associated with the Salinity Control Forum, the Upper Colorado River Basin and San Juan River Basin Endangered Fish Recovery Implementation Programs, and the Glen Canyon Dam Adaptive Management Working Group. These programs are described throughout Colorado's Water Plan. In addition, in 2011, the Upper Division Colorado River Basin States (Colorado,

Wyoming, Utah, and New Mexico), BOR, the United States Department of Energy Western Area Power Administration, and the Colorado River Energy Distributors Association signed a memorandum of agreement (MOA)~~MOA~~ that authorizes the use of the Basin Fund to further the purposes of the 1956 Colorado River Storage Project (CRSP) Act (Public Law 485) through fiscal year 2025. This MOA authorized additional uses for operational and maintenance on CRSP facilities, among other specified purposes, and provides more than $5 million for the CWCB to direct toward CRSP operation and maintenance activities.

Potential Future Funding Opportunities

Many stakeholder efforts, such as the IBCC, environmental groups, and the recently created Statewide Water Investment Funding Committee, have explored other~~Other~~ avenues of funding ~~have been explored~~ to meet Colorado's future water needs. The IBCC explored several financial options in the no-and-low-regrets~~No/Low Regrets~~ Action Plan listed below:[35]

- A~~a~~ federal/state partnership similar to the Central Arizona Project, -
- A~~a~~ state water project similar to the California State Water Project,-
- A~~a~~ state/local partnership in which the state facilitates the project, but the end-users finance and manage it,-
- A~~a~~ public/private partnership similar to those used to build transportation projects (e.g., E 470),-
- Enactment~~enactment~~ of a "water" mill levy (the assessed property tax rate used to raise revenue),-
- Additional~~additional~~ bonding authority for the State of Colorado,-
- Severance~~severance~~ tax increases,-
- A~~a~~ statewide sales tax,-
- Federal~~federal~~ loan guarantees,-
- Expanded~~expanded~~ authority of Great Outdoors Colorado funding,
- Specific~~specific~~ Farm Bill initiatives that appropriate funds for enhancing agricultural operations while supporting nonconsumptive needs,
- Regional~~regional~~ taxing,
- Statewide~~statewide~~ user fee,
- Statewide~~statewide~~ tax on internet-based transactions, and
- Debt~~debt~~ financing (debt backed by existing or newly created revenue source).

In addition, The Nature Conservancy, Colorado Chapter and the Tamarisk Coalition also assessed funding sources for environmental needs.[36] When additional funding sources are needed, some potential investment opportunities are:

Productive Legislation – Water providers, the CWCB's recently created Statewide Water Investment Funding Committee, elected officials, and community leaders can work to develop productive legislation to create effective and efficient funding processes that will maximize the use of water within the state. Some specific examples that could be considered include:

- Removal of Federal Mineral Lease and Severance Tax Fund cap limits, which could generate an additional $10~~20~~ million per year.

- Increase the funding cap~~levels~~ to the WSRA Grant Program account, currently limited to~~capped at~~ $10 million per year. Adding an additional $10 million could greatly assist in meeting environmental and recreational funding needs.
- Investigate extending instream flow tax credits for water rights donations to the instream flow program beyond 2015.[37]
- Expand the CWCB's authority to improve the management and distribution of existing funds, enabling the CWCB to fund treated water facilities could alleviate gaps in funding raw water projects with treated components that are not funded by other sources.
- Investigate the use of Conservation Tax Credits as a potential funding source to support replacement of residential outdoor turf with plants that use less water and efficient outdoor irrigation systems.
- Amend governing statutes to water providers that provides them specific authority to use P3s.
- ~~.~~ Explore broadening the statutory authority of the existing program to allow for the protection of watershed health, instream flow benefits, and alternative transfer methods to mitigate drying up agricultural lands.
    - Return remaining $123~~133~~ million in General Fund transfers back to the ~~Construction Fund and~~ Severance Tax Trust Fund. A total of $163 million was transferred from the Construction Fund and Severance Tax Trust Fund to the General Fund to help balance the State's budget from 2008-2011. To date, $40~~30~~ million has been returned.[38] These funds could be directed to various water projects, environmental and recreational projects, watershed and stream management, project management, and others.

Public-Private Partnerships (P3s~~) –)~~ Provide funding to create a State sponsored Center of Excellence, to research the pros and cons of P3's,~~P3s~~ and to develop a preliminary ~~model of a possible~~ water infrastructure P3 model. The Center of Excellence would be a centralized clearing house for water providers or entities to talk with experts in the field and to obtain information on working P3 models. Based on their expertise, the basin roundtables, in association with the WSRA process, should assist with this discussion to provide guidance to project proponents on the potential value of P3s for specific project/s being considered.

In general,~~.~~ P3s have the potential to reduce both capital investment and risk, while drawing on the respective strengths inherent of~~to~~ both the public and private sectors. Nevertheless ~~However~~, care must be taken to achieve an appropriate balance among~~between~~ public and private resources, costs, control, and long-term revenue streams. Lessons can be learned from the transportation sector, which used public-private funding for a toll road, and factors such as social perception, the interaction of state and private contracting policies, ratepayer concerns, and long-term sustainability of the partnership highlight the challenges and opportunities faced by P3s. P3's can offer a considerable amount of working capital, which~~,~~ in certain circumstances, can accelerate the delivery of costly, technically complex projects.[39]

State Repayment Guarantee Fund – For larger water projects that have many participating entities, it has proven difficult to develop an overall project financing package that equitably

distributes risk and repayment. Smaller participating entities with lower credit ratings, minimal revenue streams and service areas, can create a disincentive for larger water providers to participate in a bundled financing package for the project, given they would be subjected to higher interest rates, repayment, and risk. To address this problem the State could develop a Repayment Guarantee Fund that would act as overall repayment guarantee to the financial entity that is issuing the bond for the project. This State managed repayment guarantee would reduce the level of risk to the lender and participating entities, while providing a mechanism for smaller water providers to participate in regional water distribution/supply projects, without negatively affecting larger water providers.

The CWCB and the Statewide Water Investment Funding Committee would recommend that this fund be develop with a starting balance of $300 million. Lenders typically require a 10 percent repayment guarantee on a bond issuance, which would therefore support $3 billion in water project construction. Given that the amount of repayment guarantee diminishes over time once bonds are issued, those funds that are no longer needed to guarantee repayment on the original total bond amount, could then be reinvested into other needed environmental programs.

Impact Investment Capital (Green Bonds) – If a State Repayment Guarantee Fund is successfully developed, it could potentially support $3 billion in water infrastructure projects throughout the State. To assist in providing funding for environment and recreational projects that may or may not be attached to a specific water infrastructure project, it is recommended that the CWCB work with specific environmental groups to secure private capital through the issuance of bonds (Green Bonds), to provide meaningful, immediate funding for environmental and recreation projects throughout the State. The Green Bonds could be issued in incremental amounts over time to support projects that have been identified previously, which would minimize debt investment return costs under one large bond issuance. In summary, only issue bonds that can actually be spend in a specified time frame. The CWCB recommends that these funds be managed and disbursed through the CWCB's Watershed Restoration Program, requiring substantial reorganization of that program.

The long term obligation and repayment of the Green Bonds could come from a combination of revenues from the CWCB's Severance Tax Perpetual Fund, or public initiative, as further discussed below.

State Referendum – ~~–~~Any taxpayer-supported effort and accompanying long-term debt needs to be approached with care and consideration. There should be a clear and concise reason for the need, a comprehensive plan for how and where the funds will be expended, defined oversight and accountability, and a plan that addresses the ~~problem~~ long-term challenges.

In 2003, the Coloradans voted on Colorado Water Projects Referendum A, a ballot initiative that would have allowed the CWCB to borrow up to $2 billion by issuing bonds to construct water projects throughout the state. This ballot initiative was soundly defeated with 67 percent against and 33 percent in favor. Though Referendum A was initiated to resolve a long-term water challenges~~problem~~ in the state, it was not accompanied by a comprehensive plan outlining how to

address that challengeproblem, a quantification of the magnitude of financial need, or where and how the money would be spent.

Since 2003, a substantialsignificant amount of time and resources have gone into developing a comprehensive overview of the state's current and long-term water needs. In 2005, HB 1177 was passed creating the Inner Basin Compact Committee, the basin roundtables, and the WSRA. In 2010, the State completed the SWSIStatewide Water Supply Initiative Study (SWSI) that provided a detailed assessment of the state's current and future water needs. In 2011, the Colorado River Water Availability Study (CRWAS) was completed, and in 2015 the basinsthis year, initial drafts of the BIPs were completed the BIPs, which identified basin-specific needs, and projects and methods.

The development of the BIPs provides an excellent road map of what the State needs to accomplish to address its long-term water supply needs. It is the result of decades of discussion, debate, and collaboration among water users, providers, and the Colorado General Assembly. The BIPs, with prioritization and refinement, could provide the necessary framework to attach to state referendum funding. A State Referendum could generate hundreds of millions of dollars per year, phased over a defined period, generated from sale tax revenues, income tax, etc. The funds could reside in a statewide water investment fund that would be distributed either as a loan, grant or combination of the two, managed and disbursed through the CWCB. A portion of the funds could also be reserved as repayment guarantees for water providers seeking bonds. The basin roundtable or IBCC duties could be expanded to serve as the initial review entity, with projects then referred on to CWCB for final review and approval. The policy developed to manage and disburse money from this fund could include a zero-interest rate to market loans, security or repayment guarantees on bonds, environmental and recreational grants, permitting assistance, legal assistance, expanding funding levels for existing programs, etc. P&I returned to the fund would be invested in water projects or other areas of need within the state.

As a comparison, in 2013, the Texas Legislature authorized a transfer of $2 billion from the State's "Rainy Day Fund" to create a new loan program, later approved by Texas voters, to fund projects in the State Water Plan. This original investment in the State Water Implementation Fund for Texas (SWIFT) and the State Water Implementation Revenue Fund for Texas (SWIRFT) was designed to fund almost $27 billion in water supply projects over the next 50 years to ensure that Texas communities have adequate supplies of water during drought. Additionally, in November of 2014 the State of California approved Proposition No. 1, which allows the state to redirect $425 million in unsold bonds and sell $7.1 billion in additional bonds, for a total of $7.5 billion in general obligation bonds. The funds would be used to manage water supplies, protect and restore wetlands, improve water quality, and flood protection.

Mill Levy – In lieu of a statewide referendum, a more targeted approach could be taken to increase property taxes in those counties with large population bases along the front range, such as Adams, Arapahoe, Boulder, Denver, Douglas, El Paso, Jefferson, Weld, and Larimer Counties. These large population centers could be assessed an additional four4 to eight8 mills on their property taxes to provide critical water project funding in their area and to offset affectsimpacts to other areas. This could generate approximately an additional $215 million to $430 million dollars per year and reside in a water investment fund as described above.[40] For comparison, typical Fire

District revenues are based on 8 mills. This option might be better handled at local levels based on specific water provider needs within a specific service area.

Container Fee Ballot – –In 2010, two citizens filed a Ballot Initiative seeking a fee on beverages containers sold in Colorado. Unofficially captioned "Container Fee to Fund Water Preservation and Protection" by legislative staff for tracking purposes, the initiative was heard by the Ballot Title Setting Board in April of 2010. The initiative title for the ballot was appealed to the Supreme Court on the basis that by naming the basin roundtables specifically the initiative was not a single subject. The Supreme Court granted the appeal and the initiative was dropped. This initiative has merit and should be reevaluated. It was estimated in 2010 that this initiative could generate in excess of $100 million per year and could go directly for water projects, environmental and recreational projects, and stream and watershed management efforts throughout the state.[41] It is an initiative that could help offset the negative environmental impact of plastic containers (i.e., bottled water). If the Container Fee Ballot were successful, it would play a key role in moving many of the funding issues identified in this Section forward.

Actions

According to studies by the Environmental Protection Agency (EPA), the Congressional Budget Office, and the Water Infrastructure Network, the cost of addressing our nation's clean water infrastructure needs over the next 20 years could exceed $400 billion, which is roughly twice the current level of investment by all levels of government.[42] Colorado alone has nearly $20~~over $18~~ billion in identified water project needs, including water supply, environmental and recreational projects.[43].[44] There is no easy or inexpensive way to provide Coloradans~~Coloradoans~~ with a sustainable long-term water supply. The overarching goal is to provide clean, reliable water, at an affordable price, for many generations.

Action Summary:

Realistic, long term funding sources are essential to meeting the future water funding needs of the State. It cannot be assumed that existing programs and revenue streams are sufficient to address the long-term water supply and environmental needs of the state or to maintain existing water supply infrastructure. The following actions, as described below, could greatly assist in meeting the State's water funding needs over the next decade and assist in developing the necessary momentum in addressing the long term funding need of the State. The CWCB will work with the water investment funding committee to explore options to implement the following initiatives:

1. **Public funding sources:** Identify and determine a path to develop a new viable public source of funding, such as through a container fee ballot initiative to support a guarantee repayment fund, green bonds, and to provide additional support grants and loans for the water supply reserve account, education, alternative transfer methods, conservation, and agricultural viability.
2. **State repayment guarantee fund**: Establish a state repayment guarantee fund.
3. **Green bonds**: Develop issuance and repayment strategies needed to establish a green bond program to provide a funding source for large environmental and recreational projects.

4. **Water education and outreach:** Fund a water education and outreach grant program based on basin roundtable education action plans and the initiatives indicated in Colorado's Water Plan.
5. **WSRA**: Provide additional state account funds to the water supply reserve account program.
6. **Public-Private-Partnerships:** Modify Colorado's statutes to clearly allow for public private partnerships for water projects (§C.R.S. 43).
7. **Conservation:** Explore a tax credit for homeowners who install efficient outdoor landscapes and irrigation as part of the integrated funding plan.

Colorado's Water Plan identifies the following actions:

- The CWCB will work the water investment funding committee to develop a sustainable funding plan that integrates a guarantee repayment fund, green bonds, and additional support grants and loans for the water supply reserve account, education, alternative transfer methods, conservation, and agricultural viability.

The CWCB will assess~~Several financial "next steps" have been identified as part Colorado's Water Plan. These include the following:~~

- ~~Assess~~ funding needs across multiple sectors using the BIPs and other resources as guides~~a guide~~ (e.g., municipal, environmental, industrial, recreational, agricultural, conservation, education and outreach, among others).
- The CWCB will determine~~Determine~~ the economic benefits and effects~~impacts~~ of meeting or not meeting Colorado's future water needs.
- ~~The CWCB will work with the Encourage Colorado's~~ General Assembly and state agencies to align~~fund vacancies in DWR.~~
- ~~Align~~ state funding policies and promote coordination among state agencies to strategically support the values identified throughout Colorado's Water Plan, such as the need for multi-purpose and multi-partner projects and methods. The State will take the following actions ~~Options to consider include~~:
    - Develop a common grant inquiry process coordinated across funding agencies for environmental and recreational project proponents. This will include revisiting and reorganizing how the current State Funding Coordinators Meeting is conducted.~~proponent,~~
    - Review the CWCB's financial policies to consider providing financial incentives to move projects and methods forward and to assist small water providers in addressing upfront planning costs, such as reduced interest rate categories, extended terms (40 years), et al.
    - ~~Pursue additional funds Review and prioritize water projects identified in the BIPs, in coordination with the basin roundtable representatives, to develop a funding plan for those that could move forward. Based on the identified funding level, develop funding strategies that utilize existing and new funding sources to move high-priority projects forward in one to three years.~~

- ~~Investigate the potential to become a project beneficiary through an arranged partnership for projects that are multi-purpose, multi-partner, or those that incorporate public-private partnerships.~~
- ~~Identify and develop, in one to two years, a single multi-benefit, multi-partner, shared infrastructure pilot project that is funded through a joint revenue stream of public and private funding. From this pilot project develop the framework for how future water project P3s could move forward, considering best procurement practices, revenue streams, maintenance and operation, water administration and management, and others.~~
- ~~Create a water investment funding committee, made up of representatives from each basin, CWCB, the Authority, Executive Director's Office, large water providers, and the private sector, to evaluate the funding recommendations contained within CWP and others, to develop a well planned, phased approach to provide funding for water projects, environmental projects, recreational projects, and stream and watershed management throughout the state. This committee would meet over the course of 2015 and provide its recommendations to CWCB. Funding recommendations would be based on water project needs identified in the BIPs.~~
- ~~Work with State Engineer's Office to develop and fund a modern method to determine probable maximum precipitation for spillway sizing for dams in Colorado with the intent to provide additional storage while minimizing capital investment.~~
- ~~In years where there is a surplus in the Department of Natural Resource's severance tax operational account revenues, consider allocating all or a portion of them to address priority opportunities expressed in Colorado's Water Plan.~~

- ~~Explore near-term opportunities to increase funding resources:~~
  - ~~Develop preliminary support data for various public funding options, such as state referendums, individual county mill levy increases, the plastic container ballot initiative, or other potential funding mechanisms.~~
  - ~~Develop a draft policy on how a water investment (public tax) fund could be created, managed and disbursed.~~
  - ~~Investigate the pros and cons of developing a reserve fund that would act as a security or repayment guarantee by the State to water providers seeking bond funds through the Authority.~~
  - ~~Work with the appropriate people to evaluate the pros and cons of resurrecting the Container Fee Ballot.~~
  - ~~Reassess the Instream Flow Tax Credit program to determine how to make it more usable.~~
  - ~~Work with various stakeholders, Department of Real Estate, the Department of Revenue, and appropriate legislative committees to develop strategies to maximize the conservation tax credit program.~~
  - ~~Meet with Colorado Department of Revenue to discuss potential uses of Conservation Tax Credit revenues for stream and watershed restoration.~~
  - ~~Assess whether additional funds are needed~~ to support the Water Efficiency Grant Program, which provides financial incentives for implementing conservation

programs and planning for drought. Investigate expanding the authority of the program to provide grant funds to municipalities for documented water conservation/savings to help offset the economic impact of lost revenue because ofdue to reduced water usage. Develop funding recommendations.

- Assess whether there are additional loan opportunities for municipal conservation practices.
- Pursue funding Assess whether there is an opportunity to establish a water education and outreach grant program and develop recommendations on funding..
- Assess opportunities for additional Develop amended WSRA grant funds. As part of this, work to amend the WSRAFund guidelines on how any additional funding iscould be allocated, approved and disbursed. This could be an area where additional funding could be directed to prioritizeenvironmental and recreational projects that providedthroughout the greatest benefit to Coloradostate.
- Seek an amendment toDevelop draft amended statutory language to expand the CWCB's loan program's authority to fund treated provide funding for water supply, reuse, conservation, environmental, and recreationaltreatment projects and methods.
- Continue to provide $1 million annually to support stream management and watershed plans, and develop an established funding source.
- In partnership with the water investment funding committee, review and prioritize water projects identified in the BIPs, in coordination with the basin roundtable representatives, to develop a funding planother areas for those that could move forward. Based on the identified funding level, develop funding strategies that use existing and new funding sources to move high-priority projects forward in one to three years.
- Investigate the potential for the CWCB to become a project beneficiary through an arranged partnership for projects that are central to fulfilling the goals of Colorado's Water Plan.
- Identify and develop, in two years, a single multi-benefit, multi-partner, shared infrastructure pilot project that is funded through a joint revenue stream of public and private funding. From this pilot project develop the framework for how future water public-private partnership projects will move forward, considering best procurement practices, maintenance and operation, water administration and management, et al.
- Continue to use the water investment funding committee, made up of representatives from each basin, the CWCB, the Water and Power Authority, Executive Director's Office, large water providers, and the private sector, to evaluate the funding recommendations contained within Colorado's Water Plan and others, to develop a well planned, phased approach to provide funding for water projects, environmental projects, recreational projects, and stream and watershed management throughout the state. This committee met over the course of 2015 and will continue to meet to provide funding and implementation recommendations to the CWCB.

- Over the next year, continue to develop and fund a modern method to determine probable maximum precipitation for spillway sizing for dams in Colorado with the intent to provide additional storage while minimizing capital investment.
- Consider allocating all or a portion of any surplus in the Department of Natural Resource's severance tax operational account revenues, for efforts prioritized in Colorado's Water Plan.

- The State will explore near-term opportunities to increase funding resources by implementing the following actions:
  - Develop preliminary support data for various public funding options, such as state referendums, individual county mill levy increases, the insurance tax premiums, user fees, or other potential funding mechanisms.
  - Explore a Center of Excellence to create a working model of public-private-partnerships for water projects and methods.
  - Explore how a water investment (public tax) fund could be created, managed and disbursed.
  - Work with other applicable state agencies to develop a reserve fund that would act as a security or repayment guarantee by the State to water providers seeking bond funds through the Authority.
  - Explore the concept of a container fee ballot initiative.
  - Develop issuance and repayment strategies in issuing Green Bonds, as early as~~consideration in CWCB's~~ 2016, for environmental and recreational projects. It's recommended that Green Bonds be issued incrementally based on identified need to minimize repayment costs.
  - Reassess the Instream Flow Tax Credit program to determine how to make it more usable.
  - Work with various stakeholders, Department of Real Estate, the Department of Revenue, and appropriate legislative committees to develop strategies to maximize the conservation tax credit program.
  - Explore potential uses of Conservation Tax Credit revenues for stream and watershed restoration.
  - Explore with water providers the possibility of issuing a state tap fee for future taps installed statewide. Funds developed could be used to support the CWCB Water Efficiency Grant Program and/or water education. The amount assessed per tap would need to be determined based on the estimated number of new taps issued statewide and target revenue ~~Projects Bill~~.
  - Assess the funding opportunity from the Water Infrastructure Finance and Innovation Authority (WIFIA) and the Rural Infrastructure Fund for loans to rebuild aging water infrastructure. Encourage the U.S. Department of Transportation and other agencies to share lessons learned regarding innovative financing programs with the Corps and the EPA as they implement WIFIA.
  - Work collaboratively with foundations and nonprofits to support the environment, recreation, and education priorities through philanthropy.

1. In proposing innovative strategies to meet Colorado's existing and future water needs, the CWCB will continue to work collaboratively with local governments, recognizing the authority of the state's counties and municipalities in making water development and management decisions.

E. The State of Colorado will support strategies to maximize use of compact water while actively avoiding a Colorado River Compact deficit.

1. The CWCB will continue to support water banking efforts and prioritize the development of the programmatic approach as described over the next several years. This development will require extensive stakeholder participation and educational efforts statewide.
2. Future study and collaborative stakeholder input by the CWCB will gauge the potential for a programmatic approach to meet existing and future needs while maintaining equitable distribution of the reduced consumptive use. Multiple types of water use and locations on eastern and western slopes should share the burdens of demand management.
3. As the CWCB begins technical investigation of a potential collaborative program, a key issue to be resolved will be the potential scope of demand management: the greater the amount of existing uses to be covered by such a collaborative program, the greater the number of voluntary reductions and compensation that will be necessary.

9.2. Economics and Funding

Colorado's Water Plan coordinates existing funding sources and explores additional funding opportunities.

Introduction

Investing in the long-term sustainable supply and delivery of water is critical to Colorado's future. Even in robust economic times, the difficulties inherent in financing large, long-term and sustainable water projects can create community apprehension and political controversy.

Over the years, the CWCB has partnered with various water providers throughout Colorado to conserve, develop, and protect Colorado's water for future generations. The CWCB has provided funding through grants and loans for critical multi-purpose and multi-partner projects, such as the Chatfield Reallocation Project, the Animas-La Plata Project, the Rio Grande Cooperative Project, and the Elkhead Reservoir Enlargement Project. For these projects alone, the CWCB contributed over $200 million. These projects supplied over 100,000 acre–feet of water to help water providers meet their water supply and storage needs, while also improving stream health, promoting shared uses, sustaining agriculture, and providing long-term recreational benefits.[b] Financing long-term sustainable water supplies and infrastructure projects requires a collaborative effort involving

[b] Chatfield Reallocation Project ($62 million CWCB Investment - $80 million Loans), Animas- La Plata Project ($37 million Water Purchase) Rio Grande Cooperative Project ($5 million Grant – $15 million Loan/Grant), and Elkhead Enlargement Project ($11 million)

water users and providers, as well as federal, state, and local entities. Colorado will need to secure funding to meet water demands in the long-term through a combination of constructive legislation, partnerships, and state and federal grant and loan programs. It is the CWCB's intent to promote, and potentially support financially and politically, projects that evaluate water supply, storage, and conservation efforts from a regional, multi-purpose, multi-partner, multi-benefit basis and projects that evaluate the consolidation of services where practical, feasible and acceptable. This section provides: 1) a description of existing financial need; 2) an overview of financial assistance programs; and 3) recommendations and suggested approaches to develop an integrated water infrastructure financing model that could assist in addressing Colorado's short and long-term water needs.

Statewide Water Infrastructure Financing Need

The BIPs for the major river basins within the state are a critical component of Colorado's Water Plan. In general, each BIP looked at balancing long-term municipal, industrial, agricultural, environmental, and recreational needs within the respective basins, and among basins. As part of the BIPs, the basin roundtables identified a list of projects and methods they believe address the long-term needs of their basin. An initial summary of the costs identified in the BIP's is included in Table 9.2-1. It needs to be emphasized that at this time the vast majority of projects identified did not have costs associated with them. In addition to these projects, the BIPs include other activities that require financial support including education, outreach, conservation programs, flow agreements, alternative agricultural transfer methods, important legal investigations, and programs that manage various risks and vulnerabilities throughout the state.

