

# Colorado Water Conservation Board

## Department of Natural Resources

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# Arkansas River Drought & Water Supply Assessment Basin Summary

### Project Summary

The Colorado Drought & Water Supply Assessment is the first statewide project to determine how prepared Colorado has been for drought and identify measures that will better prepare us for the next drought.

### Overview of Basin Summary

This basin summary presents the results of the Drought & Water Supply Assessment Project for the Arkansas River Basin (also known as Division 2) for purposes of:

- Supporting local and regional planning efforts
- Presenting the water needs and issues on a regional and local basis

The summary presents selected results of the project based on responses provided by water users within Division 2. A listing of the water users that participated in the survey by water use, or segment, is provided in the table to the right. The responses were used to characterize the following key areas of interest with respect to water use and drought impacts, within the Gunnison River basin:

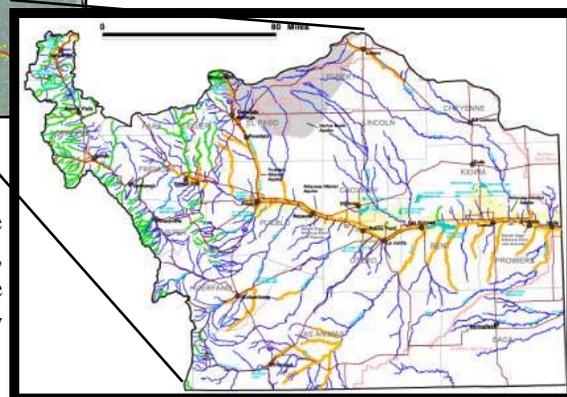
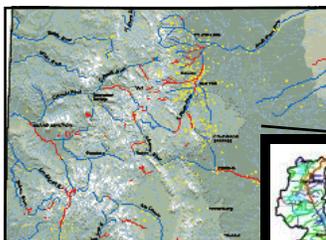
- Current Water Use Limitations
- Current Water Management Planning
- Recent Drought Impacts (1999-2003)
- Future Water Use Planning Issues
- Drought Mitigation Needs

Comparative analysis for many areas of interest are provided in this basin summary to allow for a comparison of the results from Division 2 to the rest of the State.

### Basin Overview

The Arkansas River drains the southeastern and central portion of the state, stretching from the continental divide east to the Kansas State line. The Arkansas River basin contains the second largest population in the state, collectively, and contains the largest number of municipal entities in the state, though each is relatively small in population.

Growth in the basin is expected to be an issue in the future, as is the pressure to transfer traditional agricultural rights to other uses, primarily municipal. The Arkansas River is also one of the state prime water recreation areas, for boating and fishing, which may create a competing demand with other uses.



