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Abstract
This chapter presents summaries of Drought & Water Supply Assessment participant responses related to planning for future water supply. Participants were asked to rate their ability to predict and meet future water demands, acquire new ground water and/or surface water supplies, maintain and upgrade infrastructure, manage water quality, coordinate operations, utilize cooperative agreements, and develop and fund future water projects – for both the short- and long-term planning horizons. In addition, every participant was asked to rate the relative importance of each of these water supply planning and development activities with respect to their organization.

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Introduction

Planning and managing for future water supply requires water users to bring together a diverse range of skills related to the prediction of water supply availability and water demand; the construction and maintenance of infrastructure to deliver, convey and distribute water; and the timely commitment of resources.

To better understand the future water supply planning needs of the water user community statewide, survey questions were developed to identify specific water user needs, the importance of the need, and the capability of the water user to meet the need. The specific set of potential water supply planning needs identified in the survey is presented in Table 14-1 at right.

Note that all survey participants were given the opportunity to identify other water supply planning needs beyond those listed in the survey. A discussion of the other needs identified by the survey participants is also included herein.

Table 14-1: Future Water Supply Planning Needs

- Predict future average daily demand
- Meet future average daily demand
- Predict future peak daily demand
- Meet demands with existing surface water supplies
- Meet demands with existing ground water supplies
- Acquire new surface water supplies
- Acquire new ground water supplies
- Detect and repair water system shrink or leakage
- Manage water quality impacts on water supply
- Find reliable/sustainable augmentation water
- Implement future coop agreements to manage drought
- Implement water re-use programs
- Develop future water projects individually
- Develop future water projects in a cooperative effort
- Fund needed water development/infrastructure
- Fund water supply maintenance and repair
- Retain existing water rights over time
- Implement conjunctive use programs
- Meet environmental permitting requirements
- Offset demand of growth through construction
- Offset demand of growth through agricultural land conversion

Temporal Issues

Survey respondents were asked to rate their organization's need and capability with respect to various water planning issues, both in the short-term (defined as year 2010) and in the long-term (defined as year 2030). The survey also solicited ratings of the perceived importance of each issue in both periods.

The ratings of both capability and importance of water planning issues were remarkably similar for both time periods. Respondents who felt the topics were applicable consistently identified the same items as critical. In fact, only one category – future average daily demand - showed a significant difference in short and long-term ratings. Respondents were less confident in their ability to predict future average daily demand in the long-term (45% rated their ability as a 4 or 5 on the 5-point scale where 1 is not at all important and 5 is extremely important) as opposed to the short–term (56% with 4 or 5 ratings). Due to the level of consistency reported with respect to short- and long-term ratings, it was determined that there is little need to differentiate between the two periods; therefore, this chapter will address only short-term ratings, given that short- and long-term ratings are generally the same.

Future Water Planning Issues

Colorado water planners and managers from across the state are faced with similar challenges, independent of location. Table 14-2 summarizes the most important water planning issues identified by Colorado water users, and indicates the relative importance of the listed issue for municipal and agricultural users. Four of the five most important water planning issues relate to retaining adequate water rights or meeting future water demands either with existing surface water supplies or other supplies. Clearly meeting future water demands is a key concern for water planners and managers. Funding water supply projects, including both future water development and infrastructure, and maintenance and repair of existing and new water supply infrastructure, are also important issues challenging water planners, in that as Table 14-2 shows these issues are included as two of the top seven rated issues. Finally, infrastructure management, which will include monitoring of systems, evaluations and possibly capital projects related to system leakage and shrinkage, and water quality impacts, complete the list of the top eight issues.

Table 14-2: Priority Water Planning Issues for Municipal and Agricultural Segments

Water Planning Issue	Overall Importance*	Municipal Respondents	Agricultural Respondents
1. Retain Existing Water Rights Over Time	92%	92%	90%
2. Fund Water Supply Infrastructure Maintenance & Repair	83%	90%	76%
3. Meet Future Average Daily Demand	82%	88%	74%
4. Meet Demands with Existing Surface Water Supplies	81%	79%	77%
5. Meet Future Peak Daily Demand	79%	87%	67%
6. Detect and Repair Water System Shrink or Leakage	76%	86%	67%
7. Fund Needed Water Development & Infrastructure	74%	84%	65%
8. Manage Water Quality Impacts on Water Supply	70%	88%	47%