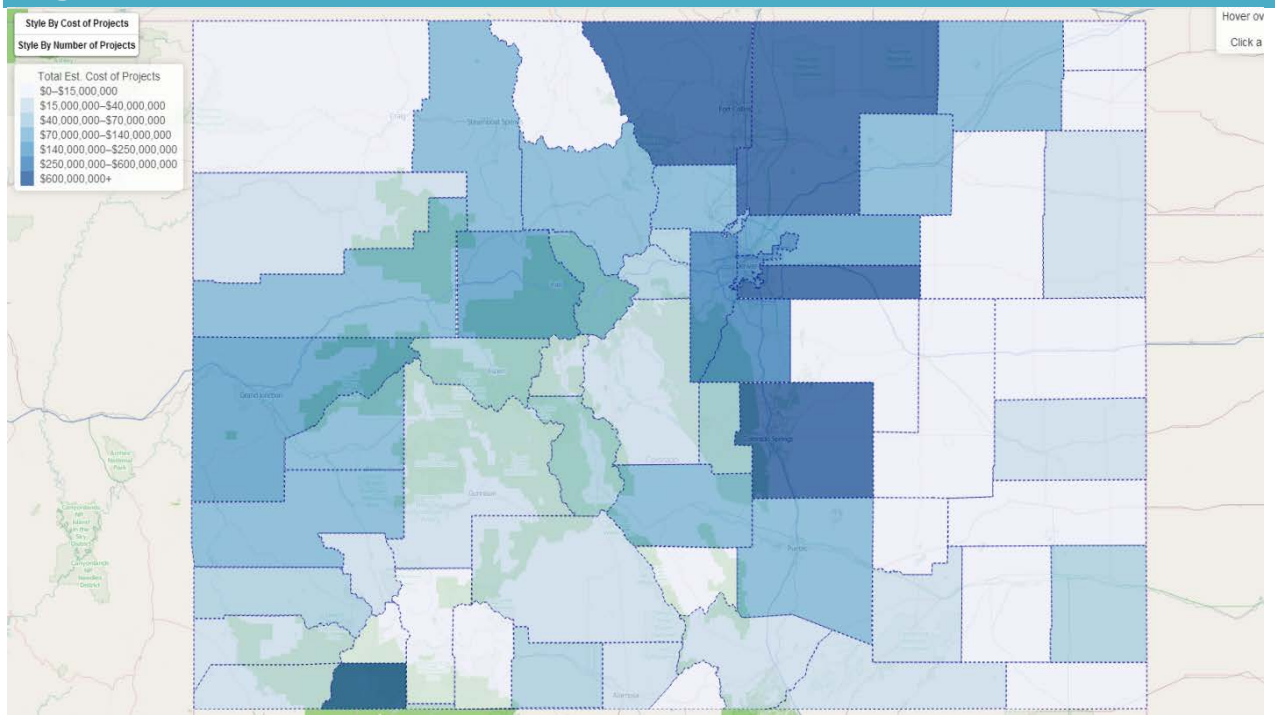
Table 9.2-1: Project Costs Identified in the Basin Implementation Plans*

Basin	Single purpose projects & methods			Multi-purpose projects	Total
	Env., rec., or water quality	Municipal & industrial	Agricultural		
Arkansas	$30,000	$20,000,000		$65,000,000	**$85,000,000**
Colorado	$1,500,000	$4,000,000		$132,000,000	**$137,000,000**
Gunnison	$8,000,000	$46,000,000	$9,000,000	$423,000,000	**$486,000,000**
North Platte	*Forthcoming*	*Forthcoming*	*Forthcoming*	*Forthcoming*	***Forthcoming***
Rio Grande	*Forthcoming*	*Forthcoming*	$80,000	$130,000,000	**$131,000,000**
South Platte / Metro	*Forthcoming*	*Forthcoming*	*Forthcoming*	*Forthcoming*	***Forthcoming***
Southwest	$60,000,000	*Forthcoming*	*Forthcoming*	*Forthcoming*	**$60,000,000**
Yampa/White/Green	$5,000,000	*Forthcoming*	*Forthcoming*	*Forthcoming*	**$5,000,000**
TOTAL	**$74,530,000**	**$70,000,000**	**$9,080,000**	**$750,000,000**	**$904,000,000**
Percent of total	**8%**	**8%**	**1%**	**83%**	

* Most identified projects did not have associated costs. Therefore, additional cost estimating and refinement of existing project costs will be forthcoming to develop an overall statewide summary of water project funding needs. Costs were rounded to three significant figures.

The Statewide Water Supply Initiative (SWSI) estimated that between $17 billion and $19 billion will be needed for municipal and industrial water infrastructure improvements by 2050.[7, c] In addition, approximately $150,000 is needed per mile of stream for smaller scale river restoration work, but could cost $240,000 or even $500,000 per mile for substantial structural changes or channel reconfiguration.[8] To better determine the amount of river restoration work and other similar types of work that may be required; up to 90 watershed or stream management plans are necessary at an estimated cost of $18 million statewide.[9] As basins and stakeholders identify their environmental and recreational needs, further projects and methods will need to be developed and funded to meet those needs. For planning purposes, however, one could estimate a $2 billion to $3 billion environmental and recreational statewide need or approximately 10 to 15 percent of the municipal and industrial water infrastructure cost estimates. Additionally, the long term funding to support the sustainability of agriculture will need to be developed based on further identification of projects and methods. Funding for agriculture should not only include legal and engineering support alternatives to reduce agricultural dry-up, but also water infrastructure to deliver water from agricultural areas to urban areas on a shared basis.

Figure 9.2-1: Estimated Near-Term Infrastructure Need[10]



Further refinement and identification of water infrastructure financial needs through the BIP process will be required as we move forward. The CWCB will review the results of these efforts to develop a list of project priorities. The criteria for a priority project include funding, if it is

[c] This number is based on an estimated $14 billion to 16 billion of identified M&I needs calculated in the Portfolio and Trade-off tool (CWCB, 2011), plus an additional $3 billion estimated need for maintaining existing M&I infrastructure. The numbers, however, are being refined based off the BIPs.

multiple-purpose, if it has multiple partners, or if it provides multiple benefits, and is regional in nature. The CWCB will identify projects that have the potential to move forward quickly, have cross-basin and statewide benefits, and have a possible funding plan. This is discussed further in Section 9.2.4.

Note that estimated overall funding needs of approximately $20 billion is associated with meeting the municipal and industrial (M&I) gap and maintaining current infrastructure. Specifically, these funds would support:

1. The Identified Projects and Processes (IPP) identified in the SWSI,
2. Short and long term maintenance needs of existing water delivery systems,
3. Alternatives to agricultural transfers
4. Active water conservation.

Additionally, financial support is needed to address environment and recreational needs throughout the State and to support agricultural viability. Treated water projects, such as drinking water treatment and distribution as well as waste water treatment, is not included in this number.

Economics

When Colorado's land, labor, and capital combine with available water, the result is economic prosperity and opportunity. Managing water operations is challenging because of the wide variation in supply and demand. Water providers need to ensure the delivery of quality water to all customers as demand rises and falls at a cost that people can afford and are willing to pay. Water is also extremely mobile and by the nature of its physical properties can move around in streams, seep into soils, move underground, evaporate, be stored in reservoirs or even bottled and transported. The inherent consequence of mobility is that there can be many sequential uses from the same molecule of water since it is rarely consumed fully by a particular user and what is left is available for other uses. To expand even further, another critical feature of water is the overall variability of where it is located, the quality, quantity, and for what duration. Colorado is a perfect example of the mobility of water, given that 89 percent of its population resides east of the continental divide, yet 70 percent of the state's water supply originates west of the continental divide.[11]

Water can be considered both a private and public good, which makes it difficult to assess its economic value. Water is capital–intensive when compared to other public utilities such as natural gas or electricity, given its weight, viscosity, and volume.[12] The public perceives water as an affordable, accessible, and continually available resource.[13] On average, most families pay less than one percent of their household income for water, so they do not understand the true cost of water when compared to other living expenses, such a fuel, electricity, food, etc.[14, d] Twelve ounces of bottled water at the store costs $1.00, but tap water that is treated and delivered across Colorado to

[d] Colorado average household income, 2008 to 2012 = $58,224. Based on 9,000 gallon monthly household water use (108,000 gallons/yr.) and inside city limit use, Denver - $35/month, Longmont - $22.50/mo, and Ute Water Conservancy District - $42.00 monthly billing rate. Average of three entities = $33/month water bill.

a house costs approximately $3.00 per one thousand gallons.[15] This lack of awareness of the true cost of water could be either an issue with what the public is willing to pay or a learned response to the apparent low cost that consumers have historically paid for treated water delivered to their homes. With the current demand and future increased demands on water supplies, it is important to focus on education. Water users need to be aware of the true costs inherent in providing water.

State Funding Resources and Other Funding Opportunities

Current Funding Opportunities

Though the statewide funding needs for both the consumptive and non-consumptive water projects is substantial, a planned, phased approach with existing and potential alternate funding sources could address a majority, if not all of the state's needs, depending on how aggressive and successful the approach is. The State recognizes that water providers are in control of their own short- and long-term capital investments, operation and maintenance costs, and customer base. Therefore, use rates and tap fees could be the primary source of funding where the end user is directly connected with the costs and investment. There are opportunities, however, when broader public interests are in play, where combining financial resources and infrastructure can solve complex water supply challenges and accelerate the construction of a project. The Water Infrastructure and Supply Efficiency (WISE) Project is a perfect example where several entities, including South Metro Water Supply Authority members, Denver Water, Aurora, and the CWCB, shared infrastructure, water, and financing to provide critical renewable water to offset well usage in Douglas County.[16]

There are many existing State funding sources or programs that can assist in meeting the state's long-term water infrastructure needs. These include: the CWCB Water Project Loan Program, the CWCB's Water Supply Reserve Account (WSRA) Fund, the Species Conservation Trust Fund, Non-consumptive funding programs as identified in SWSI 2010 Non-consumptive Toolbox, and the Water Resources and Power Development Authority's (Authority) Water Revenue Bond Program (WRBP). Though these programs cannot solely meet the financial water needs of the state, they can assist in bridging funding gaps when combined with other funding sources.

The CWCB Water Project Loan Program

Recognizing the importance of funding raw water projects, the Colorado General Assembly, in 1971 created the Water Project Loan Program, which is comprised of two funds: the Construction Fund and the Severance Tax Trust Fund: codified at section 37-60-120 in the Colorado Revised Statutes.[17] Annual revenues to the Construction Fund come from principal and interest (P&I) on existing loans and a portion of Federal Mineral Lease revenues that are paid to the State. Approximately $18 million to $20 million is available annually for water project loans from this fund.[18] In addition to the Construction Fund, in 1995, the Severance Tax Trust Fund was created under section 39-29-109, which directs 25 percent of the State's severance tax revenues into this fund, which is currently capped at $50 million annually.[19] Annual severance tax revenues provided to the CWCB range from $20 million to $50 million.[20] A portion of available Severance Tax Trust Fund revenues could be directed to assist in meeting investment return obligations on impact bonds issued in support of environmental and recreation needs throughout the State.

The Water Project Loan Program has, on average, between $50 million and $60 million available annually for loans for various water projects throughout the state. The combined fund equity from the Construction Fund and Severance Tax Trust Fund exceeds $700 million.[21]

Water Supply Reserve Account (WSRA)
This state grant program provides funding at the local basin level to address a variety of short- and long-term water needs. Current funding level is capped at $10 million annually, which is split between the Statewide and Basin Accounts. Funding comes from annual severance tax revenues to the State, and has varied from $5.7 million to $10 million annually.[22] This Program has distributed over $40 million in grant funds to date for a variety of water related studies and projects.[23]

The WSRA roundtables process has proven to be a grassroots platform for engaging local basin, regional, and cross-basin discussions on water issues. Continued support and additional funding should be considered to maintain and enhance this successful program. The existing process and structure of how the WSRA grant funds are distributed from the basin and statewide accounts should be re-evaluated to encourage multi-benefit and multi-partnering projects, and to promote planning and technical support to smaller communities and water providers. A collaborative, regional approach should always be encouraged and considered in the planning process for projects that are funded through this program.

Watershed Restoration Program
The CWCB's Watershed Restoration Program provides grants for watershed/stream restoration and flood mitigation projects throughout the State. Over the years it has leveraged substantial outside entity dollars to promote watershed health. It has had an annual funding allocation of $250,000, but has recently seen a substantial increase in funding, because of legislation approved for phreatophyte control and flood and fire mitigation. The 2015 CWCB Projects Bill also approved an additional $1 million in funding for this program to assist with funding stream management plans, as discussed in Section 6.6. If additional revenues sources were successfully developed to support environmental and recreational projects, this program could serve as the program to managed and disburse those funds.

Species Conservation Trust Fund
The Native Species Conservation Trust Fund was created in 1998, pursuant to HB98-1006. This fund is used by the CWCB and Colorado Parks and Wildlife (CPW) for programs associated with: recovering species listed as threatened and endangered under state law; recovering and protecting federal candidate species; conducting scientific studies related to the listing or delisting of any species; and evaluating genetic, habitat and declining species baseline data. The Species Conservation Trust Fund authorizes millions of dollars of work by the CWCB and CPW each year, and this authorization occurs through the annual Species Conservation Trust Fund legislation.

Water Resources and Power and Development Authority (Authority)
The Authority is a quasi-governmental organization created by section 37-95-101 in the Colorado Revised Statutes to provide low-cost financing for water and wastewater related infrastructure projects to municipalities and special districts. The Authority has four main financing programs: the

Drinking Water Revolving Fund, the Water Pollution Control Revolving Fund (WPCRF), the Small Hydropower Loan Program, and the Water Revenue Bond Program (WRBP).[24]

The WRBP provides funds up to $500 million for individual projects, without legislative review, to public entities for water and wastewater projects. The Authority's WRBP rates are consistent with private municipal bond market rates, with the distinction being that they provide bond issuance subsidies, up to a total of $250,000, for each of up to four projects in any given year. Note that the WRBP can provide funding well above $500 million with legislative approval.[25]

The Drinking Water Revolving Fund and the WPCRF are both part of the State Revolving Funds, which are operated in every state. These funds are primarily used for water quality projects, and are capitalized by state and federal funds whereby states contribute 20 cents for every federal dollar. These funds are often used to leverage other funds through the issuance of municipal bonds.

The Small Hydropower Loan Program is a joint program operated in coordination with the CWCB. Loans from this program are limited to up to $2 million per governmental agency, for eligible projects of five megawatts or less.[26] Agencies seeking more than the first $2 million available through the Authority can apply through the CWCB.

Grant Programs

The CWCB also offers many grant programs for various water related efforts, such as water efficiency, alternatives to agricultural transfers, emergency drought response, phreatophyte control, and others. Annual combined funding for these various grant programs is in excess of $4 million.[27] A list of these various grant programs can be found here.

A list of federal, state and private funding opportunities for environmental and recreational needs can be found in the Nonconsumptive Toolbox.[28] The total amount of funds available from state resources that are dedicated to these efforts on an annual basis is approximately $11 million.[29] Some of these funds are extremely competitive, while others are hard to qualify for, and are therefore not fully utilized.

There are currently limited funding sources available for education, outreach, environmental resources, recreation, and other important water related activities that do not involve construction of projects. Though these efforts have strong support from non-governmental organizations, they are typically funded through charitable donations, as opposed to tax revenue. Additionally, much of this type of work has been funded through the WSRA program, which requires approval by the basin roundtables and the CWCB. Therefore, it may be necessary to identify additional funding sources to fully meet the environmental and recreational water needs in the state.

CWCB Program Overview

Initial estimates suggest that municipalities will primarily need state, federal, or bond market loans to fund their projects. Over the next 35 years, based on current funding levels, the state expects to have nearly $2 billion available in CWCB loans for municipal, industrial and agricultural projects.[30] Compared to the statewide water infrastructure financing needs discussed above, this amount suggests a potential public financing gap. To support innovative water projects, such as multi-use, alternative agricultural transfers, or a new transmountain diversion with a sufficient back-up

supply on the eastern slope, combined with substantial environmental and recreational enhancements that meet the criteria of the Interbasin Compact Committee (IBCC), consensus and additional state funds may be necessary. Environmental and recreational projects primarily rely on grants for financial support, since those projects are not typically ratepayer supported. Current capacity to fund environmental and recreational projects and methods over the next 35 years is $385 million, based on current funding levels.[31] This suggests that it may be difficult to fund projects that promote environmental and recreational interests. Beyond the CWCB loan programs, an additional $490 million is available from the WSRA and another grant programs for meeting future needs.[32]

Federal Funding Options

Federal funding options are also a potential source for meeting financial needs. For scientific and research-based projects, the Bureau of Reclamation's (BOR) WaterSMART program, managed through Landscape Conservation Cooperatives, has funded several programs throughout the region. For certain agricultural efficiency projects, the Colorado River Basin Salinity Control Forum has brought a substantial amount of federal funding to Colorado, aimed at improving the water quality of the Colorado River.

In addition, the Upper Colorado River Basin Fund is a federal fund comprised of funds appropriated from the U.S. Treasury for capital projects, as well as proceeds from the sale of hydroelectric power, transmission services and M&I water service sales. The Basin Fund is used to fund important work associated with the Salinity Control Forum, the Upper Colorado River Basin and San Juan River Basin Endangered Fish Recovery Implementation Programs, and the Glen Canyon Dam Adaptive Management Working Group. These programs are described throughout Colorado's Water Plan. In addition, in 2011, the Upper Division Colorado River Basin States (Colorado, Wyoming, Utah, and New Mexico), BOR, the United States Department of Energy Western Area Power Administration, and the Colorado River Energy Distributors Association signed a memorandum of agreement (MOA) that authorizes the use of the Basin Fund to further the purposes of the 1956 Colorado River Storage Project (CRSP) Act (Public Law 485) through fiscal year 2025. This MOA authorized additional uses for operational and maintenance on CRSP facilities, among other specified purposes, and provides more than $5 million for the CWCB to direct toward CRSP operation and maintenance activities.

Potential Future Funding Opportunities

Many stakeholder efforts, such as the IBCC, environmental groups, and the recently created Statewide Water Investment Funding Committee, have explored other avenues of funding to meet Colorado's future water needs. The IBCC explored several financial options in the no-and-low-regrets Action Plan listed below:[33]

- A federal/state partnership similar to the Central Arizona Project,
- A state water project similar to the California State Water Project,
- A state/local partnership in which the state facilitates the project, but the end-users finance and manage it,
- A public/private partnership similar to those used to build transportation projects (e.g., E 470),

- Enactment of a "water" mill levy (the assessed property tax rate used to raise revenue),
- Additional bonding authority for the State of Colorado,
- Severance tax increases,
- A statewide sales tax,
- Federal loan guarantees,
- Expanded authority of Great Outdoors Colorado funding,
- Specific Farm Bill initiatives that appropriate funds for enhancing agricultural operations while supporting nonconsumptive needs,
- Regional taxing,
- Statewide user fee,
- Statewide tax on internet-based transactions, and
- Debt financing (debt backed by existing or newly created revenue source).

In addition, The Nature Conservancy, Colorado Chapter and the Tamarisk Coalition also assessed funding sources for environmental needs.[34] When additional funding sources are needed, some potential investment opportunities are:

Productive Legislation – Water providers, the CWCB's recently created Statewide Water Investment Funding Committee, elected officials, and community leaders can work to develop productive legislation to create effective and efficient funding processes that will maximize the use of water within the state. Some specific examples that could be considered include:

- Removal of Federal Mineral Lease and Severance Tax Fund cap limits, which could generate an additional $10 million per year.
- Increase the funding cap to the WSRA Grant Program account, currently limited to $10 million per year. Adding an additional $10 million could greatly assist in meeting environmental and recreational funding needs.
- Investigate extending instream flow tax credits for water rights donations to the instream flow program beyond 2015.[35]
- Expand the CWCB's authority to improve the management and distribution of existing funds, enabling the CWCB to fund treated water facilities could alleviate gaps in funding raw water projects with treated components that are not funded by other sources.
- Investigate the use of Conservation Tax Credits as a potential funding source to support replacement of residential outdoor turf with plants that use less water and efficient outdoor irrigation systems.
- Amend governing statutes to water providers that provides them specific authority to use P3s.
- Explore broadening the statutory authority of the existing program to allow for the protection of watershed health, instream flow benefits, and alternative transfer methods to mitigate drying up agricultural lands.
- Return remaining $123 million in General Fund transfers back to the Severance Tax Trust Fund. A total of $163 million was transferred from the Construction Fund and Severance Tax Trust Fund to the General Fund to help balance the State's budget from 2008-2011. To

date, $40 million has been returned.[36] These funds could be directed to various water projects, environmental and recreational projects, watershed and stream management, project management, and others.

Public-Private Partnerships (P3s) – Provide funding to create a State sponsored Center of Excellence, to research the pros and cons of P3s, and to develop a preliminary water infrastructure P3 model. The Center of Excellence would be a centralized clearing house for water providers or entities to talk with experts in the field and to obtain information on working P3 models. Based on their expertise, the basin roundtables, in association with the WSRA process, should assist with this discussion to provide guidance to project proponents on the potential value of P3s for specific project/s being considered.

In general, P3s have the potential to reduce both capital investment and risk, while drawing on the respective strengths inherent of both the public and private sectors. Nevertheless, care must be taken to achieve an appropriate balance among public and private resources, costs, control, and long-term revenue streams. Lessons can be learned from the transportation sector, which used public-private funding for a toll road, and factors such as social perception, the interaction of state and private contracting policies, ratepayer concerns, and long-term sustainability of the partnership highlight the challenges and opportunities faced by P3s. P3s can offer a considerable amount of working capital, which in certain circumstances, can accelerate the delivery of costly, technically complex projects.[37]

State Repayment Guarantee Fund – For larger water projects that have many participating entities, it has proven difficult to develop an overall project financing package that equitably distributes risk and repayment. Smaller participating entities with lower credit ratings, minimal revenue streams and service areas, can create a disincentive for larger water providers to participate in a bundled financing package for the project, given they would be subjected to higher interest rates, repayment, and risk. To address this problem the State could develop a Repayment Guarantee Fund that would act as overall repayment guarantee to the financial entity that is issuing the bond for the project. This State managed repayment guarantee would reduce the level of risk to the lender and participating entities, while providing a mechanism for smaller water providers to participate in regional water distribution/supply projects, without negatively affecting larger water providers.

The CWCB and the Statewide Water Investment Funding Committee would recommend that this fund be develop with a starting balance of $300 million. Lenders typically require a 10 percent repayment guarantee on a bond issuance, which would therefore support $3 billion in water project construction. Given that the amount of repayment guarantee diminishes over time once bonds are issued, those funds that are no longer needed to guarantee repayment on the original total bond amount, could then be reinvested into other needed environmental programs.

Impact Investment Capital (Green Bonds) – If a State Repayment Guarantee Fund is successfully developed, it could potentially support $3 billion in water infrastructure projects throughout the State. To assist in providing funding for environment and recreational projects that may or may not be attached to a specific water infrastructure project, it is recommended that the CWCB work with

specific environmental groups to secure private capital through the issuance of bonds (Green Bonds), to provide meaningful, immediate funding for environmental and recreation projects throughout the State. The Green Bonds could be issued in incremental amounts over time to support projects that have been identified previously, which would minimize debt investment return costs under one large bond issuance. In summary, only issue bonds that can actually be spend in a specified time frame. The CWCB recommends that these funds be managed and disbursed through the CWCB's Watershed Restoration Program, requiring substantial reorganization of that program.

The long term obligation and repayment of the Green Bonds could come from a combination of revenues from the CWCB's Severance Tax Perpetual Fund, or public initiative, as further discussed below.

State Referendum – Any taxpayer-supported effort and accompanying long-term debt needs to be approached with care and consideration. There should be a clear and concise reason for the need, a comprehensive plan for how and where the funds will be expended, defined oversight and accountability, and a plan that addresses the long-term challenges.

In 2003, the Coloradans voted on Colorado Water Projects Referendum A, a ballot initiative that would have allowed the CWCB to borrow up to $2 billion by issuing bonds to construct water projects throughout the state. This ballot initiative was soundly defeated with 67 percent against and 33 percent in favor. Though Referendum A was initiated to resolve a long-term water challenges in the state, it was not accompanied by a comprehensive plan outlining how to address that challenge, a quantification of the magnitude of financial need, or where and how the money would be spent.

Since 2003, a substantial amount of time and resources have gone into developing a comprehensive overview of the state's current and long-term water needs. In 2005, HB 1177 was passed creating the Inner Basin Compact Committee, the basin roundtables, and the WSRA. In 2010, the State completed the SWSI that provided a detailed assessment of the state's current and future water needs. In 2011, the Colorado River Water Availability Study (CRWAS) was completed, and in 2015 the basins completed the BIPs, which identified basin-specific needs, and projects and methods.

The development of the BIPs provides an excellent road map of what the State needs to accomplish to address its long-term water supply needs. It is the result of decades of discussion, debate, and collaboration among water users, providers, and the Colorado General Assembly. The BIPs, with prioritization and refinement, could provide the necessary framework to attach to state referendum funding. A State Referendum could generate hundreds of millions of dollars per year, phased over a defined period, generated from sale tax revenues, income tax, etc. The funds could reside in a statewide water investment fund that would be distributed either as a loan, grant or combination of the two, managed and disbursed through the CWCB. A portion of the funds could also be reserved as repayment guarantees for water providers seeking bonds. The policy developed to manage and disburse money from this fund could include a zero-interest rate to market loans, security or repayment guarantees on bonds, environmental and recreational grants, permitting assistance,

legal assistance, expanding funding levels for existing programs, etc. P&I returned to the fund would be invested in water projects or other areas of need within the state.

As a comparison, in 2013, the Texas Legislature authorized a transfer of $2 billion from the State's "Rainy Day Fund" to create a new loan program, later approved by Texas voters, to fund projects in the State Water Plan. This original investment in the State Water Implementation Fund for Texas (SWIFT) and the State Water Implementation Revenue Fund for Texas (SWIRFT) was designed to fund almost $27 billion in water supply projects over the next 50 years to ensure that Texas communities have adequate supplies of water during drought. Additionally, in November of 2014 the State of California approved Proposition No. 1, which allows the state to redirect $425 million in unsold bonds and sell $7.1 billion in additional bonds, for a total of $7.5 billion in general obligation bonds. The funds would be used to manage water supplies, protect and restore wetlands, improve water quality, and flood protection.

Mill Levy – In lieu of a statewide referendum, a more targeted approach could be taken to increase property taxes in those counties with large population bases along the front range, such as Adams, Arapahoe, Boulder, Denver, Douglas, El Paso, Jefferson, Weld, and Larimer Counties. These large population centers could be assessed an additional four to eight mills on their property taxes to provide critical water project funding in their area and to offset affects to other areas. This could generate approximately an additional $215 million to $430 million dollars per year and reside in a water investment fund as described above.[38] For comparison, typical Fire District revenues are based on 8 mills. This option might be better handled at local levels based on specific water provider needs within a specific service area.

Container Fee Ballot – In 2010, two citizens filed a Ballot Initiative seeking a fee on beverages containers sold in Colorado. Unofficially captioned "Container Fee to Fund Water Preservation and Protection" by legislative staff for tracking purposes, the initiative was heard by the Ballot Title Setting Board in April of 2010. The initiative title for the ballot was appealed to the Supreme Court on the basis that by naming the basin roundtables specifically the initiative was not a single subject. The Supreme Court granted the appeal and the initiative was dropped. This initiative has merit and should be reevaluated. It was estimated in 2010 that this initiative could generate in excess of $100 million per year and could go directly for water projects, environmental and recreational projects, and stream and watershed management efforts throughout the state.[39] It is an initiative that could help offset the negative environmental impact of plastic containers (i.e., bottled water). If the Container Fee Ballot were successful, it would play a key role in moving many of the funding issues identified in this Section forward.

