



Colorado Climate Plan

Water Sector Meeting Summary

Colorado Water Conservation Board
January 27, 2016
Public Input Session

Prepared by
Keystone Policy Center

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Table of Contents

Background and Process.....	3
Keystone Policy Center.....	3
Analysis of Comments	4
General Comments	4
Specific Comments.....	5
Appendix A — Jan. 27, 2016 Stakeholder Engagement Sign-in Sheet.....	7
Appendix B — Participant Responses and Recommendations.....	10
Water Supply/Infrastructure and Demand.....	10
Water Quality and Watershed Health.....	16
Overarching and/or Other Comments on the Colorado Climate Plan — Water.....	18
Extreme Events and Preparedness	19
Identified Priorities.....	23
Appendix C — Written Comments.....	26
Colorado Springs Utilities Letter and Attachments.....	26
Denver Water Letter	52
Rocky Mountain Climate Organization Letter.....	57
Western Resource Advocates Letter.....	61

Background and Process

The Colorado Water Conservation Board (CWCB), in collaboration with the Keystone Policy Center (Keystone), convened a session on January 27, 2016, in Denver in conjunction with the annual meeting of the Colorado Water Congress to solicit public input on the Water Sector recommendations (Chapter 2) of the *Colorado Climate Plan: State Level Policies and Strategies to Mitigate and Adapt* (Plan) (2015; a digital copy of the Plan can be obtained [via the CWCB's website](#)).

The CWCB hired Keystone to help organize and facilitate the two-hour session.

About 40 people from a variety of water interests attended the session (see sign-up sheet; Appendix A). The structure of the session was as follows:

- Each recommendation of the Plan's Water Section was grouped into one of three categories — Infrastructure and Supply, Water Quality and Watershed Health, and Extreme Events and Preparedness.
- These three groupings were posted on the walls of the room as “stations” where participants could informally gather and discuss the issues and write down their comments on flipchart paper. At each station, participants were asked to comment on each recommendation in each of the three groups — specifically, they were asked to provide general comments on the recommendation, how the state could lead in the implementation or development of the recommendation, and suggest other policies and strategies that were not listed as recommendations. There was also a fourth station where participants could provide general comments about anything related to the Plan and the process. Participants were encouraged to rotate to and spend some time at each of the stations as they preferred.
- Participants were each given five dots to rank each grouping of recommendations according to five questions.* These questions were:
 - (1) Which of the strategies or policies in this station are the highest priority?
 - (2) Which are the most feasible?
 - (3) Which have the greatest impact?
 - (4) Which are a priority in the short term?
 - (5) And which are a priority in the long term?
- After the station comment period, a time for general open comment was provided so that the participants could hear from each other.

Keystone Policy Center

Keystone Policy Center brings together crucial teams of stakeholders who have diverse individual perspectives but recognize a common need to address urgent issues with lasting solutions. For more than 40 years, Keystone has helped leaders move beyond fixed positions toward collaborative, action-oriented approaches to problem-solving.

In an age of polarized debate on nearly every major topic in public policy, Keystone Policy Center offers a refreshing yet proven blueprint for progress. In more than four decades of designing effective conflict management strategies for complex, contentious issues, Keystone has built a portfolio of substantive work in energy, environment, education, health, and agriculture.

*The responses from the stations are captured in Appendix B.

Analysis of Comments

Upon reviewing the input received at the stations and during the open comment period, Keystone staff provides the following observations and analysis.

General Comments

Plan is “on the right track”

After allowing participants to provide comments at each station, and by a show of hands, the vast majority of those in attendance (about 30 people) indicated that they thought the Plan was “on the right track.”

Consistent themes

Irrespective of the specific recommendation, the comments focused on a number of consistent overarching themes related to the set of recommendations as each station. These include:

- **The need for more information** — the Plan and the recommendations need to include a clear understandings of the science, impacts, monitoring, and assessment of the tools to evaluate climate impacts, and measure success regarding implementation of options; in addition, there is a need for more specifics on how the state plans to implement and develop policies around recommendations.
- **Don’t reinvent the wheel** — existing tools and support systems were identified (such as federal agencies, scientific organizations, academic institutions, and other collaborative efforts) that should be used to assess climate impacts and responses related to drought, emergency management, and monitoring; in addition, existing collaborative networks, like the Basin Roundtables, should be utilized to develop tools, provide data, and work collaboratively to address impacts and adaptation strategies.
- **Education** — regarding all aspects of the Plan and climate policy generally, there is a need to promote greater understanding by the public of climate change impacts related to water.
- **Work with partners** — the implementation of the Plan’s recommendations should include partnering at all levels, that is federal, state, local, academia, science, etc., including the Colorado Resiliency Office.
- **Address constraints** — there is a need to better understand how the current systems, incentives, laws, funding criteria, business models, and policies are working against climate change response and adaptation, and the implementation of innovative solutions, and find ways to address these.
- **Explore and identify interconnections** — there is a need to better understand how policies and actions interact, and develop policies and solutions that complement each other and do not work at cross-purposes, as well as an acknowledgement that climate change impacts and effects need to be better incorporated and integrated into all aspects of water decision making, from funding criteria, project development, etc.
- **Identify appropriate mechanisms for regulatory streamlining** — although many believed that there is a need to examine and find ways to “streamline” regulatory processes, such as National Environmental Policy Act (NEPA) reviews, the focus should be on identifying specific concerns under these processes and ways to address them, rather than on wholesale exemptions of water projects and strategies from these regulatory processes.
- **Address sequencing or timing of strategies** — as many of the recommendations are interconnected, there may be issues related to how these recommendations are timed so as to promote greater success and effectiveness of each recommendation and overall effort.
- **Contradictory Input** — on a few topics (such as addressing lawns, adjusting water rights and laws, and details regarding storage options) some participants suggested ideas and thoughts that were

countered by other participant comments; there may thus be a need to find ways to reconcile these competing perspectives.

Interpreting the Input

During the open comment session, the group expressed the following comments on how they understood the questions posed at each station and thus how their input should be viewed in light of this understanding:

- **Implementation issues v. recommendations themselves** — the group primarily expressed concerns regarding the implementation of the recommendations in the Plan, rather than expressing objections to the recommendations themselves. These concerns were expressed as obstacles and attitudes that would likely be encountered and need to be addressed, or related to aspects of the recommendations that could cause consequences for other climate work or other important non-climate related policies. Nevertheless, there were some new ideas proffered (such as a suggestion to include “green infrastructure” or using natural systems).
- **Measurable strategies** — although the Plan is “on the right track,” there is still a need to develop ways to measure the effectiveness of the strategies using agreed upon metrics.
- **Definition of terms** — concerns were expressed regarding the definition of some important terms or that some terminology may be subject to different interpretations, as well as concerns that some concepts were too vague, such as what is meant by “regulatory barriers.”
- **Feasibility of recommendations** — concerns were expressed that even though a recommendation was not identified as “feasible,” that should not be interpreted that the recommendation was not important; rather it could mean that there is a need to address the obstacles and issues that make such an option unfeasible.
- **Connection to climate change** — concerns were expressed that some recommendations, and thus the indication that these may not be priorities, do not present an obvious connection to climate change mitigation and adaptation. Thus, the need was expressed to better establish this connection.

Creation of an expert advisory panel

Interest was expressed that the Plan should also include establishment of an advisory group made up of experts related to climate change and water so as to help implement recommendations, provide guidance to state agencies on water impacts, and help educate the public.

Solicitation of more detailed comments

The participants were allowed to submit further, and more detailed, comments following this public input session. Those comments are included in Appendix C. Although these more detailed comments were solicited as part of the overall public input on the Plan, since they were provided after the January 27th session, this analysis focuses primarily on the comments received during the January 27th session. Nevertheless, it should be noted that these more detailed comments are generally consistent with the findings of this analysis.

Specific Comments

The complete comments provided at the stations can be found in Appendix B, and more detailed written comments on the Plan’s Water Section can be found in Appendix C. From all of this input, here are some more specific, noteworthy issues that were expressed by a number of commentators:

- **Ecosystem health** — the recommendations, and the implementation of the Plan, should recognize the water needs of the environment and provide assurances that water for ecosystems and wildlife is accommodated.

- **Landscaping** — many expressed interest in addressing water needs associated with lawns and landscaping in urban areas.
- **Agriculture** — many indicated a need to focus on the water use and practices of agriculture.
- **Groundwater** — many expressed an interest in seeing more attention paid to the impacts to and strategies related to groundwater resources, such as for additional storage.
- **Existing frameworks** — many indicated that there needs to be more attention to existing water frameworks (costs, legal, timing of flows, water utilities business models, etc.) that constrain and work against water conservation. Thus, many wanted to see more specific recommendation on how the Plan could seek changes in law, policy and business practices so as to encourage greater conservation and response to climate change impacts.
- **State funding for projects** — the Plan should provide more detail on how water projects and policies are funded, and that such funding should be contingent on the inclusion of explicit climate change mitigation or adaptation elements.
- **Regulatory processes** — these need to be transparent and include evaluation of climate change impacts and mitigation.
- **Funding for research and implementation** — the Plan should include a recommendation for funding to perform additional research on all aspects of climate change's impacts on water and to implement the recommendations and strategies.

Appendix A — Jan. 27, 2016 Stakeholder Engagement Sign-in Sheet



CLIMATE PLAN WATER SECTOR STAKEHOLDER ENGAGEMENT SESSION SIGN IN SHEET

January 27, 2016

Attendance List

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Appendix B — Participant Responses and Recommendations

Water Supply/Infrastructure and Demand
Promote and encourage water efficiency and/or conservation at the local and state agency level.
<i>General Comments/Concerns</i>
This runs counter to a water provider's need to sell their product — how do you reduce consumption without raising costs to customers?
As it pertains to Ag conservation, may consist of maximizing production from every drop, not necessarily less consumption/i.e., efficiency
Cost structure of water providers can be a big disincentive for people to conserve water. If water is conserved, it is natural to expect to pay less, too.
Encourage water conservation and efficiency among the next generation of Coloradans as opposed to just adults. This could help ensure sustainability of conservation in the long run.
Conservation/efficiency should start with the largest water users, so focus on Ag → even small improvements likely outweigh efforts for further residential improvements
More focus on ag conservation and efficiency is needed
Maximize use of national/international efforts (AWWA/AWE/EPA water sense ...)
The report insinuates that M&I v. ag are on the same scale as users and there are many more municipal recommendations. The efficiencies to be gained from ag are much greater and should be strategically and explicitly explore, articulated and promoted by the state.
Develop laws that allow a water user to maintain control of decreed portion of water rights even though they increase efficiency of water use. This may encourage conservation. Water user can sell or lease conserved water. Of course, consumptive use is a consideration that may prevent this.
Good goal, particularly for transbasin sources or water from non-alluvial wells. Careful consideration must be paid to water transferred from ag to municipal in a basin so that downstream water rights are not adversely affected. Often, overall basin efficiencies from the Continental Divide to the state line are very high, and that need to be respected.
Discussion and education of the implications of ag efficiency increases on the water supply. Increasing efficiency does not always save water but can negatively impact both supply and timing to downstream users.
Increase monitoring on all fronts — weather, diversions, streams, snowpack to generate better understanding and improve quantitative understanding of water budget. This is really easier said than done.
<i>If we are on the right track, where/how would you specifically like the state to lead in implementing these strategies and policies?</i>
More focus on reducing irrigation demands (specifically residential lawn removal).
(Total lawn removal? Partial? Reducing with? Irrigation system restructure/redesign/replacement would likely then be necessary. Incentive to do so? Financial and available to homeowners? Reducing CII demands as well, although they have economic incentive to do so on their own.

Lawn removal was suggested (not by me) as a conservation strategy. I definitely have comments. This proposal did not elaborate on whether total or partial removal were on the table. Replaced with what? Xeric? Mulch? Nothing? A mandate would likely be necessary, with considerable financial incentive or penalty to make it happen in the shorter term. No resources are available right now and it would be a tough sell, though there are movements in going to water budget approach. Lots of financial costs. Property values. Lawn/landscape/irrigation revamps. Water providers could lose revenue. Obstacles — the green industry. Homeowners. Property values could be compromised without proper planning and implementation. Who would enforce this strategy? How is efficacy measured? This would be longer-term — we must have better education, awareness, adoption before talking lawn removal. Without changes in the above (or without specifying the intent in a lot more detail).
Lawn removal has worked in some areas of the west — in some, not so well. Replacement with lower requirement plants require different irrigation management procedures.
Also, there is considerable room for better education and awareness and adoption of better lawn irrigation practices before removal is necessarily mandated (if that is on the table)
Education and (incentives/penalties) for landscape industries to install efficient irrigation systems and plant material.
Efficiency is critical. Conservation is an option that is secure and can be invested in at later points in time. Much less so than other options that will take time and money to change or put in place.
Cost-share support for improving on-farm and delivery efficiencies; exponentially increase urban conservation (consumptive use savings); recognize that while efficiency is important it does not always lead to increased resilience (i.e., installing permanent drip is expensive, slow moving to install and hard to change). Principles of holistic management that integrate the good functioning of the biotic and human systems is essential to integrating conservation and efficiency into a more resilient whole.
State can lead through education and public outreach at multiple levels. Inform all levels of public, educate children. Make this future real to all so conservation and preparedness become priorities for everyone. Recourse—more public meetings/informational events. More hands on educational events for children of all ages. Costs — unknown. Obstacles — obtaining personnel to head continuing public outreach. Both short and long term — Public outreach needs to continue as implementation of plans occur and as future scenarios begin to play out. This strategy will maintain public engagement as more information related to climate change and water resources becomes available. Public engagement and advocating willing promote cooperation and action.
Encourage water providers to do comprehensive integrated water resource planning, geared toward implementing the best practices at the higher customer participation levels to achieve state endorsement of projects and financial assistance.
<i>General Comments/Concerns</i>
Concern: Uneven consideration given to climate change impacts and adaptation measures, on a basin-by-basin basis. Basin Roundtables need general direction from CWCB in order to do comprehensive, <u>integrated</u> statewide planning.
Concern: Avoid using the assumption that the water budget is stationary, mainly due to rapidly changing diversion activity, but also from climate change.
Move from ‘encourage’ to ‘incent’ by providing some assurance of financial assistance, etc. Integrated planning requires more time and money, will need to incent or much more education to get small/medium providers to take this on.
This need to happen across sectors in water, not just water providers.