* Percentage of Respondents with 4 or 5 importance ratings on the 5-point scale

It is noteworthy that municipal and agricultural users throughout the state generally agree on the list of important water planning issues, and the order of importance of the issues; however, the agricultural community does not generally regard each of the issues to be as important as do the municipalities. This is perhaps indicative of the difference of the level of water supply planning incorporated into each of these water user segments and their cultures. Municipalities generate revenue selling water to customers and increasing their water user base. As a result, they have a revenue stream to apply toward planning. In contrast, agricultural entities are more often end-users that either pay for or at best do not generate revenue for their water, thus they have fewer resources to apply toward planning efforts. Agricultural entities may also be more dependent on direct flows that are less dependent on planning efforts than the complex systems of direct flows, transfers, leases and storage used by many municipalities to provide water to their customers.

The water planning issues that were of significant importance to less than half of respondents included: implementation of water reuse, growth demand offset by agricultural land conversions, conjunctive use programs, and weather pattern prediction.

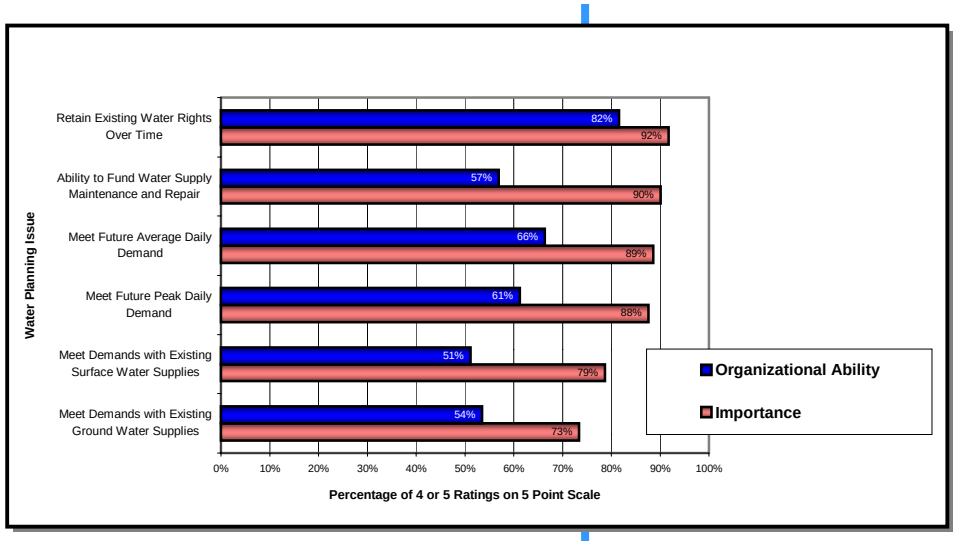
Current or Planned System Issues

Figures 14-1a Figure 14-1b present a comparison of a respondent's ability to address specific water planning issues related to their current system to the relative importance of that particular planning issue. For example, retaining existing water rights over time is important to 82% and 69% of the municipal and agricultural entities surveyed, respectively. Ninety two percent of municipalities rated their ability to retain existing water rights as a 4 or 5, whereas 90% of agricultural entities rated their ability to retain existing water rights as a 4 or 5.

All of these water-planning issues, which focus on current or planned water supply systems and those systems ability to meet demands, earned very high importance ratings across all divisions and segments. However, some of the issues that were identified as of high importance were not rated as being addressed with commensurate abilities. For example, as discussed above, although almost all respondents believed that retaining existing water rights over time was extremely important, with only 10% strongly questioning their ability to retain those rights. To this point, State support is not necessarily needed to aid water users with water rights since water users believe their ability to perform or address this water planning issue is excellent. In contrast, the general ability to meet water demands, as well as the specific ability to address existing surface and ground water supplies, drew lower confidence ratings with no