Actions

According to studies by the Environmental Protection Agency (EPA), the Congressional Budget Office, and the Water Infrastructure Network, the cost of addressing our nation's clean water infrastructure needs over the next 20 years could exceed $400 billion, which is roughly twice the current level of investment by all levels of government.[40] Colorado alone has nearly $20 billion in identified water project needs, including water supply, environmental and recreational projects.[41] There is no easy or inexpensive way to provide Coloradans with a sustainable long-term water

supply. The overarching goal is to provide clean, reliable water, at an affordable price, for many generations.

Action Summary:
Realistic, long term funding sources are essential to meeting the future water funding needs of the State. It cannot be assumed that existing programs and revenue streams are sufficient to address the long-term water supply and environmental needs of the state or to maintain existing water supply infrastructure. The following actions, as described below, could greatly assist in meeting the State's water funding needs over the next decade and assist in developing the necessary momentum in addressing the long term funding need of the State. The CWCB will work with the water investment funding committee to explore options to implement the following initiatives:

1. **Public funding sources:** Identify and determine a path to develop a new viable public source of funding, such as through a container fee ballot initiative to support a guarantee repayment fund, green bonds, and to provide additional support grants and loans for the water supply reserve account, education, alternative transfer methods, conservation, and agricultural viability.
2. **State repayment guarantee fund**: Establish a state repayment guarantee fund.
3. **Green bonds**: Develop issuance and repayment strategies needed to establish a green bond program to provide a funding source for large environmental and recreational projects.
4. **Water education and outreach:** Fund a water education and outreach grant program based on basin roundtable education action plans and the initiatives indicated in Colorado's Water Plan.
5. **WSRA**: Provide additional state account funds to the water supply reserve account program.
6. **Public-Private-Partnerships:** Modify Colorado's statutes to clearly allow for public private partnerships for water projects (§C.R.S. 43).
7. **Conservation:** Explore a tax credit for homeowners who install efficient outdoor landscapes and irrigation as part of the integrated funding plan.

Colorado's Water Plan identifies the following actions:

1. The CWCB will work the water investment funding committee to develop a sustainable funding plan that integrates a guarantee repayment fund, green bonds, and additional support grants and loans for the water supply reserve account, education, alternative transfer methods, conservation, and agricultural viability.
2. The CWCB will assess funding needs across multiple sectors using the BIPs and other resources as guides (e.g., municipal, environmental, industrial, recreational, agricultural, conservation, education and outreach, among others).
3. The CWCB will determine the economic benefits and effects of meeting or not meeting Colorado's future water needs.
4. The CWCB will work with the General Assembly and state agencies to align state funding policies and promote coordination among state agencies to strategically support the values identified throughout Colorado's Water Plan, such as the need for multi-purpose and multi-partner projects and methods. The State will take the following actions:

- Develop a common grant inquiry process coordinated across funding agencies for environmental and recreational project proponents. This will include revisiting and reorganizing how the current State Funding Coordinators Meeting is conducted.
- Review the CWCB's financial policies to consider providing financial incentives to move projects and methods forward and to assist small water providers in addressing upfront planning costs, such as reduced interest rate categories, extended terms (40 years), et al.
- Pursue additional funds to support the Water Efficiency Grant Program, which provides financial incentives for implementing conservation programs and planning for drought. Investigate expanding the authority of the program to provide grant funds to municipalities for documented water conservation/savings to help offset the economic impact of lost revenue because of reduced water usage. Develop funding recommendations.
- Assess whether there are additional loan opportunities for municipal conservation practices.
- Pursue funding to establish a water education and outreach grant program and develop recommendations on funding.
- Assess opportunities for additional WSRA grant funds. As part of this, work to amend the WSRA guidelines on how any additional funding is allocated, approved and disbursed to prioritize projects that provided the greatest benefit to Colorado.
- Seek an amendment to statutory language to expand the CWCB's loan program's authority to fund treated water supply, reuse, conservation, environmental, and recreational projects and methods.
- Continue to provide $1 million annually to support stream management and watershed plans, and develop an established funding source.
- In partnership with the water investment funding committee, review and prioritize water projects identified in the BIPs, in coordination with the basin roundtable representatives, to develop a funding plan for those that could move forward. Based on the identified funding level, develop funding strategies that use existing and new funding sources to move high-priority projects forward in one to three years.
- Investigate the potential for the CWCB to become a project beneficiary through an arranged partnership for projects that are central to fulfilling the goals of Colorado's Water Plan.
- Identify and develop, in two years, a single multi-benefit, multi-partner, shared infrastructure pilot project that is funded through a joint revenue stream of public and private funding. From this pilot project develop the framework for how future water public-private partnership projects will move forward, considering best procurement practices, maintenance and operation, water administration and management, et al.
- Continue to use the water investment funding committee, made up of representatives from each basin, the CWCB, the Water and Power Authority, Executive Director's Office, large water providers, and the private sector, to evaluate the funding recommendations contained within Colorado's Water Plan and others,

to develop a well planned, phased approach to provide funding for water projects, environmental projects, recreational projects, and stream and watershed management throughout the state. This committee met over the course of 2015 and will continue to meet to provide funding and implementation recommendations to the CWCB.

- Over the next year, continue to develop and fund a modern method to determine probable maximum precipitation for spillway sizing for dams in Colorado with the intent to provide additional storage while minimizing capital investment.
- Consider allocating all or a portion of any surplus in the Department of Natural Resource's severance tax operational account revenues, for efforts prioritized in Colorado's Water Plan.

5. The State will explore near-term opportunities to increase funding resources by implementing the following actions:
    - Develop preliminary support data for various public funding options, such as state referendums, individual county mill levy increases, the insurance tax premiums, user fees, or other potential funding mechanisms.
    - Explore a Center of Excellence to create a working model of public-private-partnerships for water projects and methods.
    - Explore how a water investment (public tax) fund could be created, managed and disbursed.
    - Work with other applicable state agencies to develop a reserve fund that would act as a security or repayment guarantee by the State to water providers seeking bond funds through the Authority.
    - Explore the concept of a container fee ballot initiative.
    - Develop issuance and repayment strategies in issuing Green Bonds, as early as 2016, for environmental and recreational projects. It's recommended that Green Bonds be issued incrementally based on identified need to minimize repayment costs.
    - Reassess the Instream Flow Tax Credit program to determine how to make it more usable.
    - Work with various stakeholders, Department of Real Estate, the Department of Revenue, and appropriate legislative committees to develop strategies to maximize the conservation tax credit program.
    - Explore potential uses of Conservation Tax Credit revenues for stream and watershed restoration.
    - Explore with water providers the possibility of issuing a state tap fee for future taps installed statewide. Funds developed could be used to support the CWCB Water Efficiency Grant Program and/or water education. The amount assessed per tap would need to be determined based on the estimated number of new taps issued statewide and target revenue.
    - Assess the funding opportunity from the Water Infrastructure Finance and Innovation Authority (WIFIA) and the Rural Infrastructure Fund for loans to rebuild aging water infrastructure. Encourage the U.S. Department of Transportation and

other agencies to share lessons learned regarding innovative financing programs with the Corps and the EPA as they implement WIFIA.

- Work collaboratively with foundations and nonprofits to support the environment, recreation, and education priorities through philanthropy.

9.3 State Water Rights and Alignment

Colorado's Water Plan ensures that state agencies coordinate the uses of their current and future water rights and will uphold Colorado's water values, as discussed in Chapter 1.

Several Colorado state agencies hold and exercise water rights for various beneficial uses that are authorized by Colorado's constitution and statutes, and by permits and water court decrees. The Division of Water Resources (DWR) administers water rights, including state-held water rights, within the state's priority system and does not own any water rights. As part of developing Colorado's Water Plan, the CWCB asked each state agency to develop an inventory of its water rights, to the extent it had not already developed one. This section describes state agencies that hold water rights, including each agency's mission and the legal basis for each agency's water rights and their uses. It also summarizes the agencies' water rights inventories and describes how the state is aligning its water rights with the water values identified in Colorado's Water Plan, provided in Chapter 1. Finally, this section describes how state agencies will work to maximize the use of their water rights to realize to greatest benefits to the state as a whole. Note that the inventory process is ongoing and the CWCB will continue to incorporate information as it becomes available.

Inventory of State Agencies' Water Rights

The CWCB

Mission and Statutory Authorities

Colorado established the CWCB in 1937 with the mission to *conserve, develop, protect, and manage Colorado's water for present and future generations.*[42] *Section 37-92-102(3), C.R.S. (2014) authorizes the CWCB to appropriate and to acquire water for instream flow water rights and natural lake level water rights to preserve and improve the natural environment to a reasonable degree. Section 37-60-106(n) authorizes the CWCB to take actions necessary to acquire or perfect water rights for projects it sponsors.*

The CWCB Water Rights Inventory

The CWCB currently holds 1595 decreed instream flow water rights that protect approximately 9180 stream miles and 480 decreed natural lake level rights.[43] The CWCB also has entered into 30 transactions by which it has acquired water, water rights, or contractual interests in water for instream flow use.[44] Pursuant to an agreement with the U.S. Army Corps of Engineers, the CWCB owns two storage rights in Bear Creek Lake in Jefferson County for approximately 2000 acre-feet, decreed absolute for piscatorial and recreational purposes, and conditional for municipal, domestic, industrial, and irrigation.[45] In 2012, the CWCB exercised its right to acquire its project water allocation of 10,460 acre-feet (supply) and 5230 acre-feet (depletions) in the Animas-La Plata Project. Currently, the project is decreed for municipal and industrial uses only, but the CWCB may

~~a.~~b. Encourage sharing and optimal use of water among state agencies where efficiency savings might be realized, and ~~and~~

~~b.~~c. Conduct technical and legal feasibility analyses of identified opportunities for aligning or sharing agency water rights and advance feasible projects in a timely manner.

3. The CWCB will identify state-owned water rights within the Colorado River Basin and evaluate opportunities for these rights to assist with Colorado River Compact compliance. For example, the Animas-La Plata project contract between the BOR and the CWCB recognizes that the state's stored water right in the project could be used for compact compliance purposes. There may be other state resources like this one that could assist the state in complying with its obligations under the Colorado River Compact.
4. The CWCB will continue to schedule joint meetings with local governmental water management agencies around the state to facilitate information sharing and coordination on common water rights issues.
5. The CWCB will work with local stakeholder groups to determine where instream flow water rights could provide the greatest benefits, and assist such groups with the instream flow recommendation process.
6. The CWCB will partner in the early stages of future multi-purpose projects as a water rights holder when such partnership is needed to ensure the success of the project, minimize environmental impacts of a project, or otherwise ~~and will~~ further the water values in Chapter 1.
7. In coordination ~~CPW will continue to work~~ with the CWCB and interested stakeholders, CPW will take ~~to maximize~~ the lead on identifying opportunities to use ~~of~~ CPW's water rights to help fill environmental and recreational gaps while maintaining consistency with its mission, statutory mandate, and rules/policies governing the use of CPW property.[g] ~~.~~

9.4 Framework for~~on~~ a More Efficient Permitting Process~~more efficient permitting processes~~

Colorado's Water Plan advocates~~promotes more~~ effective and efficient permitting in which State of Colorado~~by encouraging state~~ agencies ~~to~~ work together to~~and~~ complete their work early in the permitting process. This will provide the opportunity for state endorsement without being pre-decisional.

[g] Colorado Parks and Wildlife is funded primarily through the sale of hunting and fishing licenses, parks passes and permits, and the receipt of associated federal parks and wildlife funds. All real property interests, including water rights, purchased with wildlife cash, parks cash, or associated federal funds are required to be used only for parks and wildlife purposes. *See* sections 33-1-112(1), 117, 118, and 119, 33-9-107 and 109, 33-10-108(1), 111, 112, and 113, C.R.S.; *see also* 16 U.S.C. 669 to 669i, 16 U.S.C. 777 to 777l, and 16 U.S.C. 460l-4 to 460l-11. As such, there is limited ability to use such water rights for any purpose other than the originally intended parks and wildlife purposes. Any secondary or shared uses must be consistent with, and not otherwise impair, the water rights' originally intended parks and wildlife purposes.

Introduction

Governor Hickenlooper's May 2013 Executive Order reiterated that ~~what has been known for years in Colorado~~ the gap between Colorado's~~our~~ water supply and water demand is real and looming. While conservation is a key strategy to narrowing the gap across the state, it alone cannot solve the problem. Scenario ~~alone. In fact, scenario~~ planning indicates that at least 80 percent (350,000 acre-feet) of already planned projects ~~will~~ need to be implemented, and many of these still~~will~~ need to go through the permitting process.[61] Ideally, the permitting process ensures~~would ensure~~ the implementation of projects that best meet Colorado's water values—to support vibrant and sustainable cities, viable and productive agriculture, a robust tourism industry, efficient and effective infrastructure, and a strong environment. The current ~~To ensure this, the~~ permitting process needs review and~~. To encourage this review,~~ the Executive Order directed the CWCB to "streamline the State~~state~~ role in the approval and regulatory processes regarding water projects."[62]

The objective~~purpose~~ of this section is to explore how permitting in Colorado can be ~~made~~ more effective and efficient. Tackling permitting is extremely difficult because of the complexity of the projects, the challenges in understanding and reducing environmental impacts, and the condition of many of the aquatic systems. The section describes the current permitting and licensing processes ~~that project proponents must currently go through~~, the challenges that arise during the process, and the reforms that could ~~help~~ make the process more efficient and effective for all parties involved. The proposed solutions ~~proposed in this chapter mainly~~ focus on how the State~~state processes~~ can be more effective and eliminate and reduce redundancies. The section also ~~, and~~ touches on the benefits of~~that result from the~~ cooperation among federal agencies, local governments, and stakeholders. The approach described in this section~~the chapter~~ allows the State~~state~~ to endorse a project without predetermining the outcome of an environmental permit, certification, or mitigation plan.

Summary of Each Process~~the process for each process~~ within Water Permitting~~water permitting~~

This section ~~will~~ briefly explains~~explain~~ the state and federal process that~~processes~~ project proponents are required to address to complete their project. A description of entities involved in permitting can be found in Section 2.4.

National Environmental Policy Act (NEPA) Process

~~The~~ NEPA is a federal law that establishes a structured planning and decision making framework required for any federal decision with the potential to significantly impact the human environment.~~country's national environmental policies. To implement these policies,~~ NEPA requires federal agencies to assess the environmental effects of their proposed actions before decision making. Importantly, NEPA provides opportunities for citizen~~Citizen~~ involvement in government decision making through public disclosure and formal opportunities for public input ~~is required~~ as the environmental effects are evaluated.[63] ~~Both of these requirements are fundamental to NEPA because they should lead to implementation of NEPA's policies:~~

There are three situations in which a water supply project may trigger NEPA's procedural requirements:

- One or more project components will occur on federal lands (e.g: National Forest or Bureau of Land Management lands)
- The project or its components will be funded in part or whole by a federal funds; and
- The project will require~~"(a) The Congress, recognizing the profound impact of man's activity on the interrelations of all components of the natural environment, particularly the profound influences of population growth, high-density urbanization, industrial expansion, resource exploitation, and new and expanding technological advances and recognizing further the critical important of restoring and maintaining environmental quality to the overall welfare and development of man, declares that it is the continuing policy of the Federal Government, in cooperation with State and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.~~

  ~~(b) In order to carry out the policy set forth in this Act, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may –~~

  1. ~~fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;~~
  2. ~~assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;~~
  3. ~~attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;~~
  4. ~~preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice;~~
  5. ~~achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and~~
  6. ~~enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.~~

  ~~(c) The Congress recognizes that each person should enjoy a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment."~~[64]

~~NEPA's procedural requirements apply to all federal agencies and all federal agency decisions for actions including:~~

- ~~Financing, assisting, conducting or approving projects or programs.~~
- ~~Agency rules, regulations, plans, policies or procedures.~~
- ~~Legislative proposals.~~
- ~~NEPA applies when~~ a federal permit~~agency has discretion to choose among one~~ or license

~~more alternative means of accomplishing a particular goal.~~ For ~~state~~ water projects in Colorado, the most common federal actions that lead to a NEPA environmental review are: a Bureau Of Reclamation~~BOR~~ contract for storage of water in a facility managed by that agency, a U.S. Army Corps of Engineers (Corps) Clean Water Act (CWA) Section 404 permit, a project component that will be built on federal land, or a Federal Energy Regulatory Commission hydropower license.[65]

The NEPA process is intended to help public officials make decisions that based on an understanding of environmental consequences and take actions that protect, restore, and enhance the environment.[66] NEPA regulations instruct federal agencies to use the NEPA planning process "to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment" and to use all practicable means "to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions."[67] It is through public and agency input that these goals are to be achieved.

The NEPA process begins when the federal agency determines there is the need to take an action. ~~This determination may be made by the federal agency itself or may be brought to it by someone outside the agency, for example, through a permit application.~~ The federal agency that needs~~will need~~ to take ~~the~~ action is the lead agency and is the agency~~agency's~~ responsible for compliance with NEPA. Depending on the circumstances, a joint lead agency and/or cooperating agencies can be identified to share in the responsibilities of completing NEPA environmental review. For many state water projects, an Environmental Impact Statement (EIS) process is required when a project may have~~because~~ significant environmental impacts~~effects may occur if the projects are implemented~~.[68]

NEPA regulations direct federal agencies, to the fullest extent possible, to integrate the requirements of NEPA with other planning and environmental review procedures required by law or by agency practice so that all such procedures run concurrently rather than consecutively.[69] This goal is often not met, leading to an extended, consecutive planning process. To successfully achieve the goal of concurrent planning, the NEPA process must start at the earliest possible time within the water supply project planning process. It is recommended that proponents assess whether a project proposal is likely to trigger NEPA planning requirements at the start of planning and then engage the relevant federal agencies immediately.

Clean Water Act~~CWA~~ Section 404

Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities ~~in waters of the United States~~ regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports)~~,~~ and mining projects.

Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation (e.g. certain farming and forestry activities).

In summary, the Code of Federal Regulations (CFR) 40 Part 230 Section 404(b)(1)(Guidelines) states~~Under Section 404~~, no discharge of dredged or fill material may be permitted if:

- A practicable alternative exists that is less damaging to the aquatic environment~~, or~~
- Causes or contributes to violations of any applicable state water quality standard
- It violates any applicable toxic effluent standard
- It jeopardizes the continued existence of species listed as endangered or threatened under the Endangered Species Act
- The nation's water would be substantially degraded; and unless steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem.

Like NEPA, Section 404 requires specific, structured planning steps and information most efficiently addressed at the initial stages of project planning, and development. Various federal agencies have different Section 404 roles and responsibilities. The Corps administers the day-to-day permitting program, including individual and general permit decisions. The Corps also conducts or verifies jurisdictional determinations, develops policy and guidance, and enforces Section 404 provisions. The EPA develops and interprets policy, guidance and environmental criteria used in evaluating permit applications. The EPA also determines the scope of geographic jurisdiction and evaluates the applicability of any exemptions, approves and oversees state and tribal assumptions, and reviews and comments on individual permit applications. The EPA has the authority to prohibit, deny or restrict the use of any defined area as a disposal site under section 404 (c)~~,~~ may elevate specific cases for further evaluation under Section 404(q), and enforces Section 404 provisions. The U.S. Fish and Wildlife Service (FWS) evaluates impacts on fish and wildlife of all new federal projects and federally permitted projects, including projects subject to the requirements of Section 404. The FWS also elevates specific cases or policy issues about an~~pursuant to Section 404(q).~~

~~An~~ individual permit that is required for activities that have potentially significant impacts. Individual permits are issued by the Corps, which evaluates applications under a public interest review, as well as the environmental criteria defined in the~~CWA Section 404(b)(1)~~ Guidelines, and NEPA regulations if they are applicable~~policies and procedures~~. For most discharges that have only minimal adverse effects, a general permit is issued. General permits are issued on a nationwide, regional, or state basis for particular categories of activities. Large scale water projects require an individual Section 404 permit.[70]

401 Water Quality Certification

Under Section 401 of the CWA, if an activity that requires a federal license or permit may cause any discharge into navigable waters, the applicant for the federal license or permit must obtain a 401 certification to protect water quality.~~.~~ The Water Quality Control Division (WQCD) is required by Colorado statute (C.R.S., §25-8-302(1)(f)) to review federal licenses and permits under Section 401 of the CWA Colorado Water Quality Control Commission (WQCC). Regulation No. 82 (5 CCR 1002-

82) authorizes the division to certify, conditionally certify or deny certification of federal licenses. It also ~~and it~~ sets forth best management practices (BMPs) applicable to all certifications, with one exception~~,~~ noted below.[71] Regulation No. 82 applies to division certification of CWA 404 permits issued by the Corps, licenses for hydropower projects issued by the Federal Energy Regulatory Commission, and other federal permits involving a discharge including CWA Section 402 discharge permits issued by the EPA.[72] The exception is for 402 discharge permits issued by the EPA for facilities on tribal lands, for Section 404 permits issued by the Corps on tribal lands, and for 402 permits issued by the EPA for federally owned facilities on federal lands. For~~: for~~ these facilities, the EPA issues the 401 certification.[73] Individual certification review is not required for Section 404 general or nationwide permits issued by the Corps, except for activities covered by certain nationwide permits on tribal lands. Except for the activities on tribal lands, ~~These~~ general or nationwide permits are certified under statute (C.R.S., §25-8-302(1)(f)) without additional conditions.

The WQCD~~division~~ issues a Section~~section~~ 401 water quality certification when it determines ~~that~~ there is reasonable assurance that both the construction and the operation of the project will comply with state surface and groundwater water quality standards and requirements. If the Division~~division~~ concludes that the project will comply with the water quality standards and requirements, only if one or more conditions are placed on the license or permit, the Division will issue the certification with the necessary conditions included. House Bill 15-1249 passed during the 2015 legislative session. It repeals and reenacts statutory fees for clean water and drinking water programs in the WQCD of the Colorado Department of Public Health and Environment (CDPHE). One of the many provisions of the bill authorized new fees for the CDPHE certifications related to projects affecting regulated water quality standards in jurisdictional waters of the United States, known as 401 certifications. The WQCC establishes 401 certification fees by rule according to a tiered schedule, with these fees taking effect starting in FY 2016-17.~~division will issue the certification with the necessary conditions included.~~

Fish and Wildlife Mitigation Plans

~~Section 122.2~~

Colorado State Statute 37-60-122.2 (C.R.S.), known as the Fish and Wildlife Resources Fund and Authorization, declares that fish and wildlife resources are a matter of statewide concern and that impacts on such resources should be reasonably mitigated by applicants proposing water diversion, delivery, or storage projects. Applicants must submit a proposed mitigation plan to the CPW Commission for review and approval. If ~~mutual agreement on the plan is reached by~~ the applicant and the Commission reach a mutual agreement, the proposed ~~commission, the~~ plan is forwarded to the CWCB for Board~~board~~ adoption as the official state position~~ on the plan~~. If the Commission~~commission~~ rejects an applicant's plan, it is still forwarded to the CWCB. If the CWCB disagrees~~does not agree~~ with the Commission, then the Governor decides whether ~~or not~~ to approve the plan.

~~Once there is mutual agreement on the plan by the applicant and the Commission, the plan is forwarded to the CWCB for board adoption as the official state position on the plan.~~ A mitigation plan is generally required when an applicant seeks a permit or license from the federal government

for the specified types of water projects, with some exceptions as noted in the statute.[74] The CWCB has grant funds ~~grants may be made~~ available for~~to~~ applicants to help implement the mitigation plans. The CWCB has ~~Criteria have been~~ established criteria for such grants ~~for distribution when funds are available~~.[75] Examples of completed or in progress Section 122.2 plans ~~that are completed or in process~~ include Southern Delivery System (SDS), Windy Gap Firming Project, Moffat Collection System Project, and Chatfield Reservoir Reallocation project.

Reclaimed Water Regulation~~water regulation~~

The Colorado Water Quality Control Commission Regulation No. 84 (5 CCR 1002-84) and the WQCD's~~Water Quality Control Division's~~ reclaimed water program is designed to promote the use of reclaimed water in Colorado. It includes requirements and minimal standards for reclaimed water ~~to meet minimal standards,~~ and for treaters and users of reclaimed water to employ Best Management Practices for~~BMPs and oversee~~ its use. These minimal standards are necessary to protect public health and the environment. Regulation ~~This regulation~~ applies to the use of reclaimed water for landscape irrigation, agricultural irrigation, fire protection, industrial, and commercial uses as detailed in the table below. The ~~The type of reclaimed water use triggers the~~ treatment and best management practices required before and during use depends on the use of the reclaimed water.

Table 9.4-1: Reclaimed Water Uses Authorized in Regulation 84

Approved Uses	
Industrial	Evaporative Industrial Processes
	Washwater Applications
	Non-Discharging Construction and Road Maintenance
	Non-Evaporative Industrial Processes
Landscape Irrigation	Restricted Access
	Unrestricted Access
	Resident-Controlled
Commercial	Zoo Operation
	Commercial Laundries
	Automated Vehicle Washing
	Manual Non-Public Vehicle Washing
Fire Protection	Nonresidential Fire Protection
	Residential Fire Protection
Agricultural Irrigation	Non-Food Crop Irrigation and Silviculture

Regulation 84 requires treaters and users ~~of reclaimed water~~ to obtain and comply with a notice of authorization issued by the WQCD~~Water Quality Control Division~~. The notice of authorization contains the terms, limits, and conditions, deemed necessary to ensure compliance with Regulation 84.

1041 Local Permits

In 1974, the Colorado General Assembly enacted measures to ~~further~~ define the authority of state and local governments in making planning decisions for matters of statewide interest. These powers are commonly referred to as "1041 powers," based on the number of the bill of the proposed legislation (House Bill 74-1041). These 1041 powers allow local governments to identify, designate, and regulate areas and activities of state interest through a local permitting process. The general intention of these powers is to allow for local governments to maintain their control over particular development projects, even where the development project has statewide impacts. The statute concerning areas and activities of state interest can be found in 24-65.1-101 (C.R.S.)

Generally, development may only proceed if consistent with the environmental and developmental goals of the local communities as outlined in their 1041 regulations.

Of particular interest to many local governments are impacts from the construction and operation of large-scale water projects. The Act authorizes local governments to designate ~~as "activities of statewide interest"~~ the site selection and construction of major new domestic water and sewage treatment systems, the major extension of existing domestic water and sewage treatment systems, the site selection and development of new communities, and the efficient utilization of municipal and industrial water projects as "activities of statewide interest."~~.~~ Local governments may not pass regulations that are completely prohibitive of the building of municipal water facilities and expansion of existing projects. The Act allows the locality to require a permit with designated conditions before construction.

