Analysis and Technical Update to the Colorado Water Plan

Technical Memorandum

Prepared for:

Colorado Water Conservation Board

Subject:

Observations Regarding Public Perceptions on Water

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1.1 INTRODUCTION AND BACKGROUND

Public acceptance of the Colorado Water Plan and support for its recommendations will be important in seeking to address Colorado's water needs over the next several decades. This memorandum provides a review of the 2012-2013 survey that BBC conducted for CWCB regarding *Public Opinions, Attitudes and Awareness Regarding Water in Colorado* (CWCB survey), and other survey research relevant to understanding social values in the context of the planning scenarios and water supply challenges that Colorado is facing in the future.

The CWCB survey was neither the first, nor the last, effort to understand public values related to water supply. A 2008 survey by researchers at Colorado State University[1] gathered information from Colorado residents on several topics related to some of the questions in the CWCB survey, as did a national survey by ITT in 2010[2], and a 2009 survey conducted on behalf of the Colorado River Water Conservation District.[3] More recent survey research for the San Diego County Water Authority[4] and across the State of Texas[5] provides further insights regarding public values in connection to water supply issues.

1.2 THE CWCB SURVEY

In late 2012, the BBC team surveyed 1,950 Colorado residents regarding water-related awareness, perceptions and concerns. Surveys were conducted with 325 residents in each of six regions across the state, with each region corresponding to one or two Colorado basins – as shown in Figure 1.

[1] *Public Perceptions, Preferences and Values for Water in the West*. Colorado State University. 2008.

[2] Value of Water: Americans on the U.S. Water Crisis. ITT. 2009.

[3] *Key findings from a Colorado River District survey of 500 registered voters conducted May 31 –June 2, 2009*. Public Opinion Strategies.

[4] *2017 Water Issues Public Opinion Poll*. San Diego Water Authority. May 2017.

[5] *Texas Statewide Water Conservation Survey*. Baselice & Associates, Inc. October 5-20, 2014.