<i>If we are on the right track, where/how would you specifically like the state to lead in implementing these strategies and policies?</i>
State focus on IBCC/Basin Roundtables for implementation of water plan is good. What the basins need is a consistent way to incorporate climate change into basin implementation plans. The ideal solution would be a set of decision support system frameworks made available to each basin by the state, using common modeling methodologies on projected impacts of climate change under the full range of forecasts for all of the RCPs.
We need a systematic, comprehensive approach to risk management and to long-range planning that will allow for consistent apples to apples comparison and use across the state. The state should lead the Roundtables to do this.
Build on <u>existing</u> tools; don't reinvent the wheel at ever location. Having more standardized plan goals and components will help.
Support water sharing agreements where feasible and cost effective.
<i>General Comments/Concerns</i>
Would this include 'water banking'?
Recognizing market forces now drive water reallocation from ag to municipal uses, structure voluntary transfers — where possible — to maintain agriculture and in all cases mitigate adverse impacts to rural communities.
As this question pertains to water rights, CO should begin examining potential drastic changes in how these are managed and assigned. Change is inevitable and there is a growing movement toward equity.
Property rights must be respected as anything like this occurs.
Yes. Incentivize applies to "share" water with the environment.
Landowners need more opportunity to leave water instream and protect it by priority date.
This has potential to protect more irrigated ag land and keep CO farmers and ranchers in business. However, I don't see these agreements as providing firm supply for M&I, who will still need to seek supply/reduce demand elsewhere. Water-sharing agreements may be critical, but are not a panacea.
<i>If we are on the right track, where/how would you specifically like the state to lead in implementing these strategies and policies?</i>
We need to be able to change the use of water rights to maintain the ability for that water to be used most effectively. Example: change water to municipal, but let ag use when not in a drought.
AND- let environment use water, too. Win/Win for Colorado that values recreation/aesthetics.
Explore options to increase reuse of fully consumable water.
<i>General Comments/Concerns</i>
Treatment of recycled water to ensure adequate water quality (e.g., remove excessive salts that can damage vegetation)
Before considering reuse (potable or non-potable), communities should consider what the water will be used for. If it is to irrigate lawns, perhaps communities should reconsider and move to lawn replacement. There seems to be a lot of conservation capacity in many communities → lower cost options should be considered before more expensive options like reuse.
Lock into potable reuse and prioritize reuse as new supply development and planning

Could reduce lawns in a new areas, but need to protect the landscape in established areas simultaneously. Hate to see 100-year old trees dying for lack of water.
<i>If we are on the right track, where/how would you specifically like the state to lead in implementing these strategies and policies?</i>
Larger systems/state could pool resources for more pilots; a more comprehensive examination of the need for reuse should be conducted
Public messaging should likely start now as it seems to take many years for public acceptance.
Develop regulatory policy addressing direct reuse of WWTP [waste water treatment plant] efficiency — currently there is a vacuum in this area, hindering providers from moving forward in this area.
Incorporate Water Plan's recommendations and actions related to reuse
As climate change adaptation strategy, CWCB and the state needs to prioritize, encourage and support green infrastructure v. grey/concrete infrastructure (recognizing multiple benefits of storm water management, water augmentation , systems flexibility, water quality, health and safety, flood mitigation)
Encourage opportunities for reservoir enlargement statewide (where feasible and cost effective) that could be used for municipal, agricultural, recreational and environmental purposes.
<i>General Comments/Concerns</i>
Adapting to lower runoff and earlier melt will require additional storage projects.
Focus should be on reducing consumption per capita.
Need transparency on how decisions are made, who will receive benefits, and how those arrangements serve the greater good.
<u>Honest</u> evaluation of environmental impacts is crucial. Expansions can damage aquatic, fish, and wildlife habitat and reduce recreational opportunities (e.g., Chatfield Reallocation.)
Evaluate <u>firm yield</u> of projects v. cost and environmental impacts. “Dependable,” “firm” yield (“safe” yield also) should be greater than zero (which was C of E determination at Chatfield: “dependable yield is zero” in EIS.) The devil is in the details
Full evaluation of alternatives is a concern
Transparency/Public involvement
Is surface storage preferred over aquifer storage and recovery? The latter reduces evaporative losses.
Full and efficient use of existing water supplies and reusable return flows before development of new diversion projects needs to be encouraged.
Expand or enhance existing storage and delivery infrastructure before building new facilities in undeveloped sites, and expand water to better utilize existing diversion and storage capacities.
Recognize fundamental and end economic inequities and adverse environmental consequences of new transbasin diversions.
Improve use of existing water supply infrastructure by integrating systems and sharing resources. Avoid user to avoid unnecessary water diversions and duplications of facilities.
Design and operate water diversion projects to leave adequate flows in rivers to support healthy ecosystems under all future schematics, even if water availability diminishes in future as a result of climate change on other factors.
State can support projects and support permitting efforts in the NEPA process.

Engage federal partners early in the planning process (prior to alternative development and selection). This will help ensure more streamlined permit reviews and consideration of environmental impacts and help ensure best environmental outcome.
<i>If we are on the right track, where/how would you specifically like the state to lead in implementing these strategies and policies?</i>
Water Plan recognized the need for storage. State should begin to look for opportunities to help fund multi-objective projects especially those IPP's.
Focus should be on <u>actual water yield</u> not necessarily storage. Storage has a cost! Evaporation.
The state should promote voluntary, smart principles for storage and supply (infrastructure) projects, as a guide to assure resiliency of freshwater ecosystems and water supply reliability under climate change.
Best use of storage in climate change world may be re-timing of flows, not increased consumptive use.
Support improvements in Colorado's water infrastructure system by providing low-interest loans and grants, and encourage partnerships and resource-sharing with federal agencies.
<i>General Comments/Concerns</i>
Many small utilities are those who face the effects of climate change first. Infrastructure financing should focus first on those systems least able to respond due to technical, managerial, or financial limitations.
Where large federal projects move forward, need to ensure transparency in decision making process
It is always about paying for it — “extremely important for rural”
State should have <u>criteria</u> for involvement, such as firm yield, cost, environmental impacts, evaporation
Funding needs to be increased and climate change adaptation funding criteria and priorities adopted by state and federal funding programs and CWCB
Many systems are built 50-plus years ago (some 100 years or more) and are facing renewal or replacement → this is an opportunity to ensure new or better systems are implements, ones that account for climate change effects.
Water users should be moved to paying full costs for providing the water they use, not further subsidized.
<i>If we are on the right track, where/how would you specifically like the state to lead in implementing these strategies and policies?</i>
Does CO or state revolving funds require a climate change component in the loan/grant application process? If not, consider (along with general managerial competency)
Require the loan applications to include climate change in funding proposals
Double the funding currently appropriated to dept. of natural resources for watershed restoration and flood mitigation projects
CWCB needs to add climate change adaptive management criteria to be used in development and evaluation of all CWCB grants and loan programs.
CWCB needs to increase and ensure long-term sustainable funding for monitoring and administration of ISF (to cover staff, equipment maintenance, new gages and program administration)
Educate and encourage financing tools that require the upfront costs and ensure infrastructure improvement projects pay for themselves (performance contracting, PACE, etc.)
Collaborate with EPA to utilize SRF

Yet, both for on-farm and delivery improvements with ag Farm Bill funding and advocacy are critical to ensure \$\$ to programs like NRCS that provide cost-share support to farmers
If we are not on the right track, what new strategies or policies would you suggest as the most pressing areas for focus?
Evaluate relative cost/benefit of “green” infrastructure compared to traditional — cost, water quality implications, evaporation, etc. One subcategory would be consideration of promotion of beaver habitat. Beaver dams slow the water flow in the spring and normalize flows in summer and fall. Also provide a lot of sediment retention — which would be a major threat to existing water infrastructure.
Water “demand” need to recognize “non-consumptive” water needs (ecological, recreation).
Rethink “efficiency” not necessarily as greatest crop per drop but as the effective delivery of water to a living thing. In ag, this means healthy soil, biodiversity, and managing for the whole living/productive systems. Protecting water for ag and incentivizing conservation in all sectors are key to resilience. Engage young farmers and ranchers in all this!
Encourage studies on historical water diversion records and how they fit into the overall water budget.
Infrastructure should restore/maintain health of aquatic ecosystems and the fish, wildlife and recreation dependent on them. Plan for resiliency.
The stream health is not even mentioned here — what share does it get — should ecosystem share be first?!
Do we want to maintain current conditions? If so we need to do what mother nature no longer does and build a way to keep water high in the watersheds. As snowpack melts earlier we need infrastructure to keep water high.
Promote recognition of actual local climate, semi-arid, lush landscapes <u>not realistic</u> .
Encourage the use of “smart irrigation systems” in large developments and commercial areas. State can lead thru rebate programs to make the switch or install new ones. Costs associated are rebates or tax credits. This would be a short term strategy. Although it’s tough to get buy-in with the recent wet weather we have had.
Conservation infrastructure- promote use of aquifer and gravel pit storage to reduce evaporative loss. Studies are needed to ID suitable sites both aquifers and gravel pits. Loans for projects that use these strategies are needed. Funding — perhaps some could be shifted from other priorities (e.g., enlargement of existing reservoirs). Costs are probably in line with other water supply strategies. Obstacles — none that I know of; however, evolution of impacts of any increased storage will have to be thorough and honestly evaluated. This would be both a short and long term strategy. By reducing evaporation it would result in water supply increases.
How to minimize storage loss due to climate change — need more storage options and resources to assist municipalities in implementing projects. Costs are high and obstacles include getting approval. This would be a longer term strategy to store more water during droughts.
Water supply and demand — education and conservation are critical for long term sustainability, especially given a quickly growing population. Mechanisms: Educating the next generation to instill paradigms of conservation in young Coloradans. Costs are minimal — time spend educating and developing educational resources to be distributed. Obstacles are minimal — need to figure out how to get information into classrooms. Very cost effective and important strategy in both short- and long-term; has minimal effect on other proposals/issues.

Water Quality and Watershed Health
Identify climate change risks related to integrated water quality and water quantity management.
<i>General Comments/Concerns</i>
Need ongoing and flexible research to understand risks in a meaningful way
Need a systematic approach to risk management
Identify' is a broad word — change this to “quantify and assess”
Need a synthesis of the science
Further incentivize options for existing water rights holders to leave some water in streams below facilities
Require climate impacts be addressed to qualify for funding
States should develop a toolbox with the data, tools, processes for stakeholders to use. Need to recognize there is not a one-size-fits-all approach
<i>If we are on the right track, where/ how would you specifically like the state to lead in implementing these strategies and policies?</i>
Greater funding for Colorado universities to explore the interface of treatment and policy
Work closely with Basin Roundtables on this identification and on integration of quality and quantity
Investigate and use tools developed by Federal government to help identify and define risks
Work with regulators to modify existing water quality standards to factor in climatic change into regulations.
<i>General Comments/Concerns</i>
How can regulations incorporate flexibility? What has worked? What authorities exist to incorporate climate change?
Funding and authority to evaluate the potential for flexible and adaptive regulations
I don't understand what this means exactly — assuming this is not referring to potable water quality standards. At opening there was mention for something on temperature, but I'm not aware of that standard except if industrial dischargers. What water quality standards are to be modified and why?
This should be a high priority with a public process implemented by CDPHE and DNR jointly.
Need clear explanation of what this would mean.
<i>If we are on the right track, where/ how would you specifically like the state to lead in implementing these strategies and policies?</i>
Right track — implementing dialogue with various Federal agencies to discuss approaches
Explore options for adaptive regulations, similar to adaptive management. i.e., identify thresholds where different regulatory components might be invoked. “If this happens, then this is the regulation.”

Collaborate across jurisdictions to protect and restore ecosystems associated with healthy watersheds
<i>General Comments/Concerns</i>
Wildfire- how to collaborate across jurisdictions to reduce area and intensity?
Catalogue the players involved in each watershed
Collaborate with feds, inviting fed players to assist during public involvement sessions.
Encourage and seek out state to state cooperation
Quantify water storage and carbon storage benefits of healthy soils and foster programs to implement
Promote a new level of collaboration across sectors within and between watersheds, including agriculture, conservation, M&I, eaters, etc.
<i>If we are on the right track, where/how would you specifically like the state to lead in implementing these strategies and policies?</i>
Right track — public dialogue sessions like this one
Fund research on water needs of healthy watershed and aquatic ecosystems (i.e., non-consumptive uses). Incorporate these needs into water planning.
Current climate state to state is improving — need to capitalize now
Promote more watershed wildfire mitigation plans — state of Wyoming is currently doing this
Fund and enhance stream and lake quantity and quality monitoring.
<i>General Comments/Concerns</i>
How to measure and monitor stream health? How this relates to stream management plans and how citizens are determining local long term plans
Stream management plans in Colorado Water Plan outline elements of stream health.
Lots of literature/expertise on stream health components
Research/monitoring results should be incorporated into planning for infrastructure and water use.
<i>If we are on the right track, where/how would you specifically like the state to lead in implementing these strategies and policies?</i>
Fund the collection of basic scientific data and make available for analysis.
More funding for stream management plans.
Promote awareness/studies of how quality changes in times of drought v. high flow.
Double funding currently appropriated for watershed restoration and flood mitigation projects (CWCB grant)
Increase and ensure long-term sustainable funding provided for monitoring and administration of ISF (to cover staff, new gages, equipment maintenance, and program administration).
If we are not on the right track, what new strategies or policies would you suggest as the most pressing areas for focus?
Understand baseline current conditions and over-subscription, watershed-by-watershed
Address the split between quantity and quality in the way the state approaches these issues
Who is involved in which watershed? Catalogue the players and activities
Encourage higher education on these topics

Water quality — It seems that solving water quality problems may be a case of treating symptoms of the greater problem of continuous population growth. In other words, I would think that as the population increases, any current policies or regulations will be rendered ineffective due to the multiplication of stress placed on the environment, in general and water quality in particular. Unfortunately the problem may be impossible in our current economic system, which requires continuous growth.

Overarching and/or Other Comments on the Colorado Climate Plan — Water

Bring all interests to table to collaborate on an effective and efficient climate change adaptation strategy

You may want to avoid discussing water rights, but those discussions are inevitable and ultimately need to justify how decisions are made and why ongoing subsidies exist.

It is not clear how the strategies and policies of the individual section (i.e., water, ecosystems, etc.) relate. Need to be comprehensive, interrelate to each other.

Need greater focus on groundwater management, which is typically used more during periods of drought

Could also include stormwater management component, either in emergency response (floods invariable follow droughts) as well as more stormwater capture and storage

Communities need to be involved in decisions that affect them

For each of the strategies that the state does adopt, create a set of measurable objectives and specific actions with a timeline.

Explicitly recognize in planning efforts that a lower carbon pollution future means less climate impacts to adapt to.

Set up resilient systems to extreme events rather than reacting when they occur --> and couple to long-term sustainability what we do today does not be redone tomorrow due to under-visioning

We are both commenting on, and ranking, the original strategies. There should be a process step where the strategies are revised w/ another chance to prioritize, or some other way to reconcile issues associated with doing two steps at once.

The public generally doesn't understand where their water comes from, how it got to them, or where it goes after use, but these are foundational to developed societies. As communities respond to climate change, it's an opportunity to enhance our water systems and increase overall understanding of our water systems and resources.

As a climate scientist, I'm undoubtedly encouraged by the extent to which climate change (CC) is being incorporated in policy. On the other hand, upon having conversations with people that are not convinced CC is real, it seems that it can actually be dangerous during policy making. One example that is most obvious to me is the flaw of collectively labelling anything associated with the earth system, such as air/water pollution and CC, as "environmental" concerns. When taken separately, I suspect a large majority will want regulation on pollution, but when grouping pollution with CC, all of the sudden many people could hesitate. Perhaps this relates to your comment that CC is not quite at the level of other concerns, at the regulatory level. I guess my message is that it seems best to be very specific when promoting and crafting environmental policy. And I think that's where the Climate Plan can be improved.

I am somewhat amazed by the language used by government officials and in government publications that leaves debate about the primary causes of global warming when there is a consensus in the scientific community that the drivers are anthropogenic. The idea that we don't know what the causes are helps fuel arguments against taking action. If we don't honestly identify the causes, we won't have public support for making changes.

Need better coordination/integration among the individual strategies and policies (e.g., water, ag, ecosystems, etc.)