Past and Existing~~existing~~ Colorado Efforts

In~~efforts to make~~ the past~~permitting process more effective & efficient~~

~~Over the years~~, there have been several attempts to coordinate the permitting process. The Colorado Joint Review Process (CJRP) was created by the General Assembly~~general assembly~~ in 1983 to improve the environmental permitting process primarily for energy development. The CJRP was never fully completed for any project.[76] It is not clear if this is because the energy industry collapsed, or if the process was not considered helpful. Many projects failed to proceed for economic reasons. The CJRP also coordinated the State's combined responses to major projects such as the review of the proposed Denver International Airport, the Two Forks veto, and Colorado's bid for the Super Conducting Super Collider. In 1996, the General Assembly allowed the CJRP legislation to expire.

Another attempt to coordinate the~~have a coordinated~~ review process was initiated in 2003 when Colorado's General Assembly established the Colorado Coordination Council through HB03-1323. The ~~council was to be administered by the~~ Executive Director of the DNR was designated as the administrator of the council. It was a voluntary coordination process that sponsors could choose to use. The permitting areas allowed within the process included "extraction, use, conservation, transportation, or management of natural resources" that required~~require~~ permits, approvals or compliance from federal, state, or local governments.[77] This process was never used, and the statutes supporting the council were allowed to expire in 2013. According to the Colorado Department of Regulatory Affairs (DORA), which reviews statutes set to expire, "Very few outside,

or even inside, DNR were aware of the Council's existence. Indeed, most stakeholders contacted as part of this sunset review had never heard of the council... Those within DNR acknowledged that DNR conducted no outreach to inform the community of the Council's existence and, to the best of anyone's recollection, no one at DNR had ever suggested that a project sponsor utilize the Council."[78]

Recently, the State and various Federal agencies have made progress ~~has been made~~ through the use of Memorandums of Understanding (MOUs). No~~) among the State and various Federal agencies. While no~~ formal legislation was passed to initiate the development of MOUs. These~~these MOUs it is important to recognize that these~~ documents assist in creating a structure for the State and these respective agencies to work together with the intention of making a more coordinated permitting process.[h] Progress~~Additionally, although not formalized and signed, progress~~ has been made on a Collaborative Approach to Water Supply Permit Evaluation (CAWS) through a series of facilitated conversations, among several parties an informal agreement resulted in~~MOU,~~ which ~~would treat~~ conservation could be treated either as a demand reducer or~~rather than~~ as an alternative to the project**.** The process was initiated by the DNR to mutually understand state and ~~educate~~ federal permitting processes~~partners about state planning~~ and requirements and identify areas with potential for improved efficiencies~~permitting issues~~.[i]

~~There is the potential for recent legislation to further this progress. For instance the Hydroelectric Generation Incentives Bill (House Bill 14-1030) became law, and could help streamline the State's role in the permitting process for small hydroelectric projects.[j],[79]~~

Despite the lack of an official coordinating statute for state and federal permitting entities ~~to operate under~~, there is ~~a great deal of~~ coordination. Recently, CPW and the WQCD~~Water Quality Control Division~~ have become cooperating agencies for several projects undergoing the EIS process of ~~the~~ NEPA. Project proponents indicated ~~during the interview process for this section~~ that this has been a helpful, collaborative effort.[80] In addition~~Furthermore~~, there is~~has been~~ increased coordination within the DNR.

[h] Examples include the FERC MOU concerning collaboration with other federal permitting entities and the State and Forest Service MOU concerning coordination with the Colorado Department of Natural Resources and Forest Service.

[i] Collaborative Approach to Water Supply Permit Evaluation (CAWS-) MOU: Beginning in 2010, the Colorado Department of Natural Resources, U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers met to educate federal permitting partners about state planning and permitting issues. Out of that process, an MOU was developed concerning the utilization of conservation. Rather than conservation being considered as an alternative, it was agreed to that it would be factored into reducing demands as part of the purpose and need of the project. While this MOU has not yet been finalized, an important collaborative process was begun to help each agency understand opportunities and constraints that may inform the MOU and streamline processes in the future. Additional efforts will take place to revise and/or finalize the MOU as appropriate.

~~[j] The Hydroelectric Generation Incentives Bill (House Bill 14-1030) passed through the Colorado State Legislature with large margins. At the time of writing this section, the bill has not yet been signed into law by the Governor. The purpose of the bill is to build off of the federal "Hydropower Regulatory Efficiency Act of 2013" and streamline the State's role in the permitting process of small hydroelectric projects. It is not yet clear how effective this process will be, but one difference between this and past efforts is the narrow focus of the bill and the coordinating power given to one agency.~~

InAdditionally, in 2012, the President Obama issued Executive Order 13604, on "Improving Performance of Federal Permitting and Review of Infrastructure Projects."[81] SpecificThe involved federal agencies reportedly applied an expedited review process to 50fifty pilot projects;, each with project having an accelerated schedule, with clear project review milestones, and a designated lead coordinating agency. The, with project progress wasbeing tracked on a "Federal Infrastructure Permitting Dashboard." The Dashboard containedcontains an IT platform wherepursuant to which involved agencies couldmay develop a cooperative schedule, share project documents, and quickly communicate with one another as concerns arise.[82]

Basin Roundtable and Inter Basin Compact Committee Concepts Concerning Permittingroundtable and IBCC concepts concerning permitting

The Interbasin Compact Committee's (IBCC)IBCC's no- and- low regrets action plan andas well as the BIPs developed by the basin roundtables discussdiscussed permitting in depth. Of the eight BIPs, six discussdiscussed challenges or solutions. Table 9.4-2 at the end of this section quotes these important stakeholder sources.

While the individual statements in the table do not reflect the position of the State of Colorado, careful consideration of the challenges and solutions should be incorporated into future discussions.

Additional Stakeholder Outreachstakeholder outreach

To further understand the needs, issues, and potential solutions for the permitting process, the CWCB staff met with and interviewed a variety of water providers, environmental groups, and state and federal partners. The following is a list of organizations the CWCB met with or received comments from concerning permitting. In addition, several individuals provided comment, but are not listed.

The CWCB staff will continue to meet with state and federal permitting and licensing partners throughout the development of Colorado's Water Plan. Staff methas gotten in touch with or is in the process of scheduling interviews with the following organizations:

- Ute Water Conservancy District
- Centennial Water & Sanitation District
- U.S. Fish & Wildlife Service
- Bureau of Land Management
- United States Forest Service
- BLM
- USFS
- National Resource Conservation Service (NRCS)
- Environmental Protection Agency
- Colorado Department of Agriculture
- Colorado Counties Incorporated
- Colorado Municipal League

Stakeholders across sectors desire improved coordination and increased early involvement, regardless of whether they represent environmental or utility interests. In many cases, stakeholders believebelieved that these two aspects would shorten the time it took for permitting time while upholdingnot reducing the environmental protections permitting secures. Multipleaffords to the environment. Other themes expressed by multiple stakeholders also express interest in reducing included the need to reduce duplication, increasingincrease resources, loweringlower costs, unifyingunify methods, increasingincrease clarity, examiningexamine reuse permitting, improvingimprove quality of draft EISs, and encouragingencourage multi-purpose projects.[83]

One common concept iswas to bring back something akin to the Colorado Joint Review Program described above. The establishment of a joint NEPA review process, beginning before land use authorization applications are submitted for new water projects, may prove to facilitate a more efficient process. The Bureau of Land Management's experience is that applicants who are willing to have pre-application discussion of potential impacts and perform analysis of alternatives before submitting land use authorization applications experience much shorter wait times.

Table 9.4-2: Stakeholder input

	Met with the CWCB	Provided Written Comments
Colorado Department of Public Health & Environment (CDPHE)	X	
Colorado Parks & Wildlife (CPW)	X	
Colorado Attorney General's Office (AGs Office)	X	
Division of Water Resources (DWR)	X	
Northern Colorado Water Conservancy District (NCWCD)	X	X
Trout Unlimited (TU)	X	
South Metro Water Supply Authority (SMWSA)	X	X
U.S. Army Corps of Engineers (Corps)	X	
Environmental Protection Agency (EPA)	X	
Bureau of Reclamation (BOR)	X	X
Federal Energy Regulatory Commission (FERC)	X	
Denver Water	X	X
Upper Yampa Water Conservancy District	X	
Northwest Colorado Council of Governments	X	X
Western Resource Advocates (WRA)	X	X
Colorado Springs Utilities	X	X
Water Reuse Association	X	X
Aurora Water		X
City of Thornton		X
Front Range Water Council		X
Conservation Colorado		X
Colorado Wastewater Utility Council		X
Colorado Oil and Gas Association		X
Pikes Peak Regional Water Authority		X

Table 9.4-2: Stakeholder input		
Fountain Valley Authority		X
Douglas County		X

The Northwest Colorado Council of Governments envisioned the process in the greatest detail, which is summarized below:

> Because it is expensive, time consuming, and sometimes "work for the sake of work" for the applicant, regulators, local governments, and other stakeholders to participate in a NEPA process, the Statestate should facilitate a joint review process before and during the NEPA process. This sort of "front loading" minimizes the costs to the applicant and other stakeholders because as early as possible, the applicant and regulators understand what concerns, impacts, and potential for mitigation are relevant in the areas affected by the project; and what will be necessary to satisfy federal, state and local laws and regulations.
>
> This approach also improves the likelihood that alternatives, reports, and studies that are generated during NEPA will be more focused and responsive to actual, real world concerns, rather than reports and studies that are off the mark. Agreement can be reached on the scope of alternatives, reports and studies before the applicant/regulators spend money on consultants to prepare pounds of paper that ultimately are not necessary to satisfy NEPA, the regulators, or affected stakeholders.
>
> Another important result of the process is that for each project, the joint review process would define the regulatory framework and where the overlaps between state, local, and federal processes are, so that they could be coordinated rather than duplicative or contradictory. This saves money for the applicant, the regulators, and the public concerned about the project as well as ensuring that permits can be issued more quickly.
>
> Finally, it provides a forum to formulate agreements, like the Windy Gap Firming Project IGA, that result in projects that benefit the project proponent, the environment, and affected interests.
>
> In order to be part of the joint review process, participants would have to agree to certain principals regarding rules of engagement. Those rules would require that the parties work in good faith, explain interests not take positions, among others.
>
> The local governments from the areas that would be affected by the project should be responsible for identifying the appropriate local stakeholders and coordinating local input.
>
> Critical input points during the process are during:
>
> 1) Scoping
> 2) Developing alternatives

3) Determination of methodologies and data gaps
4) Mitigation and enhancement plans

The Front Range Water Council suggests that Colorado use, or modify, the expedited federal permitting procedures and dashboard developed as a result of Presidential Executive Order~~presidential executive order~~ 13604 described above.

Permitting Issues~~issues~~ and Potential Process Improvements~~potential process improvements~~

Several common potential process improvements emerged after~~After~~ reviewing the work of the IBCC and~~,~~ basin roundtables~~,~~ and the comments ~~made~~ from water providers, the conservation community, and various state and federal agencies~~, several common potential process improvements emerged~~. Based on these discussions, the CWCB identified the following process improvements to explore~~should be~~ further ~~explored~~:

1. **Improve Coordination**
   - Coordinate~~coordination – eliminate redundant~~ review efforts by different state~~State~~ agencies.

~~1.~~2. Coordinate EIS document review across state~~State~~ agencies with the goal of increasing efficiency.

3. **Increase Early Involvement**

~~2.~~4. Examine~~early involvement – examine~~ opportunities for state agencies, local governments, stakeholders, and federal agencies to get involved earlier in the NEPA process.

- Involve NEPA and CWA Section 404 lead agencies (if applicable) at the very initiation of project planning to assure a concurrent (vs. sequential) planning process. This will facilitate early identification of required planning steps and information needs.

5. **Coordinate Technical Methods**

~~3.~~6. Reduce~~technical methods – reduce~~ duplication of technical methods across state agencies, respecting the various authorities and obligations within existing law**.**

7. **Increase State~~state~~ and Other Resources**
   - Shorten~~other resources –~~ the length of time to complete the required environmental reviews ~~should be shortened~~ while maintaining a robust decision-making process.

~~4.~~8. Evaluate ~~At the beginning of permitting process the State should evaluate~~ potential future state staff demands and associated resources to complete the reviews in a timely manner at the beginning of permitting process. .

9. **Increase Clarity**
   - Increase~~clarity – increase~~ understanding of the information required for environmental reviews.

~~5.~~10. Identify required technical elements, assessment methodology, and results of reporting of environmental parameters, including hydrology, conservation, scenario planning, water quality status and designated uses, modeling applicability, and risk tolerance. ~~Understand the role of conservation in purpose and need documentation. Develop a State certification and mitigation handbook for project proponents and stakeholders.~~

- Understand the role of conservation in purpose and need development.
- Develop a state~~**Improve the quality of Draft EIS documents** – this would allow for State~~ certification and mitigation handbook for project proponents and stakeholders.

11. **Improve the Quality of Draft EIS Documents**
    - Enhance efficient completion of state certification, federal permitting, and mitigation plan processes.

    ~~6.~~12. ~~process to be completed more efficiently.~~ Emphasize issue identification earlier in the EIS process by involving all parties with a decision-making role and by collecting baseline environmental data.

13. **Encourage Multi~~multi~~-purpose Projects**

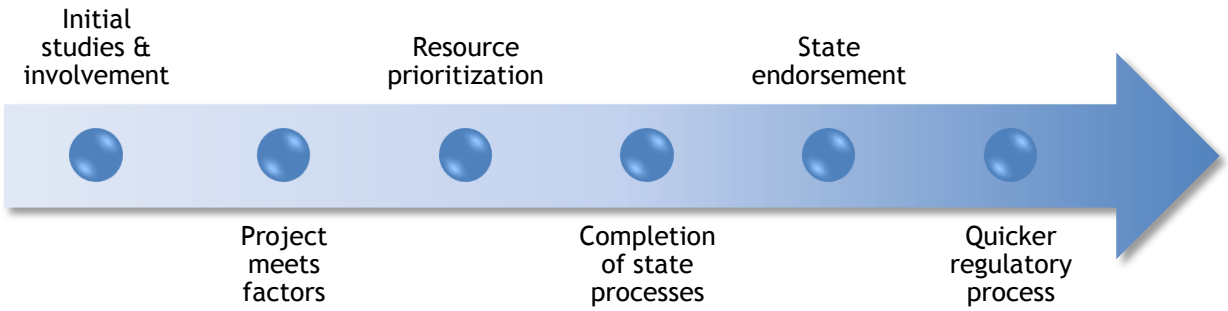
    ~~7.~~14. Facilitate~~**projects** – incentivize~~ projects with multiple objectives such as municipal, industrial, hydropower, environmental, recreation and agricultural by increasing sources and availability of funding for these types of projects. ~~purposes. The State should work with project proponents and other beneficiaries to explore opportunities to streamline permitting processes and to equitably allocate mitigation responsibilities.~~
    - Explore opportunities to streamline permitting processes, to equitably allocate mitigation responsibilities, and to provide state support and endorsement for these types of multi-purpose projects with project proponents and other beneficiaries.

Potential Conceptual Framework~~conceptual framework~~ for State~~state~~ of Colorado Support~~support~~ of a Project~~project~~

The State of Colorado could develop a more effective and efficient pathway for a water project to receive state~~a State~~ endorsement ~~and facilitate a quicker regulatory process~~ (Figure 9.4-1) while continuing~~). The purpose is to continue~~ to uphold state and regulatory review responsibilities. The state ~~while making the process more effective and efficient. This~~ could identify~~be achieved by identifying~~ milestones and decision points at the beginning of the process~~. Such a process must be designed~~ to reduce, rather than increase, regulatory burdens on project proponents.

~~A~~For the first draft of Colorado's Water Plan, a conceptual framework is explored below to encourage~~for the purposes of~~ more discussion among state agencies and stakeholders ~~during the year of the draft~~.

Figure 9.4-1: Conceptual Framework~~framework~~ for a Project~~project~~ to Receive~~receive~~ State Endorsement~~endorsement~~



Initial Studiesstudies and Stakeholder Involvementstakeholder involvement

If technical or financial support is being sought for initial planning, baseline environmental studies, alternatives analysis, feasibility studies, or initial stakeholder involvement priority should be given to projects that:

- Meet the goals and measurable outcomes identified in the BIPs,
- Have a project proponent,
- Meet an identified need, and
- May be built within the next fifteen years

Preference should also be given to projects that seek to be multi-purpose, have multiple partners, and collaborate with a broad set of local stakeholders.

Project Meets Factorsmeets factors

Project proponents who participate in the cooperative approach should commit to factors that align the project with Colorado's Water Values (see Chapter 1):

- Addresses an identified gap through one of the following:
    - Is identified in a BIP,
    - Meets a defined need in a basin needs assessment,
    - Meets a defined need in the Statewide Water Supply Initiative, or
    - Is identified as being needed as part of no--and--low regrets
- Demonstrates sustainability
    - Provides a conservation plan or plans aimed at reducing demands
    - Includes environmental mitigation and enhancements in the planning phase,
    - Mitigates or avoids impacts to or enhancesenhance water quality, and
    - Mitigates or avoids impacts on agricultural and rural community[k]
- Involves local government consultation
- Includes a stakeholder and public input process
- Establishes fiscal and technical feasibility

State Resource Prioritizationresource prioritization

WithIf more state resources become available, these factors, could allow for the State couldstate to commit to a resource-intensive approach at the beginning of the permitting process if more state resources become available. This would include coordination with local governments and stakeholders as well as be cooperating agencies through the federal permitting process. Cooperation would need to occur at critical decision points, including scoping, methodological review, alternatives analysis, and development of mitigation and enhancement opportunities. In addition, this process could use a coordinated dashboard approach, defining goals, timelines, and

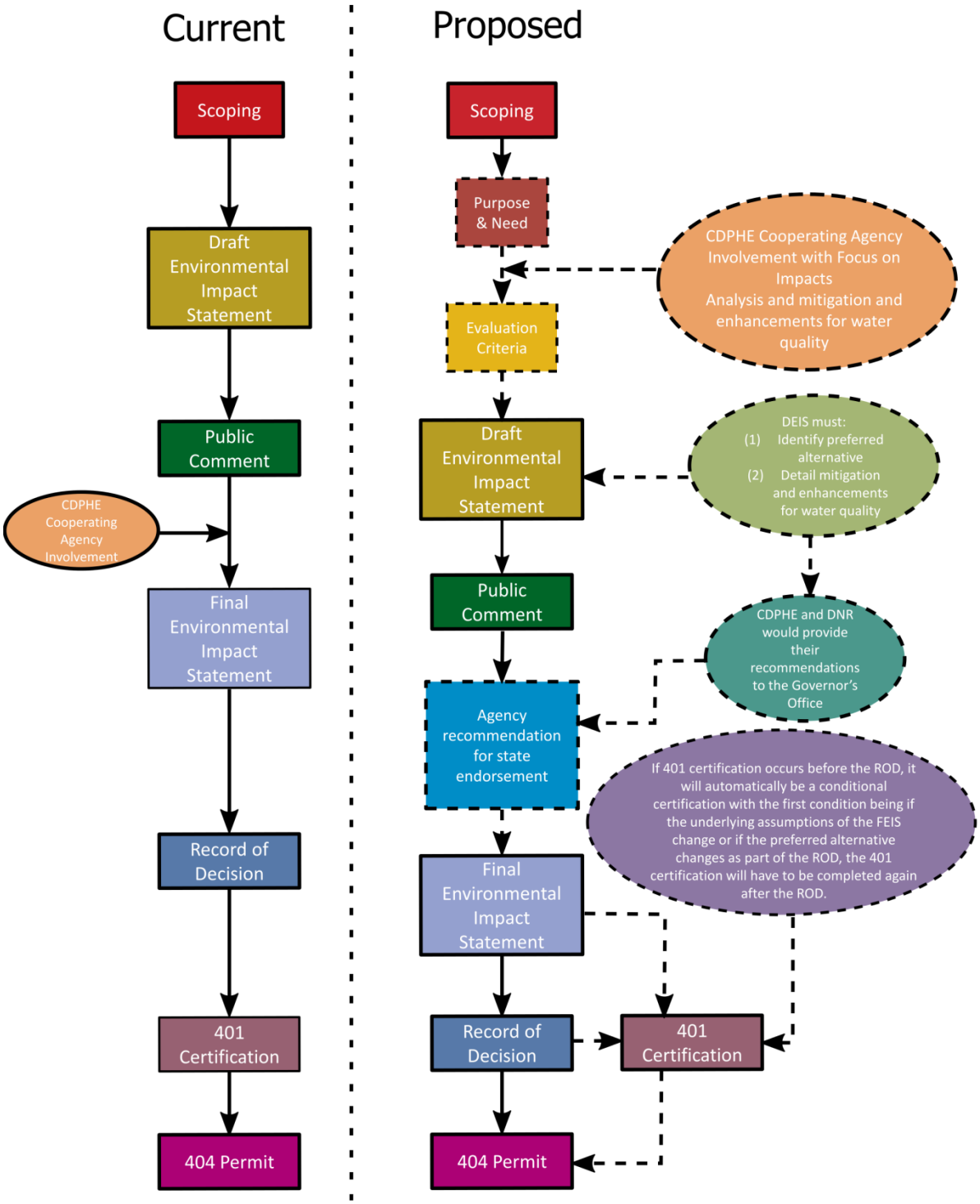
[k] This could take the form of an agricultural impact statement.

necessary permits. Existing regulations suggest that a coordinated approach is allowable under ~~state~~ existing state law. For instance, regulation number 82.5(C)(2) states, "Where possible, the 401 certification process should be coordinated or consolidated with the scoping and review processes of other agencies which have a role in a proposed project in an effort to minimize costs and delays for such projects."[84]

Preliminary Technical Review ~~technical review~~ for State Processes

The current **state processes** for involvement in the federal 404 permitting process are summarized in Figure 9.4-2. The DNR's wildlife mitigation process is guided by CRS 37-60-122.2. In 1987, the Colorado General Assembly passed HB 1158 which created a process by which agencies within the DNR come to consensus regarding fish and wildlife impacts from water resource development

Figure 9.4-2 State Involvement in Federal 404 Permitting Process



projects and the mitigation of such impacts. The statute establishes (among other things) a process that involves a project's proponent, the Parks and Wildlife Commission, and the CWCB that results in the state's official position on the mitigation of fish and wildlife impacts associated with the development of water resources for the state's citizens. Historically, this process is initiated by the project proponent's presentation of a draft mitigation plan to the Commission after which CPW staff has 60 days to review the proposed plan and provide further input to the Commission.

At the end of a 60 day period, the commission and project proponent must agree upon a plan or the different versions of the plan are forwarded to the CWCB for their separate deliberation and decision. If the Commission and proponent agree, the CWCB simply endorses that agreement and that becomes the official ~~The~~ state position. If the CWCB disagrees with the plan and modifies it in any way, it goes to the Governor to affirm or modify the plan resulting in the official state position. Irrespective of the route that the plan has taken, the official state position is then transmitted to each local, state and federal governmental entity. The statute and process is constructed in such a way that it encourages agreement between the project proponent and CPW – this greatly reduces the amount of time that this process takes thus resulting in an expedited state regulatory process. The CDPHE involvement in the federal 404 permitting process has typically occurred towards the end of the permitting process. The CDPHE's participation as a cooperating agency has generally occurred after a draft EIS is issued. Additionally, the CDPHE has typically waited until the project's Record of Decision has been completed before its official 401 certification review process.

As discussed above, if resources are prioritized for earlier state agency involvement in the federal permitting process, improvements to the current state process could be implemented. The State has an obligation to not~~be a neutral party so as not to~~ be pre-decisional in 401 certification and wildlife mitigation plan processes. However, earlier state agency involvement in ~~If state processes are coordinated during the draft EIS, then~~ the EIS process would allow for early identification and resolution of~~more fully encompass and address~~ state concerns which should result~~, resulting~~ in a high quality draft EIS. This early state agency involvement could be accomplished by using the steps highlighted in Figure 9.4.-3. As shown in Figure 9.4-3, the CDPHE could be involved earlier in the EIS process~~product~~. In this case, much of the State's~~state's~~ review work could be done prior, during, and immediately after the Draft EIS process.

The CDPHE's involvement could start shortly after the project proponent establishes the objective for the project or as the project proponent develops evaluation criteria for the EIS alternatives analysis. The CDPHE's input on the evaluation criteria is critical as the State's methodologies for assessing water quality should be used in the EIS process. In addition, with early involvement the CDPHE's input on mitigation and enhancements could also be included in the Draft EIS.

Once the Draft EIS is completed, the CDPHE and CPW's review~~Review~~ of comments from stakeholders and local government on the DEIS would give the State~~state~~ a good idea on regarding support for~~of~~ the project and/or any outstanding issues related to the project resulting from early involvement in the projects development or scoping, the CDPHE would evaluate whether the preferred alternative adequately addresses water quality impacts, and includes sufficient mitigation and enhancements for water quality. Likewise CPW staff would have had early communication and collaborative efforts with the project's proponents and would have already initiated work on the framework of a mitigation plan for the project. Then, at the appropriate time (after the publication of the Draft EIS and after the 122.2 process has been completed), each agency would then provide the Governor's office their recommendations on the project. The CDPHE's recommendation would most likely be in letter form and would specify whether the CDPHE could certify the preferred alternative identified in the DEIS. The CDPHE would provide this recommendation after the DEIS public comment period~~. The goal would be to complete preliminary~~

~~or contingent 401 certifications and wildlife mitigation plans before the final EIS~~. Because the specific project that is ultimately permitted~~approved~~ through a 404 permit ~~the NEPA process~~ must be certified with a~~through the~~ 401 certification and the 404 permit ~~process, final certification~~ cannot be issued before the completion of the EIS, 401 certification needs to occur after the Final~~final~~ EIS. However, if state processes are coordinated during the DEIS~~draft EIS~~, as noted above, then, unless the preferred alternative changes or underlying assumptions~~details~~ of the DEIS~~a project~~ change, the 401 ~~in such a way that it would impact water quality, the final~~ certification could be completed ~~shortly~~ after the ~~final~~ EIS is issued, provided that all required processes for public notice and review per Water Quality Control Commission Regulations #21 and #82 are followed. If the 401 certification is completed before the ROD, it would automatically be a conditional certification with the first condition being that if the underlying assumptions of the EIS change or if the preferred alternative changes as part of the ROD, the 401 certification will have to be completed again after the ROD.~~.~~

Potential Fish and Wildlife Mitigation Process Changes

The legislation that created the 122.2 process for the mitigation of fish and wildlife impacts associated with water project development is somewhat constraining in that official communications between the project proponent and CPW staff are not initiated until after the release of a Draft EIS. Further, 122.2 has some rigid timelines that make it difficult for project proponents and CPW staff to jointly develop a quality comprehensive mitigation plan. It is also difficult for stakeholders' early engagement in the process. Also, currently there is little written guidance (outside of the words in the statute) for either project proponents or stakeholders. Therefore, the DNR and the Parks and Wildlife Commission should develop a written policy, administrative directive, or formal rules regarding the implementation of the provisions of 122.2. This written policy should encourage and provide an avenue for early communication and collaboration between project sponsors and CPW staff regarding impacts and mitigation strategies. The policy should also provide an avenue for early stakeholder engagement on the mitigation of impacts.