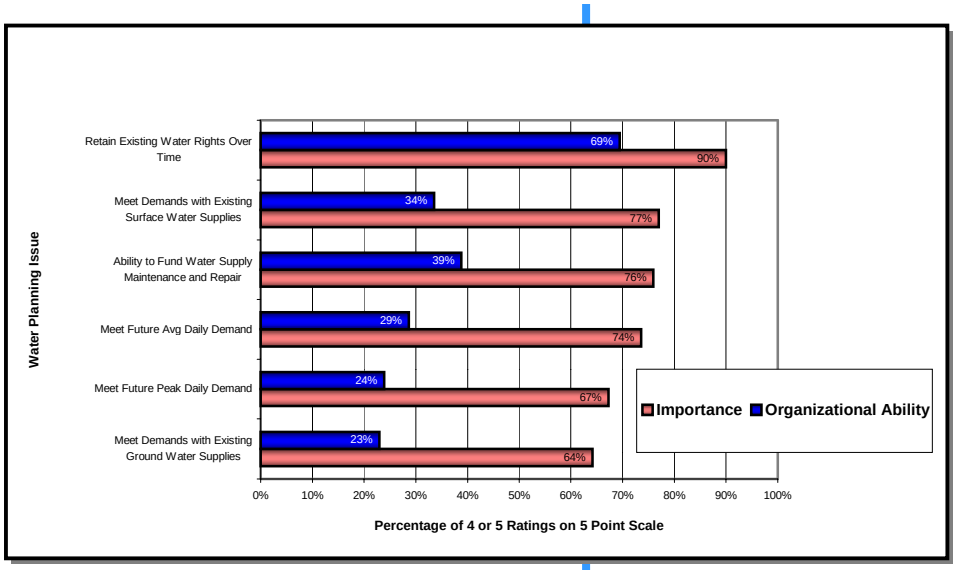
demand category garnering a rating of a 4 or 5 by more than 51% of respondents. (Notably, only 29% of agricultural respondents strongly believed in their ability to meet future average daily demand, while 66% of their municipal counterparts had high ability ratings in this category.) The state may very well have a role in providing technical, policy and financial support to water users that lack the ability to meet future water supply needs.

Figure 14-1a – Water Planning Issues – Current and Planned System Concerns for Municipalities



As pointed out previously, analysis revealed a marked difference in response between municipal and agricultural entities. While importance ratings were very similar, agricultural respondents consistently rated their ability to address water-planning issues lower than the municipal segment. In fact, only one out of twenty-three categories of future water supply planning issues (see Table 14-1), retaining existing water rights over time, drew an ability rating of a 4 or 5 from over half of all agricultural respondents; whereas the municipal entities indicated a similar level of ability in eleven of the twenty three categories.

Figure 14-1b – Water Planning Issues – Current and Planned System Concerns for Agricultural Entities

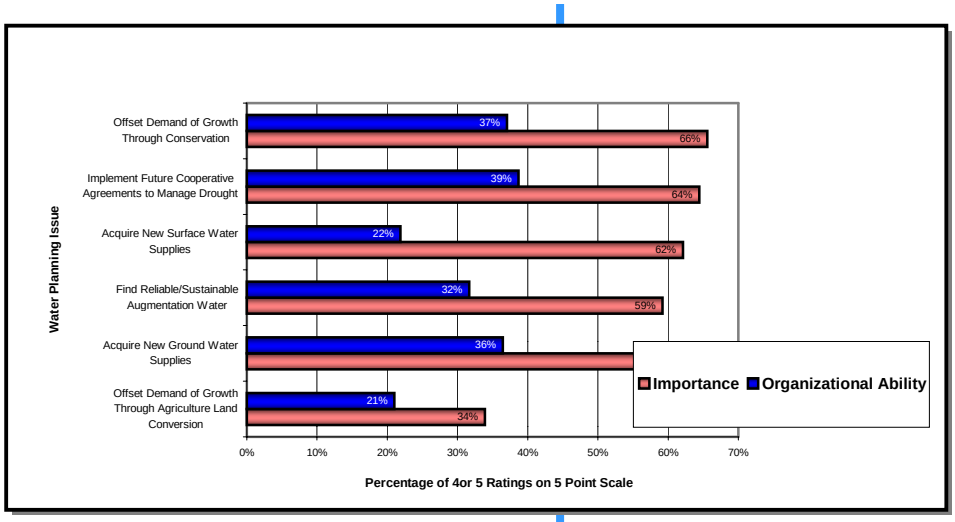


The significance of this difference may well point to the need for state support to provide technical and financial support to the agricultural community, insomuch as the agricultural water users demonstrate a need for planning but a general lack of ability to do so in various key areas.