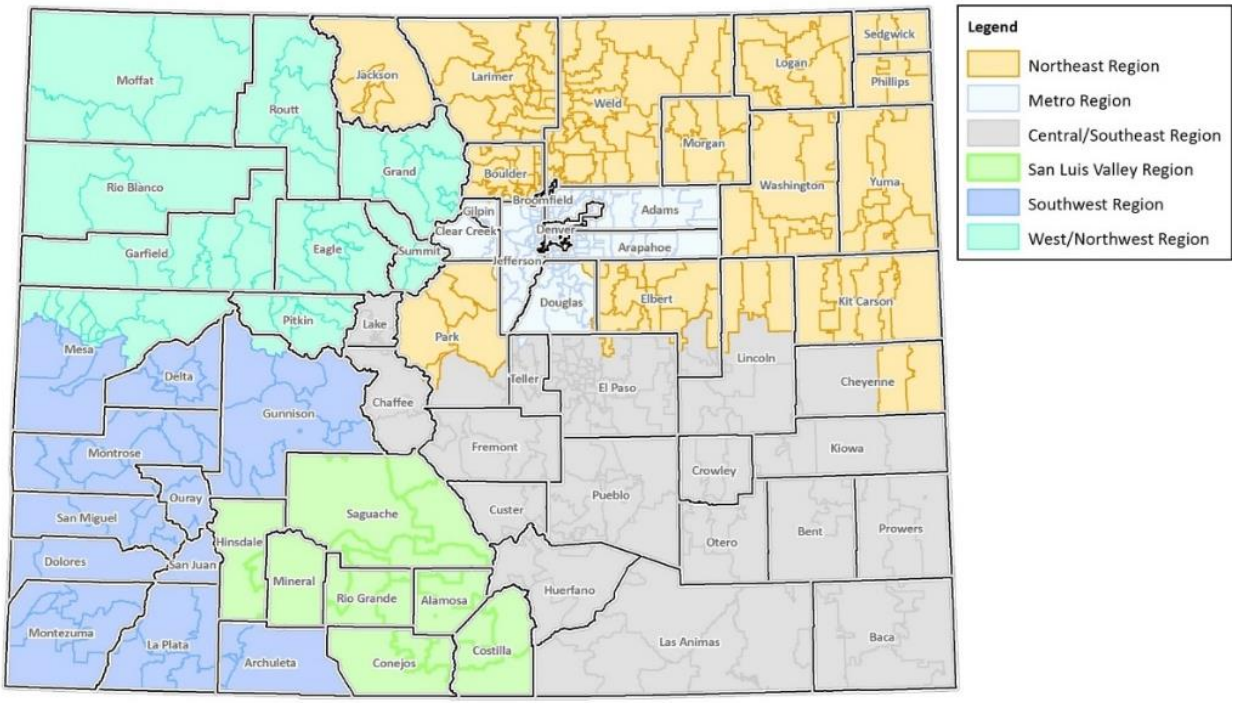


Figure 1. Map of study regions

The six regions defined for the CWCB survey approximately correspond to the Colorado Basin Roundtables as follows: Northeast Region = North Platte and South Platte Basins; Metro Region = Metro Roundtable; Central/Southeast Region = Arkansas Basin; San Luis Valley Region = Rio Grande Basin; Southwest Region = Gunnison and San Juan/Delores Basins; and West/Northwest Region = Yampa/White and Colorado Basins.

1.2.1 SURVEY TOPICS

The CWCB survey gathered a variety of information from respondents on the following topics:

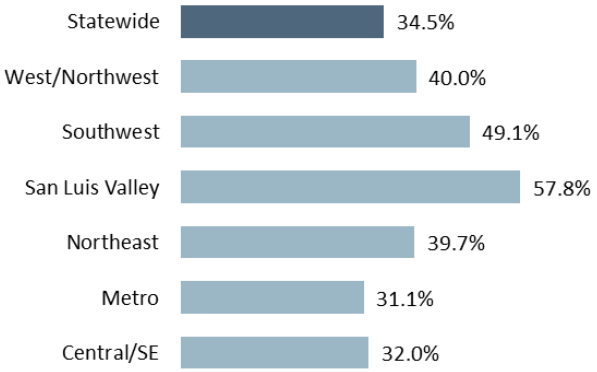
- Knowledge of Colorado water use and awareness of water issues;
- Perceptions regarding household water service;
- Performance of government agencies;
- Scarcity perceptions;
- Water-related concerns;
- Need for more information and most trusted sources; and
- Demographics.

Several of these topics are particularly relevant from the standpoint of the Colorado Water Plan and the alternative planning scenarios. The remainder of this memorandum focuses on public perceptions regarding those topics. Much more detail on the CWCB survey results is available from the original report.

1.3 PUBLIC KNOWLEDGE AND AWARENESS OF WATER ISSUES

As of 2012-13, public knowledge regarding basic information concerning water use in Colorado was mixed and varied somewhat by region. Overall across the state, about 35 percent of Colorado residents correctly identified farms and ranches as the largest water user in Colorado. Nearly two-thirds of Colorado residents did not recognize this basic water use fact, instead identifying households as the largest water user (32%) or industrial and commercial users (30%). As shown in Figure 2, residents in the

more rural regions were generally more likely to recognize that agriculture was the largest water user, while residents in the more urban basins (the Metro region and the Central and Southeast Region which contains the Colorado Springs and Pueblo areas) were less likely to know this information.



Both the 2008 survey by CSU researchers in Colorado and a recent statewide survey in Texas found similar gaps in basic water use knowledge.

Figure 2. Public knowledge that agriculture is the largest Colorado water user

Source: CWCB survey, 2013.

Across the state, Colorado's residents were paying increasing attention to water-related issues. About 72 percent of Coloradan's indicated they were paying more attention to water issues today than in the past. As shown in Figure3, this finding was relatively consistent across the regions of the state. When asked why, the most common answer was the recent drought/dry year experience in Colorado during 2012.

Recent surveys by the San Diego County Water Authority indicate that public attention to water issues can fade following droughts as other issues compete for public attention. During the California drought in 2015, one-third of San Diego residents identified water supply as the most important issue facing county residents. After the drought, in 2017, only 6 percent identified water supply as the most important issue.