Role of ground water (yield, storage, etc.) needs more attention
<p>Important elements:</p> <ul style="list-style-type: none"> • Increased flexibility for landowners to leave water instream and protect by priority • Financial and organizational support for locally-led conservation and planning • Partner with NRCS and universities to advance soil health implementation and outreach to store water and carbon, and illustrate quantitative benefits (somewhat covered in 6.4) • Similar to above, healthy riparian areas, wetlands, floodplains and watersheds are cost-effective ways to increase water storage, decrease the severity of extreme events, reduce stream temperatures and improve water quality. We need to support related programs and the research and documentation needed to prioritize this “green infrastructure.”
<p>This comment is not necessarily toward to that last session, but more so something to consider for a future forum. I think it would be very useful to get into some specific examples of how climate changes could be factored into planning and operations efforts, and what specific successes could occur when that happens versus when climate change is not planned for but ends up happening down the road. It might help people from different perspectives learn more specifically how and when to start including climate change planning, different from what we do today.</p>

Extreme Events and Preparedness
Promote and encourage drought preparedness through comprehensive drought planning and mitigation implementation.
<i>General Comments/Concerns</i>
Would be good to post best practices/policies of utilities to share experiences and lessons learned.
While skill is low keep on your radar long lead climate and drought forecasting for planning. Hopefully skill will improve in the future.
<i>If we are on the right track, where/how would you specifically like the state to lead in implementing these strategies and policies?</i>
Review policies re: ag transfer
Education of realities of the potential for longer and more severe droughts to other extreme events
Foster collaboration among entities within each watershed, cooperate with neighbors, not compete
Don't build halfway → Long-term, solid infrastructure, bank stabilization, drainage stabilization to mitigate wildfire counts
Engaging existing local networks — Roundtables, conservation districts, farmer/rancher organizations, etc. — for a bottom-up approach that fits the local/basin level.
Drought gaming is a good approach for scenario analysis and stakeholder engagement
Continue to leverage CWCW drought planning tools and funding to expand local level drought management plans.
State can lead through education and public outreach at multiple levels. Inform all levels of public, educate children. Make this future real to all so conservation and preparedness become priorities for everyone. Recourse—more public meetings/informational events. More hands on educational events for children of all ages. Costs — unknown. Obstacles — obtaining personnel to head continuing public outreach. Both short and long term — Public outreach needs to continue as implementation of plans occur and as future scenarios begin to play out. This strategy will maintain public engagement as more information related to climate change and water resources becomes available. Public engagement and advocating willing promote cooperation and action.

Assist local communities in building resilience through the development and implementation of regional and local resiliency plans.
<i>General Comments/Concerns</i>
(none)
<i>If we are on the right track, where/how would you specifically like the state to lead in implementing these strategies and policies?</i>
Help local municipalities develop messaging on climate change — toolbox of resources
Develop consistent info/data for local municipalities to understand CC levels — how much warming could we see — work from same set of H, M, C scenarios
Incorporate standardized language into local land use master plans. Local areas need format/standards
Discourage building in floodplains to avoid losses in catastrophic floods
Actively promote collaboration among water user groups to encourage conservation
Prioritize protecting ag land and ag water as essential to climate resilience (food security, intact rural economies that are equipped — financially, socially, ecologically — to build resilience, biodiversity, soil health, carbon sequestration, etc.)
Build on the Colorado resiliency framework developed by Colorado Res. and Rec office
Instead of a new plan for resiliency consider guidance on “connected planning” that gauges resilience in existing planning mechanisms, e.g., drought planning, hazard mitigation planning, climate adaptation and mitigation planning, land use plans etc.
Incorporate climate variability and change into long-term, statewide water planning efforts.
<i>General Comments/Concerns</i>
Yes, do this. But need to understand how final decision points are established and build consensus on which targets are chosen and what path to take.
Don't let the perfect get in the way of the good. Use existing modeling to initiate discussions knowing that model results will change as the climate does. Don't wait or expect “perfect” information.
Incorporate climate change in SWSI 2016 supply and demand projections and analysis.
Provide guidance and resources to relevant stakeholders to incorporate SWSI 2016 climate related info in statewide, basinwide and local supply planning processes
Adapt and implement climate change criteria in all Basin Roundtable Basin Implementation Plans (BIPs)
Develop robust modeling and decision-making tools (or enhance existing ones) to look at impacts of climate change to ag, water right holders and under different scenarios.
<i>If we are on the right track, where/how would you specifically like the state to lead in implementing these strategies and policies?</i>
Education — very important
Incorporate drought planning into local planning
Public relations, outreach that drought/water shortage is a recurring phenomenon in Colorado, not unusual events, long term lifestyle/infrastructure need to reflect the actual conditions.

Support high-resolution weather simulations of future climate. The science is there. This could be accomplished by CWCB creating an integrated set of decision support systems for each of the Basin Roundtables. Quantify the 5 IBCC/CWCB scenarios across the full range of RCPs as part of the DSS.
Encourage (require?) municipalities to use drought-resistant landscaping at all public facilities and disseminate info on effective xeriscaping
Healthy <u>soil</u> is essential to water policy and management and should be integrated into water plans, programs, funding, etc.
Make this an ongoing, sustained goal → new info will emerge continuously and need flexibility to incorporate it.
Develop a toolbox of data, tools, methods for users to pull from. We need consistent systems tie analysis to planning, but there is not a 'best' approach/tool for this.
Application of climate change to existing tools that people are comfortable and familiar with. Climate scenarios → state mod, etc.
Fund and enhance existing weather monitoring systems
<i>General Comments/Concerns</i>
Continue to fund stream gauge sites.
Need long-term, renewable funding stream for basic data collection and dissemination for analysis to underlay future decisions — without the data and science, correct, effective actions are not going to occur
High elevation precipitation gauges, such as SNOTEL, are invaluable. Their value increases with record length.
Continue to fund long-term monitoring. Fund organizations that collect data at high elevation sites.
Taking “weather” monitoring literally, weather networks such as COAgMet are invaluable in landscape irrigation (as of course, Ag also). The information needed (ET _o , ET _r , reference ET) is not very accessible to the average person. Better, easier tools to use this information are needed. A tall order — I know from experience.
General comments: too narrow, not just weather but other “data” networks: river flows, snowpack, climate modeling, water quality, etc. State can support seeking federal funding for monitoring and enhancing.
<i>If we are on the right track, where/how would you specifically like the state to lead in implementing these strategies and policies?</i>
Identify information gaps so we can efficiently increase the number of stations that will best inform changes in water supply
Monitoring provides the data and basis for climate analyses. Honing/improving networks provides better understanding of how mechanisms work and where efficiencies can be realized.
Include in this state cost-share support for on-farm soil moisture monitoring and other efficiency technologies
We need to understand the conditions that stress the water systems so we can determine monitoring priorities and thresholds that will require action.
We need to know the monitoring priorities and needs so we can demand when we go to D.C. or federal funding priority meetings.
Work with utilities and federal agencies to identify and address regulatory barriers to climate preparedness and adaptation.
<i>General Comments/Concerns</i>
Help streamline NEPA

Need to clarify that utilities means water in this context
Need greater transparency in decision making process
Assume a basin-focused approach (like Colorado Water Plan) to develop specific basic objectives and define responsibilities and roles
Streamlining should <u>not</u> reduce compliance with NEPA, CWA, etc. and should maintain/promote transparency and extensive public involvement
Understand Federal regulations, constraints and work towards integrating variability/flexibility into regulatory processes
Need to engaged Fed agencies (EPA) at the inception of projects rather than at the PDEIS stage
State needs to develop a statewide vulnerability assessment that evaluates comprehensive set of water-related impacts and criteria and used as required and criteria to regulatory requirements
<i>If we are on the right track, where/how would you specifically like the state to lead in implementing these strategies and policies?</i>
Reducing barriers to new storage
engage with USFS on Forest Plans
Help filter the Federal climate change priorities down to state actions
Be aware of CEQ's upcoming climate change guidance
State lean on building codes for minimum standards for efficiency
Comply fully with CWA 404 guidelines
Proactively leverage President Obama's E.O. 13693 mandates (related to federal coordination with state, local and tribal government's water management, drought, and climate resiliency planning) to ensure federal funding and decisions/actions align with and support Colorado Water Plan and Climate Plan. See E.O 13693 sections 7(g) and 10(b), (c)
<i>If we are not on the right track, what new strategies or policies would you suggest as the most pressing areas for focus?</i>
Do not forget floods!
Make sure to use COWARN (water auto response network?); could develop something similar for long term response (v. WARN which focuses on utilities sharing resource during emergencies)
Ensure watershed-based planning and continued stakeholder involvement
advance instream flow tools and landowner flexibility to manage water
healthy soils and watershed can help avoid extreme events
Did not see specific reference to local climate adaptation/preparedness planning

Identified Priorities

Water Supply/Infrastructure and Demand	<i>For each column/question, each participant will use dots to pick 1 strategy or policies for each question</i>				
Strategy or Policy	Which of the strategies or policies in this category are the highest priority (based on feasibility and impact)?	Which are the most feasible?	Which would have the greatest impact?	Which are a priority in the short term?	Which are a priority in the long term?
Promote and encourage water efficiency and/or conservation at the local and state agency level.	9	10	6	9	10
Encourage water providers to do comprehensive integrated water resource planning, geared toward implementing the best practices at the higher customer participation levels to achieve state endorsement of projects and financial assistance.	9	0	2	3	6
Support water sharing agreements where feasible and cost effective.	1	1	3	2	3
Explore options to increase reuse of fully consumable water.	3	3	0	4	0
Encourage opportunities for reservoir enlargement statewide (where feasible and cost effective) that could be used for municipal, agricultural, recreational and environmental purposes.	8	1	6	5	6
Support improvements in Colorado's water infrastructure system by providing low-interest loans and grants, and encourage partnerships and resource-sharing with federal agencies.	0	2	2	2	1

Water Quality and Watershed Health	<i>For each column/question, each participant will use dots to pick one strategy or policies for each question</i>				
Strategy or Policy	Which of the strategies or policies in this category are the highest priority (based on feasibility and impact)?	Which are the most feasible?	Which would have the greatest impact?	Which are a priority in the short term?	Which are a priority in the long term?
Identify climate change risks related to integrated water quality and water quantity management.	10	5	1	6	5
Work with regulators to modify existing water quality standards to factor in climatic change into regulations.	2	1	2	6	5
Collaborate across jurisdictions to protect and restore ecosystems associated with healthy watersheds	3	1	17	3	10
Fund and enhance stream and lake quantity and quality monitoring.	8	8	3	6	4

Extreme Events and Preparedness	<i>For each column/question, each participant will use dots to pick one strategy or policies for each question</i>				
Strategy or Policy	Which of the strategies or policies in this category are the highest priority (based on feasibility and impact)?	Which are the most feasible?	Which would have the greatest impact?	Which are a priority in the short term?	Which are a priority in the long term?
Promote and encourage drought preparedness through comprehensive drought planning and mitigation implementation.	9	10	8	13	6
Assist local communities in building resilience through the development and implementation of regional and local resiliency plans.	0	1	10	5	4
Incorporate climate variability and change into long-term, statewide water planning efforts.	1	4	4	4	8
Fund and enhance existing weather monitoring systems.	1	11	0	5	3
Work with utilities and federal agencies to identify and address regulatory barriers to climate preparedness and adaptation.	15	0	4	3	3

Appendix C — Written Comments

Colorado Springs Utilities Letter and Attachments



Memorandum

To: CWCB

From: Colorado Spring Utilities

Date: 2/18/2016

Re: **Colorado Climate Plan: Water Quality and Water Supply**

Chapter 2 of the recently released “Colorado Climate Plan” addresses “Water,” including observations on “Water Supply,” “Infrastructure,” and “Water Demands.” *Id.* at pp. 7-10. Cross reference is made to EPA’s “Climate Ready Utilities” publication and the impact of changing temperature and flow conditions upon the ability to successfully comply, in the future, with “fixed regulatory standards”. *Id.* at pp. 8-9. More specifically, it is observed that “In some instances, . . . the United States Environmental Protection Agency has the ability to make modifications that will afford utilities more flexibility to adapt to climate change, while in other instances increasing flexibility would require changes to existing law.” *Id.* at p.9. The state has therefore correctly identified a significant looming concern which merits further consideration, i.e., whether the existing statutory and regulatory regime established under the CWA and the SDWA can, or cannot, accommodate a new climate paradigm, with specific reference to future impacts on the construction and operation of water supply facilities.

This issue is not new. EPA recognized it at the time of the issuance of its 2008 “National Water Program Response to Climate Change” publication. However, in 2008, it simply raised the question of whether, and if so how, the then current regulatory regime could reach its goals under a modified climate regime. More recently, in its June, 2015 work plan bearing the same title as the 2008 publication, EPA called for the incorporation of climate change considerations into the section 404 permit program, including a directive to “consider the effects of climate change . . . when making significant degradation determinations in the . . . 404 wetlands permitting and enforcement program.” Part D of this 2015 work plan (Goal 12), entitled “Water Quality,” contained a number of strategic actions of interest to water suppliers, including a call for the consideration of climate change in the context of “water quality planning,” “NPDES permitting,” “the

February 18, 2016

establishment of TMDLs,” the “protection of designated uses,” and the establishment of “water quality criteria,” including in the context of “hydrologic condition.” One of the Goal 12 program actions is identified as “A Headquarters/Regional team will review issues related to climate change in Clean Water Act water quality criteria and standards and identify possible options for addressing climate change in the context of the Water Quality Standards Program.” See also: “U.S. EPA Climate Change Adaptation Plan,” June, 2014. Thus, the appropriate questions have definitely been posed—what is lacking is an in-depth discussion of potential solutions.

The Western Urban Water Coalition (WUWC), the Water Utilities Climate Alliance (WUCA), as well as the National Water Resources Association (NWRA) and the Association of Metropolitan Water Agencies (AMWA), have shown a significant interest in this issue and have begun to explore on-the-ground examples of problems or potential problems for both water suppliers and wastewater treatment facilities as a consequence of climate variability. They have started to reach out to EPA HQ and the EPA Regional offices for purposes of establishing a dialogue on points of regulatory friction and potential remedies, including flexibility in regulatory interpretations and/or the adoption of regulatory changes. See e.g., attached WUWC Regulatory Matrix. The state should take advantage of the information developed as a consequence of these ongoing efforts and consider how it may wish to join in those efforts.

On a more local level, over the past several years, both Colorado Springs Utilities and Aurora Water, members of WUWC and NWRA, have been actively engaged in this conversation. The two attached memorandum, though somewhat dated (for example, since the date of preparation of the Q/Q document, SB 15-212 on stormwater was adopted at the state level and EPA finalized its “WOTUS” rule, 80 FR 37054), provide a starting point in understanding both the quality/quantity relationship and the potential impacts of climate change on future regulatory compliance.

Colorado Springs Utilities offers these documents and observations for utilization by the state in furtherance of this effort, and is willing to assist in advancing the discussion on future response strategies. This would be accomplished in conjunction with the CWCB and the WQCC. Thank you for your consideration of these comments.

TO: Western Urban Water Coalition Perkins Coie LLP
 RE: Flexibility in CWA Regulations



1. Removal of Unattainable Uses

Regulation	Statutory Authority	Name	Effect	Regulatory Flexibility	Statutory Preclusion and Barriers to Flexibility
40 C.F.R. § 131.10(g)	33 U.S.C. § 1251 et seq.	Removal of Unattainable Uses	Allows for states to remove designated uses which are not existing uses (per 40 C.F.R. 131.3) if the state can demonstrate attaining the use is infeasible.	Limited flexibility exists within the current rule. The language in this regulation influences variance allowances and sets the foundation for the removal of unworkable uses. However, existing uses may not be removed even if their attainment becomes more difficult as a result of changed background conditions.	Flexibility is likely precluded by statute or EPA's three-tiered anti-degradation program. Use removal, even if such uses may be eliminated without great strain, is subject to significant statutory and policy barriers, and may be subject to ESA obligations.