Acquiring or Managing New Water Supplies

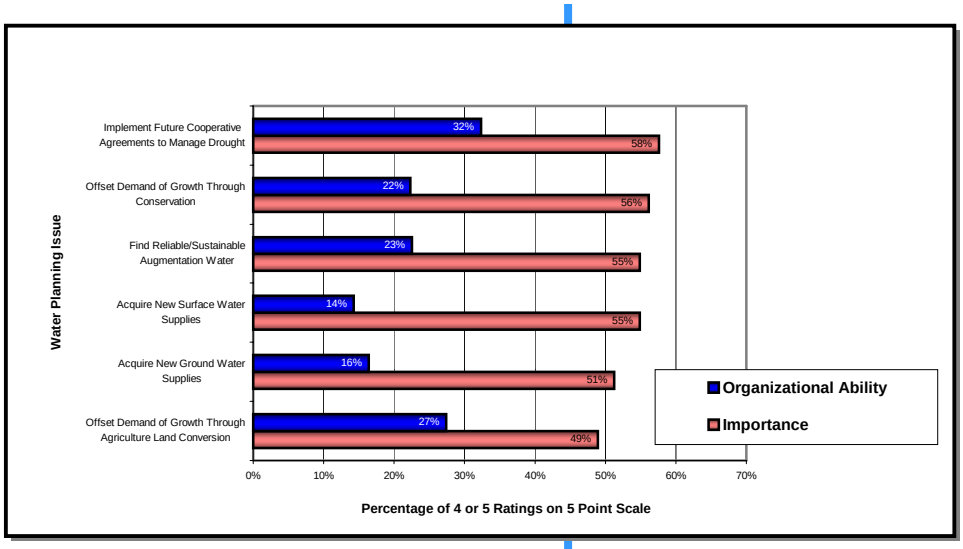
Figure 14-2a and Figure 14-2b provide a comparison of importance to ability for municipal and agricultural water users, respectively, related to acquiring or managing new water supplies. Included in this set of issues are acquiring new surface and groundwater supplies, implementing future cooperative agreements, finding and acquiring reliable augmentation water and use of agricultural land conversions.

Figure 14-2a – Water Planning Issues – Acquiring New Supplies for Municipalities



Not more than 40% of respondents expressed confidence in their ability to acquire or manage new water supplies based on the number of respondents that provided a rating of a 4 or 5, although the same respondents rated the need for new supplies as an important issue at more than 6 of every 10 water users. Acquiring new water supplies, including surface, ground and augmentation water, was noticeable in its low ability ratings as underscored by the low 4 or 5 showings. Only 18% rated ability to obtain new surface water as high; 27% cited the same for ground water, followed by 28% for augmentation water.

Figure 14-2b – Water Planning Issues – Acquiring New Supplies for Agricultural Entities



To this point, it appears that the state may have a role in providing technical and financial support to municipal and agricultural entities that need to expand their current water supply systems and/or acquire new water supplies.

Infrastructure

Apart from demanding that water organizations examine their ability to meet current and future demands, the drought has also highlighted various infrastructure needs related to both aging facilities and the related repair and maintenance costs. As presented in Figures 14-3a and Figure 14-3b, three infrastructure issues stood out as critical regarding organizational ability related to funding water supply maintenance and repair, detecting and repairing water system shrink or leakage, and funding needed water development and infrastructure. While approximately three-quarters of all respondents stated that these issues were important, no more than 54 percent of them rated their ability as a 4 or 5. In fact, less than 30% of respondents rated their ability to fund needed water development as high (i.e., as a 4 or 5).