### Basin Statistics and Information

#### Population

2000	811,442
2030 (projected)	1,293,000

#### Number of Reservoirs and Dams

426

#### Colorado Legislative Districts

House	14-19, 21, 40, 46, 47, 56, 60, 62-64
Senate	1-5, 9-12

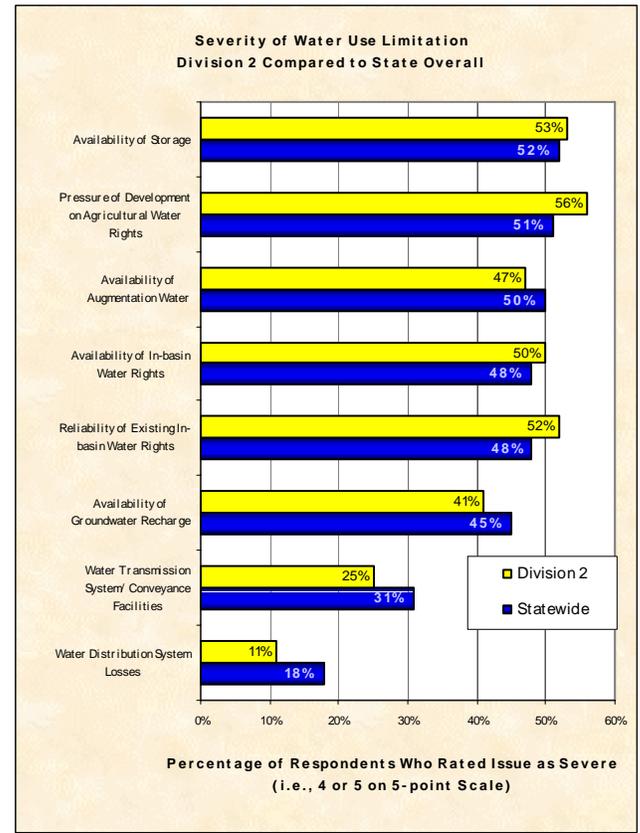
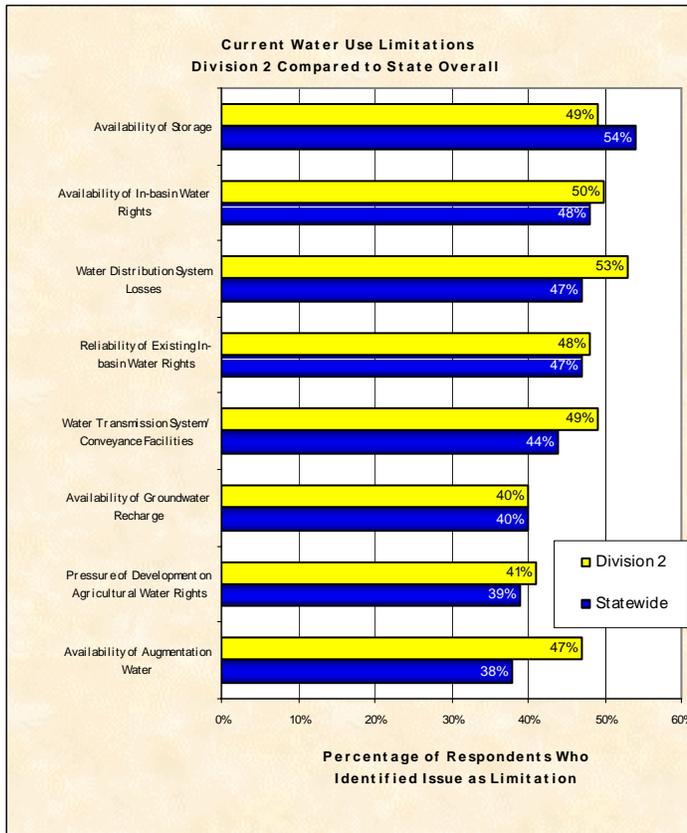
#### Survey Participants (Total = 83)

Municipal	50
Agricultural	15
Federal	1
State	4
Water Conservancy District	1
Industry	4
Other	8 (including 2 Power)

#### Additional Projected In Basin Municipal/Industrial Water Supply at 2030

(based on SWSI)  
 98,100 acre-feet

## Current Water Use Limitations



The two graphs presented above, in combination, indicate what are believed by Division 2 water users to be current water use limitation within the basin, and the relative severity of the limitation. For example, about half of the Division 2 water users indicated that current water supply is limited by the water distribution system losses, availability of in-basin water rights, availability of storage, existing water system conveyance and transmission facilities, and availability of augmentation water. Some of these limitations are severe, as indicated by the water users, especially the pressure of development on agricultural water rights, followed by the availability of storage and the reliability of in-basin water rights. Noteworthy is that most other divisions rank the availability of storage as the greatest limitation, however Division 2 indicates that pressure of development on agricultural water rights is first.

## Current Water Management Planning

### Water Supply Master Plans:

- 56% of Division 2 water users have a water supply master plan vs. 43% of the water users statewide.
- More respondents view water master plans as effective tools for managing drought.

### Drought Management Plans:

- 42% of Division 2 water users have drought management plans vs. 40% of the water users statewide. Given the large number of small municipalities in this Division, more drought planning may have been expected.
- Division 2 water users utilize different drought management tools than water users in the rest of the

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### Key Water Planning Definitions

**Water Supply Master Plan:** A comprehensive plan in which a water management entity or planner will address technical and political issues related to providing sufficient quantity and quality of water for identified or projected demands.

