Colorado Water Conservation Board
Department of Natural Resources
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Rio Grande 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 Rio Grande River Basin (also known as Division 3) 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 3. 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 3 to the rest of the State.

Basin Statistics and Information

Population

2000	44,574
2030 (projected)	63,000

Number of Reservoirs and Dams
72

Colorado Legislative Districts

House	59, 60, 61, 62
Senate	5, 6

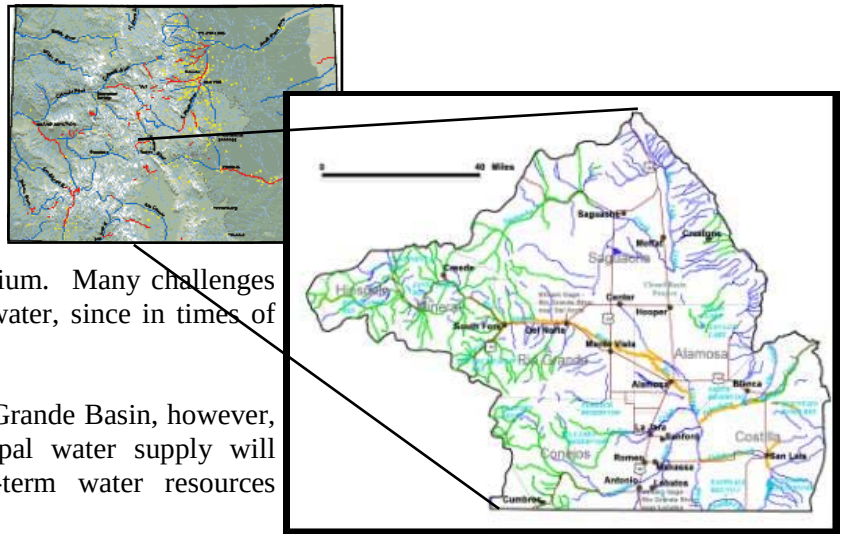
Survey Participants (Total = 43)

Municipal	16
Agricultural	15
Federal	4
State	3
Water Conservancy District	5
Industry	0
Other	0

Additional Projected In Basin Municipal/ Industrial Water Supply at 2030 (based on SWSI)
4,300 acre-feet

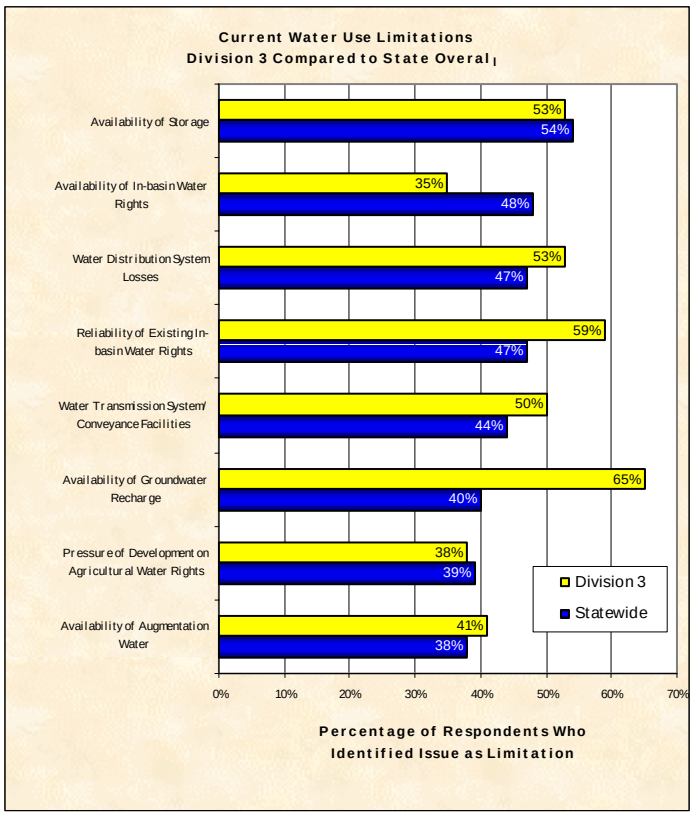
Basin Overview

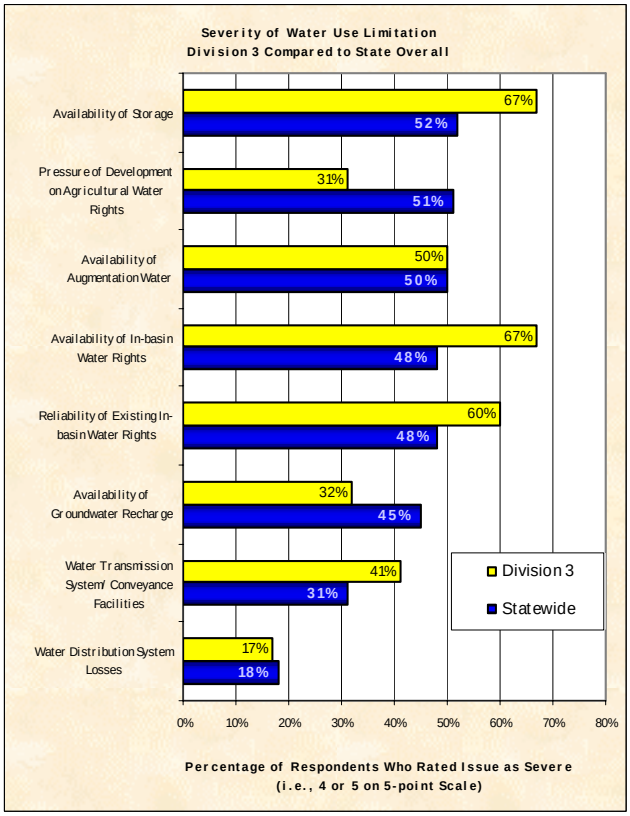
The Rio Grande Basin is characterized by high mountain areas surrounding the relatively large and arid San Luis Valley. The San Luis Valley contains some of the state's oldest and most productive agricultural lands, which are irrigated with a combination of canals and ditches fed with surface water, and groundwater from the shallow and deep alluvium. Many challenges exist regarding the overproduction of groundwater, since in times of drought, the alluvial system can be overtaxed.