Figure 14-3a – Water Planning Issues – Infrastructure for Municipalities

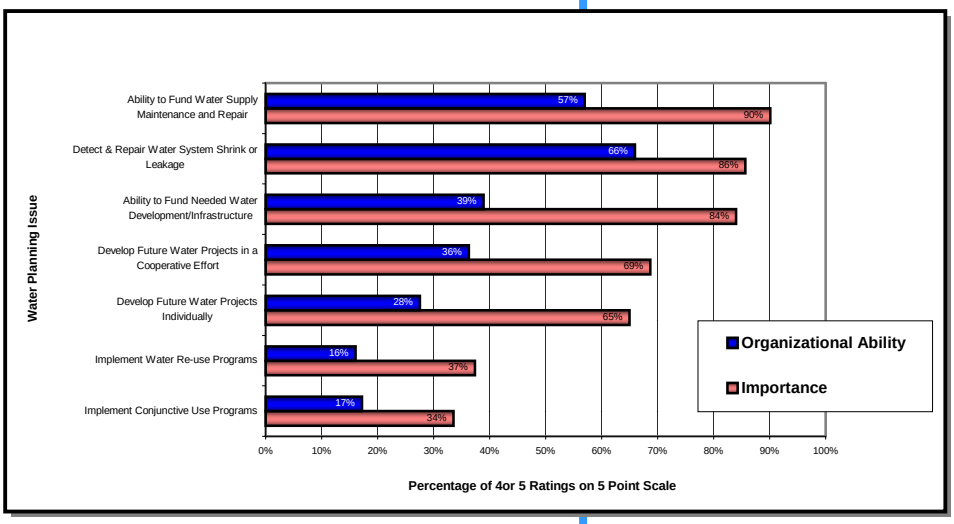
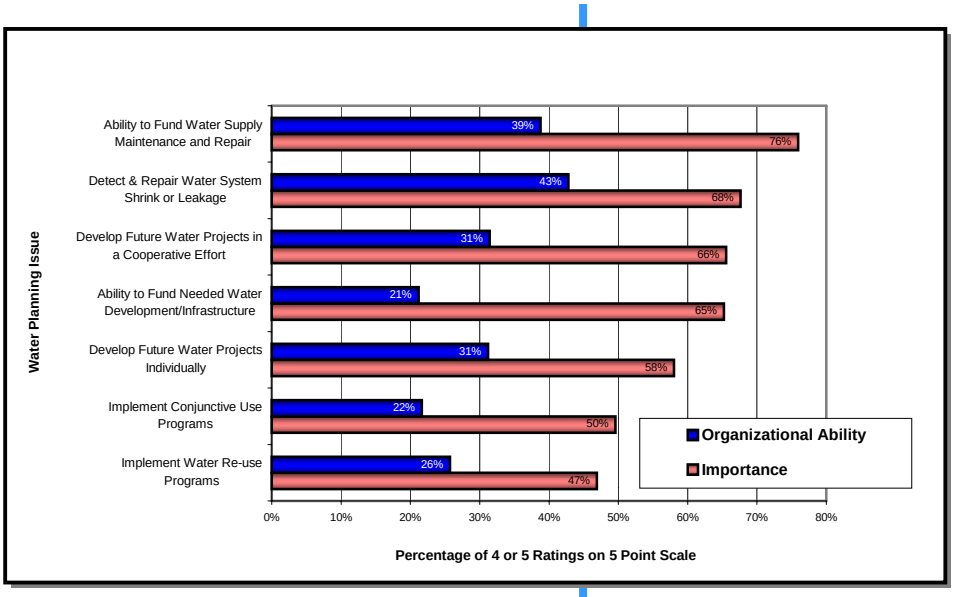


Figure 14-3b – Water Planning Issues – Infrastructure for Agricultural Entities



The top system infrastructure needs also highlighted acute differences between the municipal and agricultural sectors. While both segments viewed these issues as very important, ability ratings demonstrate that agriculture feels significantly less confident in addressing these issues.

Discussion

Table 14-3 presents the results of how all the other segments rated the relative importance of the various water supply planning issues, noting that only those issues receiving a rating of a 4 or 5 from at least 80% of the segment respondents are included in the table.