2. Establishment and Implementation of Water Quality Standards

Regulation	Statutory Authority	Name	Effect	Regulatory Flexibility	Statutory Preclusion and Barriers to Flexibility
40 C.F.R. § 131.11	33 U.S.C. § 1251 et seq.	Water Quality Standards: Reference Criteria	Mandates state consideration of certain pollutants and specific criteria when setting water quality standards.	Flexibility exists within the current rule. Criteria must reflect the latest scientific knowledge pertaining to effect, behavior, and existence of pollutants in water. Reference criteria must also incorporate pure water-quality and ecological effects.	In practice, even if there is CWA regulatory flexibility, there might be ESA issues.
40 C.F.R. § 131.13	33 U.S.C. § 1251 et seq.	Water Quality Standards: State Policies	Provides states discretion to consider factors impacting application and implementation of state water quality standards.	Flexibility exists within the current rule. While policies accounting for mixing zones, low flows, and variance allowances have some flexibility, this can potentially encompass other factors, such as catastrophic drought conditions and shifting environmental baselines caused by climate change.	In practice, even if there is CWA regulatory flexibility, there may be ESA issues.
40 C.F.R. § 131.20	33 U.S.C. § 1251 et seq.	State Review and Revision of Water Quality Standards	Requires periodic review and revision of water quality standards by states to ascertain viability of uses not yet attained in certain water bodies.	This rule is inflexible. Revisions towards more stringent criteria are permitted, but the rule is not yet structured to account for changed baseline conditions or climate change adaptability.	Changes to this provision would likely require concurrent revisions to statutory anti-degradation requirements. However, these changes arguably are not necessarily precluded by statute.

3. Anti-degradation Reviews and Policy

Regulation	Statutory Authority	Name	Effect	Regulatory Flexibility	Statutory Preclusion and Barriers to Flexibility
40 C.F.R. § 131.12	33 U.S.C. § 1251 et seq.	Anti-degradation Policy	Sets an absolute water quality floor for all waters of the United States and provides a floor for water bodies with "fishable/swimmable" use status. Promotes maintenance of other uses based on several factors.	Very little flexibility exists within the current rule. The rule includes a provision allowing water quality standards revision if it is "necessary to accommodate important economic or social development in the area in which the waters are located."	Flexibility is not statutorily precluded, but faces significant barriers. Consistent with 33 U.S.C. § 1251(a)(2), water quality that has attained demonstrable "fishable/swimmable" viability since 1975 must be maintained for such uses. This is further complicated by potential Endangered Species Act consultation required when Tier 2 (propagation of fish, shellfish, and wildlife) anti-degradation issues encompass threatened or endangered populations and species.

4. Development and Implementation of Total Maximum Daily Loads (TMDLs)

Regulation	Statutory Authority	Name	Effect	Regulatory Flexibility	Statutory Preclusion and Barriers to Flexibility
40 C.F.R. § 130.7	33 U.S.C. § 1251 et seq.	Total Maximum Daily Load Development	Mandates establishment of TMDLs for certain water quality limited segments, as defined by the statute. Explains the consideration factors for establishing TMDLs.	Flexibility exists within the current rule. Both thermal and non-thermal TMDL regulations allow establishing entities to account for certain external factors, including flow rates, seasonal variations, existing sources, and more. This and other applicable TMDL regulations should allow for the consideration of factors related to climate change, including increased salinity, altered background pH, increased temperatures, and more.	In practice, even if there is CWA regulatory flexibility, there may be ESA issues.

Water Supply Challenges
The Quality/Quantity Interface
(Background Information Summary)
(Prepared by Mark Pifher 7/12/13)

Introduction

On May 14, 2013, Governor Hickenlooper issued Executive Order D 1013-005. The Governor directed the Colorado Water Conservation Board (CWCB) to develop a Colorado Water Plan, and to work with other state agencies, including the Water Quality Control Division (WQCD) and Water Quality Control Commission (WQCC) in the completion of that Plan. In addition, the CWCB was directed to assemble ad-hoc panels of Coloradans and inter-agency working groups to acquire additional input and develop recommendations on specific topics. One such topic would be the inter-relationship between water quality and water quantity in the context of meeting state consumptive and non-consumptive water demands.

Representatives of the State Engineer's Office, the CWCB, the WQCC, the WQCD, Park and Wildlife and the Department of Agriculture have been meeting on a quarterly basis for several years to discuss quality/quantity issues. These meetings began, at least in part, to meet the statutory directive in CRS 25-8-104(2)(d) which provides that "the commission and division shall consult with the state engineer and the water conservation board or their designees before making any decision or adopting any rule or policy which has the potential to cause material injury to water rights." This committee may serve as an inter-agency working group on the topic of water quality/water quantity, but the Executive Order also contemplates an ad-hoc panel, which could include representatives from the water provider, discharger and environmental/recreational communities, as well as federal government agencies, including the Forest Service and Bureau of Reclamation.

The CWCB would need to define the particular mission, goals and objectives of such an ad-hoc panel. A starting point may be agreement upon a list of key questions to be answered, such as:

- Where are there potential conflicts between quality and quantity in the development and use of water resources, and how can these conflicts be minimized or eliminated?
- Are there technical, economic, or other synergies between the identified means to meet quality and quantity objectives, such that water quality and supply goals can be simultaneously addressed?

- Is there flexibility in the existing Clean Water Act (CWA) and Safe Drinking Water Act (SDWA) programs that can be utilized to advance identified water supply objectives, be they consumptive or non-consumptive?
- Is there flexibility in the administration of the prior appropriation system that can be utilized to advance identified water quality objectives? Is more flexibility needed?
- Are there any legislative or regulatory reforms needed to simultaneously meet CWA and SDWA objectives, while advancing water supply solutions?

This paper describes some of the currently recognized relationships between quality and quantity decision making as reflected in the statutes, regulations and case law. It is designed to be a common starting point for the discussions to follow.

Quality/Quantity Relationships

1. **Federal Clean Water Act:** The CWA is directed towards protecting the “in-stream” quality of our nation’s waterways. Section 101(g) of the CWA states, in part, “that the authority of each state to allocate quantities of water within its jurisdiction shall not be superseded, abrogated or otherwise impaired by this Act.” Further, “nothing in this Act shall be construed to supersede or abrogate rights to quantities of water which have been established by any State.” In addition, section 510(2) of the Act provides that nothing in the Act shall “be construed as impairing or in any way affecting any right or jurisdiction of the States with respect to the waters...of such States.” In discussing these two sections, the U.S. Supreme Court has noted that:

“Sections 101(g) and 510(2) preserve the authority of each State to allocate water quantity as between users; they do not limit the scope of water pollution controls that may be imposed on users who have obtained, pursuant to state law, a water allocation.” PUD No. 1 v. Washington Dept. of Ecology, 511 U.S. at 720 (1994). Cf: South Florida Water Management v. Miccosukee Tribe, 541 U.S. at 108 (1994) (raising cost of water delivery to prohibitive levels may violate section 101(g)).

2. **State Water Quality Control Act:** The Colorado water quality control statutes provide that:

“No provision of this article shall be interpreted so as to supersede, abrogate, or impair rights to divert water and apply water to beneficial uses in accordance with the provisions of sections 5 and 6 of article XVI of the constitution of the state of Colorado, compacts entered into by the state of Colorado, or the provisions of articles 80 to 93 of title 37, C.R.S., or Colorado court determinations

with respect to the determination and administration of water rights.” CRS 25-8-104(1).

Pursuant to CRS 25-8-205, the WQCC can adopt “control regulations” for specified water bodies, and has exercised such authority for specific reservoirs, e.g., Dillon Reservoir and Cherry Creek Reservoir. This same statutory provision bestows authority upon the Commission over “reuse of reclaimed domestic wastewater” and “gray water”.

In addressing the nexus between water quality and water quantity, the state Supreme Court stated that:

“Water quality regulation that affects water rights without causing material injury or impairment is not necessarily prohibited. However, section 25-8-104(1) serves notice that despite the importance of water quality regulation, the legislature’s primary emphasis in enacting this scheme is to maximize beneficial use and to minimize barriers to further beneficial appropriation.” Thornton v. Bijou Irrigation, 926 P.2d at 92 (Colo. 1996).

The Thornton court noted that there is no recourse for alleged water quality injuries associated with the depletive effects of diversions, for to afford one would result in the creation of a “private in stream flow right.” Id. at 93. Rather, the current “legislative water quality scheme is not designed to protect against quality impacts unrelated to discharges....” Id. Under Colorado law, water quality goals cannot be achieved by limiting diversions.

3. Safe Drinking Water Act (SDWA) requirements: The federal SDWA is dedicated to protecting water quality “at the tap”. Its rules govern public water systems based upon maximum contaminant levels (MCLs) and maximum contaminant level goals (MCLGs) for a variety of parameters. The SDWA also contains certain technology based treatment requirements. In general, the WQCC simply adopts standards established by EPA. The nexus of the SDWA to water supply decisions lies primarily in source water protection, preserving the “treatability”, in a cost effective manner, of the raw water supply source, be it surface water or ground water. See e.g., new nutrients rule to protect direct use water supply (DUWS) reservoirs. Section 31.17 (According to Inside EPA, June 3, 2013, an EPA-state workgroup is currently crafting a series of recommendations identifying which tools from the CWA and SDWA would be best suited for advancing source water protection goals). Issues arise between upstream municipal and industrial CWA dischargers and downstream SDWA water suppliers, with policy questions, both technical and economic, surrounding the most appropriate point of treatment, i.e., at the point of discharge or the point of use. Finally, water suppliers

may be required to respond to potential CWA and/or SDWA standards for contaminants of emerging concern, such as pharmaceuticals, endocrine disruptors, and personal care products.

4. Federal regulations: In addition to those federal regulations adopted to implement specific statutory provisions related to quality/quantity issues, such as the establishment of water quality standards and the development of total maximum daily loads (TMDLs), additional provisions are worthy of note. First, 40 CFR 131.10(a) provides that “in no case shall a State adopt waste transport or waste assimilation as a designated use for any waters of the United States.” Thus, “dilution” cannot be a designated use of waters flowing through a given river reach. Allowing it to be used in this manner would have precluded its use for traditional beneficial purposes. Second, 40 CFR 131.10(g) (4) indicates that a use, such as aquatic life, can be removed from a segment (assuming it is not an existing use) in certain circumstances, including where “dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use.”
5. State regulations: Certain state regulations that bear upon the quality/quantity relationship can be found in Department of Natural Resources (DNR) promulgations and the rules adopted by the WQCC. A number of references in regulations adopted by the WQCC and accompanying Basis and Purpose Statements highlight the need to abide by CRS 25-8-104. For example, section 31.45 of the regulations acknowledges that the exercise of water rights may constitute irreversible man-induced changes to stream temperatures that warrant the adoption of site specific temperature standards. With respect to DNR, the State Engineer has adopted regulations governing the “quality” of the substitute water supply used in exchanges and substitute water supply plans. 2CCR 402-8, rule 6.5, states that in determining the acceptability of the quality of the substitute supply any standards or classifications adopted by the WQCC “shall be considered in determining water requirements of senior appropriators.....For example, if the senior beneficial use is agricultural in nature, then the appropriate standards for agricultural use may be applied....” Rule 6.5.2. The SEO regulations apply a presumption of acceptability to waters discharged in compliance with a WQCD permit or to waters treated in accordance with the Safe Drinking Water Act. Rule 6.5.6. In the 2011 Division of Water Resources memo entitled “Administrative Approach for Storm Water Management,” the Division indicates that storm flows can be held in detention facilities without running afoul of the no injury (to water rights) rule so long as they are released within 72 hours of the end of a precipitation event.

6. Additional Q/Q Examples: There are other examples in the statutory/regulatory regime where quality and quantity intersect, such that water quality laws may impact the ability to develop water supplies, or water supply projects may have water quality impacts.
- Section 401 Certifications: If the construction of a proposed water supply project, such as a new reservoir or pipeline, requires a federal license or permit, e.g., a section 404 dredge and fill permit from the Corps of Engineers or a FERC license for hydro generation, the federal permitting authority must secure from the state water quality agency a certification that the construction and operation of the project will meet all applicable state water quality requirements. The certification may contain water quality protective “conditions” which, in turn, become a part of the federal approval. Recent Colorado examples of water supply projects requiring such certifications include Colorado Springs’ Southern Delivery System, Denver Water’s Moffat Project, and the Northern District’s Windy Gap Firming and NISP Projects. The Water Quality Control Division has found it necessary to supplement the number of staff working upon such certifications.
 - Section 303 Water Quality Standards: Water quality standards for streams and lakes, including reservoirs, are adopted under the authority of section 303 of the federal CWA, and can come in the form of numeric criteria, such as .01ug/l Zn, or narrative standards, such as “no toxics in toxic amounts.” “Biological criteria”, which measure the health of the aquatic ecosystem, including fish and macro invertebrates, can also be adopted. The standards program also encompasses both (i) “antidegradation” reviews, e.g., prohibition against significant degradation in existing water quality absent a demonstration that the project represents important economic and social development (and, in any event, the underlying standards shall continue to be met); and (ii) designated uses, i.e., the need to maintain the underlying designated use, e.g., aquatic life, regardless of the “measured” chemical quality of the water.

The construction and/or operation of a water project could certainly impact the above standards. For example, the removal, i.e., diversion, of water from a stream could elevate stream temperatures beyond the temperature criteria, while a temporary dewatering of a stream in the exercise of water rights could foreclose the aquatic life use of the stream. An example of an applicable “antidegradation” review would be when a river segment has been identified as “outstanding waters” by the WQCC. This would preclude any measureable change in water quality within the segment, including those associated with upstream diversions or storage that

causes a reduction in “dilution” flows, and hence an increase in pollutant concentrations.

- Water Transfers Rule: In late 2008, EPA promulgated what is known as the “water transfers rule”, 40 CFR 122.3(i), clarifying that water can be moved from one water body to another, e.g., a transbasin diversion, through a variety of conveyance facilities, such as ditches, pipelines and tunnels, without the need for an NPDES point source discharge permit, so long as there is no intervening industrial, municipal or commercial use of the water. The rule was promulgated in response to several court decisions, e.g., a Second Circuit determination that NYC needed such a permit to run water through a tunnel from the Catskill Mountains to the basin of ultimate use. The rule has been challenged in several court cases. Should the rule be struck down, many water providers might be unable to continue essential movement of water from its source to its place of use.
- Total Maximum Daily Loads (TMDLs): Under section 303(d) of the federal Act, if a water body is not in compliance with water quality standards it must be listed as impaired (303(d) list), and allowable pollutant loadings must be allocated between point sources and nonpoint sources in order to achieve the standard. To the extent hydrologic modifications, e.g., dams and diversions, are considered nonpoint sources of pollution, and receive an allocation, it may be extremely difficult to meet such a requirement, e.g., through treatment. The only realistic remedy may result in a loss of yield. For example, alleviating a temperature exceedance may require leaving flow in the stream.
- Impacts of Climate Change: Climate variability, accompanied by more frequent and severe droughts, higher average temperatures and more intense rainfall events with accompanying run-off may lead to less water yield and increased water demand. This may also result in environmental degradation, including poorer water quality, as a consequence of increased pollutant loadings associated with run-off, increased groundwater discharge to surface waters, higher water temperatures and less flow for fish and other aquatic life. Lower flow levels can also cause a tightening of effluent limitations on wastewater plant discharges, with a concomitant increase in treatment costs, since such limits are often times calculated based on historic low flow (dilution) conditions. This could, in turn, lead to the increased use of “zero discharge” treatment options, depriving the stream of “return flows”. Increasing climate variability might also complicate water rights administration with regard to the requirement that junior appropriators are entitled to the conditions on the stream that existed at the time of their appropriation.