State Endorsement

If improvements to the state's involvement in the permitting process are implemented as described above, the State could provide **endorsement** of the project before the Final EIS. As described above, each state agency would provide their recommendations to the Governor's office that could then communicate to the appropriate federal agency that the State supports or does not support a given project.

~~Once State Processes are complete, state endorsement is possible without being pre-decisional.~~

Quicker Regulatory Process~~regulatory process~~

Such state endorsement would allow the State~~state~~ to encourage completion of the ~~final~~ EIS and ROD.

Actions

One of the main goals~~purposes~~ of the Colorado's Water Plan is to find ways to support the implementation of the BIPs. Increased efficiency in the permitting process, while not predetermining the outcome and supporting the statutory and regulatory requirements of each

permitting agency, is a significant way to assist project proponents. While the decision could be "yes" or "no," having a decision, no matter the outcome, would be beneficial to the state planning process and help remove uncertainty. The actions below help to find efficiencies where possible and increase coordination. In addition, these actions will provide an incentive that encourages multi-purpose projects with many partners, especially for project proponents that meet Colorado's water values, such as enhanced conservation and efficiencies. In addition to the chapter of the water plan, a handbook will be developed, which details the status quo and a "new" joint review process. The following actions are needed to support these efforts:

- The CWCB will host a series of lean events with relevant permitting agencies and stakeholders to examine current processes and determine how to make them more efficient and effective. The lean events will specifically examine how to eliminate redundant review efforts, reduce duplication of technical methods, and increase clarity on the required technical elements, and assessment methodology.
- The DNR~~CWCB~~ will coordinate the development of a permitting, certification and mitigation handbook in partnership with local, state, and federal agencies.
- State agencies with permitting authority will actively participate as a cooperating agency from the outset of the regulatory process and parallel processes are encouraged.
- Where more than one agency has jurisdiction over a particular issue, a lead state agency will be identified.
- The State of Colorado will explore options~~The DNR will work with state and federal partners to finalize the CAWS MOU, which factors conservation in as a demand reducer.~~
- ~~The DNR will form a task force to study, draft recommendations, and, where appropriate, implement ways to improve State coordination in the permitting process. Members of the task force will include all State agencies that have any involvement in the permitting process associated with water projects, including reuse projects. The goal of the task force will be to examine potential process improvements, and the potential conceptual framework for State of Colorado support of a project described above, taking into account stakeholder input received and permitting program directives. The task force deliverable will be a set of guidelines and recommendations that define ways to help state agencies coordinate with each other, federal permitting agencies, local governments with 1041 powers, and other stakeholders. Frequent consultation with these entities will be needed throughout the process.~~
- ~~CWCB will continue to gather technical information and stakeholder input to explore how to make the permitting process more effective and efficient based off of the potential process improvements described above.~~
- ~~The State of Colorado will explore option~~ for adding CDPHE and DNR staff and other resources to support a more efficient and effective permitting process.
- The will work with state and federal partners to encourage cooperation through the CAWS MOU process, which factors conservation in as a demand reducer.
- State agencies with permitting authority will work with local governments and stakeholders to determine how Colorado will endorse a project after preliminary or contingent 401 certifications and fish and wildlife mitigation plans are completed.

Table 9.4-3: Summary of the IBCC No-and-Low-Regrets Action Plan and the BIP Comments on Permitting[85]

IBCC & Basin Roundtables~~BRTs~~	Challenges	Solutions
IBCC No-~~-~~and-Low-~~-~~Regrets Action Plan	"Needs assessment work conducted as part of the SWSI determined that every basin in Colorado will have a gap in water supply by 2050… 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."	As part of the No-~~no~~-and-Low-Regrets Action Plan~~low regrets action plan~~, the IBCC considered several potential actions in relation to permitting: As part of the No-and-Low-Regrets Action Plan~~no and low regrets action plan~~, the IBCC considered several potential actions in relation to permitting: "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~~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." "Continue state coordination with the federal permitting entities: The State~~state~~ should continue to meet with federal agencies and look for opportunities, including entering into MOUs, to make NEPA and 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 of the positive is positive or not." "Support local permitting authorities to identify, as requested, multi-purpose components up front in a project planning to incorporate county and local concerns." "Upon request of a project proponent, encourage legislative resolutions in support of IPPs that meet the values of the CWP: the 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."

		"Publicly advocate for IPPs that meet the values of the CWP and have stakeholder support: the CWCB, members of the IBCC and the basin roundtables~~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." "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."
Arkansas BIP	"Significant challenges exist to achieving the storage goals of the Arkansas Basin, including government permitting, regulation, competing stakeholder interests, and reluctance of storage site owners to take on further responsibility."	No permitting solutions mentioned.
Colorado BIP	"Regulatory restrictions, high costs and variable geologic conditions have prevented proceeding with these conditional storage rights." "Water providers must recognize the change in permitting that has occurred and that has resulted in the lengthy and costly regulatory requirements for reservoirs. Rather than undertake this risk with no assurances of approval, water providers should consider other	"This BIP recommends that State, Federal and Local regulatory jurisdictions work collaboratively to improve the permitting process." "Improvements to the permitting process to support new water supply projects are imperative in securing safe drinking water in the future." "Secure 401 certification for specific places prior to a ROD by the Corps, through a coordinated permitting process that includes all permitting agencies, including local government" Measurable Outcome: "Reduced average permitting time for reservoir project to under 10 years" "Improve inefficiencies in reservoir permitting process between federal agencies and promote revisions and BMPs to improve process timeline and cost" "Further research needs to be conducted that will evaluate the reservoir permitting process and provide recommendations on improvements."

	alternatives."	
Gunnison BIP	Several of the project sheets list permitting as a constraint and challenge. In these cases, the text typically reads: "Issues limiting project implementation may include: Regulations – permitting requirements may limit construction activities and potentially increase cost and timing."	"Due to the numerous benefits to future water resource projects, the Gunnison Basin Roundtable recommends the reinstatement of a process similar to the CJRP or~~CJRPor~~ Colorado Coordination Council." In Strategies to address regulations, the following bullet points are included to streamline permitting or develop collaborative solutions: Collaborate with the CWCB to identify technical support mechanisms for Federal permitting activities Identify methods to proactively address potential regulatory pitfalls that generate excessive time delays and added costs Identify methods to streamline regulatory processes between multiple agencies with proactive, time-dependent deadlines Collaborate with the CWCB to identify financial support mechanisms for Federal permitting activities "Better management tools will optimize projects to meet multiple needs, minimize cost, and protect public health and safety. An example of this is the Extreme Precipitation Analysis Tool (EPAT). Reservoir storage restrictions currently cost the state some 74,000 acre–feet in lost storage opportunities. An updated EPAT would provide cost savings by minimizing necessary dam spillway sizes and would streamline the permitting process."
North Platte BIP	Regulations can be a constraint to securing acceptance of a project. Since a large amount of the land in the North Platte Basin is under federal ownership, permitting issues can impact project feasibility, cost, and schedule.... Regulatory bureaucracy and environmental impact requirements may significantly delay project timelines, increase costs and ultimately	In Strategies to address regulations, the following bullet points are included to streamline permitting or develop collaborative solutions: Collaborate with the CWCB to identify technical support mechanisms for Federal permitting activities. Identify methods to proactively address potential regulatory pitfalls that generate excessive time delays and added costs. Identify methods to streamline regulatory processes between multiple agencies with proactive, time-dependent deadlines. Collaborate with the CWCB to identify financial support mechanisms for Federal permitting activities.

	limit the ability of a project sponsor to implement a proposed project, regardless of the relative size of project scope. Regulatory streamlining and cooperative strategies may help address regulatory constraints."	
Rio Grande BIP	No permitting challenges mentioned.	No permitting challenges mentioned.
South Platte and Metro BIP	"In order to be developed, water supply, infrastructure, and treatment projects must go through a myriad of federal, state and local permitting processes which are both time and resource intensive. Improving the efficiency of current federal and state permitting requirements has the potential to save the public money while providing the same assurance of quality and due diligence. The Executive Order cites this issue and calls for the identification of potential areas of improvement in CWP. The intent is not to reduce existing environmental protections but to obtain permitting decisions in a more timely and cost effective manner with a more predictable process for federal and state engagement."	"The State of Colorado could support a more efficient EIS process for water supply projects.... Greater efficiency, cooperation, predictability, and consistency in the permitting process could be achieved by establishing guidelines for what the lead federal agency and all state and federal agencies involved in the process require for approval. Efficiency and predictability of the permitting process could be further enhanced by the State compiling agreed upon ranges, tools, and methodologies for assessing contentious topics such as hydrology modeling, system risk, conservation as a demand reducer, and others." "To increase the efficiency, consistency, and predictability of the EIS process, the State could work cooperatively with Federal agencies to develop a Programmatic EIS. Colorado's Water Plan could be used as the platform for a Programmatic EIS. Under a Programmatic EIS, no specific projects are approved, but it would create an analysis from which future specific approvals can rely." "Starting in 2010, the Corps, the DNR including the CWCB, and the US EPA embarked upon a process called CAWS. The major outcome of CAWS was an informal agreement among the three parties that conservation should be used as a demand reducer in analyzing the purpose and need for a project rather than during the alternatives analysis portion of the NEPA process. Though this informal agreement was not publicly documented, an important policy tool going forward could be the use of conservation as a demand reducer in the purpose and need segment of the EIS process. By doing this, water providers will have greater incentive to implement proactive conservation strategies to demonstrate decreased demand and strain on existing resources." "Scoping for 404 or NEPA permitting must follow federally required processes. Delays often result when new areas of analysis are identified late in the permitting process after scoping has occurred. By ensuring that regulating agency concerns are addressed in their entirety during the scoping process, applicants can more

accurately plan for the costs associated with the analysis and avoid delays."

"The State~~state~~ of Colorado could encourage the Corps and EPA Region 8 to revise their 1990 MOA on sequencing. Their current MOA says that the Corps must determine the Least Environmentally Damaging Practicable Alternative (LEDPA) first and then look at compensatory mitigation to authorize the LEDPA. A revision would enable public works projects to use compensatory mitigation in the identification of the LEDPA. This revision could be limited to public works projects."

"The State of Colorado's requirement for 401 certification~~401certification~~ and an approved Wildlife Mitigation Process could be improved to provide project proponents greater certainty in project planning. Earlier starts for these approval processes could effectively utilize information from the Federal Process to save project proponents and the citizens of Colorado time and money while allowing for greater certainty of project implementation."

Southwest BIP	No permitting challenges mentioned.	No permitting solutions mentioned.
Yampa/ White/Green BIP	No permitting challenges mentioned.	"Develop methods to assist with streamlining permitting in a cost-effective manner." "Success in permitting and constructing in-basin storage projects."

- Develop a common grant inquiry process coordinated across funding agencies for environmental and recreational project proponents. This will include revisiting and reorganizing how the current State Funding Coordinators Meeting is conducted.
- Review the CWCB's financial policies to consider providing financial incentives to move projects and methods forward and to assist small water providers in addressing upfront planning costs, such as reduced interest rate categories, extended terms (40 years), et al.
- Pursue additional funds to support the Water Efficiency Grant Program, which provides financial incentives for implementing conservation programs and planning for drought. Investigate expanding the authority of the program to provide grant funds to municipalities for documented water conservation/savings to help offset the economic impact of lost revenue because of reduced water usage. Develop funding recommendations.
- Assess whether there are additional loan opportunities for municipal conservation practices.
- Pursue funding to establish a water education and outreach grant program and develop recommendations on funding.
- Assess opportunities for additional WSRA grant funds. As part of this, work to amend the WSRA guidelines on how any additional funding is allocated, approved and disbursed to prioritize projects that provided the greatest benefit to Colorado.
- Seek an amendment to statutory language to expand the CWCB's loan program's authority to fund treated water supply, reuse, conservation, environmental, and recreational projects and methods.
- Continue to provide $1 million annually to support stream management and watershed plans, and develop an established funding source.
- In partnership with the water investment funding committee, review and prioritize water projects identified in the BIPs, in coordination with the basin roundtable representatives, to develop a funding plan for those that could move forward. Based on the identified funding level, develop funding strategies that use existing and new funding sources to move high-priority projects forward in one to three years.
- Investigate the potential for the CWCB to become a project beneficiary through an arranged partnership for projects that are central to fulfilling the goals of Colorado's Water Plan.
- Identify and develop, in two years, a single multi-benefit, multi-partner, shared infrastructure pilot project that is funded through a joint revenue stream of public and private funding. From this pilot project develop the framework for how future water public-private partnership projects will move forward, considering best procurement practices, maintenance and operation, water administration and management, et al.
- Continue to use the water investment funding committee, made up of representatives from each basin, the CWCB, the Water and Power Authority, Executive Director's Office, large water providers, and the private sector, to evaluate the funding recommendations contained within Colorado's Water Plan and others,

to develop a well planned, phased approach to provide funding for water projects, environmental projects, recreational projects, and stream and watershed management throughout the state. This committee met over the course of 2015 and will continue to meet to provide funding and implementation recommendations to the CWCB.

- Over the next year, continue to develop and fund a modern method to determine probable maximum precipitation for spillway sizing for dams in Colorado with the intent to provide additional storage while minimizing capital investment.
- Consider allocating all or a portion of any surplus in the Department of Natural Resource's severance tax operational account revenues, for efforts prioritized in Colorado's Water Plan.

5. The State will explore near-term opportunities to increase funding resources by implementing the following actions:
    - Develop preliminary support data for various public funding options, such as state referendums, individual county mill levy increases, the insurance tax premiums, user fees, or other potential funding mechanisms.
    - Explore a Center of Excellence to create a working model of public-private-partnerships for water projects and methods.
    - Explore how a water investment (public tax) fund could be created, managed and disbursed.
    - Work with other applicable state agencies to develop a reserve fund that would act as a security or repayment guarantee by the State to water providers seeking bond funds through the Authority.
    - Explore the concept of a container fee ballot initiative.
    - Develop issuance and repayment strategies in issuing Green Bonds, as early as 2016, for environmental and recreational projects. It's recommended that Green Bonds be issued incrementally based on identified need to minimize repayment costs.
    - Reassess the Instream Flow Tax Credit program to determine how to make it more usable.
    - Work with various stakeholders, Department of Real Estate, the Department of Revenue, and appropriate legislative committees to develop strategies to maximize the conservation tax credit program.
    - Explore potential uses of Conservation Tax Credit revenues for stream and watershed restoration.
    - Explore with water providers the possibility of issuing a state tap fee for future taps installed statewide. Funds developed could be used to support the CWCB Water Efficiency Grant Program and/or water education. The amount assessed per tap would need to be determined based on the estimated number of new taps issued statewide and target revenue.
    - Assess the funding opportunity from the Water Infrastructure Finance and Innovation Authority (WIFIA) and the Rural Infrastructure Fund for loans to rebuild aging water infrastructure. Encourage the U.S. Department of Transportation and

other agencies to share lessons learned regarding innovative financing programs with the Corps and the EPA as they implement WIFIA.

- Work collaboratively with foundations and nonprofits to support the environment, recreation, and education priorities through philanthropy.

9.3 State Water Rights and Alignment

Colorado's Water Plan ensures that state agencies coordinate the uses of their current and future water rights and will uphold Colorado's water values, as discussed in Chapter 1.

Several Colorado state agencies hold and exercise water rights for various beneficial uses that are authorized by Colorado's constitution and statutes, and by permits and water court decrees. The Division of Water Resources (DWR) administers water rights, including state-held water rights, within the state's priority system and does not own any water rights. As part of developing Colorado's Water Plan, the CWCB asked each state agency to develop an inventory of its water rights, to the extent it had not already developed one. This section describes state agencies that hold water rights, including each agency's mission and the legal basis for each agency's water rights and their uses. It also summarizes the agencies' water rights inventories and describes how the state is aligning its water rights with the water values identified in Colorado's Water Plan, provided in Chapter 1. Finally, this section describes how state agencies will work to maximize the use of their water rights to realize to greatest benefits to the state as a whole. Note that the inventory process is ongoing and the CWCB will continue to incorporate information as it becomes available.

Inventory of State Agencies' Water Rights

The CWCB

Mission and Statutory Authorities

Colorado established the CWCB in 1937 with the mission to *conserve, develop, protect, and manage Colorado's water for present and future generations.*[42] *Section 37-92-102(3), C.R.S. (2014) authorizes the CWCB to appropriate and to acquire water for instream flow water rights and natural lake level water rights to preserve and improve the natural environment to a reasonable degree. Section 37-60-106(n) authorizes the CWCB to take actions necessary to acquire or perfect water rights for projects it sponsors.*

The CWCB Water Rights Inventory

The CWCB currently holds 1595 decreed instream flow water rights that protect approximately 9180 stream miles and 480 decreed natural lake level rights.[43] The CWCB also has entered into 30 transactions by which it has acquired water, water rights, or contractual interests in water for instream flow use.[44] Pursuant to an agreement with the U.S. Army Corps of Engineers, the CWCB owns two storage rights in Bear Creek Lake in Jefferson County for approximately 2000 acre-feet, decreed absolute for piscatorial and recreational purposes, and conditional for municipal, domestic, industrial, and irrigation.[45] In 2012, the CWCB exercised its right to acquire its project water allocation of 10,460 acre-feet (supply) and 5230 acre-feet (depletions) in the Animas-La Plata Project. Currently, the project is decreed for municipal and industrial uses only, but the CWCB may

use this water for compact compliance, endangered species, and instream flow purposes.[46] The CWCB intends to sell or lease its water allocation to local water providers in southwest Colorado as demands dictate.

Finally, the CWCB is an active partner in the Chatfield Reservoir Reallocation Project and has multiple roles that include feasibility study sponsor, storage space share holder, and financial lender for low-interest project loans. Further, the Colorado General Assembly appropriated funding within two consecutive legislative cycles so that the CWCB could hold, and later disperse for investment recovery, a certain percentage of unused storage space commonly referred to as "orphan shares." In October 2014, following an approval letter and federal Record of Decision (ROD), the Colorado Department of Natural Resources (DNR) executed a storage contract with the U.S. Army Corps of Engineers to use up to 20,600 acre-feet of additional storage space in the reservoir.[47] The new space will be used to store water supply for multiple uses.

Uses of the CWCB's Water Rights

The CWCB uses its instream flow and natural lake level water rights to preserve the natural environment to a reasonable degree. In some cases, the CWCB uses water acquired for instream flow use to improve the natural environment to a reasonable degree. These uses enhance healthy watersheds, rivers and streams, and wildlife. Additionally, through its water acquisitions, the CWCB can work with other entities on multi-purpose projects, aligning water rights to meet consumptive and nonconsumptive needs.

One such example of a multi-purpose project is the CWCB's acquisition, in partnership with the Colorado Water Trust and Skyland Metropolitan District, of an interest in the Breem Ditch, located in the Gunnison River Basin. This project resulted in multiple uses of the acquired water right, which included preserving and improving the natural environment on Washington Gulch and the Slate River with subsequent municipal use by the District to meet the needs of its constituents. The CWCB, in partnership with the Colorado Water Trust, also has acquired an interest in the McKinley Ditch, located in the Gunnison River Basin. The CWCB will use the water in a split-season arrangement, under which a lessee will use the water to irrigate in the early season and the CWCB will use the water for instream flow use for the remainder of the irrigation season. These creative and flexible approaches enable the CWCB to work with its partners to protect Colorado's streams and the species that rely on them, to sustain agriculture, and to maximize beneficial uses of Colorado's water. The CWCB will use this water rights inventory process as a starting point for increased coordination with other state agencies to explore opportunities for sharing water.

The legislation that authorized the CWCB to appropriate and acquire water for instream flow and natural lake level water rights recognized the need to "correlate the activities of mankind with some reasonable preservation of the natural environment."[48] The General Assembly imposed that balance by limiting instream flow appropriations to amounts the CWCB determines are "required for minimum stream flows to preserve the natural environment to a reasonable degree."[49] The multi-purpose projects described above are an innovative and important way to benefit the natural environment while maintaining other uses of water. The CWCB acknowledges the many competing needs for water in Colorado and will continue to work closely with stakeholders to ensure instream

flow protection and other water uses co-exist harmoniously to achieve the necessary balance to uphold the Colorado Water Plan water values.

Colorado Parks and Wildlife (CPW)

Mission and Statutory Authorities

CPW was created by the merger of the Division of Parks and Recreation and the Division of Wildlife in 2011.[e] The two state agencies are responsible for conservation, outdoor recreation, and wildlife management for current and future Coloradans.[50] CPW's mission statement is: "To perpetuate the wildlife resources of the state, provide a quality state parks system, and provide enjoyable and sustainable outdoor recreation opportunities that educate and inspire current and future generations to serve as active stewards of Colorado's natural resources."[51] CPW is authorized to acquire land and water, or interests in land and water, for wildlife purposes and parks and outdoor recreation purposes.[52]

CPW Water Rights Inventory

At present, CPW holds or manages approximately 1320 decreed water rights, acquired primarily using sportspersons' dollars dedicated to preserving wildlife habitat, providing public access, and producing fish to stock state waters. Using general descriptors of these water rights, roughly 620 are direct flow surface water rights, 270 are groundwater rights, 220 are spring rights, and 210 are storage rights. The water rights are decreed for irrigation, piscatorial uses, direct flow rights for fish propagation, wildlife and recreation, and domestic rights for employee housing and water supply for drinking and sanitary purposes at state parks. Some permitted wells, other water interests not associated with court decrees, and various agreements are not included in this number.

Uses of CPW Water Rights

Governor Hickenlooper, through his executive order, required that Colorado's water values (outlined in Chapter 1) be reflected in Colorado's Water Plan.

CPW is the state agency charged with protecting wildlife and natural resources and providing recreation now and for future generations. Nearly all of the water rights owned or leased by CPW are dedicated to this purpose.[f] This directly supports the Governor's goals and the agency's constitutional and statutory obligation to protect, preserve, enhance, and manage wildlife and recreation for the use, benefit, and enjoyment of the people of this state and its visitors.

There is statewide acknowledgement that supporting environmental and recreational attributes is vital to local economies and Coloradan's quality of life. The statewide environmental and economic benefits provided by Colorado's streams and lakes require that the state protect environmental, wildlife and recreational water needs. For example, endangered or threatened species and species of concern exist throughout the state; consequently, the State must ensure that there is water

[e] House Bill 11-208 established the merger of the Division of Parks and Recreation and the Division of Wildlife. House Bill 12-1317 established the composition of the new Parks and Wildlife Commission

[f] The 'Parks' side of CPW has some domestic water rights that provide water for bathing, drinking etc. at State Parks. These are the only rights not dedicated to protection and preservation of wildlife and natural resources.

available to support these species. Similarly, while there are hotspots for recreation (e.g., rafting on the Upper Arkansas River and fishing on the Colorado River), the state benefits by supporting healthy multi-faceted recreational economies on both the Front Range and on the western slope.

CPW provides outdoor recreation, hunting, and fishing opportunities for more than 12 million state park visitors, 284,000 licensed hunters, and 733,000 licensed anglers. About 45 percent of Coloradans report that they regularly visit state parks. Recent studies indicate that roughly 18 percent of Coloradans are anglers and almost 5 percent of Coloradans hunt. Additionally, over 80 percent of all Coloradans use trails and over 50 percent participate in water sports. Overall, activities supported by CPW result in over 24 million recreation days per year in Colorado.

CPW's water use supports:

- Fisheries (rivers, reservoirs)
- Fish stocking (hatcheries)
- Recreation (fishing, boating, hunting, wildlife viewing)
- Habitat
    - Instream flows
    - Conservation pools in reservoirs
    - Wetlands, riparian habitat
    - Forage production, terrestrial habitat through irrigation
- Threatened and endangered species protection, recovery and propagation
- Groundwater recharge
- Drinking water for visitors to state parks and wildlife areas

Partnerships are critical to CPW's mission. CPW works extensively with private landowners, local, state, and federal agencies, other public entities, such as water districts and municipalities, and non-governmental organizations (NGOs) in a number of wildlife and recreation related areas. Some of the water-related projects include:

- Partnerships for protecting and restoring species of concern such as the Colorado River cutthroat trout, roundtail chub, bluehead sucker, and flannelmouth sucker.
- General fishery management strategies regarding management classifications for all waters in the state such as the Basin Aquatic Wildlife Management Plans.
- Partnerships with agricultural water users to share and coordinate the use of water resources, such as the Rio Grande cooperative agreement and the Tamarack Ranch groundwater recharge project.
- Development of data to understand water quality issues and support wise water quality management.
- The Habitat Partnership Program is funded by revenue from the sale of big game licenses and develops partnerships among landowners, land managers, sportsmen, the public and CPW to reduce wildlife conflict, particularly conflict associated with forage and fencing. Habitat Partnership Program committees are responsible for finding local solutions to local problems. This program works with public and private landowners to develop distributed water features, such as stock ponds, solar wells, and springs statewide, that improve livestock or game distribution on the landscape and keep riparian damage to a minimum.

- Protect water-dependent conservation values on easement properties helping to minimize agricultural dry-up and provide long-term benefits to wildlife and landowners.
- Investments that provide public access and recreational opportunities to and on otherwise private land and water rights.
- Work with the CWCB on the protection and enhancement of streams and lakes through the Instream Flow Program. For example, in 2012, CPW loaned water to the CWCB from Lake Avery for instream flow use on Big Beaver Creek and the White River.
- Work with the Colorado Department of Public Health and Environment to ensure protection of water quality for fish, amphibians, wildlife, plants and people.
- Provide water to enhance wetlands on Natural Resource Conservation Service Wetlands Reserve Program easements in the San Luis Valley, benefitting both wildlife and agricultural operations.

CPW is committed to developing positive relationships in every area of the state. There is also the potential to bolster CPW's work with other state agencies to develop and realize additional benefits from water assets. For example, CPW looks forward to working more closely with the State Land Board (SLB) to develop ways to use water assets that enhance wildlife habitat on state trust lands.