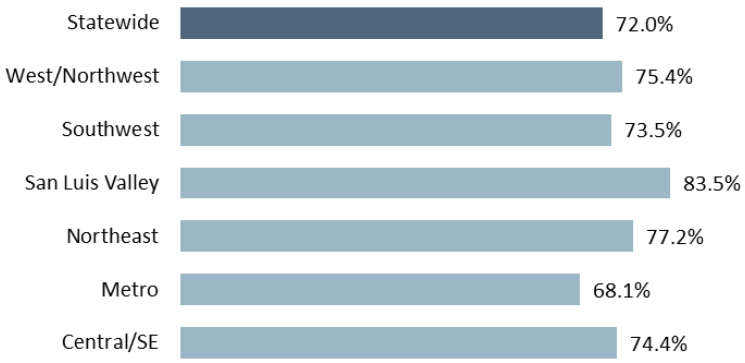


Figure 3. Residents indicate they are paying more attention to water issues and water use than in the past

Source: CWCB survey, 2013.

1.3.1 PERCEPTIONS REGARDING WATER SCARCITY

In the CWCB survey, Coloradans were asked whether they agreed or disagreed with the statement that "Colorado has enough water to meet our current needs." On a scale of 1 to 10 — with 10 indicating strong agreement that we have enough water for current needs, and 1 indicating strong disagreement —the mean response statewide was 4.9. Put differently, 46 percent of Coloradan's disagreed with the premise that we have enough water to meet current needs, about 29 percent agreed with the statement, and the remainder were neutral. Responses to this statement were fairly consistent across all regions of the state

except in the San Luis Valley, where a larger majority (62%) disagreed that Colorado has enough water to meet current needs.

Coloradans were more consistent in their disagreement with the statement that "Colorado has enough water for the next 40 years." The mean score in regard to this statement was 3.5, with 68 percent disagreeing with the statement and only 13 percent agreeing with the premise that we have enough water to meet future needs over this period. Figure 4 compares the responses in regard to the sufficiency of supplies to meet current needs, and to meet future needs. Again, residents of the San Luis Valley felt the most strongly about the future scarcity of water in Colorado, with 81 percent disagreeing with the statement our existing water supply is sufficient to meet future needs.

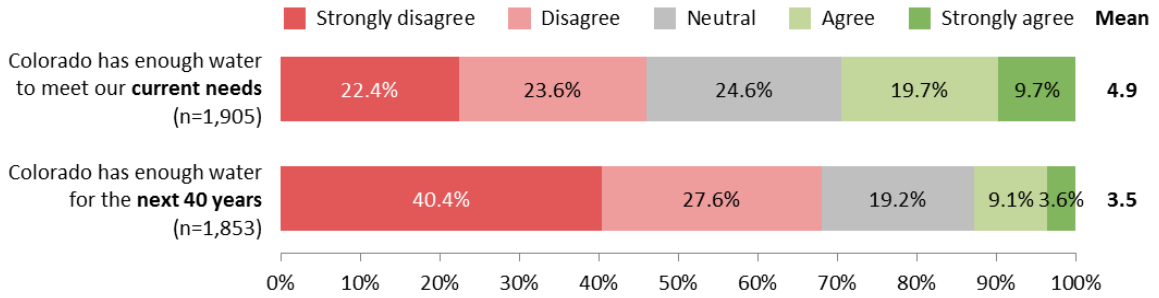


Figure 4. Agreement with statements that: 1) Colorado has enough water to meet current needs, and 2) Colorado has enough water for the next 40 years

Source: CWCB survey, 2013.

1.4 SOCIAL VALUES

The Colorado Water Plan identified future social values as one of the primary drivers in developing the five alternative planning scenarios evaluated in the SWSI update (along with future changes in M&I water demand and water supply availability). More specifically, in Chapter 6 of the Colorado Water Plan, social values are described as a measure of statewide public sentiment that may trend toward a "more green" orientation or may shift toward "greater resource utilization."

The "more green" perspective was further described as:

Favor(ing) more dense, low-impact urban development, greater reliance on water reuse and energy efficiency, greater protection of environmental and recreational resources, and preservation of local agriculture and open space.

The "greater resource utilization" perspective was further described as:

Gravitat(ing) toward full use of existing natural sources as well as the development of new sources to satisfy M&I water demands.

While Coloradans cannot be neatly categorized into either of these two alternative perspectives, and many of the states' residents likely embody some of both perspectives to varying degrees, the CWCB survey results do shed some light on the social values of Colorado residents as of 2013. The most useful questions from the CWCB survey in terms of identifying social values may have been the question posed to survey respondents regarding the "most important" water-related concern facing the state, and what they thought should be done to address their most important water-related concern.