- **Reuse Regulations:** In an attempt to close the water supply gap, entities often look to “reuse” opportunities, such as those available under Colorado water law for transbasin diversions, i.e., the right to re-divert and reuse the return flows to extinction. This concept of reuse is reflected in “purple pipe” systems, where wastewater is treated to standards suitable for certain nonpotable uses, such as irrigation and industrial uses. “Direct reuse”, i.e., treating and purifying effluent to the point of reintroduction into the potable water system, may be more common in the not too distant future as treatment techniques improve and public objections wane, but it is not currently permissible in Colorado. Any reuse has a nexus with water quality regulation, which defines the level of treatment necessary for both the discharge back to the stream prior to re-diversion and for the ultimate intended use. The effects of the treatment for reuse, e.g., reverse osmosis and associated brine disposal, create their own issues that influence the economic and environmental suitability of reuse flows as a water supply.
- **Definition of “Waters of the U.S.”:** Ever since the U.S. Supreme Court issued the SWANCC and Rapanos decisions, regulatory, legislative and judicial activity has sought to define the scope of federal jurisdiction under the CWA, as reflected in the statutory phrase “waters of the U.S.” Draft EPA/Corps guidance on the topic was issued for public comment last summer. The guidance has not been finalized to date, and may be replaced by a rule. The broader the interpretation of “water of the U.S.”, the more likely that planned water supply projects, including reservoirs and pipelines, will trigger CWA permit requirements and, more importantly, costly and time consuming reviews under the National Environmental Policy Act (NEPA), as well as state 401 certification requirements.
- **Use Designations:** Individual segments of Colorado waterways are classified according to identified designated uses, including domestic water supply, aquatic life, agriculture and recreation. Each of these uses, in turn, has an accompanying set of protective water quality criteria. Thus, as both consumptive and non-consumptive water uses are identified, the associated water quality criteria will need to be met.
- **Section 402 Point Source Discharge Permits:** Section 402 of the CWA prohibits point sources from discharging to waters of the U.S. without a discharge permit. Colorado is a “delegated” state, i.e., it has been given primary authority to administer the permit program within Colorado. The permit program can bear upon water supply options in a number of ways, including: (a) the need to protect, through the imposition of effluent limits, downstream water uses; (b) the use of treated effluent as a source of reuse water; (c) the use of effluent as a means to meet non-consumptive aquatic life or recreational uses, especially in effluent dominated or

effluent dependent stream systems; and (d) the regulation of parameters found in infiltration and inflow into wastewater collection systems, which can be viewed as a source of pollutants or considered a foregone source of supply. (As also noted above, water diversions may increase wastewater treatment costs associated with permit compliance due to the removal of dilution flows).

- Section 319 Nonpoint Source Program: Section 319 of the CWA governs the “nonpoint” source program, i.e., pollution from diffuse sources, such as run-off from agricultural fields or flow from mineralized areas that is not funneled through any discrete conveyance or “point source”. Section 319 is not a permit based program, but rather focuses on the implementation of best management practices (BMPs) and the use of federal nonpoint source grant money to accomplish water quality objectives. As early as 1977, EPA identified “hydrologic modifications” as potential nonpoint sources of pollution. See EPA Nonpoint Source Control Guidance (1977); EPA National Management Measures to Control Nonpoint Source Pollution from Hydrologic Modifications (2007); EPA Water Quality Standards for Wetlands (1983) (covers hydrologic modifications, antidegradation and biological criteria). The 319 program also provides funding for monitoring, technical assistance and demonstration projects.
- Stormwater Control Program: Stormwater discharges are regulated as point sources under section 402(p) of the CWA, though the MS4 discharge permit program, as applied to municipalities, relies primarily upon the utilization of best management practices (BMPs), rather than numeric effluent limitations. EPA is in the process of increasing the stringency of the stormwater management requirements imposed on municipalities. Stormwater (and rainwater harvesting) have been looked upon by some as a potential source of water supply. See HB 09-1129 (rainwater harvesting pilot program). The State Engineer has issued an administrative memorandum on stormwater management (2011) which allows for stormwater detention for up to 72 hours to protect against potential injury to decreed downstream water rights. This limitation on detention may complicate the efforts of municipalities to comply with their MS4 permits.
- State Revolving Funds (SRFs): The SRFs, established under federal law, see e.g., CWA section 300j, generally consist of low cost federal loan monies available for projects designed to meet CWA and SDWA mandates. The Water Resource and Power Development Authority, working in concert with the WQCD and WQCC, administers the Colorado program. These monies are not available to secure water rights or build reservoirs. Unfortunately, due to federal budget pressures, the SRF programs are facing budget reductions despite an ever increasing demand for infrastructure investments.

Conclusion

This paper represents an overview of areas where water quality and water supply intersect. Additional examples of this relationship exist, and this memorandum can be expanded as necessary. In addition, the net could be cast even wider incorporating, for example, the relationship between the CWA and the Endangered Species Act, or even Wild and Scenic River designations. However, this outline can be utilized as a starting point for a dialogue on the quality/quantity relationship in the context of preparing a Colorado Water Plan.



Memorandum from



To: AMWA Climate Change Committee
From: Mark Pifher, Director, Aurora Water
Date: April 1, 2010
Subject: Regulatory Impacts of Climate Change

I. Introduction

It is anticipated that climate change may result in a variety of impacts on water resources and water based ecosystems in different areas of the country depending upon the specific geographic location, elevation, geology, existing hydrology and other pertinent factors found there. Certain areas may have significantly less annual precipitation, together with potential changes in the form of that precipitation, i.e. more rain and less snow pack. This may be accompanied by higher average temperatures. Mountain snowpack runoff may, in turn, occur earlier and be of a shorter duration. However, "drier" areas may experience more intense, albeit brief, rainfall events during summer months. Other geographic locations may see an increase in overall precipitation, while coastal areas may face the prospect of rises in sea level.

EPA is certainly aware of the above issues and has begun the process of formulating a response. See e.g., EPA, National Water Program Strategy: Response to Climate Change (2008). As acknowledged by the agency, "the challenges posed by climate change, however, do not always fit neatly into existing programs...", while "individual water programs, such as standards, permits, and wetlands protection, need to [be] adjust[ed] to the extremes of climate change." Id. However, "how" such programs are adjusted is of critical importance to the water and wastewater communities. For example, though EPA suggests that with reference to water quality standards, it may be necessary to examine the need for "expanded efforts to meet current standards, modifying criteria to protect uses and modifying designated uses," Id, the details surrounding the approach to such actions, including the technical and economic feasibility thereof, are yet to be crafted.

This paper is prepared under the assumption that, at least for certain parts of the country, there will be a departure from the historic norms relative to water flow, water temperatures, and certain baseline water quality and ecosystem conditions. This is important because designated beneficial uses and accompanying water quality concentrations, as reflected in adopted water quality standards and NPDES terms and conditions, are based upon "historical" flow and temperature patterns. Hence, it is necessary to thoughtfully examine how climate change and its associated impacts may require a paradigm shift relative to some of the CWA and SDWA regulatory programs that will be implicated.

II. Impacts on Water Quality

Before turning to a recitation of specific regulatory programs that could be affected by the impacts of climate change, it is useful to more generally note some of the potential water quality impacts associated with such change. As previously observed by EPA and others, a change in climatic conditions could affect waterbodies in the following ways:

A. Physical Integrity

- Channel reconfiguration due to changes in flow regimes (damage to riparian areas and sediment transport through flooding).
- Increase in forest fires and accompanying sedimentation and runoff concerns.
- Warmer temperatures and decrease in flows, along with wide channels, resulting in significant water warming.

B. Biological Integrity

- Drought related low flows may fall below aquatic life needs (loss of biodiversity).
- Cold and cool water species (salmon and trout) may experience significant reduction in numbers.
- Exacerbation of whirling disease instances.
- Potential loss of riparian zone plant and animal species.

C. Chemical Integrity

- Increase pollutant runoff from more frequent and severe rainfall events.
- Loss of anticipated dilution flows.
- Increase in salinity attributable to additional mineralized groundwater discharge and seepage.
- Increased salinity from agriculture lands runoff.
- Reduced DO levels.

III. Regulatory Nexus

As alluded to above, there are a number of federal regulatory programs, the implementation of which could be impacted by changing climatological conditions should they come to pass. The following is a preliminary list of where a regulatory nexus may exist, and hence a potential issue may arise. In addition, there is a brief identification of the nature of some of the accompanying concerns from the perspective of municipal water utilities. This is by no means an exhaustive list, but should be adequate to spur further dialogue.

A. NPDES Permit Calculations

Issue: Effluent limitations for point source discharges are generally based upon a calculation that takes into account historic flow regimes, i.e. the amount of dilution available in the receiving waterbody. Permit limits are set to protect designated uses based on low flow conditions. If prolonged periods of lower flows are experienced, such flows become a part of the calculation equation and calculated limits potentially become more stringent.

Concern: Obviously, if a municipality is a full service utility responsible for both water and wastewater compliance, there is a concern attached to the technical and economic feasibility of meeting new discharge permit limits. In addition, in areas of the country where water is more closely managed through diversion and storage facilities, e.g., the arid West, there may be attempts to alleviate the pollution problem simply through a man-made change in the flow regime, i.e. the introduction of more flow at the point of discharge. This could be accomplished through reservoir releases or curtailed upstream diversions. Such requirements could be imposed in the context of other regulatory hooks, such as NEPA reviews, local land use permits, water court proceedings, section 404 permits and accompanying 401 certifications, etc.

B. TMDL Development

Issue: Should a waterbody fail to meet water quality standards, including designated uses, the waterbody is to be treated as impaired under Section 303(d) of the CWA and a total maximum daily load (TMDL) developed in an attempt to meet applicable water quality criteria. The TMDL allocates loadings between point and non-point sources that contribute to the exceedance, i.e., load allocations and waste load allocations. With climate induced modified flow regimes, there may be more exceedances, and hence more impairment listings based on an absence of dilution flows. In other circumstances, there may be more exceedances as a consequence of additional groundwater contribution to surface waterbodies or stormwater contributions. Low flows may also result in "temperature" standard exceedances, which must be treated the same as more traditional parameters for TMDL purposes.

Concern: As noted above, there are concerns associated with the technical and economic feasibility of bringing the impaired waterbody into compliance through additional treatment. From a purely water provider perspective, there will be the additional concern that dilution flows may be viewed as a viable "treatment" alternative, with "hydrologic modifications" being considered a non-point source responsible for its own load allocation. This is especially true in the case of temperature, where little can often-times be realistically accomplished other than the implementation of some watershed activities designed to increase shading within the waterway corridor or changes to current diversion/storage/release patterns, with a concomitant potential injury to water availability for the utility.

C. Enhanced Treatment Techniques

Issue: As sources of more pristine drinking water become scarce, utilities will turn to the use of more brackish ground water, salt water, high TDS return flows and naturally mineralized river reaches to meet drinking water demands. Such water often times needs advanced treatment to be used as a potable supply. Reverse osmosis (RO) is one such treatment technique. Brine disposal is associated therewith.

Concern: The capital cost of advanced treatment techniques is often times quite high, as are future O&M costs. The techniques may also be energy intensive, with a fairly large carbon footprint. Part of the cost is associated with the brine disposal. If the brine is

discharged back to the river or stream, it becomes yet another challenge for down-stream water purveyors. Other disposal techniques include deep well injection or zero liquid discharge (ZLD) treatment/land disposal; however these techniques carry with them their own permitting and cost concerns. More efficient and less energy intensive technologies will need to be developed.

D. Changes in Designated Uses

Issue: Climate change, with altered flow and temperature patterns, may result in the loss of some designated waterbody uses or the modification of existing uses. For example, the range of certain “cold water” fish could be narrowed or eliminated, or fresh water species driven out of certain areas due to salt water intrusion. Different or new uses may, in turn, trigger the need for modified criteria specific to the protection of those uses.

Concern: The process for changing or removing uses as reflected in 40 CFR S. 131.10 has historically been difficult to utilize. Use attainability analyses (UAAs) are often times very costly, with the ultimate outcome of the administrative process uncertain. The definition of “existing uses” in 40 CFR 131.3 (all uses present after November 28, 1975) presents an additional barrier to flexibility, as all such uses must be protected. If the appropriate “post” climate modification uses are not established, water providers could be called upon to re-operate their water supply projects, including diversion and storage, (see 40 CFR 131.10 (g) (4) on dams and diversions) in an effort to protect “pre” climate change uses.

E. Antidegradation

Issue: EPA’s antidegradation policy (40 CFR 131.12), as implemented through the delegated states, is designed to protect all existing uses and waterbodies whose water quality exceeds those standards set to protect the designated uses. It also prevents the degradation of waterbodies identified as “outstanding natural resource waters.” However, as noted above, climate change may cause a loss or modification of the uses, and a “natural” or climate driven exceedance of the criteria.

Concern: It is unknown at this time how easy or difficult it would be for states to modify the categories or, as EPA calls them the “tiers,” into which the states have placed waterbodies for antidegradation review purposes. In addition, if the antidegradation review process is triggered, for example by the need for a section 401 certification for a water project required to obtain a section 404 permit, or as a consequence of a TMDL load and waste load allocation, it is unknown how a water diversion activity, which may be considered a non-point source for purposes of antidegradation review, will be impacted in an effort to ensure the attainment of standards which may no longer appropriately apply.

F. Sediment Criteria

Issue: Many states currently have not adopted sediment criteria. However, changes in climate related variables associated with sediment movement, such as precipitation amount and intensity, seasonal patterns of precipitation, stream velocity, the absence of flushing flows, and groundwater recharge patterns can impact the biological condition of

the water body relative to the fishery, macro-invertebrates and terrestrial aquatic ecosystems. This may lead to sediment criteria adoption and biological monitoring (biomonitoring) requirements, the end points for which are not now clearly defined.

Concern: Once sediment related stressors are identified, an adjustment to watershed activities may be looked upon as a solution. This may lead to a proposed modification of existing diversion, storage and release patterns which may or may not be possible without disruption of the yields historically realized by the water system. In addition, the mere variance in sediment loadings may exacerbate water treatment difficulties.

G. Endangered Species Impacts

Issue: Changes in the aquatic system of the nature noted above, including modifications in flow, temperature, pollutant concentrations and food sources may be detrimental to the habitat and health of threatened and endangered species. Activities which may further harm habitat or result in a “take” of a species, such as the exercise of existing or future water rights, may trigger consultation and mitigation requirements.

Concern: Those who divert water and place it to traditional agricultural, municipal or industrial beneficial uses already bear the burden of species protection. Recovery programs often necessitate dedication of water to stream reaches or habitat conservation/restoration plans. Program costs, both in terms of cash investments and lost yield, are high. Additional regulatory impositions on water management activities may curtail necessary drinking water supplies. Further, the species habitat may be irretrievably altered as a consequence of climate change, such that mitigation strategies reflect an unwise use of limited resources.

H. Drinking Water Standards

Issue: Changing flow and temperature patterns, including increased stormwater flows associated with climate change, could result in higher levels of organic nutrients and pathogens in drinking water sources.

Concern: Monitoring will be necessary to assess the level of such risk. In addition, to the extent new contaminants at levels of verified concern are discovered, new MCLs will need to be developed and treatment controls designed and implemented. Without an appropriate prioritization of risk and an accurate assessment of infrastructure needs, a cost effective plan of action cannot be devised.

I. Carbon Footprint

Issue: Many of the water quality changes potentially accompanying climate change may result in the use of new treatment technologies by both wastewater facilities and water plants that add significantly to the carbon footprint. For example, aeration stations, R/O treatment facilities, pump stations and additional chemical deliveries may significantly contribute to greenhouse gas emissions.

Concern: In addressing water quality changes associated with climate change, a more holistic approach to environmental impacts should be adopted, such that regulatory

decisions achieve an appropriate balance when weighing competing environmental values.

J. Reuse Regulations

Issue: In areas where climate change reduces water availability, there will be pressure to increase the reuse of available water supplies, either through direct or indirect potable reuse, or non-potable reuse for primarily irrigation purposes. Reuse regulations, with accompanying criteria and operating practices, are not yet fully developed in many states. Some additional studies on risk, e.g. reuse for irrigated crops or residential lawns, may be necessary. Finally, as more water is “reused,” there will be a further diminishment of in-stream flows which may have historically supported certain aquatic uses.