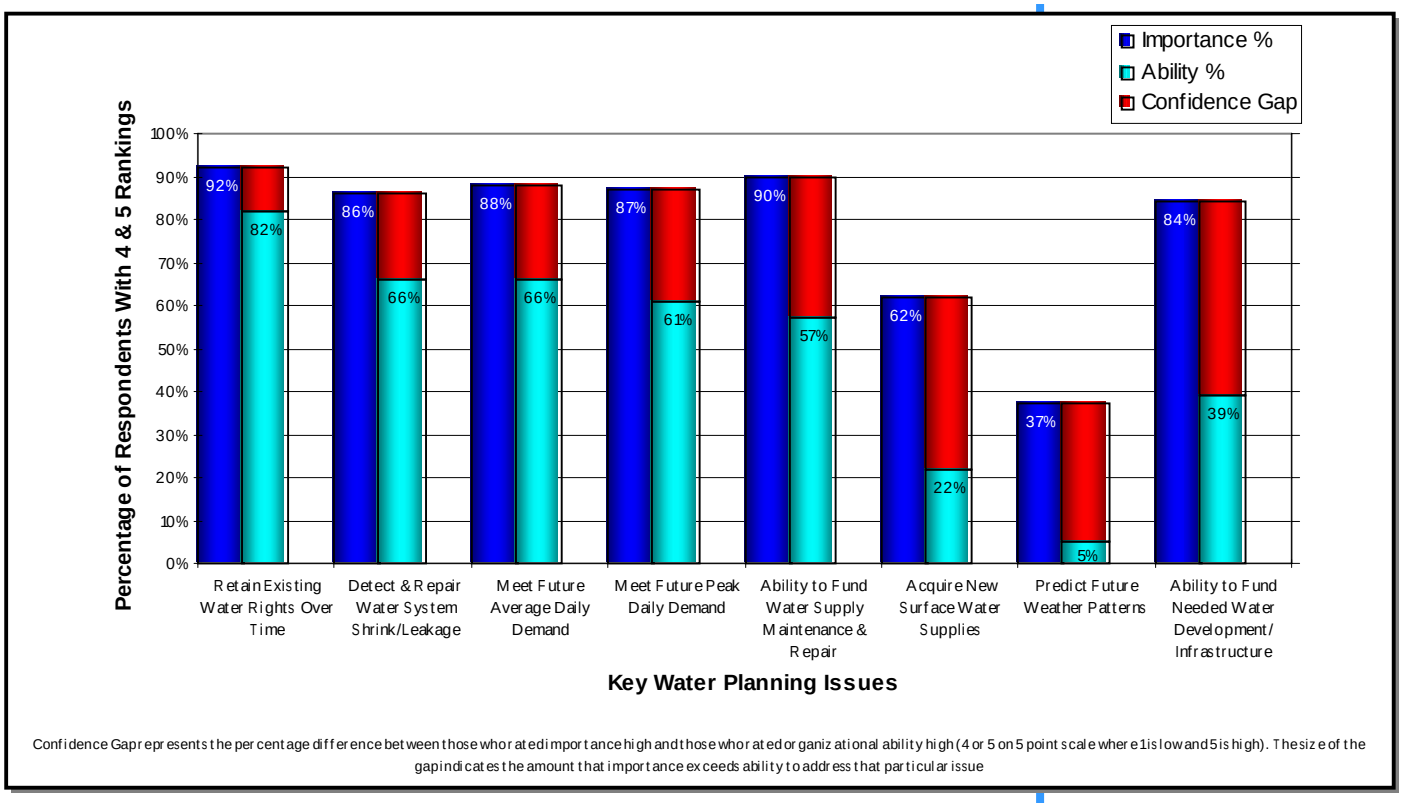
Table 14-3: Water Planning Issue by Segment other than Municipal and Agriculture

Most Important Water Planning Issue	Percentage Respondents Ranking Importance of 4 or 5*					
	Power	Federal	State	Water Conservancy District	Industry	Other
Retain existing water rights over time	100	91	89	100	100	100
Meet future average daily demand	100	80	--	87	94	--
Meet demands with existing surface water supplies	100	82	100	85	92	86
Meet future peak daily demand	80	--	88	--	93	--
Detect and repair system shrink or leakage	--	--	--	--	--	83
Fund needed water development and infrastructure	--	--	--	--	--	84
Manage water quality impacts on water supply	--	--	88	--	--	80
Predict future peak daily demand	100	--	--	--	--	--
Predict future average daily demand	80	80	--	--	--	--
Meet environmental permitting requirements	100	83	89	89	88	--
Offset demand of growth through agricultural land conversion	100	--	--	--	--	--
Ability to fund water supply maintenance and repair	80	--	--	--	92	84
Implement future cooperative agreements to manage drought	--	100	--	83	--	--

*Percentage of Respondents with 4 or 5 importance ratings on a 5-point scale
-- Did not rank at or above 80%