1.4.1 MOST IMPORTANT WATER-RELATED ISSUE

Respondents to the CWCB survey were given a list of nine potential water-related concerns (read to each respondent in a different, randomized sequence) and asked to identify which concern was the most important. The options included:

- Water quality in our rivers, lakes and streams
- Amount of water available for Colorado's cities and towns
- Amount of water available for Colorado's farms and ranches
- Amount of water for recreational use such as boating, rafting and fishing
- Amount of water for fish and wildlife
- Condition of underground water pipes, dams and other water utility infrastructure
- The quality of water you receive in your home
- Amount of water used for energy development
- Effects of energy development on water quality

From a statewide perspective, the largest number of Coloradan's identified home water quality as the most important water-related issue, followed by the amount of water available for Colorado's farms and ranches, then by the amount of water available for Colorado's cities and towns – as shown in Figure 5.

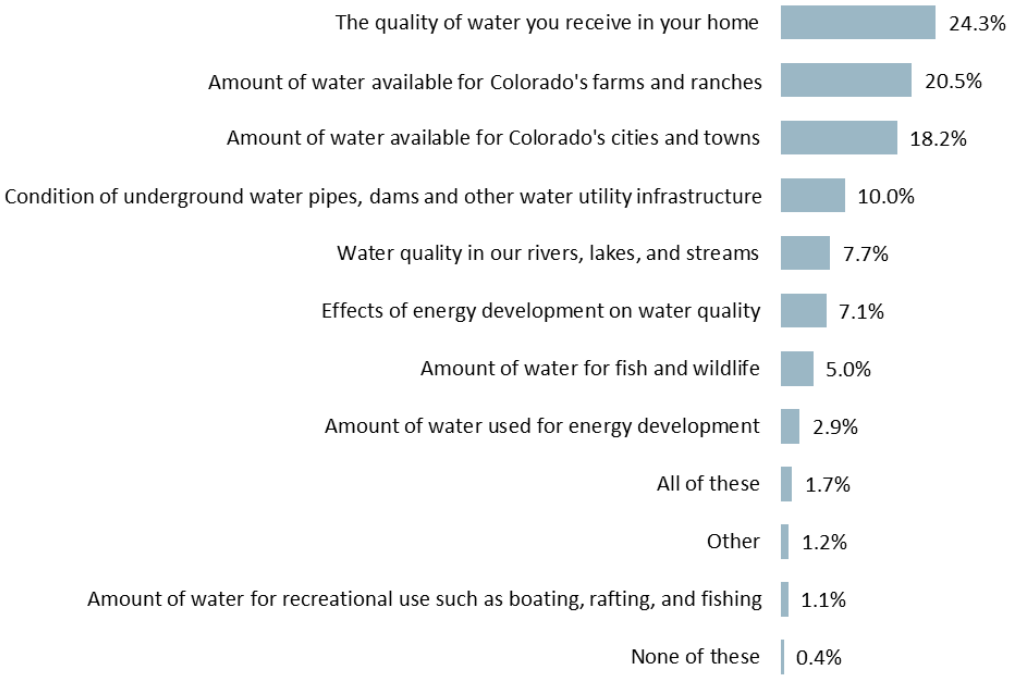


Figure 5. Most important water-related issue

Totals may not equal 100% due to rounding.

Source: CWCB survey, 2013.

To further understand these results, the study team conducted 20 brief, follow-up telephone interviews with respondents who had indicated the quality of water they receive in their home or the amount of water available for Colorado's farms and ranches were their most important concern.

The interviews with respondents who had identified the quality of water they receive in their home was their most important issue generally indicated that:

- Most of these respondents selected quality of water at home because of water's critical contribution to their family's health, and
- Most were satisfied with their current home water quality, but were concerned about potential contamination in the future, and
- Some respondents cited stories in the media regarding water contamination as a reason for their concerns.

The follow-up interviews with respondents who had identified the amount of water available for Colorado's farms and ranches were their most important concern indicated:

- These respondents were concerned about maintaining the ability of Colorado's farms and ranches to produce our food locally and about maintaining the vitality of Colorado's rural communities, and
- They were concerned about growth in Colorado's larger cities and pressure to move water from agricultural to urban uses, and
- Although some respondents indicated concerns about these situations at present, most were more concerned about the future.