Concern: As entities strive to wisely use the resource in response to climate change or the increasing water demands associated with growth, reuse in a variety of forms, including through aquifer recharge and recovery, will expand. The regulatory regime should protect human health and the environment, yet not be overly stringent so as to unduly hamper reuse opportunities. In addition, such lawful reuse opportunities should not be precluded or unduly increased in cost by attempts to use regulatory mechanisms as a means to “keep the water in the stream.”

K. Availability and Cost of Municipal Infrastructure and Compliance

Issue: The infrastructure funding shortfalls faced by water utilities come as no surprise to anyone familiar with current utility challenges. However, climate change may not only increase the demand for new water infrastructure, e.g. storage, but due to potential increases in pollutant concentrations and greater stormwater flows, may stress existing wastewater infrastructure. Further, the construction associated with such infrastructure, including reservoirs, pump stations and pipelines, may trigger NEPA reviews.

Concern: Many municipal utilities provide combined services. To the extent wastewater investments needed to meet regulatory mandates result in rate increases to pay for wastewater upgrades, little flexibility remains to raise rates for water supply purposes. On a similar note, wastewater enforcement actions, with accompanying penalties and schedules of compliance, can deplete overall utility resources. Hence, there must, once again, be a more holistic approach to the use of enforcement tools designed to ensure regulatory compliance. In addition, the NEPA process must not become a forum for unwarranted costs and delays as innumerable alternatives are analyzed and environmental impacts endlessly debated. An appropriate level of deference must be afforded to the purpose and needs statement of the project proponent and the pertinent application must be diligently processed.

L. Agriculture to Urban Water Transfers

Issue: As urban water demands increase, due in part to climate change, and certain formerly rural areas urbanize, water will be transferred from agricultural uses to

municipal/industrial uses. Many such transfers will be market driven. The agricultural sources may be of lower quality and require more advanced treatment.

Concern:

It is unknown whether regulatory agencies will facilitate such market based transfers, be they interruptible supply arrangements, such as leasing/fallowing, or permanent water transfers. The treatment requirements associated with such water sources must be cost effective and based on sound science. That said, the agencies should not be promoting such transfers in the context of regulatory reviews, e.g. NEPA, if viable "standard" supply alternatives exist and are supported by the local community, such as the use of available storage. It must be recognized that such transfers can have their own social/economic impacts which must be satisfactorily addressed.

IV. General Observations and Recommendations

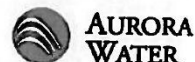
The above outline is designed to simply highlight some of the areas where there exists a nexus between potential climate change impacts and existing regulatory programs. Though the focus is on the CWA and SDWA, the processes found under NEPA and the ESA are certainly also implicated. If and when it becomes necessary to adjust "baseline" water conditions, regulatory programs will also need to adjust so as to accommodate this new paradigm. These program changes will not be easily accomplished, but must be grounded in law, sound science and common sense. In addition, the financial constraints faced by all involved parties, regulators and regulated entities alike, must be taken into account. The following general recommendations may assist in furthering the dialogue:

- EPA, in close coordination with other interested stakeholders, should refine the list of primary regulatory revisions with a potential nexus to climate change impacts.
- The involved stakeholders should identify any studies, monitoring, or scientific investigations necessary to formulate an appropriate regulatory response.
- The involved stakeholders should identify those program adjustments that would be possible within the existing regulatory framework, i.e., based simply on changes to policies/guidelines.
- The involved stakeholders should identify those areas where regulatory changes may be required, e.g. regulations with a direct nexus to flow or temperature patterns. Stakeholders should describe a process for making the regulatory adjustments, taking into account the need for an adaptive management or similar iterative approach.

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Memorandum from



To: AMWA Climate Change Committee
From: Mark Pifher, Director, Aurora Water
Date: April 1, 2010
Subject: Regulatory Impacts of Climate Change

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Concern: Obviously, if a municipality is a full service utility responsible for both water and wastewater compliance, there is a concern attached to the technical and economic feasibility of meeting new discharge permit limits. In addition, in areas of the country where water is more closely managed through diversion and storage facilities, e.g., the arid West, there may be attempts to alleviate the pollution problem simply through a man-made change in the flow regime, i.e. the introduction of more flow at the point of discharge. This could be accomplished through reservoir releases or curtailed upstream diversions. Such requirements could be imposed in the context of other regulatory hooks, such as NEPA reviews, local land use permits, water court proceedings, section 404 permits and accompanying 401 certifications, etc.

B. TMDL Development

Issue: Should a waterbody fail to meet water quality standards, including designated uses, the waterbody is to be treated as impaired under Section 303(d) of the CWA and a total maximum daily load (TMDL) developed in an attempt to meet applicable water quality criteria. The TMDL allocates loadings between point and non-point sources that contribute to the exceedance, i.e., load allocations and waste load allocations. With climate induced modified flow regimes, there may be more exceedances, and hence more impairment listings based on an absence of dilution flows. In other circumstances, there may be more exceedances as a consequence of additional groundwater contribution to surface waterbodies or stormwater contributions. Low flows may also result in "temperature" standard exceedances, which must be treated the same as more traditional parameters for TMDL purposes.

Concern: As noted above, there are concerns associated with the technical and economic feasibility of bringing the impaired waterbody into compliance through additional treatment. From a purely water provider perspective, there will be the additional concern that dilution flows may be viewed as a viable "treatment" alternative, with "hydrologic modifications" being considered a non-point source responsible for its own load allocation. This is especially true in the case of temperature, where little can often-times be realistically accomplished other than the implementation of some watershed activities designed to increase shading within the waterway corridor or changes to current diversion/storage/release patterns, with a concomitant potential injury to water availability for the utility.

C. Enhanced Treatment Techniques

Issue: As sources of more pristine drinking water become scarce, utilities will turn to the use of more brackish ground water, salt water, high TDS return flows and naturally mineralized river reaches to meet drinking water demands. Such water often times needs advanced treatment to be used as a potable supply. Reverse osmosis (RO) is one such treatment technique. Brine disposal is associated therewith.

Concern: The capital cost of advanced treatment techniques is often times quite high, as are future O&M costs. The techniques may also be energy intensive, with a fairly large carbon footprint. Part of the cost is associated with the brine disposal. If the brine is

discharged back to the river or stream, it becomes yet another challenge for down-stream water purveyors. Other disposal techniques include deep well injection or zero liquid discharge (ZLD) treatment/land disposal; however these techniques carry with them their own permitting and cost concerns. More efficient and less energy intensive technologies will need to be developed.

D. Changes in Designated Uses

Issue: Climate change, with altered flow and temperature patterns, may result in the loss of some designated waterbody uses or the modification of existing uses. For example, the range of certain “cold water” fish could be narrowed or eliminated, or fresh water species driven out of certain areas due to salt water intrusion. Different or new uses may, in turn, trigger the need for modified criteria specific to the protection of those uses.

Concern: The process for changing or removing uses as reflected in 40 CFR S. 131.10 has historically been difficult to utilize. Use attainability analyses (UAAs) are often times very costly, with the ultimate outcome of the administrative process uncertain. The definition of “existing uses” in 40 CFR 131.3 (all uses present after November 28, 1975) presents an additional barrier to flexibility, as all such uses must be protected. If the appropriate “post” climate modification uses are not established, water providers could be called upon to re-operate their water supply projects, including diversion and storage, (see 40 CFR 131.10 (g) (4) on dams and diversions) in an effort to protect “pre” climate change uses.

E. Antidegradation

Issue: EPA’s antidegradation policy (40 CFR 131.12), as implemented through the delegated states, is designed to protect all existing uses and waterbodies whose water quality exceeds those standards set to protect the designated uses. It also prevents the degradation of waterbodies identified as “outstanding natural resource waters.” However, as noted above, climate change may cause a loss or modification of the uses, and a “natural” or climate driven exceedance of the criteria.

Concern: It is unknown at this time how easy or difficult it would be for states to modify the categories or, as EPA calls them the “tiers,” into which the states have placed waterbodies for antidegradation review purposes. In addition, if the antidegradation review process is triggered, for example by the need for a section 401 certification for a water project required to obtain a section 404 permit, or as a consequence of a TMDL load and waste load allocation, it is unknown how a water diversion activity, which may be considered a non-point source for purposes of antidegradation review, will be impacted in an effort to ensure the attainment of standards which may no longer appropriately apply.

F. Sediment Criteria

Issue: Many states currently have not adopted sediment criteria. However, changes in climate related variables associated with sediment movement, such as precipitation amount and intensity, seasonal patterns of precipitation, stream velocity, the absence of flushing flows, and groundwater recharge patterns can impact the biological condition of

the water body relative to the fishery, macro-invertebrates and terrestrial aquatic ecosystems. This may lead to sediment criteria adoption and biological monitoring (biomonitoring) requirements, the end points for which are not now clearly defined.

Concern: Once sediment related stressors are identified, an adjustment to watershed activities may be looked upon as a solution. This may lead to a proposed modification of existing diversion, storage and release patterns which may or may not be possible without disruption of the yields historically realized by the water system. In addition, the mere variance in sediment loadings may exacerbate water treatment difficulties.

G. Endangered Species Impacts

Issue: Changes in the aquatic system of the nature noted above, including modifications in flow, temperature, pollutant concentrations and food sources may be detrimental to the habitat and health of threatened and endangered species. Activities which may further harm habitat or result in a "take" of a species, such as the exercise of existing or future water rights, may trigger consultation and mitigation requirements.

Concern: Those who divert water and place it to traditional agricultural, municipal or industrial beneficial uses already bear the burden of species protection. Recovery programs often necessitate dedication of water to stream reaches or habitat conservation/restoration plans. Program costs, both in terms of cash investments and lost yield, are high. Additional regulatory impositions on water management activities may curtail necessary drinking water supplies. Further, the species habitat may be irretrievably altered as a consequence of climate change, such that mitigation strategies reflect an unwise use of limited resources.

H. Drinking Water Standards

Issue: Changing flow and temperature patterns, including increased stormwater flows associated with climate change, could result in higher levels of organic nutrients and pathogens in drinking water sources.

Concern: Monitoring will be necessary to assess the level of such risk. In addition, to the extent new contaminants at levels of verified concern are discovered, new MCLs will need to be developed and treatment controls designed and implemented. Without an appropriate prioritization of risk and an accurate assessment of infrastructure needs, a cost effective plan of action cannot be devised.

I. Carbon Footprint

Issue: Many of the water quality changes potentially accompanying climate change may result in the use of new treatment technologies by both wastewater facilities and water plants that add significantly to the carbon footprint. For example, aeration stations, R/O treatment facilities, pump stations and additional chemical deliveries may significantly contribute to greenhouse gas emissions.

Concern: In addressing water quality changes associated with climate change, a more holistic approach to environmental impacts should be adopted, such that regulatory

decisions achieve an appropriate balance when weighing competing environmental values.

J. Reuse Regulations

Issue: In areas where climate change reduces water availability, there will be pressure to increase the reuse of available water supplies, either through direct or indirect potable reuse, or non-potable reuse for primarily irrigation purposes. Reuse regulations, with accompanying criteria and operating practices, are not yet fully developed in many states. Some additional studies on risk, e.g. reuse for irrigated crops or residential lawns, may be necessary. Finally, as more water is “reused,” there will be a further diminishment of in-stream flows which may have historically supported certain aquatic uses.

Concern: As entities strive to wisely use the resource in response to climate change or the increasing water demands associated with growth, reuse in a variety of forms, including through aquifer recharge and recovery, will expand. The regulatory regime should protect human health and the environment, yet not be overly stringent so as to unduly hamper reuse opportunities. In addition, such lawful reuse opportunities should not be precluded or unduly increased in cost by attempts to use regulatory mechanisms as a means to “keep the water in the stream.”

K. Availability and Cost of Municipal Infrastructure and Compliance

Issue: The infrastructure funding shortfalls faced by water utilities come as no surprise to anyone familiar with current utility challenges. However, climate change may not only increase the demand for new water infrastructure, e.g. storage, but due to potential increases in pollutant concentrations and greater stormwater flows, may stress existing wastewater infrastructure. Further, the construction associated with such infrastructure, including reservoirs, pump stations and pipelines, may trigger NEPA reviews.

Concern: Many municipal utilities provide combined services. To the extent wastewater investments needed to meet regulatory mandates result in rate increases to pay for wastewater upgrades, little flexibility remains to raise rates for water supply purposes. On a similar note, wastewater enforcement actions, with accompanying penalties and schedules of compliance, can deplete overall utility resources. Hence, there must, once again, be a more holistic approach to the use of enforcement tools designed to ensure regulatory compliance. In addition, the NEPA process must not become a forum for unwarranted costs and delays as innumerable alternatives are analyzed and environmental impacts endlessly debated. An appropriate level of deference must be afforded to the purpose and needs statement of the project proponent and the pertinent application must be diligently processed.

L. Agriculture to Urban Water Transfers

Issue: As urban water demands increase, due in part to climate change, and certain formerly rural areas urbanize, water will be transferred from agricultural uses to

municipal/industrial uses. Many such transfers will be market driven. The agricultural sources may be of lower quality and require more advanced treatment.

Concern:

It is unknown whether regulatory agencies will facilitate such market based transfers, be they interruptible supply arrangements, such as leasing/fallowing, or permanent water transfers. The treatment requirements associated with such water sources must be cost effective and based on sound science. That said, the agencies should not be promoting such transfers in the context of regulatory reviews, e.g. NEPA, if viable "standard" supply alternatives exist and are supported by the local community, such as the use of available storage. It must be recognized that such transfers can have their own social/economic impacts which must be satisfactorily addressed.

IV. General Observations and Recommendations

The above outline is designed to simply highlight some of the areas where there exists a nexus between potential climate change impacts and existing regulatory programs. Though the focus is on the CWA and SDWA, the processes found under NEPA and the ESA are certainly also implicated. If and when it becomes necessary to adjust "baseline" water conditions, regulatory programs will also need to adjust so as to accommodate this new paradigm. These program changes will not be easily accomplished, but must be grounded in law, sound science and common sense. In addition, the financial constraints faced by all involved parties, regulators and regulated entities alike, must be taken into account. The following general recommendations may assist in furthering the dialogue:

- EPA, in close coordination with other interested stakeholders, should refine the list of primary regulatory revisions with a potential nexus to climate change impacts.
- The involved stakeholders should identify any studies, monitoring, or scientific investigations necessary to formulate an appropriate regulatory response.
- The involved stakeholders should identify those program adjustments that would be possible within the existing regulatory framework, i.e., based simply on changes to policies/guidelines.
- The involved stakeholders should identify those areas where regulatory changes may be required, e.g. regulations with a direct nexus to flow or temperature patterns. Stakeholders should describe a process for making the regulatory adjustments, taking into account the need for an adaptive management or similar iterative approach.

cc: File copy



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February 9, 2016

Mrs. Taryn Finnessey
Climate Change Risk Management Specialist
Colorado Water Conservation Board
1313 Sherman Street
Room 718
Denver, Colorado 80203

RE: Colorado Climate Plan Water Strategy and Policy Recommendations

Dear Mrs. Finnessey,

Thank you for the opportunity to comment on the Colorado Climate Plan's Water Chapter. We applaud the state's effort and the broad coordination across agencies to document their climate mitigation and adaptation activities. Moving forward, we encourage the state to incorporate climate considerations across processes and decisions, and provide (and sustain) the funding mechanisms and tools necessary to create and sustain a climate ready state.

Denver Water's comments focus on climate adaptation and water resources planning, as well as present actions for a proactive response. We begin with strategic recommendations and conclude with page specific comments. We envision working with the state to design and implement these recommendations.