While some examples of projects with multiple benefits are listed above, the ability to use any particular water right for multiple purposes is generally a function of the individual water right decree. CPW's water is first and foremost dedicated to environmental, wildlife, and recreational uses, with most of CPW's water rights decreed for these uses. However, CPW actively works within the various water basins to find opportunities to optimize the use of water to benefit Coloradans without diminishing the protect wildlife, habitat, and recreational facilities.

Colorado State Land Board (SLB) of Commissioners

Mission and Constitutional/Statutory Authorities

The SLB protects, enhances, and manages Colorado's permanent endowments of assets to generate revenue for Colorado's public schools and public facilities. The SLB believes that economic productivity in perpetuity is dependent on sound stewardship, which includes the protection and enhancement of the beauty, natural values, open space, and wildlife habitat of those lands. Amendment 16 of the Colorado Constitution and Section 36-1-118, C.R.S. govern the SLB's management of its assets.

SLB Water Rights Inventory

The majority of the SLB's water assets consist of agricultural stock wells. The SLB's inventory identified and verified the following water assets:

Table 9.3-1: SLB Water Assets		
Type of Water Asset	**Quantity**	**Comments**
Ownership Shares in Ditch Companies	9	Used to support agricultural leases located on state trust land.
Decreed Surface Water Structures	17	
Decreed Groundwater Structures	117	
Permitted Structures	55	
Agricultural Stock Wells (estimated)	3,000	These are stock wells located on state trust land, used to support grazing leases and permitted at less than 15gpm.

Uses of SLB Water Rights

All water rights currently owned by the SLB are used to support agricultural production on state trust lands. This directly supports the agency's constitutional and statutory obligation to "protect and enhance the long-term productivity and sound stewardship of state trust land held by the board" by promoting sound land management practices, long-term agricultural productivity, and community stability. This use of the SLB's water rights also supports Colorado's Water Plan goal to maintain viable and productive agricultural lands.

Additional opportunities for the SLB to work with other state agencies to develop and maximize benefits from its water assets include:

- leasing existing water assets to CPW or the CWCB to support projects that enhance wildlife habitat on state trust lands;
- selling or leasing land to other agencies for the development of new water projects; and
- purchasing new water assets that can be held by the SLB and leased to other state agencies.

History Colorado

Established in 1879, History Colorado is both a state agency under the Department of Higher Education and a 501(c)(3) charitable organization.[53] History Colorado is a trustee of the state and holds property on its behalf.[54]

Table 9.3-2: History Colorado Water Assets		
Type of Water Asset	**Quantity**	**Uses**
Leased Water Rights	2	Commercial, Domestic, Storage
Decreed Surface Water Structures	2	Augmentation
Decreed Groundwater Structures	7	Commercial, Domestic, Industrial, Irrigation, Geothermal

History Colorado Water Rights Inventory

History Colorado's water assets are a mix of surface, ground, and leased rights. History Colorado's inventory identified and verified the following water assets:

Uses of History Colorado's Water Rights

History Colorado uses its water rights in connection with the operation and maintenance of its museums and historic sites.

Colorado Department of Corrections (DOC)

Mission and Statutory Authorities

The DOC is governed by Article 17, C.R.S. (2014). The DOC's mission is "To protect the citizens of Colorado by holding offenders accountable and engaging them in opportunities to make positive behavioral changes and become law-abiding, productive citizens."[55] Section 37-88-101 authorizes the DOC to own ditches, canals and reservoirs for irrigation and domestic purposes.[56] Section 17-24-106 authorizes the Division of Correctional Industries to own real and personal property, which includes water rights.[57]

The DOC Water Rights Inventory

The DOC owns a number of water rights, including surface and groundwater rights and one storage right, located in Water Divisions 2, 4, and 5. The decreed uses of these water rights include: irrigation, (including irrigation by reuse and successive use of treated wastewater), domestic, exchange, augmentation and recreational (including fish and wildlife), storage and subsequent application to beneficial uses, sanitary, commercial, industrial, stock watering, mechanical, horticultural, fire protection, and manufacturing.

Uses of the DOC's Water Rights

Currently, the DOC uses most of its water rights for landscape irrigation and to support the Division of Correctional Industries agribusiness program (e.g. raising pasture grass and hay to support cow-calf dairy herd development). The DOC uses the wells and reservoir associated with the Rifle Correctional Center in Garfield County to support all functions at the facility, including irrigation needs.

Actions

Based upon the information compiled in the state agency water rights inventory process, the state agencies discussed in this section are currently using their water rights in ways that accomplish their respective missions, benefit the state, and further the water values underlying Colorado's Water Plan. To further align state water rights with these values and maximize the use of these water rights to realize all possible benefits to the state, the following actions are necessary:

1. The CWCB will continue to work with state agencies to compile and update inventories of their water rights.
2. The CWCB and other state agencies will use the information resulting from the inventory as a basis for coordinating agencies' water right uses and potentially sharing water to provide additional benefits to the state. To accomplish this, the CWCB and other state agencies will:
    a. Convene work groups comprised of multiple agencies' staff to identify opportunities to align the agencies' water rights to achieve additional benefits and where feasible, use those water rights to meet identified needs. For example, the CWCB and CPW can identify opportunities for releases from CPW reservoirs to be protected under the state's Instream Flow Program;

   b. Encourage sharing and optimal use of water among state agencies where efficiency savings might be realized, and
   c. Conduct technical and legal feasibility analyses of identified opportunities for aligning or sharing agency water rights and advance feasible projects in a timely manner.
3. The CWCB will identify state-owned water rights within the Colorado River Basin and evaluate opportunities for these rights to assist with Colorado River Compact compliance. For example, the Animas-La Plata project contract between the BOR and the CWCB recognizes that the state's stored water right in the project could be used for compact compliance purposes. There may be other state resources like this one that could assist the state in complying with its obligations under the Colorado River Compact.
4. The CWCB will continue to schedule joint meetings with local governmental water management agencies around the state to facilitate information sharing and coordination on common water rights issues.
5. The CWCB will work with local stakeholder groups to determine where instream flow water rights could provide the greatest benefits, and assist such groups with the instream flow recommendation process.
6. The CWCB will partner in the early stages of future multi-purpose projects as a water rights holder when such partnership is needed to ensure the success of the project, minimize environmental impacts of a project, or otherwise further the water values in Chapter 1.
7. In coordination with the CWCB and interested stakeholders, CPW will take the lead on identifying opportunities to use CPW's water rights to help fill environmental and recreational gaps while maintaining consistency with its mission, statutory mandate, and rules/policies governing the use of CPW property.[g]

[g] Colorado Parks and Wildlife is funded primarily through the sale of hunting and fishing licenses, parks passes and permits, and the receipt of associated federal parks and wildlife funds. All real property interests, including water rights, purchased with wildlife cash, parks cash, or associated federal funds are required to be used only for parks and wildlife purposes. *See* sections 33-1-112(1), 117, 118, and 119, 33-9-107 and 109, 33-10-108(1), 111, 112, and 113, C.R.S.; *see also* 16 U.S.C. 669 to 669i, 16 U.S.C. 777 to 777l, and 16 U.S.C. 460l-4 to 460l-11. As such, there is limited ability to use such water rights for any purpose other than the originally intended parks and wildlife purposes. Any secondary or shared uses must be consistent with, and not otherwise impair, the water rights' originally intended parks and wildlife purposes.

9.4 Framework for a More Efficient Permitting Process

Colorado's Water Plan advocates effective and efficient permitting in which State of Colorado agencies work together to complete their work early in the permitting process. This will provide the opportunity for state endorsement without being pre-decisional.

Introduction

Governor Hickenlooper's May 2013 Executive Order reiterated that the gap between Colorado's water supply and water demand is real and looming. While conservation is a key strategy to narrowing the gap across the state, it alone cannot solve the problem. Scenario planning indicates that at least 80 percent (350,000 acre-feet) of already planned projects need to be implemented, and many of these still need to go through the permitting process.[58] Ideally, the permitting process ensures the implementation of projects that best meet Colorado's water values—to support vibrant and sustainable cities, viable and productive agriculture, a robust tourism industry, efficient and effective infrastructure, and a strong environment. The current permitting process needs review and the Executive Order directed the CWCB to "streamline the State role in the approval and regulatory processes regarding water projects."[59]

The objective of this section is to explore how permitting in Colorado can be more effective and efficient. Tackling permitting is extremely difficult because of the complexity of the projects, the challenges in understanding and reducing environmental impacts, and the condition of many of the aquatic systems. The section describes the current permitting and licensing processes, the challenges that arise during the process, and the reforms that could make the process more efficient and effective for all parties involved. The proposed solutions focus on how the State can be more effective and eliminate and reduce redundancies. The section also touches on the benefits of cooperation among federal agencies, local governments, and stakeholders. The approach described in this section allows the State to endorse a project without predetermining the outcome of an environmental permit, certification, or mitigation plan.

Summary of Each Process within Water Permitting

This section briefly explains the state and federal process that project proponents are required to address to complete their project. A description of entities involved in permitting can be found in Section 2.4.

National Environmental Policy Act (NEPA) Process

NEPA is a federal law that establishes a structured planning and decision making framework required for any federal decision with the potential to significantly impact the human environment. NEPA requires federal agencies to assess the environmental effects of their proposed actions before decision making. Importantly, NEPA provides opportunities for citizen involvement in government decision making through public disclosure and formal opportunities for public input as the environmental effects are evaluated.[60]

There are three situations in which a water supply project may trigger NEPA's procedural requirements:

- One or more project components will occur on federal lands (e.g: National Forest or Bureau of Land Management lands)
- The project or its components will be funded in part or whole by a federal funds; and
- The project will require a federal permit or license

For water projects in Colorado, the most common federal actions that lead to a NEPA environmental review are: a Bureau Of Reclamation contract for storage of water in a facility managed by that agency, a U.S. Army Corps of Engineers (Corps) Clean Water Act (CWA) Section 404 permit, a project component that will be built on federal land, or a Federal Energy Regulatory Commission hydropower license.[61]

The NEPA process is intended to help public officials make decisions that based on an understanding of environmental consequences and take actions that protect, restore, and enhance the environment.[62] NEPA regulations instruct federal agencies to use the NEPA planning process "to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment" and to use all practicable means "to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions."[63] It is through public and agency input that these goals are to be achieved.

The NEPA process begins when the federal agency determines there is the need to take an action. The federal agency that needs to take action is the lead agency and is the agency responsible for compliance with NEPA. Depending on the circumstances, a joint lead agency and/or cooperating agencies can be identified to share in the responsibilities of completing NEPA environmental review. For many state water projects, an Environmental Impact Statement (EIS) process is required when a project may have significant environmental impacts.[64]

NEPA regulations direct federal agencies, to the fullest extent possible, to integrate the requirements of NEPA with other planning and environmental review procedures required by law or by agency practice so that all such procedures run concurrently rather than consecutively.[65] This goal is often not met, leading to an extended, consecutive planning process. To successfully achieve the goal of concurrent planning, the NEPA process must start at the earliest possible time within the water supply project planning process. It is recommended that proponents assess whether a project proposal is likely to trigger NEPA planning requirements at the start of planning and then engage the relevant federal agencies immediately.

Clean Water Act Section 404

Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and mining projects. Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation (e.g. certain farming and forestry activities).

In summary, the Code of Federal Regulations (CFR) 40 Part 230 Section 404(b)(1)(Guidelines) states, no discharge of dredged or fill material may be permitted if:

- A practicable alternative exists that is less damaging to the aquatic environment
- Causes or contributes to violations of any applicable state water quality standard
- It violates any applicable toxic effluent standard
- It jeopardizes the continued existence of species listed as endangered or threatened under the Endangered Species Act
- The nation's water would be substantially degraded; and unless steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem.

Like NEPA, Section 404 requires specific, structured planning steps and information most efficiently addressed at the initial stages of project planning, and development. Various federal agencies have different Section 404 roles and responsibilities. The Corps administers the day-to-day permitting program, including individual and general permit decisions. The Corps also conducts or verifies jurisdictional determinations, develops policy and guidance, and enforces Section 404 provisions. The EPA develops and interprets policy, guidance and environmental criteria used in evaluating permit applications. The EPA also determines the scope of geographic jurisdiction and evaluates the applicability of any exemptions, approves and oversees state and tribal assumptions, and reviews and comments on individual permit applications. The EPA has the authority to prohibit, deny or restrict the use of any defined area as a disposal site under section 404 (c), may elevate specific cases for further evaluation under Section 404(q), and enforces Section 404 provisions. The U.S. Fish and Wildlife Service (FWS) evaluates impacts on fish and wildlife of all new federal projects and federally permitted projects, including projects subject to the requirements of Section 404. The FWS also elevates specific cases or policy issues about an individual permit that is required for activities that have potentially significant impacts. Individual permits are issued by the Corps, which evaluates applications under a public interest review, as well as the environmental criteria defined in the Guidelines, and NEPA regulations if they are applicable. For most discharges that have only minimal adverse effects, a general permit is issued. General permits are issued on a nationwide, regional, or state basis for particular categories of activities. Large scale water projects require an individual Section 404 permit.[66]

401 Water Quality Certification

Under Section 401 of the CWA, if an activity that requires a federal license or permit may cause any discharge into navigable waters, the applicant for the federal license or permit must obtain a 401 certification to protect water quality. The Water Quality Control Division (WQCD) is required by Colorado statute (C.R.S., §25-8-302(1)(f)) to review federal licenses and permits under Section 401 of the CWA Colorado Water Quality Control Commission (WQCC). Regulation No. 82 (5 CCR 1002-82) authorizes the division to certify, conditionally certify or deny certification of federal licenses. It also sets forth best management practices (BMPs) applicable to all certifications, with one exception noted below.[67] Regulation No. 82 applies to division certification of CWA 404 permits issued by the Corps, licenses for hydropower projects issued by the Federal Energy Regulatory Commission, and other federal permits involving a discharge including CWA Section 402 discharge permits issued by the EPA.[68] The exception is for 402 discharge permits issued by the EPA for facilities on tribal lands, for Section 404 permits issued by the Corps on tribal lands, and for 402

permits issued by the EPA for federally owned facilities on federal lands. For these facilities, the EPA issues the 401 certification.[69] Individual certification review is not required for Section 404 general or nationwide permits issued by the Corps, except for activities covered by certain nationwide permits on tribal lands. Except for the activities on tribal lands, general or nationwide permits are certified under statute (C.R.S., §25-8-302(1)(f)) without additional conditions.

The WQCD issues a Section 401 water quality certification when it determines there is reasonable assurance that both the construction and the operation of the project will comply with state surface and groundwater water quality standards and requirements. If the Division concludes that the project will comply with the water quality standards and requirements, only if one or more conditions are placed on the license or permit, the Division will issue the certification with the necessary conditions included. House Bill 15-1249 passed during the 2015 legislative session. It repeals and reenacts statutory fees for clean water and drinking water programs in the WQCD of the Colorado Department of Public Health and Environment (CDPHE). One of the many provisions of the bill authorized new fees for the CDPHE certifications related to projects affecting regulated water quality standards in jurisdictional waters of the United States, known as 401 certifications. The WQCC establishes 401 certification fees by rule according to a tiered schedule, with these fees taking effect starting in FY 2016-17.

Fish and Wildlife Mitigation Plans

Colorado State Statute 37-60-122.2 (C.R.S.), known as the Fish and Wildlife Resources Fund and Authorization, declares that fish and wildlife resources are a matter of statewide concern and that impacts on such resources should be reasonably mitigated by applicants proposing water diversion, delivery, or storage projects. Applicants must submit a proposed mitigation plan to the CPW Commission for review and approval. If the applicant and the Commission reach a mutual agreement, the proposed plan is forwarded to the CWCB for Board adoption as the official state position. If the Commission rejects an applicant's plan, it is still forwarded to the CWCB. If the CWCB disagrees with the Commission, then the Governor decides whether to approve the plan.

A mitigation plan is generally required when an applicant seeks a permit or license from the federal government for the specified types of water projects, with some exceptions as noted in the statute.[70] The CWCB has grant funds available for applicants to help implement the mitigation plans. The CWCB has established criteria for such grants.[71] Examples of completed or in progress Section 122.2 plans include Southern Delivery System (SDS), Windy Gap Firming Project, Moffat Collection System Project, and Chatfield Reservoir Reallocation project.

Reclaimed Water Regulation

The Colorado Water Quality Control Commission Regulation No. 84 (5 CCR 1002-84) and the WQCD's reclaimed water program is designed to promote the use of reclaimed water in Colorado. It includes requirements and minimal standards for reclaimed water and for treaters and users of reclaimed water to employ Best Management Practices for its use. These minimal standards are necessary to protect public health and the environment. Regulation applies to the use of reclaimed water for landscape irrigation, agricultural irrigation, fire protection, industrial, and commercial uses as detailed in the table below. The treatment and best management practices required before

and during use depend on the use of the reclaimed water. Regulation 84 requires treaters and users to obtain and comply with a notice of authorization issued by the WQCD. The notice of authorization contains the terms, limits, and conditions, deemed necessary to ensure compliance with Regulation 84.

1041 Local Permits

In 1974, the Colorado General Assembly enacted measures to define the authority of state and local governments in making planning decisions for matters of statewide interest. These powers are commonly referred to as "1041 powers," based on the number of the bill of the proposed legislation (House Bill 74-1041). These 1041 powers allow local governments to identify, designate, and regulate areas and activities of state interest through a local permitting process. The general intention of these powers is to allow for local governments to maintain their control over particular development projects, even where the development project has statewide impacts. The statute concerning areas and activities of state interest can be found in 24-65.1-101 (C.R.S.)

Table 9.4-1: Reclaimed Water Uses Authorized in Regulation 84

Approved Uses	
Industrial	Evaporative Industrial Processes
	Washwater Applications
	Non-Discharging Construction and Road Maintenance
	Non-Evaporative Industrial Processes
Landscape Irrigation	Restricted Access
	Unrestricted Access
	Resident-Controlled
Commercial	Zoo Operation
	Commercial Laundries
	Automated Vehicle Washing
	Manual Non-Public Vehicle Washing
Fire Protection	Nonresidential Fire Protection
	Residential Fire Protection
Agricultural Irrigation	Non-Food Crop Irrigation and Silviculture

Generally, development may only proceed if consistent with the environmental and developmental goals of the local communities as outlined in their 1041 regulations.

Of particular interest to many local governments are impacts from the construction and operation of large-scale water projects. The Act authorizes local governments to designate the site selection and construction of major new domestic water and sewage treatment systems, the major extension of existing domestic water and sewage treatment systems, the site selection and development of new communities, and the efficient utilization of municipal and industrial water projects as "activities of statewide interest." Local governments may not pass regulations that are completely

prohibitive of the building of municipal water facilities and expansion of existing projects. The Act allows the locality to require a permit with designated conditions before construction.

Past and Existing Colorado Efforts

In the past, there have been several attempts to coordinate the permitting process. The Colorado Joint Review Process (CJRP) was created by the General Assembly in 1983 to improve the environmental permitting process primarily for energy development. The CJRP was never fully completed for any project.[72] It is not clear if this is because the energy industry collapsed, or if the process was not considered helpful. Many projects failed to proceed for economic reasons. The CJRP also coordinated the State's combined responses to major projects such as the review of the proposed Denver International Airport, the Two Forks veto, and Colorado's bid for the Super Conducting Super Collider. In 1996, the General Assembly allowed the CJRP legislation to expire.

Another attempt to coordinate the review process was initiated in 2003 when Colorado's General Assembly established the Colorado Coordination Council through HB03-1323. The Executive Director of the DNR was designated as the administrator of the council. It was a voluntary coordination process that sponsors could choose to use. The permitting areas allowed within the process included "extraction, use, conservation, transportation, or management of natural resources" that required permits, approvals or compliance from federal, state, or local governments.[73] This process was never used, and the statutes supporting the council were allowed to expire in 2013. According to the Colorado Department of Regulatory Affairs (DORA), which reviews statutes set to expire, "Very few outside, or even inside, DNR were aware of the Council's existence. Indeed, most stakeholders contacted as part of this sunset review had never heard of the council... Those within DNR acknowledged that DNR conducted no outreach to inform the community of the Council's existence and, to the best of anyone's recollection, no one at DNR had ever suggested that a project sponsor utilize the Council."[74]

Recently, the State and various Federal agencies have made progress through the use of Memorandums of Understanding (MOUs). No formal legislation was passed to initiate the development of MOUs. These documents assist in creating a structure for the State and these respective agencies to work together with the intention of making a more coordinated permitting process.[h] Progress has been made on a Collaborative Approach to Water Supply Permit Evaluation (CAWS) through a series of facilitated conversations, among several parties an informal agreement resulted in which conservation could be treated either as a demand reducer or as an alternative to the project**.** The process was initiated by the DNR to mutually understand state and federal permitting processes and requirements and identify areas with potential for improved efficiencies.[i]

[h] Examples include the FERC MOU concerning collaboration with other federal permitting entities and the State and Forest Service MOU concerning coordination with the Colorado Department of Natural Resources and Forest Service.

[i] Collaborative Approach to Water Supply Permit Evaluation (CAWS) MOU: Beginning in 2010, the Colorado Department of Natural Resources, U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers met to educate federal permitting partners about state planning and permitting issues. Out of that process, an MOU was developed concerning the utilization of conservation. Rather than conservation being considered as an alternative, it was agreed to that it would be factored into reducing demands as part of the

Despite the lack of an official coordinating statute for state and federal permitting entities, there is coordination. Recently, CPW and the WQCD have become cooperating agencies for several projects undergoing the EIS process of NEPA. Project proponents indicated that this has been a helpful, collaborative effort.[75] In addition, there is increased coordination within the DNR.

In 2012, President Obama issued Executive Order 13604, "Improving Performance of Federal Permitting and Review of Infrastructure Projects."[76] Specific federal agencies reportedly applied an expedited review process to 50 pilot projects; each with an accelerated schedule, clear project review milestones, and a designated lead coordinating agency. The project progress was tracked on a "Federal Infrastructure Permitting Dashboard." The Dashboard contained an IT platform where agencies could develop a cooperative schedule, share project documents, and quickly communicate with one another.[77]

Basin Roundtable and Inter Basin Compact Committee Concepts Concerning Permitting

The Interbasin Compact Committee's (IBCC) no-and-low regrets action plan and the BIPs developed by the basin roundtables discuss permitting in depth. Of the eight BIPs, six discuss challenges or solutions. Table 9.4-2 at the end of this section quotes these important stakeholder sources.

While the individual statements in the table do not reflect the position of the State of Colorado, careful consideration of the challenges and solutions should be incorporated into future discussions.

Additional Stakeholder Outreach

To further understand the needs, issues, and potential solutions for the permitting process, the CWCB staff met with and interviewed a variety of water providers, environmental groups, and state and federal partners. The following is a list of organizations the CWCB met with or received comments from concerning permitting. In addition, several individuals provided comment, but are not listed.

The CWCB staff will continue to meet with state and federal permitting and licensing partners throughout the development of Colorado's Water Plan. Staff met with or is in the process of scheduling interviews with the following organizations:

- Ute Water Conservancy District
- Centennial Water & Sanitation District
- U.S. Fish & Wildlife Service
- Bureau of Land Management
- United States Forest Service
- National Resource Conservation Service
- Environmental Protection Agency

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purpose and need of the project. While this MOU has not yet been finalized, an important collaborative process was begun to help each agency understand opportunities and constraints that may inform the MOU and streamline processes in the future. Additional efforts will take place to revise and/or finalize the MOU as appropriate.

- Colorado Department of Agriculture
- Colorado Counties Incorporated
- Colorado Municipal League

Stakeholders across sectors desire improved coordination and increased early involvement, regardless of whether they represent environmental or utility interests. In many cases, stakeholders believe that these two aspects would shorten permitting time while upholding the environmental protections permitting secures. Multiple stakeholders also express interest in reducing duplication, increasing resources, lowering costs, unifying methods, increasing clarity, examining reuse permitting, improving quality of draft EISs, and encouraging multi-purpose projects.[78]

Table 9.4-2: Stakeholder Input

	Met with the CWCB	Provided Written Comments
Colorado Department of Public Health & Environment (CDPHE)	X	
Colorado Parks & Wildlife (CPW)	X	
Colorado Attorney General's Office (AGs Office)	X	
Division of Water Resources (DWR)	X	
Northern Colorado Water Conservancy District (NCWCD)	X	X
Trout Unlimited (TU)	X	
South Metro Water Supply Authority (SMWSA)	X	X
U.S. Army Corps of Engineers (Corps)	X	
Environmental Protection Agency (EPA)	X	
Bureau of Reclamation (BOR)	X	X
Federal Energy Regulatory Commission (FERC)	X	
Denver Water	X	X
Upper Yampa Water Conservancy District	X	
Northwest Colorado Council of Governments	X	X
Western Resource Advocates (WRA)	X	X
Colorado Springs Utilities	X	X
Water Reuse Association	X	X
Aurora Water		X
City of Thornton		X
Front Range Water Council		X
Conservation Colorado		X
Colorado Wastewater Utility Council		X
Colorado Oil and Gas Association		X
Pikes Peak Regional Water Authority		X
Fountain Valley Authority		X
Douglas County		X

One common concept is to bring back something akin to the Colorado Joint Review Program described above. The establishment of a joint NEPA review process, beginning before land use

authorization applications are submitted for new water projects, may prove to facilitate a more efficient process. The Bureau of Land Management's experience is that applicants who are willing to have pre-application discussion of potential impacts and perform analysis of alternatives before submitting land use authorization applications experience much shorter wait times.

The Northwest Colorado Council of Governments envisioned the process in the greatest detail, which is summarized below:

> Because it is expensive, time consuming, and sometimes "work for the sake of work" for the applicant, regulators, local governments, and other stakeholders to participate in a NEPA process, the State should facilitate a joint review process before and during the NEPA process. This sort of "front loading" minimizes the costs to the applicant and other stakeholders because as early as possible, the applicant and regulators understand what concerns, impacts, and potential for mitigation are relevant in the areas affected by the project; and what will be necessary to satisfy federal, state and local laws and regulations.
>
> This approach also improves the likelihood that alternatives, reports, and studies that are generated during NEPA will be more focused and responsive to actual, real world concerns, rather than reports and studies that are off the mark. Agreement can be reached on the scope of alternatives, reports and studies before the applicant/regulators spend money on consultants to prepare pounds of paper that ultimately are not necessary to satisfy NEPA, the regulators, or affected stakeholders.
>
> Another important result of the process is that for each project, the joint review process would define the regulatory framework and where the overlaps between state, local, and federal processes are, so that they could be coordinated rather than duplicative or contradictory. This saves money for the applicant, the regulators, and the public concerned about the project as well as ensuring that permits can be issued more quickly.
>
> Finally, it provides a forum to formulate agreements, like the Windy Gap Firming Project IGA, that result in projects that benefit the project proponent, the environment, and affected interests.
>
> In order to be part of the joint review process, participants would have to agree to certain principals regarding rules of engagement. Those rules would require that the parties work in good faith, explain interests not take positions, among others.
>
> The local governments from the areas that would be affected by the project should be responsible for identifying the appropriate local stakeholders and coordinating local input.
>
> Critical input points during the process are during:
>
> 1) Scoping
> 2) Developing alternatives

3) Determination of methodologies and data gaps
4) Mitigation and enhancement plans

The Front Range Water Council suggests that Colorado use, or modify, the expedited federal permitting procedures and dashboard developed as a result of Presidential Executive Order 13604 described above.