Home water quality, the amount of water available for farms and ranches, and the amount of water available for cities and towns were consistently identified as the three most important water-related issues across all of Colorado's regions. However, the regions did rank these top issues in different orders. As shown in Figure 6, having enough water for Colorado's farms and ranches was identified as the most important issue in most of the less urbanized regions of the state, while having enough water for Colorado's cities and towns was more frequently identified as the most important issue in the more urbanized regions (Metro and Central/Southeast Colorado).

	Ranking Order for Top Water Issues		
Region	Home WQ	Water for Farms	Water for Cities
Central/SE	2	3	1
Metro	1	3	2
Northeast	2	1	3
San Luis Valley	2	1	3
Southwest	3	1	2
West/Northwest	1	2	3
Statewide	**1**	**2**	**3**

Figure 6. Rankings of most Important water-related issue by region

Source: CWCB survey, 2013.

1.4.2 ADDRESSING THE MOST IMPORTANT WATER-RELATED ISSUES

Survey participants were asked what they thought should be done to address their most important concerns. That question was open-ended (unprompted), but responses (including a few multiple responses) were coded by the surveyors. Figure 7 presents those results.

Overall, respondents most frequently indicated that their most important potential water-related issue should be addressed through conservation (19%), though the response to this question differed depending on which water-related issue respondents felt was most important (as discussed on the

following page). Respondents also frequently indicated that their most important concerns should be addressed by:

- Prioritizing environmental needs (14%); or
- Developing new projects/building more dams or reservoirs (14%).

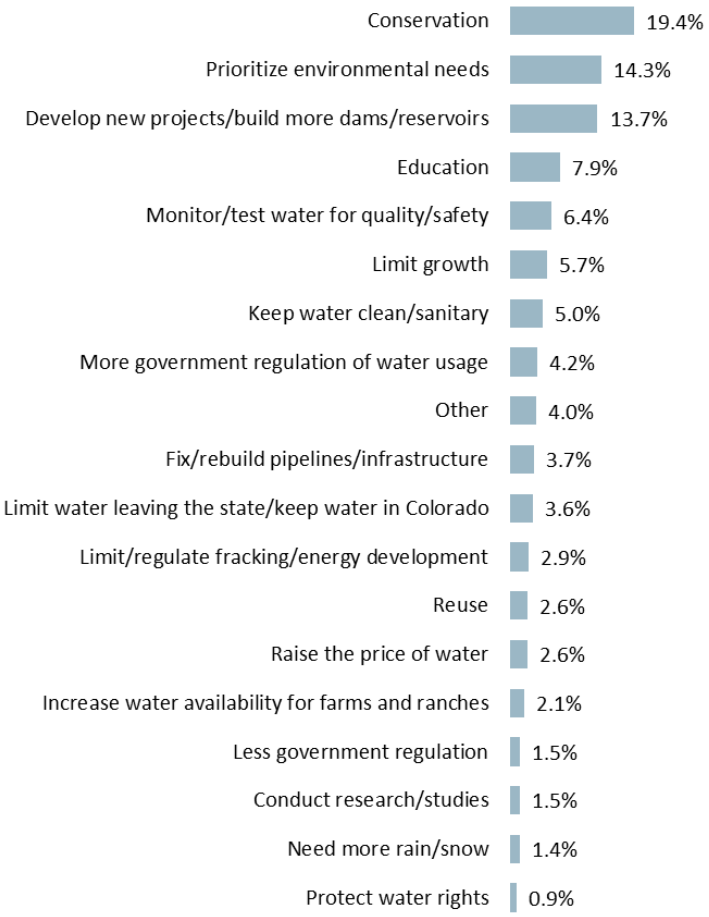


Figure 7. What should be done to address the most important water concerns?

Totals do not equal 100% because respondents could choose more than one option.

Source: CWCB survey, 2013.

How participants thought about addressing water-related issues varied depending on what they had identified as their most important water-related concerns. Figure 8 presents responses for addressing the top three most important potential water related concerns:

- Quality of water you receive in your home;
- Amount of water available for Colorado's farms and ranches; and
- Amount of water for Colorado's cities and towns.