**Drought Management Plan:** A plan in which a water management entity or entities or planner identified the measures and responses needed to prepare for, monitor, and mitigate the effects of drought

**Water Conservation Plan:** A plan that outlines how a water management entity or planner will improve water use efficiency over the long-term and how the efforts fit within their overall water supply and demand management efforts.

## Current Water Management Planning (continued)

state, which may be attributed to the number of municipalities contained in this basin compared to the other divisions.

- A comparison of the most significant differences between drought management tools used by Division 3 water users vs. statewide follows:
  - More have drought related communications protocols (external, 63% vs. 55%; internal 71% vs. 63%)
  - More have defined levels of drought response (59% vs. 48%)
  - More have water quality monitoring programs (70% vs. 54%)
  - More have procedures for declaring drought (70% vs. 52%)

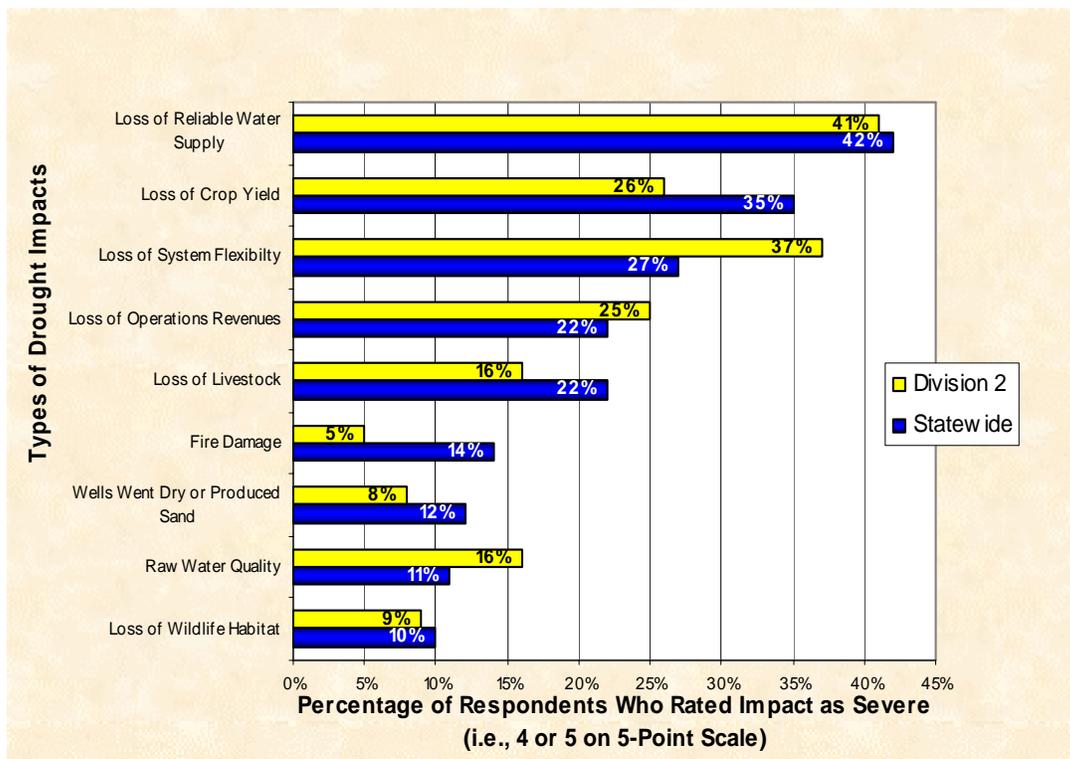
### Tools for Drought

- More conjunctive use, more lawn watering fines, more lawn water restrictions, more cooperative agreements, more of public education and involvement