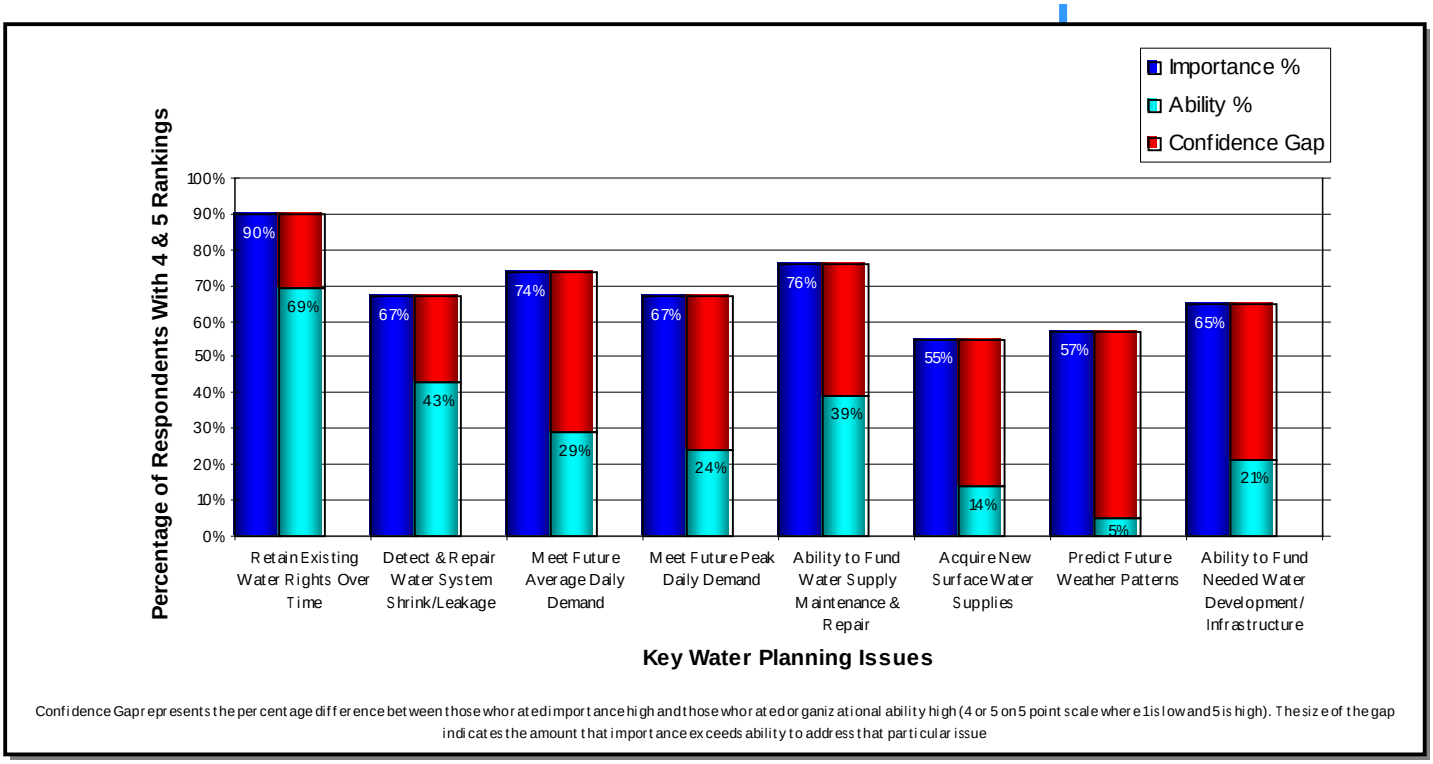
As Colorado attempts to mitigate the effect of current drought, a myriad of planning options face Colorado water providers. Resources must be allocated to address supply, demand and infrastructure issues. In order to establish priorities for water planning, not only must critical water issues be identified, but also the ability of water entities to address those issues in a beneficial manner must be gauged. Figure 14-4a and Figure 14-4b offer some insight into how priorities might be set by the state through the identification of a “confidence gap” – that is the difference between important planning issues and respondent ability to perform or address the issue. The "confidence gaps," illustrated in Figures 14-4a and 14-4b, are displayed in red and presented in order to draw attention to the difference between ratings of importance and corresponding ratings of ability. Large confidence gaps signify issues that may warrant the allocation of state resources.

Figure 14-4a: Concern over Colorado Water Planning Issues, Organizational Ability vs. Importance for Municipal Respondents



Confidence Gap represents the percentage difference between those who rated importance high and those who rated organizational ability high (4 or 5 on 5 point scale where 1 is low and 5 is high). The size of the gap indicates the amount that importance exceeds ability to address that particular issue

Figure 14-4b: Concern over Colorado Water Planning Issues, Organizational Ability vs. Importance for Agricultural Respondents



Confidence Gap represents the percentage difference between those who rated importance high and those who rated organizational ability high (4 or 5 on 5 point scale where 1 is low and 5 is high). The size of the gap indicates the amount that importance exceeds ability to address that particular issue