1. Require climate change (adaptation and mitigation) be addressed in Water Supply Reserve Account funding requests

Incorporating climate change into funding processes will ensure state resources are used effectively and efficiently. It will decrease the potential for needing to refund projects that did not build in adaptive capacity, result in fewer investments in unnecessary assets, and ensure funded research is robust. We recommend the state look to organizations using state of the art methods for systematic allocation analysis. For example, Seattle Public Utilities is using the Stage Gates tool to mainstream climate change considerations into their capital planning process, San Francisco Public Utilities Commission requires sea level rise vulnerabilities be addressed prior to project funding, and sustainability questions are part of the City and County of Denver's financial planning process. The state should include questions like:

- How is the impact of climate change addressed in the project or research?
- How is adaptability built into the project or research?
- What is the energy footprint of this project and what options are available for carbon mitigation?

2. Provide the mechanisms needed for systematic climate analysis in Colorado

More thorough and systematic climate analysis and planning is needed across the state. The analysis in the State Water Plan was limited and many fundamental climate inquiries remain. (For example, we need to better understand the implications of warming on water rights.) Additionally, agencies wanting to prepare for climate change (such as a result of the recommended funding requirements above) will seek tools and processes recommended by the state. We recommend the state develop and continuously update a toolbox of information, models, and processes to meet technical and planning needs in Colorado. The toolbox should include a comprehensive discussion of the capabilities and limitations of products provided. This approach should allow for comparable, consistent, and scientifically rigorous climate planning and analysis. A similar approach has been pursued by the California Department of Water Resources.

3. Provide funding for new climate science and applications research

Understanding and preparing for climate change in Colorado is incredibly tricky. New science, tools, and planning techniques are continuously emerging, and there is considerable pressure to use the most recently published science. It takes considerable time and resources to develop and understand if new science is more predictive and useful. Building on our second comment, we encourage the state to provide funding for Colorado specific science – research, monitoring, and modeling, which will help build the toolbox noted in comment 2 – to both progress climate change understanding in Colorado and help decipher emerging information.

4. Update the Climate in Colorado Report every five years. and provide funding for new research

The Climate Change in Colorado report is one of the most valuable climate resources available in Colorado. The report is credible, balanced, and high quality. We recommend the state fund the Western Water Assessment or equally credible and capable integrated team to update the report every five years and/or following the completion of IPCC reports.

5. Create an Expert Advisory Panel to educate state agencies and inform climate policy

We recommend the state build on their CCTAG and formalize an expert advisory panel to educate state agencies on climate change science and research, and act as an advisory group to inform and support the development of climate strategies and policy. The group should meet regularly with state agencies and convene before SWSI 2016. We feel it is critical for the panel to include both water policy and climate experts.

6. Build flexibility and adaptive capacity into state regulations

We applaud the inclusion of flexible and adaptive regulations in the Colorado Climate Plan water infrastructure discussion. This is one of the first articulations by a state that climate change will make some regulations more challenging (and eventually impossible) to meet. We encourage the state to further acknowledge and prepare to address attribution issues associated with climate change. For example, those with existing infrastructure and diversions may be blamed for climate change induced hydrologic changes. In addition, without climate-adjusted and flexible regulations, they may also be expected to mitigate changes outside of their control.

7. Use precise, scientific language

We encourage the state to use consistent, accurate and precise language throughout the report. Emotional, opinion based, and exaggerated statements may turn readers off, decrease credibility, or be used against the state. Examples include “Thankfully, Colorado is already leading the charge,” “Colorado is a resilient state, and together we are well-positioned to face this challenge,” and “Colorado’s Water Plan provides innovative solutions to meet the water needs of all Coloradans long into the future, and factors in how a changing climate may affect our supplies, demands, and ecosystems.”

8. Make consistent and equitable recommendations for Agriculture and Municipal

It is misleading to lump and compare agricultural and municipal demand management recommendations. For example, the sentence, “Colorado’s greatest water demands come from agriculture and municipalities” implies the two are of the same scale use and have the same potential in magnitude of savings. Additionally, there are only three agriculture strategies were recommend in comparison to several municipal recommendations. We highly recommend the state revise the section to reflect fair and equitable actions.

9. Detail the approach and implementation for the recommended Strategies and Policies

The strategy and policy section does not address fundamental implementation and prioritization, including: funding, tracking, agency owners, priorities, accountability, or pathways to action. We encourage the state to work with informed stakeholder to prioritize and implement strategies and policies.

10. The noted statistic is inaccurate

Please change, “Today, Denver Water, the municipal water provider for Colorado’s largest metropolitan area, has a treated water demand that is less than the treated water demand of 1980, despite a steadily increasing population,” to “Denver Water customers are using about 17 percent less treated water (in total) than before the 2002 drought, despite a 12 percent increase in population.”

The following are page specific comments:

Page Number	Section	Comment
General	All and strategy	Incorporate a discussion and evaluation of cascading events and impact
General	2.5	Add mitigation adaptation nexus
13	New section	Add section on planning and preparedness
13	2.5	Need a “common” climate assessment methodology and planning futures to prepare in comparable ways across the state.
13	2.5	Need a vetted methodology for changing variability coupled with warming
13	2.5	Carbon neutral goal to keep up with peers?
3	1.2	How does the Colorado renewable standard work?
4	1.2	What is ‘charge ahead Colorado’ in the tree diagram
ES and 7	ES, 2.0	Warming is only part of the cause of peak timing change – more complicated than this. Dust on snow, wind, etc. Be clear and correct.
7	2.0	Education and knowledge development is also key to adaptation

8/9	2.1.1	What is flexible regulations and monitoring in infrastructure section?
8/9	2.1.1	Add that storage will supplement loss of snowpack reservoir
9, 13		Monitoring should be based on a spatial/elevation scale as well as by political boundaries.
13	2.5	How are you going to ID monitoring needs and priorities? Where is the funding going to come from?
9-13	2.2, 2.3, 2.4	Add monitoring to each section
8/9	2.1.1	Add that storage will supplement loss of snowpack reservoir
9/13	2.1.1, 2.5	How are you going to help bridge the federal-utility gap for adaptive regulations?
9	2.2	"The effects of climate change on annual municipal diversions (in acre-feet) are projected to range from 0-8 percent (Figure 2-1).26" This assumes everything remains the same and on the next page the report talks the recent reductions in per capita water use...they seem contradictory and it should be added that the 0-8% is the increase from climate change with everything else being equal.
10	2.2	Warming increases outdoor watering: Municipal demand may increase to a point – there will be a threshold where grass isn't desired or outdoor uses become indoor needs
10	2.2	More agriculture discussion before municipal
10	2.2	Note the limitations with growing season due to available/intensity of sun in colder seasons
10	2.2	"As temperatures warm urban grasses will also require more water under increasing evapotranspiration rates, affecting irrigation requirements for municipal outdoor irrigation demands." Is the author trying to avoid saying bluegrass or cool season turf? We recommend being clear and saying cool season turf instead of urban grasses.
10	2.2	"Nevertheless, as density continues to grow so too will overall demand for water." We recommend this says, "as the population of Colorado continue to grow so may overall municipal water demand."
10	2.2	Agriculture demand recommendations: Talk about planting smarter, more drought proof plants and using efficient watering practices like in the municipal and supply sections
10-11	2.2 and 2.3	Discuss environmental demands and needs
General	2.1 – 2.3, 2.5	Discuss how reservoirs protect in-stream flows and recreation/tourism demands
13 and other sections.	2.5. critical to all	Add specific language supporting new and expanded reservoirs, especially if the largest reservoir of water doesn't live as long
9, 11	2.1.1, 2.3	The regulations discussion may better fit in the water quality section. Further elaboration is needed on how to build flexibility in the regulations and what examples we can learn from.
General	2.1, 2.5	The burden of streamflow changes and reduced snowpack lifespan should not be on those with the reservoirs and infrastructure. It should be on the whole community.
12	2.4	Need more and better description of the study parameters discussed on page 12 for the cameo gage in extreme events
13	2.5	Need funding for uncertainty planning research, climate science, and impact analysis

Thank you for the opportunity to review and comment on the water chapter of the Colorado Climate Plan. We look forward to working with the state to design and implement these and other climate adaptation strategies.

Respectfully,

A handwritten signature in blue ink, appearing to read 'Laurina Kaatz', with a stylized flourish at the end.

Laurina Kaatz
Climate Adaptation Program Manager
Denver Water

Rocky Mountain Climate Organization Letter

**Comments for CWCBC Stakeholder Engagement
On the Colorado Climate Plan
Statement by Tom Easley, Director of Programs
The Rocky Mountain Climate Organization
January 27, 2016**

On behalf of the [Rocky Mountain Climate Organization](#), I am pleased to have the opportunity to submit these comments for the record of the Colorado Water Conservation Board's stakeholder input on the [Colorado Climate Plan](#).

Importance of the Colorado Climate Plan

First, we would like to express our appreciation for the plan and especially for Governor Hickenlooper's role in [announcing the plan](#). Climate change poses serious risks to the resources and values that make Colorado such a special place to live, work, and play. Both the plan itself and the Governor's leadership in announcing it provide an important framework for future state government actions to address these risks. As the Governor said, "This comprehensive plan puts forth our commitment from the state and sets the groundwork for the collaboration needed to make sure Colorado is prepared." We also welcomed the Governor's emphasizing the importance of the plan in his recent [State of the State address](#). All of this helps to ensure that all Colorado state government departments and agencies will give increased importance to efforts to reduce both our state's contributions to climate change and our risks from its impacts.

Importance of public engagement

We appreciate the opportunity for stakeholder input on the Colorado Climate Plan. This opportunity is especially important because, unfortunately, there was only very limited opportunity for comment last year on the draft of the climate plan. Only about a dozen organizations were provided an opportunity to comment, and many more than that would have welcomed a chance to do so. Many local governments, in particular, asked for an opportunity to review the draft and comment, but were denied that opportunity, despite the participation of so many of them in the Colorado Local Resilience Project convened by RMCO and the Colorado Municipal League, which outlined a broad agenda for a potential partnership between the state and local governments for assessing and addressing climate-related risks. We realize that the decision to limit public review and comment was not made by the CWCBC, but that decision makes it all the more important that every state agency with a role in implementing the climate plan reach out extensively to stakeholders and the general public to provide meaningful opportunities for engagement in shaping agency decisions on how the plan will be implemented.

Of course, the state government has existing mechanisms for public engagement on water matters, including the basin roundtables, the Interbasin Compact Committee, and the CWCBC Climate Change Technical Advisory Group. However, these existing mechanisms are not fully adequate to provide all the stakeholder engagement that would improve the state's decision making on climate change/water matters. For one thing, although many organizations and interests are represented on the IBCC and the basin roundtables, many others are not. Also, the CCTAG, as its name suggests, focuses on technical matters, not bigger and broader matters including policy. This is why the Colorado Water Working Group at the Getches-Wilkinson Center, University of Colorado Law School, in its comments on the draft water plan, recommended a new climate change/water panel, to be appointed by the governor, to be

comprised of climate scientists, water leaders, and representatives of key interests to help develop guidance on how we can meet our water needs in a changed future. Whether accomplished through this recommendation, which RMCO has endorsed, or through another mechanism, we urge the CWCB to do more to take advantage of the state's abundance of expertise on climate change impacts on our water resources, with many experts in our universities, government agencies, water providers, private sector, and nonprofit organizations. Further drawing on that expertise would help the state government shape policy and take other actions to meet our climate change/water impacts.

Section 2 of the Climate Plan

The CWCB, uniquely among state agencies, already has been comprehensively addressing climate change in its ongoing plans and management actions, and so it is uniquely appropriate with respect to the climate plan's section 2, on water, that the climate plan should amount primarily to a cross-reference to the ongoing plans and management actions that CWCB is already taking that address climate change.

These include, most importantly:

- Efforts to implement the new Colorado's Water Plan;
- The upcoming Statewide Water Supply Inventory (SWSI) 2016 update, and the individual analyses that will support it;
- CWCB's guidance to and interactions with the basin roundtables in developing basin implementation plans consistent with the new state water plan; and
- Other specific studies that address climate change impacts on Colorado's water supplies and uses, such as a second phase of the Colorado River Water Availability Study.

RMCO compliments the CWCB for the broad framework that the water plan lays out for actions to meet Colorado's water needs. It is important that the state proceed to identify, as the plan says we will, how we are going to eliminate the projected 2050 municipal and industrial water supply gap; how we are going to increase both conservation and storage; how we are going to preserve agriculture, the environment, and recreation; how we are going to raise the funds needed to meet these needs; and how we are going to raise public awareness. Because the water plan sets these goals but mostly does not specify how we are going to meet them, the upcoming processes and decisions on how we are going to meet the goals are at least as important as the plan itself. But we repeat that we applaud the plan and all the work that went into it for identifying goals to guide our future actions.

RMCO submitted three sets of comments on the different drafts of the state water plan. Most of our comments focused on how the plan should provide more detailed information on how climate change is likely to affect both our supplies of and demands for water, to bring into sharper focus what the state government, water suppliers and users, and the general public should understand and can do to fully address the substantial risks that climate change poses to water supplies and water quality. Our continuing concern was consistent with other comments received on the draft plan. In its comments on the plan, for example, Denver Water commented:

the climate change portion falls short. . . . While some general information is provided in the Plan, the full breadth of the potential impacts of climate change needs to be explicitly included and explained.

Similarly, the Front Range Water Council commented, “Climate change is potentially an equal or greater contributor than population growth to the state’s looming future water gap,” and identified five new recommended actions to be included in the plan to address climate change, including:

The state needs to identify potential impacts from climate change in the municipal and agricultural supply and demand projections in the state water plan under reasonable future climate scenarios.

And the Colorado Water Working Group at the Getches-Wilkinson Center, University of Colorado Law School, stated that the plan “offers little guidance about actions the state, water suppliers, and water users should take in response to these effects” [of climate change on our water].

During the development of the plan, continued improvements were made in each new version of the draft plan on its consideration of climate change. However, the CWCB ultimately decided to leave some key steps to be taken in SWSI 2016 rather than in the state water plan. As a result, much of what we and others had to say in comments on the drafts of the water plan still apply, although now to the actions that should be taken in preparing SWSI 2016.

Major points from our previous comments on the draft water plan that we now understand are to be addressed in SWSI 2016 are:

- First, the CWCB should do a quantified analysis to spell out in numerical terms the M&I gaps that would result from the different conceptual scenarios described in the water plan, both for SWSI 2016 itself and for consideration by the basin roundtables in developing basin implementation plans. As before, we recommend that quantified analyses of climate change effects on both water supplies and water demands be used to define the scenarios, and that the underlying analyses be clearly explained and made available.
- Second, the CWCB should prepare for inclusion in SWSI a proper quantified analysis of the extent to which climate change may affect M&I and agricultural demands for water. The analysis should be a separate, stand-alone analysis to promote stakeholder and public engagement and awareness, should be developed with opportunities for review and comment, and should identify the different possible effects that could result from different climate scenarios. On the latter point, it is of course the case that a hotter future would increase water demands more than a future with less climate change, but we do not yet know what that difference might be. Far more is now known about possible climate change impacts on water supplies, but impacts on demands will also shape our future water gaps and needs.
- SWSI 2016 and/or a second phase of the Colorado River Water Supply Availability Study should provide information on the interplay between interstate compacts and climate change. Ultimately, Colorado’s greatest water risk is that the exercise of existing in-state water rights may be curtailed because of the operation of interstate compacts. Particularly for the Colorado River, this risk is greatly magnified by climate change, as compact compliance is determined by flows at Lees Ferry, which depend on runoff from across the entire Upper Basin, including lower-elevation areas in other states which may be even more vulnerable to the effects of climate change on snowpacks than Colorado’s higher mountains are. As this arguably is the strongest reason why new actions may be needed to meet our water needs in a changed future, a straightforward explanation of what is known here is important to inform Coloradans about water issues to encourage engagement and innovation in determining Colorado’s water future, one of the water plan’s major objectives.

- SWSI 2016 should identify other key gaps in the available information and analysis needed to understand and address climate change impacts on water resources, and identify how those gaps can and will be filled.