### Water Conservation Plans

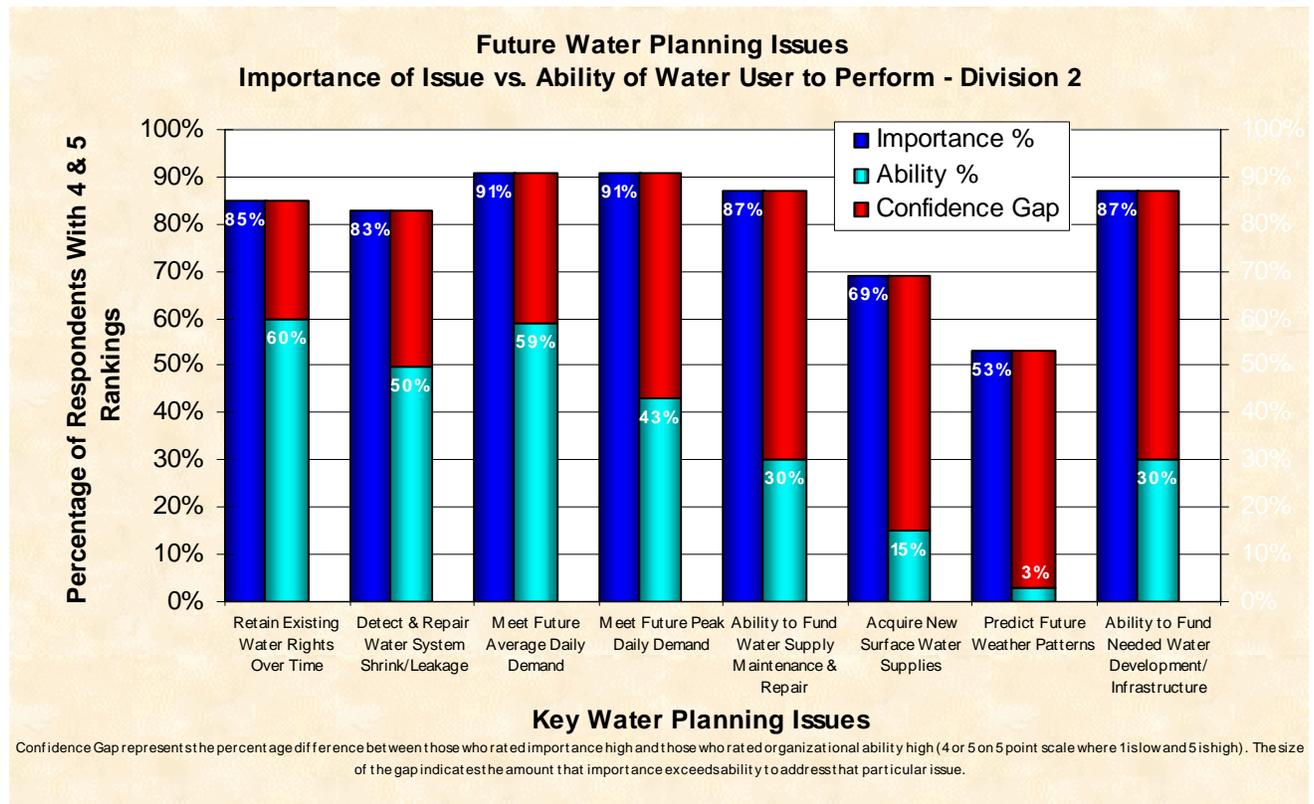
- Tools utilized for water conservation (Division 2 vs. statewide)
  - Less lining of ditches and canals
  - More metering, pricing strategies, and public information/education
- Best tools for water conservation (Division 2 vs. statewide)
  - Public education/involvement
  - Metering

## Recent Drought Impacts (1999-2003)



Division 2 water users indicated that they were impacted by the recent drought, and that the severity of the impacts were in some cases more than the severity of the impacts noted by other water users statewide. Loss of reliable water supply and loss of system flexibility were the most severe impacts noted in the Arkansas basin. Loss of system flexibility was considerably more severe in Division 2 than was indicated by the rest of the state. Division 2 also indicated that water quality issues were more significant in the Arkansas basin than in the rest of the state. Agricultural impacts were, however, generally less in Division 2 compared to the remainder of the state.

## Future Water Use Planning Issues



The above figure compares the relative importance of a selected future water planning issue (as identified by water users) (dark blue) with the ability of water users to address the issue on their own (light blue). The difference between the importance of the issue and the ability of the water user to address the issue is identified as a gap (red), with the size of the gap indicative of where water users may require assistance in the future. To illustrate the meaning of the gap analysis, consider “meet future average daily demands”. This issue was rated as the most important issue by Division 2 water users. These same water users indicated that roughly 3 out of every 5 had the ability to address this issue with in-house resources. To this point, there was a gap of 32% between those indicating that this issue was important and those that believed they had the ability (e.g., resources, staff, funds) to address this issue. Conversely, the funding of water supply development was identified as an important issue by about 9 of every 10 water users, with only 30% indicating that they had the ability to address this issue; thus identifying a 57% gap between need and ability. Large gaps (i.e., 40% or greater) were also identified for the majority of the other planning issues. The number and the size of the gaps for the Arkansas are significant especially given that four are 50% or greater.