Quality of water you receive in your home. To address the concern of quality of household water, respondents most frequently indicated that water pipelines or infrastructure should be fixed or rebuilt (19%). A number of respondents also indicated that the quality of household water should be addressed by:

- Keeping water clean/sanitary (16%); and

- Increasing government regulation of water usage (16%).

Amount of water available for Colorado's farms and ranches. Respondents most frequently indicated that concerns about water for farms and ranches should be addressed through conservation (25%).

Amount of water for Colorado's cities and towns. Respondents most frequently indicated that concerns about water for cities and towns should be addressed through conservation (29%).

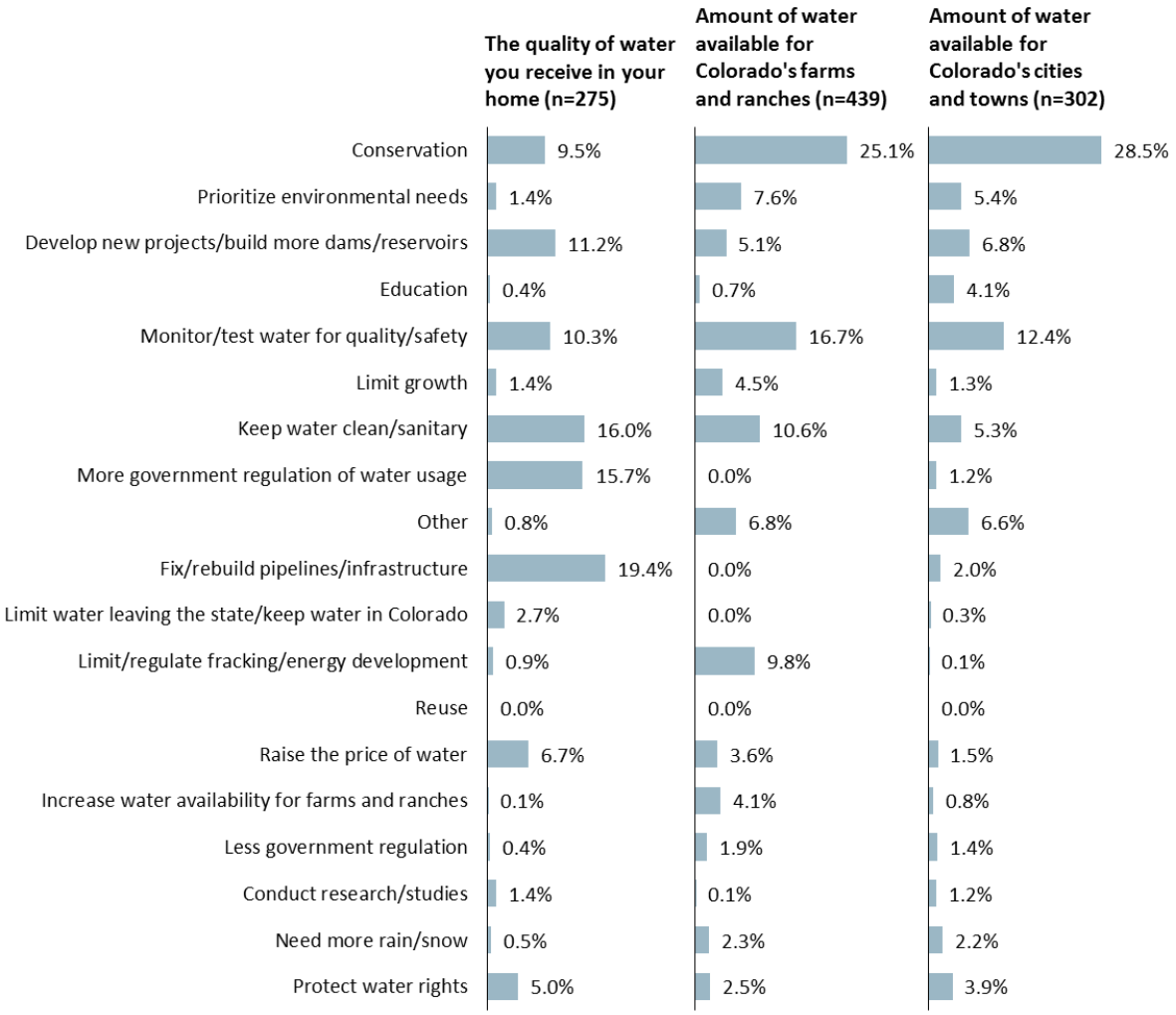


Figure 8. What should be done to address the most important water concerns? Breakdown by top three concerns

Totals do not equal 100%, because respondents could choose more than one option.