Permitting Issues and Potential Process Improvements

Several common potential process improvements emerged after reviewing the work of the IBCC and basin roundtables and the comments from water providers, the conservation community, and various state and federal agencies. Based on these discussions, the CWCB identified the following process improvements to explore further:

1. **Improve Coordination**
   - Coordinate review efforts by different state agencies.
   - Coordinate EIS document review across state agencies with the goal of increasing efficiency.
2. **Increase Early Involvement**
   - Examine opportunities for state agencies, local governments, stakeholders, and federal agencies to get involved earlier in the NEPA process.
   - Involve NEPA and CWA Section 404 lead agencies (if applicable) at the very initiation of project planning to assure a concurrent (vs. sequential) planning process. This will facilitate early identification of required planning steps and information needs.
3. **Coordinate Technical Methods**
   - Reduce duplication of technical methods across state agencies, respecting the various authorities and obligations within existing law**.**
4. **Increase State and Other Resources**
   - Shorten the length of time to complete the required environmental reviews while maintaining a robust decision-making process.
   - Evaluate potential future state staff demands and associated resources to complete the reviews in a timely manner at the beginning of permitting process. .
5. **Increase Clarity**
   - Increase understanding of the information required for environmental reviews.
   - Identify required technical elements, assessment methodology, and results of reporting of environmental parameters, including hydrology, conservation, scenario planning, water quality status and designated uses, modeling applicability, and risk tolerance.
   - Understand the role of conservation in purpose and need development.
   - Develop a state certification and mitigation handbook for project proponents and stakeholders.
6. **Improve the Quality of Draft EIS Documents**
   - Enhance efficient completion of state certification, federal permitting, and mitigation plan processes.
   - Emphasize issue identification earlier in the EIS process by involving all parties with a decision-making role and by collecting baseline environmental data.
7. **Encourage Multi-purpose Projects**

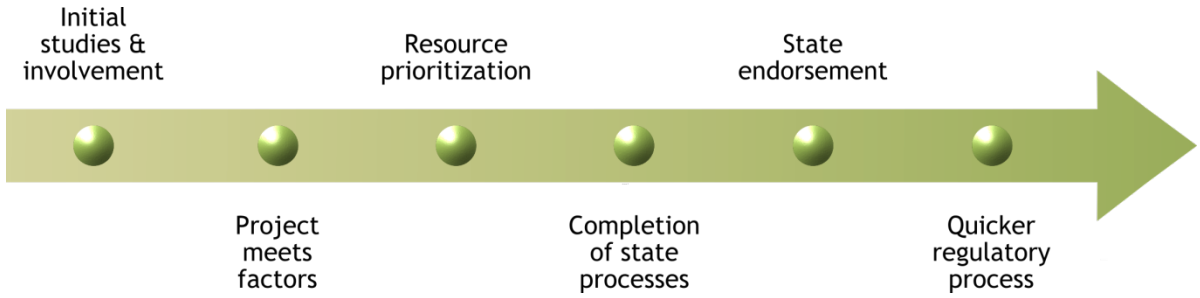
- Facilitate projects with multiple objectives such as municipal, industrial, hydropower, environmental, recreation and agricultural by increasing sources and availability of funding for these types of projects.
- Explore opportunities to streamline permitting processes, to equitably allocate mitigation responsibilities, and to provide state support and endorsement for these types of multi-purpose projects with project proponents and other beneficiaries.

Potential Conceptual Framework for State of Colorado Support of a Project

The State of Colorado could develop a more effective and efficient pathway for a water project to receive state endorsement (Figure 9.4-1) while continuing to uphold state and regulatory review responsibilities. The state could identify milestones and decision points at the beginning of the process to reduce, rather than increase, regulatory burdens on project proponents.

A conceptual framework is explored below to encourage more discussion among state agencies and stakeholders.

Figure 9.4-1: Conceptual Framework for a Project to Receive State Endorsement



Initial Studies and Stakeholder Involvement

If technical or financial support is being sought for initial planning, baseline environmental studies, alternatives analysis, feasibility studies, or initial stakeholder involvement priority should be given to projects that:

- Meet the goals and measurable outcomes identified in the BIPs,
- Have a project proponent,
- Meet an identified need, and
- May be built within the next fifteen years

Preference should also be given to projects that seek to be multi-purpose, have multiple partners, and collaborate with a broad set of local stakeholders.

Project Meets Factors

Project proponents who participate in the cooperative approach should commit to factors that align the project with Colorado's Water Values (see Chapter 1):

- Addresses an identified gap through one of the following:
  - Is identified in a BIP
  - Meets a defined need in a basin needs assessment
  - Meets a defined need in the Statewide Water Supply Initiative

    - Is identified as being needed as part of no-and-low regrets
- Demonstrates sustainability
    - Provides a conservation plan or plans aimed at reducing demands
    - Includes environmental mitigation and enhancements in the planning phase
    - Mitigates or avoids impacts to or enhances water quality, and
    - Mitigates or avoids impacts on agricultural and rural community[j]
- Involves local government consultation
- Includes a stakeholder and public input process
- Establishes fiscal and technical feasibility

State Resource Prioritization

With these factors, the State could commit to a resource-intensive approach at the beginning of the permitting process if more state resources become available. This would include coordination with local governments and stakeholders as well as be cooperating agencies through the federal permitting process. Cooperation would need to occur at critical decision points, including scoping, methodological review, alternatives analysis, and development of mitigation and enhancement opportunities. In addition, this process could use a coordinated dashboard approach, defining goals, timelines, and necessary permits. Existing regulations suggest that a coordinated approach is allowable under existing state law. For instance, regulation number 82.5(C)(2) states, "Where possible, the 401 certification process should be coordinated or consolidated with the scoping and review processes of other agencies which have a role in a proposed project in an effort to minimize costs and delays for such projects."[79]

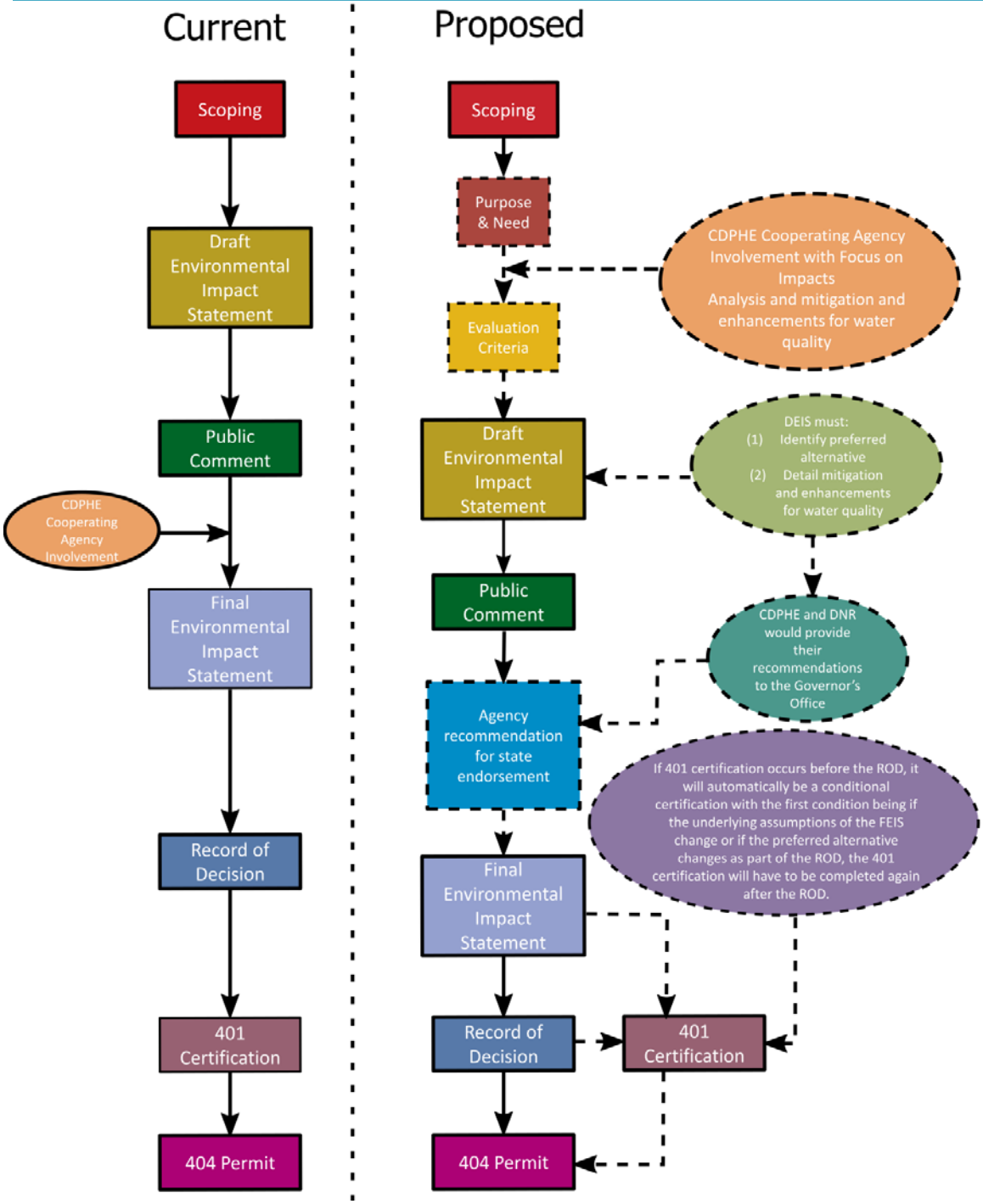
Preliminary Technical Review for State Processes

The current state processes for involvement in the federal 404 permitting process are summarized in Figure 9.4-2. The DNR's wildlife mitigation process is guided by CRS 37-60-122.2. In 1987, the Colorado General Assembly passed HB 1158 which created a process by which agencies within the DNR come to consensus regarding fish and wildlife impacts from water resource development projects and the mitigation of such impacts. The statute establishes (among other things) a process that involves a project's proponent, the Parks and Wildlife Commission, and the CWCB that results in the state's official position on the mitigation of fish and wildlife impacts associated with the development of water resources for the state's citizens. Historically, this process is initiated by the project proponent's presentation of a draft mitigation plan to the Commission after which CPW staff has 60 days to review the proposed plan and provide further input to the Commission. At the end of a 60 day period, the commission and project proponent must agree upon a plan or the different versions of the plan are forwarded to the CWCB for their separate deliberation and decision. If the Commission and proponent agree, the CWCB simply endorses that agreement and that becomes the official state position. If the CWCB disagrees with the plan and modifies it in any way, it goes to the Governor to affirm or modify the plan resulting in the official state position. Irrespective of the route that the plan has taken, the official state position is then transmitted to each local, state and federal governmental entity. The statute and process is constructed in such a way that it

[j] This could take the form of an agricultural impact statement.

encourages agreement between the project proponent and CPW – this greatly reduces the amount of time that this process takes thus resulting in an expedited state regulatory process.

Figure 9.4-2 State Involvement in Federal 404 Permitting Process



The CDPHE involvement in the federal 404 permitting process has typically occurred towards the end of the permitting process. The CDPHE's participation as a cooperating agency has generally occurred after a draft EIS is issued. Additionally, the CDPHE has typically waited until the project's Record of Decision has been completed before its official 401 certification review process.

As discussed above, if resources are prioritized for earlier state agency involvement in the federal permitting process, improvements to the current state process could be implemented. The State has an obligation to not be pre-decisional in 401 certification and wildlife mitigation plan processes. However, earlier state agency involvement in the EIS process would allow for early identification and resolution of state concerns which should result in a high quality draft EIS. This early state agency involvement could be accomplished by using the steps highlighted in Figure 9.4.-3. As shown in Figure 9.4-3, the CDPHE could be involved earlier in the EIS process. In this case, much of the State's review work could be done prior, during, and immediately after the Draft EIS process.

The CDPHE's involvement could start shortly after the project proponent establishes the objective for the project or as the project proponent develops evaluation criteria for the EIS alternatives analysis. The CDPHE's input on the evaluation criteria is critical as the State's methodologies for assessing water quality should be used in the EIS process. In addition, with early involvement the CDPHE's input on mitigation and enhancements could also be included in the Draft EIS.

Once the Draft EIS is completed, the CDPHE and CPW's review of comments from stakeholders and local government on the DEIS would give the State a good idea on regarding support for the project and/or any outstanding issues related to the project

Resulting from early involvement in the projects development or scoping, the CDPHE would evaluate whether the preferred alternative adequately addresses water quality impacts, and includes sufficient mitigation and enhancements for water quality. Likewise CPW staff would have had early communication and collaborative efforts with the project's proponents and would have already initiated work on the framework of a mitigation plan for the project. Then, at the appropriate time (after the publication of the Draft EIS and after the 122.2 process has been completed), each agency would then provide the Governor's office their recommendations on the project. The CDPHE's recommendation would most likely be in letter form and would specify whether the CDPHE could certify the preferred alternative identified in the DEIS. The CDPHE would provide this recommendation after the DEIS public comment period. Because the specific project that is ultimately permitted through a 404 permit must be certified with a 401 certification and the 404 permit cannot be issued before the completion of the EIS, 401 certification needs to occur after the Final EIS. However, if state processes are coordinated during the DEIS, as noted above, then, unless the preferred alternative changes or underlying assumptions of the DEIS change, the 401 certification could be completed after the EIS is issued, provided that all required processes for public notice and review per Water Quality Control Commission Regulations #21 and #82 are followed. If the 401 certification is completed before the ROD, it would automatically be a conditional certification with the first condition being that if the underlying assumptions of the EIS change or if the preferred alternative changes as part of the ROD, the 401 certification will have to be completed again after the ROD.

Potential Fish and Wildlife Mitigation Process Changes

The legislation that created the 122.2 process for the mitigation of fish and wildlife impacts associated with water project development is somewhat constraining in that official communications between the project proponent and CPW staff are not initiated until after the release of a Draft EIS. Further, 122.2 has some rigid timelines that make it difficult for project

proponents and CPW staff to jointly develop a quality comprehensive mitigation plan. It is also difficult for stakeholders' early engagement in the process. Also, currently there is little written guidance (outside of the words in the statute) for either project proponents or stakeholders. Therefore, the DNR and the Parks and Wildlife Commission should develop a written policy, administrative directive, or formal rules regarding the implementation of the provisions of 122.2. This written policy should encourage and provide an avenue for early communication and collaboration between project sponsors and CPW staff regarding impacts and mitigation strategies. The policy should also provide an avenue for early stakeholder engagement on the mitigation of impacts.

State Endorsement

If improvements to the state's involvement in the permitting process are implemented as described above, the State could provide endorsement of the project before the Final EIS. As described above, each state agency would provide their recommendations to the Governor's office that could then communicate to the appropriate federal agency that the State supports or does not support a given project.

Quicker Regulatory Process

Such state endorsement would allow the State to encourage completion of the EIS and ROD.

Actions

One of the main goals of the Colorado's Water Plan is to find ways to support the implementation of the BIPs. Increased efficiency in the permitting process, while not predetermining the outcome and supporting the statutory and regulatory requirements of each permitting agency, is a significant way to assist project proponents. While the decision could be "yes" or "no," having a decision, no matter the outcome, would be beneficial to the state planning process and help remove uncertainty. The actions below help to find efficiencies where possible and increase coordination. In addition, these actions will provide an incentive that encourages multi-purpose projects with many partners, especially for project proponents that meet Colorado's water values, such as enhanced conservation and efficiencies. In addition to the chapter of the water plan, a handbook will be developed, which details the status quo and a "new" joint review process. The following actions are needed to support these efforts:

1. The CWCB will host a series of lean events with relevant permitting agencies and stakeholders to examine current processes and determine how to make them more efficient and effective. The lean events will specifically examine how to eliminate redundant review efforts, reduce duplication of technical methods, and increase clarity on the required technical elements, and assessment methodology.
2. The DNR will coordinate the development of a permitting, certification and mitigation handbook in partnership with local, state, and federal agencies.
3. State agencies with permitting authority will actively participate as a cooperating agency from the outset of the regulatory process and parallel processes are encouraged.

4. Where more than one agency has jurisdiction over a particular issue, a lead state agency will be identified.
5. The State of Colorado will explore options for adding CDPHE and DNR staff and other resources to support a more efficient and effective permitting process.
6. The will work with state and federal partners to encourage cooperation through the CAWS MOU process, which factors conservation in as a demand reducer.
7. State agencies with permitting authority will work with local governments and stakeholders to determine how Colorado will endorse a project after preliminary or contingent 401 certifications and fish and wildlife mitigation plans are completed.

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Table 9.4-3: Summary of the IBCC No-and-Low-Regrets Action Plan and the BIP Comments on Permitting[80]

IBCC & Basin Roundtables	Challenges	Solutions
IBCC No-and-Low-Regrets Action Plan	"Needs assessment work conducted as part of the SWSI determined that every basin in Colorado will have a gap in water supply by 2050… 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."	As part of the No-and-Low-Regrets Action Plan, the IBCC considered several potential actions in relation to permitting: As part of the No-and-Low-Regrets Action Plan, the IBCC considered several potential actions in relation to permitting: "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." "Continue state coordination with the federal permitting entities: The State should continue to meet with federal agencies and look for opportunities, including entering into MOUs, to make NEPA and 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 of the positive is positive or not." "Support local permitting authorities to identify, as requested, multi-purpose components up front in a project planning to incorporate county and local concerns." "Upon request of a project proponent, encourage legislative resolutions in support of IPPs that meet the values of the CWP: the 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." "Publicly advocate for IPPs that meet the values of the CWP and have stakeholder support: the 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

Table 9.4-3: Summary of the IBCC No-and-Low-Regrets Action Plan and the BIP Comments on Permitting[80]		
IBCC & Basin Roundtables	**Challenges**	**Solutions**
		implementing these IPPs is critical to meeting Colorado's water supply needs while maintaining our agricultural heritage, healthy environment, and recreational economies." "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."
Arkansas BIP	"Significant challenges exist to achieving the storage goals of the Arkansas Basin, including government permitting, regulation, competing stakeholder interests, and reluctance of storage site owners to take on further responsibility."	No permitting solutions mentioned.
Colorado BIP	"Regulatory restrictions, high costs and variable geologic conditions have prevented proceeding with these conditional storage rights." "Water providers must recognize the change in permitting that has occurred and that has resulted in the lengthy and costly regulatory requirements for reservoirs. Rather than undertake this risk with no assurances of approval, water providers should consider other alternatives."	"This BIP recommends that State, Federal and Local regulatory jurisdictions work collaboratively to improve the permitting process." "Improvements to the permitting process to support new water supply projects are imperative in securing safe drinking water in the future." "Secure 401 certification for specific places prior to a ROD by the Corps, through a coordinated permitting process that includes all permitting agencies, including local government" Measurable Outcome: "Reduced average permitting time for reservoir project to under 10 years" "Improve inefficiencies in reservoir permitting process between federal agencies and promote revisions and BMPs to improve process timeline and cost" "Further research needs to be conducted that will evaluate the reservoir permitting process and provide recommendations on improvements."
Gunnison BIP	Several of the project sheets	"Due to the numerous benefits to future water resource projects, the Gunnison Basin Roundtable

Table 9.4-3: Summary of the IBCC No-and-Low-Regrets Action Plan and the BIP Comments on Permitting[80]

IBCC & Basin Roundtables	Challenges	Solutions
	list permitting as a constraint and challenge. In these cases, the text typically reads: "Issues limiting project implementation may include: Regulations – permitting requirements may limit construction activities and potentially increase cost and timing."	recommends the reinstatement of a process similar to the CJRP or Colorado Coordination Council." In Strategies to address regulations, the following bullet points are included to streamline permitting or develop collaborative solutions: Collaborate with the CWCB to identify technical support mechanisms for Federal permitting activities Identify methods to proactively address potential regulatory pitfalls that generate excessive time delays and added costs Identify methods to streamline regulatory processes between multiple agencies with proactive, time-dependent deadlines Collaborate with the CWCB to identify financial support mechanisms for Federal permitting activities "Better management tools will optimize projects to meet multiple needs, minimize cost, and protect public health and safety. An example of this is the Extreme Precipitation Analysis Tool (EPAT). Reservoir storage restrictions currently cost the state some 74,000 acre-feet in lost storage opportunities. An updated EPAT would provide cost savings by minimizing necessary dam spillway sizes and would streamline the permitting process."
North Platte BIP	Regulations can be a constraint to securing acceptance of a project. Since a large amount of the land in the North Platte Basin is under federal ownership, permitting issues can impact project feasibility, cost, and schedule.... Regulatory bureaucracy and environmental impact requirements may significantly delay project timelines, increase costs and ultimately limit the ability of a project sponsor to implement a proposed project, regardless of the relative size of project	In Strategies to address regulations, the following bullet points are included to streamline permitting or develop collaborative solutions: Collaborate with the CWCB to identify technical support mechanisms for Federal permitting activities. Identify methods to proactively address potential regulatory pitfalls that generate excessive time delays and added costs. Identify methods to streamline regulatory processes between multiple agencies with proactive, time-dependent deadlines. Collaborate with the CWCB to identify financial support mechanisms for Federal permitting activities.

Table 9.4-3: Summary of the IBCC No-and-Low-Regrets Action Plan and the BIP Comments on Permitting[80]

IBCC & Basin Roundtables	Challenges	Solutions
	scope. Regulatory streamlining and cooperative strategies may help address regulatory constraints."	
Rio Grande BIP	No permitting challenges mentioned.	No permitting challenges mentioned.
South Platte and Metro BIP	"In order to be developed, water supply, infrastructure, and treatment projects must go through a myriad of federal, state and local permitting processes which are both time and resource intensive. Improving the efficiency of current federal and state permitting requirements has the potential to save the public money while providing the same assurance of quality and due diligence. The Executive Order cites this issue and calls for the identification of potential areas of improvement in CWP. The intent is not to reduce existing environmental protections but to obtain permitting decisions in a more timely and cost effective manner with a more predictable process for federal and state engagement."	"The State of Colorado could support a more efficient EIS process for water supply projects.... Greater efficiency, cooperation, predictability, and consistency in the permitting process could be achieved by establishing guidelines for what the lead federal agency and all state and federal agencies involved in the process require for approval. Efficiency and predictability of the permitting process could be further enhanced by the State compiling agreed upon ranges, tools, and methodologies for assessing contentious topics such as hydrology modeling, system risk, conservation as a demand reducer, and others." "To increase the efficiency, consistency, and predictability of the EIS process, the State could work cooperatively with Federal agencies to develop a Programmatic EIS. Colorado's Water Plan could be used as the platform for a Programmatic EIS. Under a Programmatic EIS, no specific projects are approved, but it would create an analysis from which future specific approvals can rely." "Starting in 2010, the Corps, the DNR including the CWCB, and the US EPA embarked upon a process called CAWS. The major outcome of CAWS was an informal agreement among the three parties that conservation should be used as a demand reducer in analyzing the purpose and need for a project rather than during the alternatives analysis portion of the NEPA process. Though this informal agreement was not publicly documented, an important policy tool going forward could be the use of conservation as a demand reducer in the purpose and need segment of the EIS process. By doing this, water providers will have greater incentive to implement proactive conservation strategies to demonstrate decreased demand and strain on existing resources." "Scoping for 404 or NEPA permitting must follow federally required processes. Delays often result when new areas of analysis are identified late in the permitting process after scoping has occurred. By ensuring that regulating agency concerns are addressed in their entirety during the scoping process, applicants can more accurately plan for the costs associated with the analysis and avoid delays." "The State of Colorado could encourage the Corps and EPA Region 8 to revise their 1990 MOA on sequencing. Their current MOA says that the Corps must determine the Least Environmentally Damaging Practicable Alternative (LEDPA) first and then look at compensatory mitigation to authorize the LEDPA. A

Table 9.4-3: Summary of the IBCC No-and-Low-Regrets Action Plan and the BIP Comments on Permitting[80]

IBCC & Basin Roundtables	Challenges	Solutions
		revision would enable public works projects to use compensatory mitigation in the identification of the LEDPA. This revision could be limited to public works projects." "The State of Colorado's requirement for 401 certification and an approved Wildlife Mitigation Process could be improved to provide project proponents greater certainty in project planning. Earlier starts for these approval processes could effectively utilize information from the Federal Process to save project proponents and the citizens of Colorado time and money while allowing for greater certainty of project implementation."
Southwest BIP	No permitting challenges mentioned.	No permitting solutions mentioned.
Yampa/ White/Green BIP	No permitting challenges mentioned.	"Develop methods to assist with streamlining permitting in a cost-effective manner." "Success in permitting and constructing in-basin storage projects."

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10. Critical Action Plan

10.1 Colorado's Water Values

Colorado's Water Plan hinges upon three primary 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; and
- A healthy environment that includes healthy watersheds, rivers, streams, and wildlife.

These values shape the goals and actions of each section in the plan. The purpose of Chapter 10 is to further describe each of these values, and then describe the goals and critical actions needed to meet them. These high-impact actions are a subset of a broader set of actions found throughout the plan in chapters six through nine, and eleven.

1. Colorado's Water Plan values a productive economy that supports vibrant and sustainable cities, viable and productive agriculture, and a robust skiing, recreation and tourism industry: Colorado will continue to face natural stressors such as deep droughts, destructive wildfires, and catastrophic floods. The best science available indicates that these conditions will only get worse with climate change. Past events in Colorado, as well as recent droughts in Texas and California, serve as important warnings that these challenges harm Colorado's economy and way of life. As Colorado's economy continues to grow with the influx of new residents and industry, water planning for the future must reflect careful deliberation and balancing of the many municipal, industrial, and agricultural uses throughout the state. Critical actions must recognize the value of water to Colorado's economy, and identify options for maintaining a viable agricultural industry. Coloradans at all levels – individually, locally, regionally, and statewide – must work proactively to best mitigate for and respond to these inevitable natural pressures so that Colorado can continue to flourish. In addition, these natural pressures can create uncertainty for interstate compact compliance, and Colorado must work to reduce risks associated with meeting Colorado's compact obligations.