Major carry-over points from our earlier comments that are more relevant to the implementation of the state water plan include:

- The CWCB should provide clear guidance to the basin roundtables on how they should consider climate change impacts in developing implementation plans. So far, some basin roundtables have clearly considered climate change, in varying ways, and others have not really considered it.
- It is important that the CWCB should provide more detailed information on climate change impacts for consideration by basin roundtables and individual water providers, as now called for in the state water plan. In particular, smaller water utilities in the state simply do not have the resources by themselves to assemble the information they need to assess impacts on their systems. One option to help provide this information is the use of Water Supply Reserve Account Grants to fund needed analyses.

Of course, many new actions will be necessary to implement the Colorado Climate Plan and the related water programs of the CWCB, far beyond those we identified in our comments on the early drafts of the state water plan. As just one example, something that we think it important that the CWCB do in implementing both the climate and water plans is to revise the criteria governing the award of the state's Water Supply Reserve Account grants to call out the eligibility of actions addressing climate change. This could be accomplished by adding to the criteria used by the CWCB to evaluate grant and loan applications explicit statements that water technical assistance, studies, analyses, and other actions to help identify and prepare for climate change impacts on water supplies and demands are eligible for funding. The Metro Roundtable has already done so in the criteria for its funding decisions under this program. We think the CWCB and the IBCC should do the same at a state level.

Other sections of the climate plan

In our comments here, we have focused on section 2 of the Colorado Climate Plan, on water, and not on other sectors. Because of the lead role that the CWCB has within the state government on climate change, though, we want to point out that in the sections of the plan applying to state agencies that have not undertaken the breadth of climate change-related work that the CWCB has, much more work is needed to define the new actions that will be taken to meet the goals of improving Colorado's ability to adapt to future climate change impacts and of reducing emissions of climate-changing pollution. Also, the plan fails to meet one of the statutory requirements for it provided by H.B. 13-1293, that:

The development of a climate action plan in accordance with this section must take into account previous action plans developed by the state and goals and directives contained in executive orders issued by the governor.

We believe that this shortcoming of the current plan is one of the motivating factors behind H.B. 16-1004, to be considered in this session, to amend the law to provide more details on what must be in a state climate plan. RMCO will comment on that legislation in this session of the General Assembly.

Again, thank you for the opportunity to make these comments.

Western Resource Advocates Letter



February 5, 2016

Taryn Finnessey
Climate Change Risk Management Specialist
Colorado Water Conservation Board
1313 Sherman St., Rm. 721, Denver, CO 80203

Re: Comments on helping to shape the state's next steps in addressing climate change in the water sector

For the past 25 years, Western Resource Advocates (WRA) has been protecting Colorado's land, air, and water. We use law, science, and economics to craft innovative solutions to the most pressing conservation issues in the state. Our expert staff works throughout Colorado and the Interior West, creating opportunities for resilient water management strategies that are focused on innovation and efficiency, and providing alternatives to new, large dams and diversions that drain the life from our rivers.

WRA appreciates this opportunity to provide written comments to the Colorado Water Conservation Board (CWCB) in response to the CWCB's request for input from the water community on how to chart a path forward in addressing climate change. Specifically, we are responding to CWCB's request for input on the following general questions:

1. What are the water sectors' biggest concerns regarding climate change?
2. How can the state help to address those?

WRA is mainly concerned about the significant impacts that climate change may have on the health of the state's rivers and lakes, and world-class outdoor recreational industries. We believe the state needs to play a critical role in ensuring that water supply planning and management, and water infrastructure investments, take climate change into account during decision-making processes in order to ensure reliable water supplies and resilient built and natural environments. We also strongly support continued action to reduce the emission of greenhouse gas pollution, thereby addressing the root of impacts to Colorado's rivers and community water supplies.

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In summary, WRA strongly recommends that—under all climate scenarios—long-term water demands must be met in ways that protect and sustain abundant fish and wildlife, robust recreational economies, and vibrant quality of life. To achieve this, the CWCB, in collaboration with other stakeholders, should:

- 1. Develop a comprehensive statewide climate change vulnerability assessment as a critical planning tool and wise investment of taxpayer funds**
- 2. Ensure protection of freshwater ecosystems –under all climate scenarios-- in local, basin, and state water planning processes**
- 3. Support consideration of climate change impacts as part of the analysis of federal actions under National Environmental Policy Act (NEPA) reviews**
- 4. Adopt and encourage a set of key climate change adaptation strategies**
- 5. Promote voluntary, *Smart Principles* for water infrastructure projects, as a guide to assure resiliency of freshwater ecosystems and water supply reliability under climate change**
- 6. Increase funding to implement adaptation strategies, and adopt specific climate change criteria to help guide the evaluation of projects and grant proposals**
- 7. Increase inter-agency coordination and ensure implementation of Colorado’s Climate Plan**

1. DEVELOP A COMPREHENSIVE STATEWIDE CLIMATE CHANGE VULNERABILITY ASSESSMENT AS A CRITICAL PLANNING TOOL AND WISE INVESTMENT OF TAXPAYER FUNDS

Climate change is happening now, and the scientific consensus is that climate change will impact Colorado and the West in far-reaching ways. As identified in the *Colorado Climate Change Vulnerability Study*, a key next step in preparedness planning for the water sector would be to build on the state’s 2013 *Drought Vulnerability Assessment* (prepared pursuant to Disaster Mitigation Act 2000 & Section 409, PL 93-288) with a formal, water-specific climate change vulnerability assessment for surface and groundwater supplies.^{1, 2}

¹ Gordon, E., and Ojima, D. 2015. Colorado Climate Change Vulnerability Study: a Report by the University of Colorado Boulder and Colorado State University to the Colorado Energy Office. January.

² Colorado Water Conservation Board. 2013. Drought Vulnerability Assessment Technical Information: Annex B to the Colorado Drought Mitigation and Response Plan. August.

The Colorado Climate Plan recognizes that extreme weather events, such as drought, flooding, and wildfires may become more common, and that the likely impacts of climate change—such as increased sediment loading from forest fires, earlier snowmelt, decreased runoff, and higher evapotranspiration rates of crops—pose serious water quantity and quality risks to fish and other water users.

Within the past five years, insured losses from Colorado wildfires (Fourmile Canyon (2010), High Park (2012), Waldo Canyon (2012), Black Forest (2013)) have exceeded \$1 Billion. That said, a new report from the Center for American Progress projects that the U.S. Forest Service will have to spend 80 percent more per year over the next decade to fight wildfires in Colorado and other Western states, compared with the past five years. Nine deaths have been attributed to the September 2013 Colorado flooding events, with an estimated 2,000 homes damaged or destroyed statewide, and damage to public and private property from the September 2013 floods alone has been estimated at more than \$2 billion.

In sum, the economic, health, and safety risks of not evaluating and not clearly understanding the state's vulnerabilities to climate change are too high to ignore. Developing a statewide climate change vulnerability assessment that covers the state's freshwater ecosystems and water supplies is warranted and would be a wise and cost-effective investment of tax-payer money.

2. ENSURE PROTECTION OF FRESHWATER ECOSYSTEMS—UNDER ALL CLIMATE SCENARIOS—IN LOCAL, BASIN, AND STATE WATER PLANNING PROCESSES

Responding to the impact of climate change to Colorado's water resources and freshwater ecosystems requires a multi-faceted approach, including:

- Update the Colorado Climate Plan with specific actions and strategies identified in a prospective statewide vulnerability assessment (see *Recommendation #1* above), including goals and metrics to track progress in the implementation of the Climate Plan, and tasks and implementation mechanisms needed to achieve the adopted goals.³
- State water planning processes must incorporate the information and priorities identified in a prospective statewide vulnerability assessment and in updated Climate Plans, and the CWCB needs to provide guidance to basin roundtables and stakeholders on how to do this at the basin, municipal, and project levels.
- Design and operate water diversion projects to leave adequate flows in rivers to support healthy ecosystems under all future scenarios, even if water availability diminishes as a result of climate change and other factors.

³ See Natural Resources Defense Council. 2012. Ready or Not: An Evaluation of State Climate and Water Preparedness Planning. April.

- Integrate climate change in SWSI 2016 supply and demand projections and analysis, and provide resources and guidance to relevant stakeholders to incorporate SWSI 2016 climate change-related information in statewide, basin, and local water supply planning and water management processes.
- Develop robust modeling and decision-making tools (or enhance existing ones) to look at the impacts to agriculture, water right holders, and the environment under different climate scenarios (this might be done in, among other tools, stream management plans (SMP) and SMP grants).
- Adopt and implement climate change adaptation criteria in all basin roundtable implementation plans (BIPs).

3. SUPPORT CONSIDERATION OF CLIMATE CHANGE IMPACTS AS PART OF THE ANALYSIS OF FEDERAL ACTIONS UNDER NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) REVIEWS

As we look to find the best solutions to climate change adaptation, the NEPA process must be recognized as essential to good decision-making. It helps ensure that the public, water providers, and governmental agencies understand a project's consequences and that the alternative selected is the best one, taking into account a broad range of important criteria.

However, there may be opportunities to save time and money on the NEPA process without sacrificing the high-quality information necessary to promote good decision-making. Options include pursuing scalable climate change adaptation-related strategies through single programmatic NEPA documents from which individual actions may tier, thereby avoiding duplicative analyses with each individual action. Programmatic documents also provide the opportunity to set consistent policy objectives over broad geographic and subject-matter areas. The state could therefore analyze whether there are opportunities and there is value in programmatic NEPA reviews related to scalable climate change adaptation-related actions planned in the state. Some questions and issues worthy of consideration include:

- Identifying and prioritizing a short-list of the most promising on-the-ground adaptation strategies and/or projects. The list should emphasize those projects or strategies that can be scaled-up across broad geographic areas to provide the most significant climate change adaptation benefits. (A statewide vulnerability assessment and an updated Climate Plan could provide guidance for the creation of such a short-list of strategies and projects).
- What Federal decisions need to be made now and in the future regarding the broad action(s) being proposed?

- What are the appropriate geographic (spatial) and time frame (temporal) limits for this programmatic review?
- What are the meaningful decision points from proposal through implementation, and where are the most effective points in that continuum to address the potential for effects?
- Is it necessary to analyze the particular effects of a proposed action at a broader scale to facilitate analysis and/or decision-making at a more refined (i.e., tiered) level, and is a programmatic NEPA review the best way to do this?
- How long will the programmatic review continue to provide a relevant framework for tiering subsequent actions and what factors may result in the need to supplement or refresh the review?
- What are the federal agencies that can/should provide meaningful input during the development of the programmatic or tiered NEPA reviews?⁴

4. ADOPT AND ENCOURAGE A SET OF KEY CLIMATE CHANGE ADAPTATION STRATEGIES

The CWCB should adopt clear climate change adaptation policy priorities to help inform decision-making across all CWCB programs. For example, the CWCB should:

- Encourage the full and efficient use of existing water supplies and reusable return flows before the development of new diversion projects.
- Prioritize policies that advance conservation, reuse, and green infrastructure over costly grey/concrete infrastructure projects that can be inflexible under changing climatic conditions and may in fact increase climate-related vulnerabilities.
- Prioritize the implementation of the specific reuse, M&I conservation, land use, and alternative ag transfers actions adopted in Colorado's Water Plan and the Colorado Climate Plan.

⁴ See Michael Boots. 2014. Memorandum for Heads of Federal Departments and Agencies on the Effective Use of Programmatic NEPA Reviews. December 18.

5. PROMOTE VOLUNTARY, *SMART PRINCIPLES* FOR WATER INFRASTRUCTURE PROJECTS, AS A GUIDE TO ASSURE RESILIENCY OF FRESHWATER ECOSYSTEMS AND WATER SUPPLY RELIABILITY UNDER CLIMATE CHANGE⁵

- Improve use of existing water supply infrastructure by integrating systems and sharing resources among water users to avoid unnecessary new diversions and duplication of facilities.
- Recognize the fundamental political and economic inequities and the adverse environmental consequences of new transbasin diversions.
- Expand or enhance existing storage and delivery before building new facilities in presently undeveloped sites, and expand water supplies incrementally to better utilize existing diversion and storage capacities.
- Recognizing that market forces now drive water reallocation from agricultural to municipal uses, structure voluntary transfers, where possible, to maintain agriculture and in all cases to mitigate the adverse impacts to rural communities from these transfers.
- Involve all stakeholders in decision-making processes and fully address the inevitable environmental and socioeconomic impacts of increasing water supplies.
- Design and operate water diversion projects to leave adequate flows in rivers to support healthy ecosystems under all future scenarios, even if water availability diminishes in the future as a result of climate change or other factors.
- Seek to develop “multi-purpose projects” to spread project benefits as well as costs.

6. INCREASE FUNDING TO IMPLEMENT ADAPTATION STRATEGIES, AND ADOPT SPECIFIC CLIMATE CHANGE CRITERIA TO HELP GUIDE THE EVALUATION OF PROJECTS AND GRANT PROPOSALS

- Double the funding that is currently appropriated to the Department of Natural Resources for watershed restoration and flood mitigation projects.

⁵ The recommended *Smart Principles* have been developed by Western Resource Advocates, Trout Unlimited, and Conservation Colorado. 2012. Filling the Gap: Commonsense Solutions for Colorado’s Front Range: Joint Executive Summary of the South Platte and Arkansas Basin report.

- Add climate change and adaptive management criteria to be used in the evaluation of all CWCB grants and loans programs:
 - Water Project Loan Program
 - Water Efficiency Grants
 - Water Supply Reserve Account Grants
 - Colorado Healthy Rivers Fund Grants
 - Severance Tax Trust Fund Operational Account Grants
 - Invasive Phreatophyte Control Program
 - Colorado Watershed Restoration Grants
 - Ag Emergency Drought Response Program
 - Alternative Ag Water Transfer Methods Grants
 - Fish and Wildlife Resources Fund Grants
 - Non-Reimbursable Project Investment Grants
- Increase and ensure long-term sustainable funding is provided for monitoring and administration of ISF reaches (to cover staff, new gages, equipment maintenance, and program administration).

7. INCREASE INTER-AGENCY COORDINATION TO ENSURE EFFICIENT AND EFFECTIVE IMPLEMENTATION OF THE COLORADO CLIMATE PLAN

- Fund a full-time state climate change adaptation staff/coordinator position
- Establish a coordinating group that organizes adaptation efforts among agencies and is responsible for implementing the Colorado Climate Plan. This group should ideally be convened via mandate from the governor (i.e. via Executive Order) to agency directors with jurisdiction over water quality and quantity, hazard response, transportation, forestry, aquatic species, and public health. Such a group could be a subcommittee of the Greening Government Leadership Council (GGLC, <http://greengov.state.co.us/about>).⁶
- Proactively leverage President Obama's E.O. 13,693 mandates related to federal coordination with state and local water management, drought, and climate resiliency planning, to ensure that federal funding and actions are consistent with the Colorado Water Plan and Colorado Climate Plan.⁷
- A prospective statewide vulnerability assessment (see *Recommendation #1* above) that evaluates a comprehensive set of water-related impacts and develops adaptation criteria can be used, among other things:
 - To inform the analysis of federal actions under NEPA reviews.
 - To inform and ensure federal actions are consistent with state climate resiliency planning priorities, as mandated under E.O. 13,693.
 - As a key reference to score or evaluate projects and federal and state funding proposals from a climate change, emergency and risk management perspective.

⁶ For an example of such a statewide coordinating group, see the *California Climate Action Team* http://www.climatechange.ca.gov/climate_action_team/

⁷ See Exec. Order No. 13,693 §§ 7(g), and 10 (b), (c).

We very much appreciate the opportunity to comment on the ways the CWCB can address, in collaboration with stakeholders, the impacts of climate change to our water resources and communities.

Respectfully,

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