### Key Water Projects Definitions

**Structural Projects for Drought Mitigation:** These projects relate to the construction of capital improvements such as dams, pipelines, pump stations, treatment and transmission facilities, and wells. Increasingly, structural projects also include water reuse and conjunctive use projects, rehabilitation or upgrades to existing facilities and management of water consuming vegetation.

**Non-Structural Projects for Drought Mitigation:** These projects do not necessarily include construction, although limited earthwork or stream restoration may be involved. Non-structural project components include the development and implementation of efficient water supply and demand management tools or methods, allowing water owners, planners and managers flexibility in operating or managing their water resources.

## Need for Structural Drought Mitigation Projects

Type of Project	Statewide Need	Division 2
New storage for surface water	40%	47%
Large-scale/multi-basin projects	24%	39%
New aquifer storage recovery	21%	30%
New storage for groundwater	19%	30%
New or Upgraded Pipelines	33%	53%
New or Upgraded Water Distribution Systems	33%	46%
Lining of Ditches	19%	14%

Like every other part of the state, Division 2 water users identified various structural projects as effective means to mitigate the effects of drought in their basin. Different from every other basin, creating new surface water storage facilities was not ranked as the most important method to mitigate the effects of drought (although it was close); rather, new and upgrade pipelines to convey raw water was ranked as more important. New and upgraded water distribution systems were also ranked near the top. The need for conveyance and distribution infrastructure may be the result of aging municipal assets and the need to provide additional water to growing communities.

When asked to **prioritize** the structural projects that would best mitigate drought impacts, Division 2 water users listed the following projects (in order of priority):

- New storage for surface water
- New or upgraded pipelines
- New or deepened wells
- New storage for groundwater
- New raw water treatment systems

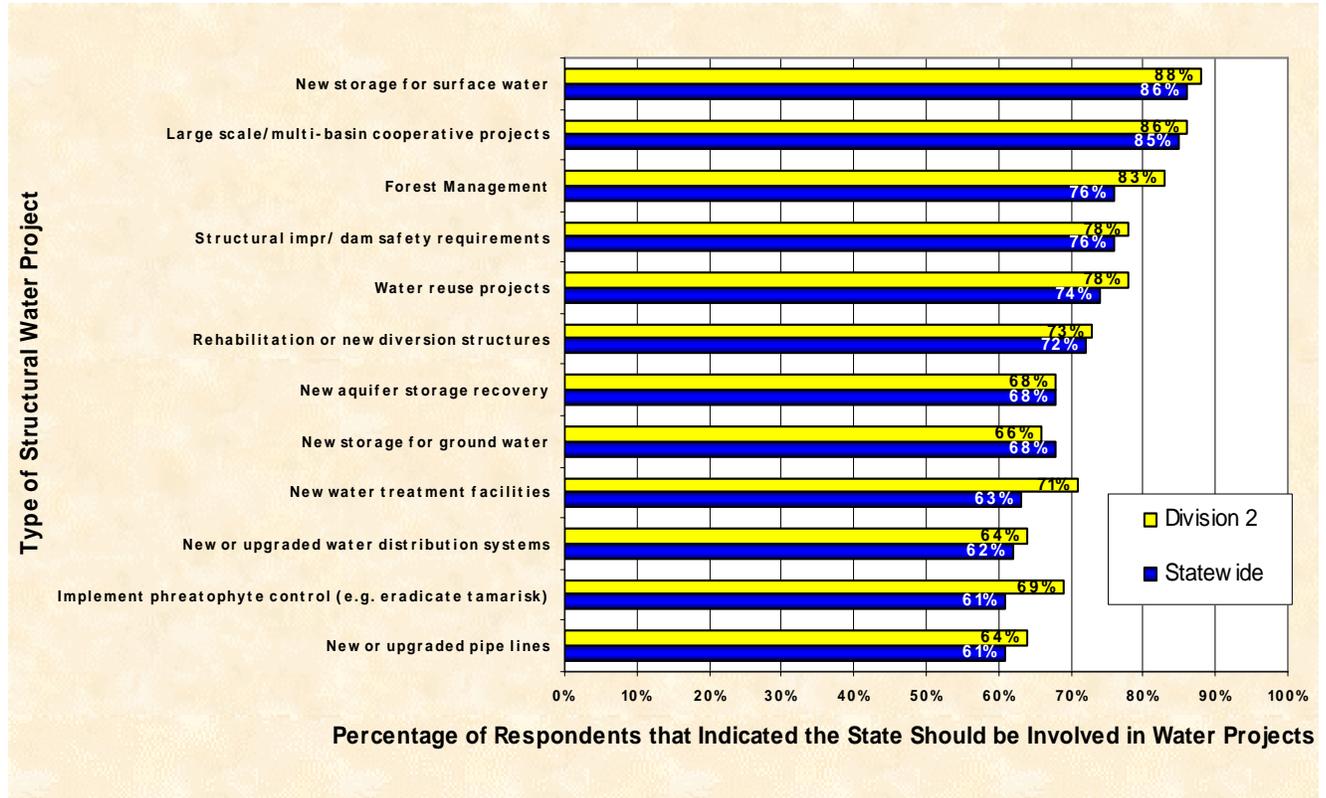
Although water users statewide agreed that new surface water storage was of the highest priority, they did not see as great a need for pipelines, or wells. No other water division indicated as high a priority for raw water treatment either.