2. Colorado's Water Plan values efficient and effective water infrastructure: Beyond addressing underlying natural pressures, Colorado must contend with the growing and changing needs of our communities, farms, and ranches. Colorado is one of the fastest growing states in the country, and growing cities could mean the significant loss of agriculture if Colorado continues on its current path. Innovative solutions and additional conservation and efficiency are needed to stretch Colorado's water supplies and maintain aging reservoirs, canals, and distribution systems. New water systems that address several needs and involve multiple partners will also be necessary. Colorado's Water Plan uses a grassroots approach to formulate projects and methods to close water gaps with more agile, informed, and responsible water management. By doing so, Colorado will

achieve its long-term objective to meet the needs of municipalities, industry, agriculture, the environment, and recreation in a balanced manner.

3. Colorado's Water Plan values a strong environment that includes healthy watersheds, rivers, streams and wildlife: Colorado's identity includes the grand snowy mountains and sweeping rivers, majestic valleys and easy access to all of this raw beauty. Underlying Colorado's natural splendor are populations and communities of fish, birds, amphibians, and wetland plants. Colorado is home to endangered and imperiled species along with exemplary pristine ecosystems. It is important to protect and restore Colorado's natural environment with the most effective tools available. A resilient natural environment is the long-term goal of the critical actions which address this value.

10.2 Measures of Success and Adaptive Management

Colorado's Water Plan is a living document. The Plan and the supporting work of the Basin Implementation Plans (BIPs) and the Statewide Water Supply Initiative (SWSI) will need to be updated periodically to respond to changing conditions and improved information. Part of this work will require measuring success for each action and adapting over time. Future iterations of Colorado's Water Plan will evaluate the progress made and identify or refine future actions.

As stated in Chapter 11, Colorado's Water plan will be updated as values, conditions, or data warrant. The CWCB will determine when the next version of Colorado's Water Plan will be completed within the next five to ten years, based on progress of the BIPs and SWSI.

10.3 Strategic Goals and Actions

The State of Colorado intends to take the following actions to address Colorado's water challenges and seize its water opportunities. Additional information and context for each of the critical actions is further explained in the referenced section. Each action is labeled as one of the following types:

- **Legislation:** Legislative actions require the Colorado General Assembly to pass a bill changing or adding language in the Colorado Revised Statutes. Prior to developing legislative proposals necessary to implement Colorado's Water Plan, the Department of Natural Resources will conduct a thorough review of input provided by the Water Resources Review Committee, the Colorado Water Conservation Board, and interested stakeholders. Any legislative recommendations in the Action Plan will be evaluated in light of administration priorities and the state budget. To the extent that legislation is necessary to execute Colorado's Water Plan, legislative recommendations will be offered in concert with the phased implementation of the plan over subsequent years.
- **Programmatic:** Programmatic actions can be accomplished within existing authority and existing state programs. Changes only need to be made at the programmatic level to accomplish these actions. These changes may have resource impacts that will need to be addressed prior to accomplishing the action.
- **Board Policy:** Board policy actions can be accomplished through a rule-making or other formal approval process by the Colorado Water Conservation Board to give CWCB staff the authority to accomplish these actions. Other state agencies may also need to adopt policies,

as is noted below. Resources to develop and implement the policy changes will need to be identified.

- **Process:** Process actions indicate actions that will involve several parties or sub-committees developing a plan or making recommendations to the CWCB or other appropriate authority. Process actions can be accomplished within existing statutory authority.

I. Develop a Multi-purpose Funding Plan

a. Align Existing Funding: Align state funding policies and promote coordination among state agencies to strategically support the values identified throughout Colorado's Water Plan, such as the need for multi-purpose and multi-partner projects and methods.

Critical Actions to Align Funding	Section	Partners	When	Type
1. Seek an amendment to expand the CWCB loan program's authority to fund treated water supply, reuse, conservation, environmental, and recreation projects and methods.	9.2, 6.3.2, 6.3.1	CWCB, DNR, General Assembly	Near-term[a]	Legislation
2. Create a public private partnership center of excellence that models how to develop P3 agreements and explores financial incentives for regionalization.	9.2	CWCB & Funding Committee	Near-term	Programmatic
3. Develop a common grant inquiry process coordinated across agencies for environmental and recreational projects and methods.	9.2	CWCB, CPW, DNR, CDPHE	Near-term	Programmatic
4. Encourage regional and multi-purpose projects and methods by providing financial incentives such as an interest rate reduction or extended loan repayment periods.	9.2	CWCB, Water & Power Authority	Near-term	Board policy
5. Continue to provide $1 million annually to support stream management and watershed plans.	9.2	CWCB & General Assembly (Projects Bill)	Near-term	Legislation

[a] Near term is defined as occurring within three years following the finalization of Colorado's Water Plan.

Critical Actions to Align Funding	Section	Partners	When	Type
6. Investigate the potential for the CWCB to become a project beneficiary through an arranged partnership for projects that are central to fulfilling the goals of Colorado's Water Plan.	9.2	CWCB	Mid-term[b]	Programmatic

b. Assess Funding: Assess funding needs across multiple sectors using the BIPs and other resources as a guide (e.g., municipal, environmental, industrial, recreational, agricultural, conservation, education and outreach, among others).

Critical Actions to Assess Funding	Section	Partners	When	Type
1. Develop a sustainable funding plan that integrates a guarantee repayment fund, green bonds, and additional support grants and loans for the Water Supply Reserve Account (WSRA), education, conservation, alternative transfer methods (ATMs), and agricultural viability.	9.2	CWCB & Funding Committee	Near-term	Process
2. Assess funding needs across multiple sectors as part of SWSI, using the BIPs and other resources as a guide.	9.2	CWCB	Near-term	Programmatic
3. Determine the economic benefits and impacts of meeting or not meeting Colorado's future water needs as part of SWSI.	9.2	CWCB	Near-term	Programmatic

c. Explore New Funding Opportunities: Develop near-term funding opportunities that maximize the smallest amount of funds possible to have the greatest benefit to implementing Colorado's Water Plan.

[b] Mid-term is defined as occurring within six years following the finalization of Colorado's Water Plan.

Critical Actions to Explore New Funding	Section	Partners	When	Type
1. In order to support the integrated funding plan, identify and determine a path to develop a new viable public source of funding, such as through a container fee ballot initiative.	9.2	CWCB & Funding Committee	Near-term	Process, possible legislation & ballot initiative
2. Establish a state repayment guarantee fund.	9.2	CWCB & General Assembly	Near-term	Legislation
3. Develop issuance and repayment strategies needed to establish a green bond program to provide a funding source for large environmental and recreational projects.	9.2	CWCB & General Assembly (Projects Bill)	Near-term	Legislation
4. Fund a water education and outreach grant program based on basin roundtable education action plans and the initiatives indicated in Colorado's Water Plan.	9.2, 9.5	CWCB & General Assembly (Projects Bill)	Near-term	Legislation
5. Provide additional statewide account funds to the WSRA program.	9.2	CWCB & General Assembly	Near-term	Possible legislation
6. Modify Colorado's statutes to clearly allow for public private partnerships for water projects (§C.R.S. 43).	9.2	CWCB, DNR, WRRC	Near-term	Legislation
7. Explore a tax credit for homeowners who install efficient outdoor landscapes and irrigation as part of the integrated funding plan.	9.2, 6.3.1	CWCB & Funding Committee	Mid-term	Process

II. Promote Multi-purpose Initiatives

a. Improve Permitting Processes: Advocate for more effective and efficient permitting in which state agencies work together to complete their work early in the permitting process. This will provide the opportunity for state endorsement without being pre-decisional.

Critical Actions to Improve Permitting	Section	Partners	When	Type
1. Conduct a series of lean events with permitting agencies and stakeholders to determine how to make permitting more efficient and effective.	9.4	CWCB (host), local, state, federal, & partners	Near-term	Process

Critical Actions to Improve Permitting	Section	Partners	When	Type
2. Create a permitting handbook to guide applicants and other interested parties through the permitting process.	9.4	State and federal permitting agencies	Near-term	Programmatic
3. Relevant state agencies will actively participate as a cooperating agency in federal NEPA permitting processes at the outset of the regulatory process to engage in scoping, developing alternatives, determining methodologies and data gaps, and developing mitigation and enhancement plans.	9.4	All state agencies w/ permitting authority on a project	Near-term	Programmatic
4. Where more than one state agency has jurisdiction over a particular issue (e.g., fish health), a lead state agency will be identified.	9.4	State agencies w/ permitting authority	Near-term	Programmatic
5. Explore options for adding resources to support a more efficient and effective permitting process.	9.4	State agencies w/ permitting authority	Near-term	Possible legislation
6. Determine how Colorado will endorse a project after preliminary or contingent 401 certifications and fish wildlife mitigation plans are completed.	9.4, 6.3.1	State agencies w/ permitting authority, local governments,	Mid-term	State policies, possible legislation

b. Promote Protection and Restoration of Water Quality: The protection and restoration of water quality should be a key objective when planning for Colorado's current and future consumptive, recreational, and environmental water needs.

Critical Actions to Address Water Quality	Section	Partners	When	Type
1. Integrate water quality and quantity management by evaluating water quality impacts from BIP proposed projects and methods, exploring graywater and reuse potentials, and supporting green infrastructure.	7.3	CDPHE, CWCB, other state agencies	Mid-term	Programmatic, Board policy, Process

Critical Actions to Address Water Quality	Section	Partners	When	Type
2. Support policy initiatives which relate to quality and quantity integration, such as appropriate modification of regulation and guidance documents, creative and solution-oriented actions, and greater understanding of stormwater and wastewater impacts.	7.3, 7.2	CDPHE, CWCB, other state agencies	Mid-term	Programmatic
3. Continue and expand financial support of water quality related programming, such as nonpoint source pollution management efforts and watershed-based water quality improvement planning.	7.1, 7.2, 7.3	CDPHE, CWCB, other state agencies	Mid-term	Programmatic, Process
4. Support stakeholder and public outreach efforts to meet the integration goal, encouraging a watershed approach for engagement on water quality issues and monitoring public opinion on water quality issues.	7.3	CDPHE, CWCB, other state agencies	Mid-term	Programmatic, Process

c. Facilitate Alternative Transfer Methods: Respect property rights and the contributions of the agricultural industry by maximizing options for alternatives to permanent farmland dry-up to share 50,000 acre-feet annually within the next decade.

Critical Actions to Water Sharing	Section	Partners	When	Type
1. Support the maximum use of water rights by exploring opportunities to create more flexibility for various types of water transfers	6.4	CWCB, DWR, Stakeholders	Near-term	Process
2. Organize and conduct regional workshops with partners or co-sponsors to share lessons learned on actual ATM projects, and to garner additional interest in the pilot program by discussing benefits.	6.4	CWCB, partners	Near-term	Programmatic

Critical Actions to Water Sharing	Section	Partners	When	Type
3. Explore expanded grant funding that supports implementing actual ATM projects, related infrastructure, or entities that would help facilitate alternative transfer methods.	6.4	CWCB, BRTs, DWR, Stakeholders	Mid-term	Process

d. Meet Colorado's Water Gaps: Use a grassroots approach to formulate projects and methods that avoid some of the undesirable outcomes of the supply-demand gaps. The plan addresses the gap from multiple perspectives (e.g., water storage, reuse, recycling, integrated water management, restoration and conservation).

Critical Actions to Meet Water Gaps	Section	Partners	When	Type
1. Support and assist the basin roundtables in moving forward the municipal, industrial, environmental and agricultural projects and methods identified in their BIPs through technical, financial and facilitation support when requested by a project proponent.	6.5, 6.6	CWCB, BRTs	Near-term	Programmatic
2. Develop guidelines for basin roundtable WSRA grants to help facilitate the implementation of the BIPs.	11	CWCB, BRTs	Near-term	Programmatic

e. Promote Additional Storage and Infrastructure: Assess and promote opportunities for multi-purpose and multi-partner storage projects that address strategic needs.

Critical Actions to Promote Storage	Section	Partners	When	Type
1. Provide financial support to technical and practical innovations in the use of aquifer storage and recovery where it is practicable.	6.5	CWCB	Ongoing	Programmatic
2. Assess storage opportunities to determine where existing storage can and should be expanded or rehabilitated to prepare for climate change, improve sharing and use of conserved water, and meet Colorado's compact obligations.	6.5	CWCB, DWR, local partners	Near-term	Programmatic

Critical Actions to Promote Storage	Section	Partners	When	Type
3. Prioritize grants and loans to support the implementation of BIP identified multi-purpose projects and methods, taking into consideration locally identified geographic and/or seasonal gaps.	6.5, 6.6	CWCB, BRTs	Near-term	Funding
4. Explore and support opportunities to increase benefits to environmental and recreational values associated with existing and planned storage and infrastructure projects and methods.	6.5, 6.6	Project sponsors, CWCB, BRTs	Mid-term	Programmatic

III. Promote Vibrant and Sustainable Cities

a. Increase Municipal Conservation and Efficiency: Reduce Colorado's projected 2050 municipal water demands by 400,000 acre-feet through active conservation, while preserving the contribution of urban landscape to vibrancy and sustainability.

Critical Actions to Increase Conservation	Section	Partners	When	Type
1. Require water providers to conduct comprehensive integrated water resource planning using the water conservation best practices at the high customer participation levels where possible, as defined in SWSI.	6.3.1, 9.4	CWCB, other permitting agencies, stakeholders	Near-term	Policy
2. Provide funding, technical support, and training workshops to assist water providers with managing systems more efficiently, including techniques such as water budgets, smart metering, comprehensive water loss management programs, and improved data collection.	6.3.1	CWCB, CDPHE, CWAPA, water providers, conservation professionals	Near-term	Programmatic
3. Support legislation that would require retailers to only sell irrigation technologies that meet WaterSense specifications by providing technical details on the potential savings and hosting a stakeholder process.	6.3.1	CWCB, DNR, General Assembly, stakeholders	Near-term	Process, possible legislation

Critical Actions to Increase Conservation	Section	Partners	When	Type
4. Adopt a stretch goal to encourage demand-side innovation that places Colorado at the conservation forefront. Support a stakeholder process that examines options for local water providers to establish targets consistent with the stretch goal and the amount of savings possible given past work and local opportunities.	6.3.1	CWCB, stakeholders	Near-term	Board policy, programmatic
5. Host a stakeholder process to explore financial incentives for outdoor water conservation measures, such as a tax credit program to incentivize retrofitting higher water landscapes with lower water landscapes and more efficient irrigation systems.	6.3.1, 9.2	CWCB, stakeholders	Mid-term	Process

b. Encourage Reuse: Encourage the development of regional reuse solutions to maximize fully consumable water supplies.

Critical Actions to Encourage Reuse	Section	Partners	When	Type
1. Conduct a technical review of regional reuse options and provide grants to support regional reuse plans and projects	6.3.2, 7.3	CWCB, water providers, reuse experts	Near-term	Programmatic
2. Examine the amount of water being reused, the potential to increase reuse, and the amount of water providers plan to reuse.	6.3.2, 7.3	CWCB, water providers, stakeholders	Near-term	Programmatic
3. Improve the regulatory environment to foster permanent growth in the reuse of limited water supplies, while protecting public health and the environment.	6.3.2, 7.3, 9.4	CDPHE, CWCB, stakeholders	Near-term	CDPHE policy, potential legislation
4. Proactively seek applicants to use WSRA grant funds for expanded research and innovation related to the technical challenges and solutions of reuse.	6.3.2	CWCB, BRTs, reuse experts, water providers	Near-term	Programmatic

c. Integrate Land Use and Water Planning: Initiate the use of local land use tools, where appropriate, to reduce water demands for municipalities, and the need to urbanize agricultural lands.

Critical Actions to Integrate Land Use	Section	Partners	When	Type
1. Through voluntary trainings for local governments, encourage the incorporation of best management practices in land use for water demand management, water efficiency, and water conservation.	6.3.3	CWCB, DOLA, stakeholders	Near-term	Programmatic
2. Develop new guidance to require the incorporation of land use practices into water conservation plans.	6.3.3	CWCB, DOLA	Near-term	Programmatic
3. Examine barriers in state law for integrating water and land use solutions, such as for gray water, green infrastructure, and green buildings.	6.3.3, 7.3	CWCB, DOLA, State Plumbing Board, stakeholders	Mid-term	Programmatic

IV. Address Agricultural Viability and Efficiency

a. Maintain Agricultural Viability: Maintain Colorado's agricultural productivity, support of rural economies, and food security (through meaningful incentives and grassroots efforts).

Critical Actions to Maintain Ag.	Section	Partners	When	Type
1. Establish an education and assistance program for farmers and ranchers to help realize more transactions that allow for water sharing and for new Colorado farmers to own land.	6.5	CWCB, Colorado Dept. of Agriculture	Near-term	Programmatic
2. Host a stakeholder group to help develop a framework for an evaluation of agricultural transfers from a technical and legal perspective.	6.5	CWCB (host), local government, ag. producers, municipalities, environmental interests	Near-term	Process

Critical Actions to Maintain Ag.	Section	Partners	When	Type
3. Encourage ditch-wide and regional planning to explore system-wide conservation and efficiency opportunities, the potential for water sharing, and long-term infrastructure maintenance needs.	6.5, 6.3.4	CWCB, agricultural partners, BRTs	Near-term	Programmatic
4. Update and improve Colorado's aging agricultural infrastructure, especially where improvements could benefit other sectors.	6.5	CWCB, BRTs, agricultural partners, other stakeholders	Mid-term	Programmatic

b. Support Agricultural Conservation and Efficiency: Support Colorado's agricultural industry to make it more efficient, resilient, and able to reduce water consumption without impacting agricultural productivity.

Critical Actions to Support Ag. Conservation and Efficiency	Section	Partners	When	Type
1. Develop a strategic education program to promote agricultural water conservation and soil health initiatives.	6.3.4, 6.5	CWCB, BRTs, Colorado Energy Office, CDA, NRCS, CSU extension, ag. partners	Near-term	Programmatic
2. Provide grants, loans, and technical support to refurbish diversions and ditches to generate saved water and reduce losses where there are benefits to recreation, the environment, and other consumptive water users.	6.3.4	CWCB, ag. partners, local environmental groups, BRTs	Near-term	Programmatic
3. Develop model voluntary flow agreement language, facilitation, and technical support to encourage the use of these agreements when paired with irrigation efficiency practices.	6.3.4	CWCB, DWR, agricultural partners, environmental groups, BRTs	Near-term	Programmatic, state agency policies

Critical Actions to Support Ag. Conservation and Efficiency	Section	Partners	When	Type
4. Support the management and removal of invasive phreatophytes with a newly established grant program.	6.3.4	CWCB, local partners	Near-term	Programmatic
5. Explore the development of administrative means to track and administer agricultural conserved water for the purposes of marketing these waters.	6.3.4	DWR, CWCB	Mid-term	Process

V. Support a Strong Environment and a Robust Recreation Industry

a. Recover Imperiled Species: Promote restoration, recovery, and resiliency of endangered, threatened, and imperiled aquatic and riparian dependent species and plant communities.

Critical Actions to Recover Imperiled Species	Section	Partners	When	Type
1. Support and participate in collaborative approaches to Endangered Species Act issues to prevent listings, promote the sustainability of endangered, threatened and imperiled aquatic and riparian-dependent species and communities (e.g., recovery programs, cooperative agreements, and other efforts).	6.6	CWCB, CPW, other agencies and stakeholders	Ongoing	Programmatic
2. Establish and achieve measurable outcomes for federally and state listed endangered, threatened, and imperiled species by developing a plan that compiles and develops near-term projects and methods. At the same time, the CWCB will support the strategic implementation of currently identified projects with technical and financial assistance.	6.6	CWCB, Colorado Parks & Wildlife, BRTs, other agencies, and stakeholders	Near-term	Programmatic

b. Enhance Environmental and Recreational Economic Values: Protect and enhance economic values to local and statewide economies derived from environmental and recreational water uses, such as fishing, boating, waterfowl hunting, wildlife watching, camping, and hiking.

Critical Actions to Enhance Economic Values	Section	Partners	When	Type
Develop a plan that compiles and develops near-term projects and methods to support economically important water-based recreation.	6.6	CWCB, BRTs, interested stakeholders	Mid-term	Programmatic

c. Protect Healthy Environments: Understand, protect, maintain, and improve conditions of streams, lakes, wetlands, and riparian areas to promote self- sustaining fisheries and functional riparian and wetland habitat to promote long-term resiliency.

Critical Actions to Protect Environments	Section	Partners	When	Type
1. Develop stream management plans for priority streams identified in a BIP or otherwise as having environmental or recreational value. As part of this work, the CWCB will provide guidelines and templates for developing stream management plans, and will conduct ongoing analyses through SWSI.	6.6, 7.1, 9.2	CWCB, BRTs, other stakeholder groups	Beginning near-term	Programmatic
2. Institute policies, criteria, and programmatic approaches to proactively developing projects and methods that strategically address important aquatic, riparian, and wetland habitats with existing programs.	6.6	CWCB, other state agencies, BRTs, other interested stakeholders	Near-term	Programmatic
3. Develop common metrics for assessing the health and resiliency of watersheds, rivers, and streams.	6.6	CWCB, CPW, other state agencies, BRTs, stakeholders	Mid-term	Programmatic

VI. Prepare for an Uncertain Future

a. Plan for the Future: Coordinate and sequence updates to SWSI, the BIPs, and future iterations of Colorado's Water Plan to represent the most up-to-date technical, stakeholder, and policy information available.

Critical Actions to Plan for the Future	Section	Partners	When	Type
1. Monitor critical drivers of water supply, demand, and other stressors through future SWSI updates and other technical work.	6, 7, 8, 9	CWCB, other state agencies, BRTs	Mid-term	Programmatic
2. Support BIP updates of basin roundtable policies, public input, and project and method updates in a sequenced schedule through funding and technical support.	6.2, 6.5, 6.6, 8	CWCB, other state agencies, BRTs, IBCC, Coloradans	Mid-term	Programmatic, Board policy
3. Continue to use and promote scenario planning and the use of adaptive strategies.	6.1, 6.2	CWCB, other state agencies, BRTs, IBCC	Mid-term	Programmatic
4. Continue development of Colorado's Decision Support Systems to be the most up-to-date and technically sound resource for data-driven planning and decision making.	6.1	CWCB, other state agencies	Mid-term	Programmatic

b. Protect and Restore Critical Watersheds: Protect and restore watersheds critical to water infrastructure, environmental, or recreational areas.

Critical Actions for Watersheds	Section	Partners	When	Type
1. Provide technical and financial support to local stakeholder groups to develop watershed master plans for watersheds critical to consumptive or nonconsumptive water supply and quality.	6.6, 7.1, 7.3	CPW, CDPHE, CWCB	Near-term	Programmatic
2. Prioritize and implement projects identified in master planning efforts.	6.6, 7.1	CPW, CDPHE, CWCB & local coalitions	Ongoing	Programmatic

c. Prepare for and Respond to Natural Disasters: Colorado's Water Plan promotes water resource resilience from natural disasters through strategic preparedness and response.

Critical Actions for Natural Disasters	Section	Partners	When	Type
1. Provide tools and resources to actively encourage local communities to develop drought preparedness plans.	7.2	CWCB	Near-term	Programmatic
2. Implement the actions identified in the Colorado Resiliency Framework to build communities that are more resilient to natural disasters	7.2	Local communities, CWCB, Colorado Recovery & Resiliency Office	Near-term	Programmatic

d. Protect Compact Entitlements and Manage Risks: Protect Colorado's ability to fully develop compact entitlements, and continue to support agreements that strengthen Colorado's position in interstate negotiations while ensuring the long-term viability of Colorado's interstate compacts and relationships. Focus planning efforts on maintaining healthy systems and avoiding a Colorado River Compact deficit rather than on responding to compact curtailment.

Critical Actions to Protect Compacts and Manage Risk	Section	Partners	When	Type
1. Protect the ability to fully develop Colorado's compact entitlements by working with federal, state, and local stakeholders and maintaining the litigation fund.	8, 9.1	CWCB, AGO, DWR, downstream states, federal agencies	Ongoing	Programmatic, Board policy
2. Continue to comply with Colorado's compacts and equitable apportionment decrees and support strategies to proactively manage compact obligations.	9.1	CWCB, AGO, DWR, downstream states, federal agencies	Ongoing	Programmatic, Board policy

Critical Actions to Protect Compacts and Manage Risk	Section	Partners	When	Type
3. Work with federal agencies to assure that their responsibilities are implemented in a way that respects Colorado's compact and decree entitlements and authorities to administer waters within the State.	9.1	CWCB, AGO, DWR, downstream states, federal agencies	Ongoing	Programmatic, Board policy
4. Monitor the ongoing conceptual framework discussion and consider adopting the conceptual framework	8	CWCB	Near-term	Board policy
5. Prioritize the development of a programmatic approach to prevent a Colorado River Compact deficit.	8, 9.1	CWCB, other Upper Division States, stakeholders	Near-term	Programmatic, policy, and funding

e. Prepare for Climate Change: Respond to, monitor, and prepare for climate change.

Critical Actions for Climate Change	Section	Partners	When	Type
1. Promote scenario planning and the use of adaptive strategies to monitor, mitigate, prepare for and respond to climate change.	6.1	CWCB	Mid-term	Programmatic
2. Work with utilities and federal and state agencies to proactively identify and address regulatory barriers to climate preparedness and adaptation.	7.2	CWCB, CDPHE, utilities, federal and other state agencies, stakeholders	Mid-term	Process
3. Incorporate the potential effect of climate change on municipal, industrial, environmental, and agricultural projects and methods.	6.5, 6.6	CWCB, IBCC & Providers	Mid-term	Programmatic
4. Work with regulators to modify existing water quality standards to factor in climatic change.	7.3	CDPHE	Mid-term	CDPHE policy

VII. Advance Education and Outreach

Advance Education and Outreach: Inform Coloradans about water issues to encourage engagement in determining Colorado's water future.

Critical Actions to Advance Education	Section	Partners	When	Type
1. Create a new outreach, education, and public engagement grant program to fund basin roundtable education action plans and initiatives indicated in the water plan.	9.5, 9.2	CWCB, General Assembly	Near-term	Possible legislation
2. Conduct a water education assessment to help develop a plan that addresses critical gaps in water education, advances efforts in Colorado's Water Plan, and supports basin roundtable work.	9.5	CWCB, BRTs, education partners	Mid-term	Programmatic