Source: CWCB survey, 2013.

Public preferences on addressing water-related concerns by region. Figure 9 shows the percentage of respondents by region that identified each of the top three strategies for addressing their most important water-related concern. Conservation was the top priority among respondents from each region, and support for placing more emphasis on environmental needs was relatively consistent across the regions. Support for developing new projects varied by region.

Region	Percentage Choosing Each Strategy		
	Conservation	Prioritize Environmental Needs	Build New Projects
Central/SE	16%	15%	15%
Metro	20%	14%	12%
Northeast	20%	13%	17%
San Luis Valley	22%	12%	7%
Southwest	23%	19%	10%
West/Northwest	21%	15%	16%
Statewide	**19%**	**14%**	**14%**

Figure 9. Most frequently identified strategy for addressing top water-related concern by region

Source: CWCB survey, 2013.

Several other surveys have gathered public input on their preferences concerning water strategies. The *Public Perceptions, Preferences and Values for Water in the West* survey by CSU researchers found that building reservoir storage was ranked first among strategies. Various conservation and reuse options, however, were ranked second, third and fifth among the eight options provided. Taken together, conservation and reuse as a package would have ranked first. Respondents in that survey also indicated mild agreement with the proposition that "Reallocating water for the natural environment and for human use should have the same priority" (average score about 3.5, where 3.0 is neutral and 5.0 is strong agreement). A 2013 survey of 710 Colorado voters by Public Opinion Strategies found that 80 percent of Colorado voters favored emphasizing conservation over building new projects in order to meet Colorado's water needs.

1.4.3 FINANCIAL SUPPORT FOR ADDRESSING WATER-RELATED CONCERNS

Whether tackled through additional conservation, environmental flow and habitat enhancement, new water storage and supply projects or most likely a combination of these measures and others – addressing Colorado's water related concerns and issues will require financial support from its citizens. Information gathered during the CWCB survey indicates the public is willing to pay more to address water-related issues.

During the earlier stages of each survey interview, respondents were asked about the affordability of home water service. Statewide, and in each region, Coloradan's consistently rated water service as more affordable ("inexpensive" or "priced about right") than other home services including energy, telephone service, and cable or satellite television service.

During the later stages of each interview, following discussion about the most important water-related issues facing Colorado and the respondents' suggestions regarding how they should be addressed, each interviewee was asked questions to identify their willingness-to-pay to address these issues. On average, survey respondents indicated their household would be willing to pay $5 to $10 per month to address Colorado's water related-issues:

- 66 percent of respondents indicated that they would be willing to pay an additional $1 per month;
- 54 percent of respondents indicated that they would be willing to pay an additional $5 per month;

- 48 percent of respondents indicated that they would be willing to pay an additional $10 per month; and
- 34 percent indicated that they would be willing to pay an additional $25 per month.

The degree of financial support for addressing water-related issues did vary by household income level. As shown in Figure 10, higher income households (above $75,000 per year) were more supportive of larger monthly costs (e.g. up to $25 per month), while the majority of lower income households (less than $50,000 per year) were unwilling to pay more than $5 per month.