## Need for Non-Structural Drought Mitigation Projects

Division 2 water users identified the need and/or benefit of non-structural projects for drought mitigation, mirroring in many ways the response of water users statewide. Division 2 responses indicate a slightly greater need for public education and awareness, improved water conservation methods and technical support in water supply planning than did the rest of the state. The need for water conservation planning and drought technical assistance was about the same as the remainder of the state.

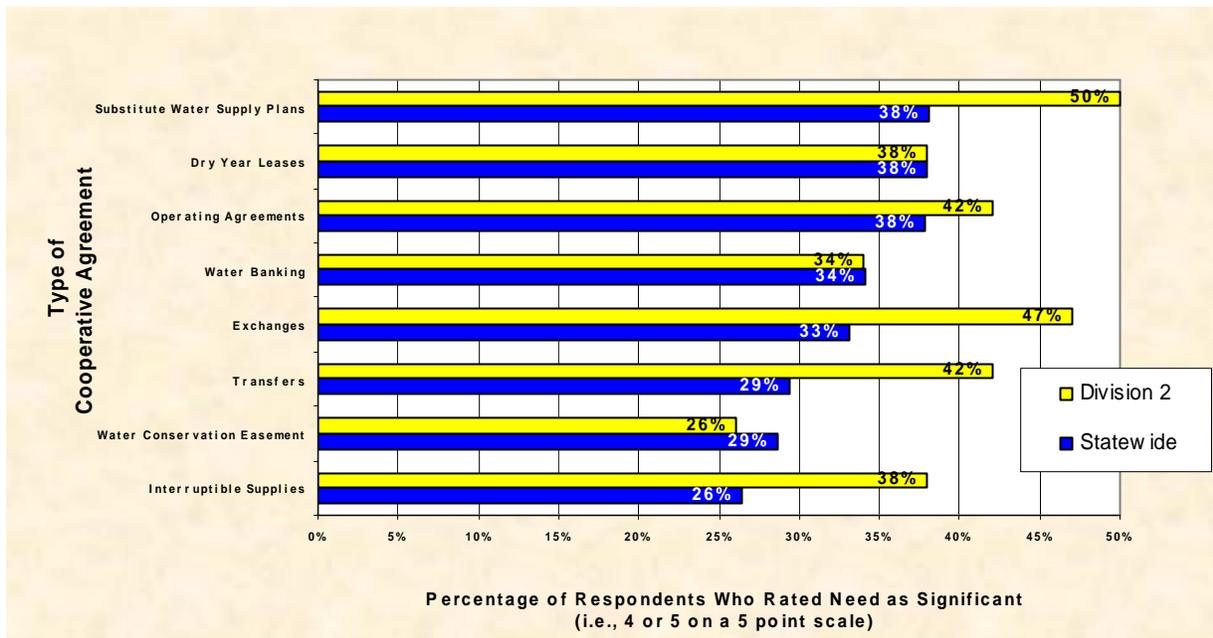
Non-Structural Project	Statewide	Division 4
Public education & awareness	46%	50%
Improved water conservation methods	46%	47%
Technical support in water supply planning	43%	47%
Technical support in drought & conservation planning	42%	40%
Improved water conservation measurement methods	29%	26%