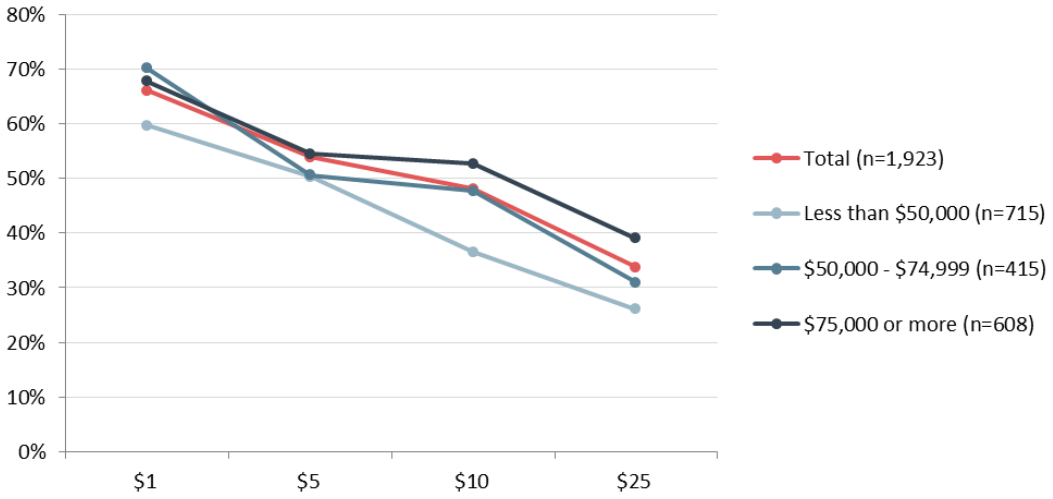


Figure 10. Willingness to pay to address water-related issues

Source: CWCB survey, 2013.

Colorado currently has a little over 2.1 million households (U.S. Census, ACS 2017 1-year estimates). If each household contributed $5 per month (in some fashion) toward resolving Colorado's water-related issues, those contributions would provide an annual funding stream of more than $125 million.

1.5 SUMMARY

- Coloradans have varied levels of knowledge regarding water use in the state. Only one in three residents recognizes that agriculture is that largest water user in Colorado. There is room for further education.
- But, in 2012-2013, a large majority of the state's residents were paying more attention to water issues, and their own water use, than they had in the past. In part, this was likely due to the very dry conditions during the summer of 2012. Repeated surveys in other locations have found that water awareness rises during droughts and diminishes after the drought recedes.
- The Colorado Water Plan identified social values as one of the key drivers in developing alternative future scenarios. More specifically the Colorado Water Plan discussed the possibility of values either trending towards a "more green" perspective or shifting toward "greater resource utilization."
- The CWCB survey provides some perspective on social values regarding water as of 2013, particularly in terms of identifying the water issues that residents felt were most important, how they thought Colorado's water issues should be addressed, and their willingness-to-pay to help resolve those issues. Social values can and do shift over time, and may also be affected by droughts, water contamination outbreaks (such as the Flint crisis which occurred after the CWCB survey was conducted), and public education and outreach efforts.
- Among eight potential water concerns, Coloradan's identified protecting home water quality, having enough water for Colorado's farms and ranches, and having enough water for Colorado's cities and towns

as the most important. These were the top three issues in each region of the state, though the ranking order of the issues varied by region.

- Coloradans most frequently described conservation as their preferred approach to addressing Colorado's water issues, followed by prioritizing environmental needs and building new water supply projects. Conservation was the most frequently recommended strategy in every region and support for prioritizing environmental needs was also quite consistent across Colorado's regions. Support for developing new water supply projects was more varied among the regions.
- Coloradans perceive home water service to be affordable compared to other home services, and are willing to pay more to address Colorado's water issues. On average, Coloradans are willing to pay between $5 and $10 more per month to address their water-related concerns. At $5 per month per household, this willingness-to-pay would correspond to statewide annual financial support of about $125 million.

1.6 POTENTIAL NEXT STEPS

The CWCB may want to undertake an updated public opinion survey prior to the next update to the Colorado Water Plan. As described in this memorandum, public awareness and opinions regarding water and water-related issues can and do change in response to climate variability, ongoing public education efforts by water providers and other entities, and external issues such as the highly publicized Flint water crisis that occurred several years ago (but after the 2012-2013 CWCB Survey). The makeup of Colorado's population is also dynamic. Census Bureau data from the American Community Survey indicate that approximately 1.2 million people moved to Colorado from other states or countries during the five-year period from 2013 and 2017. While some of those migrants may have already moved on to other locations, it seems likely that 10 to 20 percent of Colorado's current residents were not here when the 2012-2013 CWCB Survey was conducted.

If CWCB does sponsor an updated survey in the next few years, we would recommend that the new survey be conducted with a similar sampling frame to again produce statistically representative results for each basin, as well as the state as a whole. The survey instrument should include many of the same (or very similar) questions to allow comparison of results over time, although some new questions may be warranted to further examine social values in the context of the Colorado Water Plan scenarios and updated technical information.