## Support for State Involvement in Structural Water Projects



Support for state involvement in structural water projects is significant, both statewide and within Division 2 as indicated in the figure above. State involvement appears to be most welcome related to large projects, such as new surface water storage, water treatment facilities, water reuse, dam safety requirements, forest management, and large scale/multi-basin projects. The Arkansas basin demonstrates significantly more desire for state involvement than identified for most other basins.

## Need for Cooperative Agreements



## Need for Cooperative Agreements (continued)

Cooperative agreements are becoming increasingly important within Colorado, creating flexibility within the otherwise rigid prior appropriation system. Cooperative agreements provide the means to allow for temporary transfers of water between uses, and allow for the more efficient use of water in periods of water scarcity. For example, agricultural users can utilize cooperative agreements to allow for the temporary lease, exchange and/or transfer of water to a needy municipal entity, when the limited availability of water may have impacted crop yield or production. In this way, the agricultural community can find sources of revenue while municipalities find emergency and/or short term water supplies in dry and drought years.

When compared to the statewide response, Division 2 water users indicated significantly more need for or use of cooperative agreements than elsewhere in the state, in nearly every category. Division 2 indicated substantially more need in the use of substitute water supply plans, exchanges, transfers and interruptible supplies perhaps indicative of the increased pressures on utilizing traditional agricultural rights to support growing municipalities and other water uses.

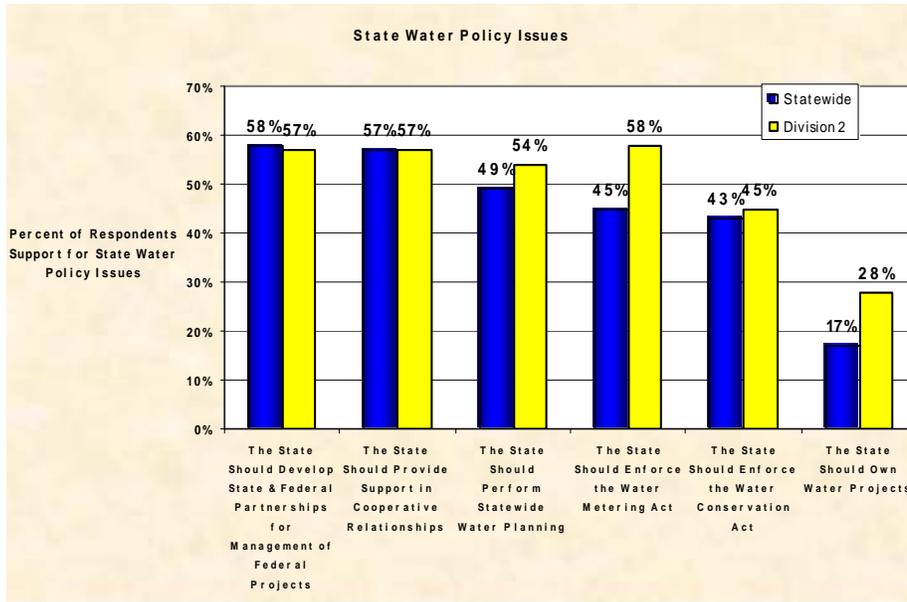
### Summary of Results for the Arkansas River

The Arkansas River basin represents a microcosm of the Colorado water situation—there are significant demands on permanently transferring agricultural water uses and rights to other uses, drying up traditional farmland in favor of new homes and subdivisions, in some cases for development outside the basin. In addition, the Arkansas River basin is faced with the potential need for development of over 100,000 acre-feet of additional water by the year 2030, based on predicted increases in demand caused to some extent by growth. Demands for recreational flows are also substantial given the presence of a flourishing boating and rafting industry along the Arkansas which is one of the largest tourism-based economic engines in the state. With over a million and a quarter permanent residents expected by 2030, the Arkansas River basin is faced with many challenges in the coming years.

In response to the existing and future challenges, water managers and planners in the basin have been planning at a rate substantially higher than has been seen in the rest of the state, especially with respect to water supply. However, the increased level of planning has among other things, helped water users to identify those areas where help is needed, given the lack of locally available resources. For example, Division 2 water users indicated substantial gaps between future funding needs and available funds. In addition, Division 2 water users identified substantially more need for structural projects than their counterparts in the rest of the state—especially in areas of large multi-basin projects, new storage projects (for both surface water and groundwater) and new or upgraded pipelines and water distribution systems.

The raised level of awareness and concern indicated by Division 2 water users resulted, presumably, from the increased level of planning, and the existing pressures on an already stretched water supply more so than the detrimental impacts of the recent drought. In fact, the Division 2 water users indicated less severe impacts from the recent drought than water users did, in general, across the state, with the notable exception of the loss of system flexibility noted by 37% of users vs. 27% statewide. Perhaps the lack of severe drought impacts stemmed from the relatively low number of agricultural water users in the basin compared to the large number of medium to small municipalities.

Finally, water users in Division 2 have indicated that they have a substantially greater need and/or use for cooperative agreements than other water users statewide. This need may be driven in part by the infrastructure currently in place, and the water user motivation to share the available water in a cooperative and flexible manner as water resources become more tight in response to growing demand and limited supplies.



### Major Objectives of State Water Policy

- Improve water availability and reliability statewide

### Areas of Practice to Achieve the Major Objective

- Improve public understanding and knowledge of state water and water resources issues
- Support infrastructure needs of water users and suppliers
- Support technical assistance needs of water users

### Initial Implementation Steps Proposed by the CWCB

- Examine need for new policies related to how CWCB provides public information and education, technical assistance and infrastructure support
- Improve the role and relationship of public information and education efforts by the CWCB with the DNR and the Governors Office.
- Evaluate, improve, and coordinate the role and relationship of public information and education efforts with those being conducted by local water authorities, utilities, users, and suppliers.
- Evaluate, and where appropriate, engage alternative funding sources and mechanisms to provide resources for programs water users identified as being needed.
- Evaluate and support enhancements to and funding for improving the SEO water administration tools related to tracking annual water use, stored water, well and water administration, and diverted water by water users.
- Revise and update CWCB Strategic Plans to ensure performance of the identified implementation tasks and activities occurs.
- Examine internal budgets and organizational structure to determine how to best achieve desired objectives.
- Evaluate means to fund public information and education, infrastructure construction and maintenance, and technical assistance programs in conjunction with sustaining and expanding the construction fund.
- Coordinate use of other state resources (e.g., DoLA, SEO, etc.) and affiliates (e.g., Colorado Foundation for Water Education) in supporting needs identified by Colorado's water users.
- Continue to support the development and use of the CDSS tools, especially with respect to understanding and characterizing basin hydrology, firm yield, groundwater-surface water interactions (including augmentation water and groundwater recharge programs), and water supply development needs.
- Continue to support development and implementation of the Statewide Water Supply Initiative (SWSI) as it relates to the identification of areas with critical water management issues, water development projects, water supply and demand imbalances, and infrastructure needs; and the development of a sustainable process for maintaining inter and intra-basin communications.
- Continue development and the appropriate allocation of resources to the Office of Water Conservation and Drought Planning in providing technical assistance to covered entities, evaluating submitted water conservation and drought plans, administering fund programs, and disseminating information to the public.
- Integrate the results of this project, and other relevant projects, into the SWSI, Bureau of Reclamation Water 2025 Project, and other state and regional water planning efforts.
- Provide appropriate resources to continue to develop and administer opinion surveys of Colorado water users relative to important water issues, and to create a temporal database related to drought and water supply impacts, limitations, planning needs and projects.