Growth is not particularly an issue in the Rio Grande Basin, however, reliable agricultural use, as well as municipal water supply will continue to dominate the short and long-term water resources management issues in this basin.

Current Water Use Limitations





The two graphs presented above, in combination, indicate what are believed by Division 3 water users to be current water use limitation within the basin, and the relative severity of the limitation. For example, 65% of Division 3 water users believe that the current availability of groundwater recharge limits current water use. Of these water users, only 1 out of every 3 view this limitation as severe. The responses indicate that the Rio Grande basin water users perceive that there are more limitations to current water use than is perceived in the remainder of the state in other basins, and that numerous limitations are more severe than elsewhere (e.g., the availability of storage, availability of in-basin water rights, reliability of existing in-basin water rights, and water transmission systems and conveyance facilities).

Current Water Management Planning

Water Supply Master Plans:

- 32% of Division 3 water users have a water supply master plan vs. 43% of the water users statewide.
- Small municipal entities in the Division as a rule do not have significant resources available for planning.

Drought Management Plans:

- 26% of Division 3 water users have drought management plans vs. 40% of the water users statewide, which is again indicative of the lack of available resources for planning within the Division
- Division 3 water users that plan for drought do a good job, utilizing communications methods to share

(Continued on page 3)

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)

information. Specifically, 65% of Division 3 entities that plan for drought include external communication methods in their drought plans (compared to 55% statewide). Internal communications also are more prevalent (68% vs. 63% statewide).

- More entities include water quality monitoring in there drought planning efforts vs. the state (59% to 54%.
- Fewer have procedures for declaring a drought (41% vs. 52% statewide)

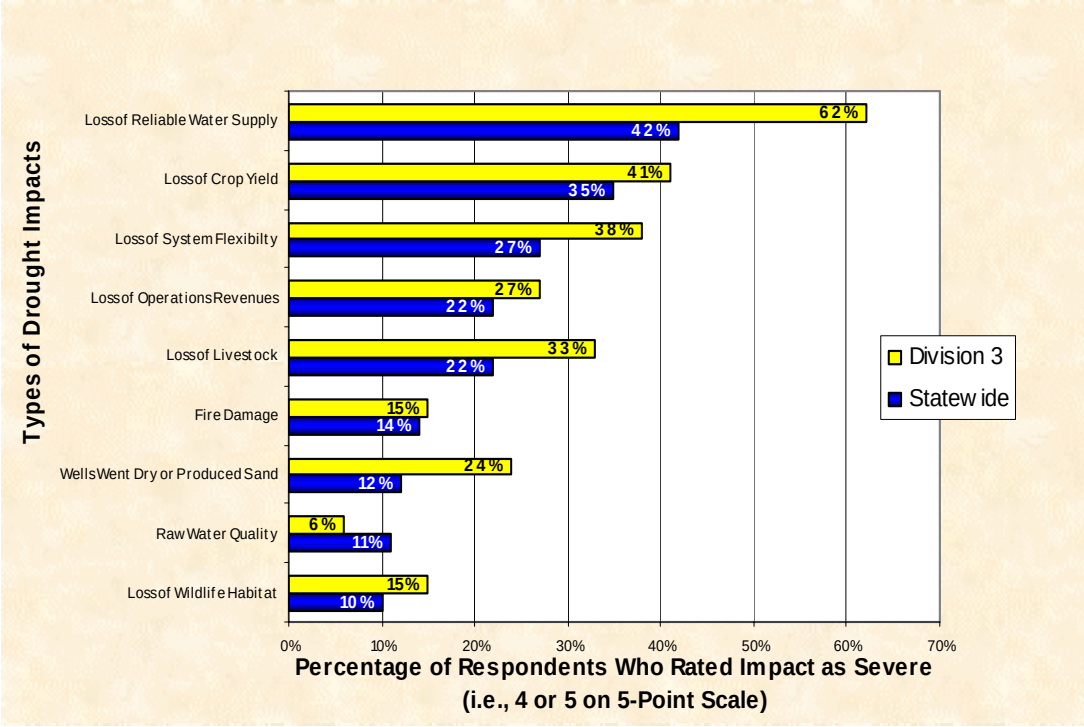
Tools for Drought

- Division 3 uses different tools to mitigate drought, based in part on the availability of groundwater in the basin.
- 41% use aquifer storage/recovery to mitigate drought compared to 18% statewide. Similarly, pumping groundwater is used by 65% of those with plans, compared to 38% those statewide.
- Other differences include: less cloud seeding, fewer emergency water supply agreements, fewer cooperative agreements, fewer landscape controls, more controls on new construction and more dual water systems for irrigation.

Water Conservation Plans

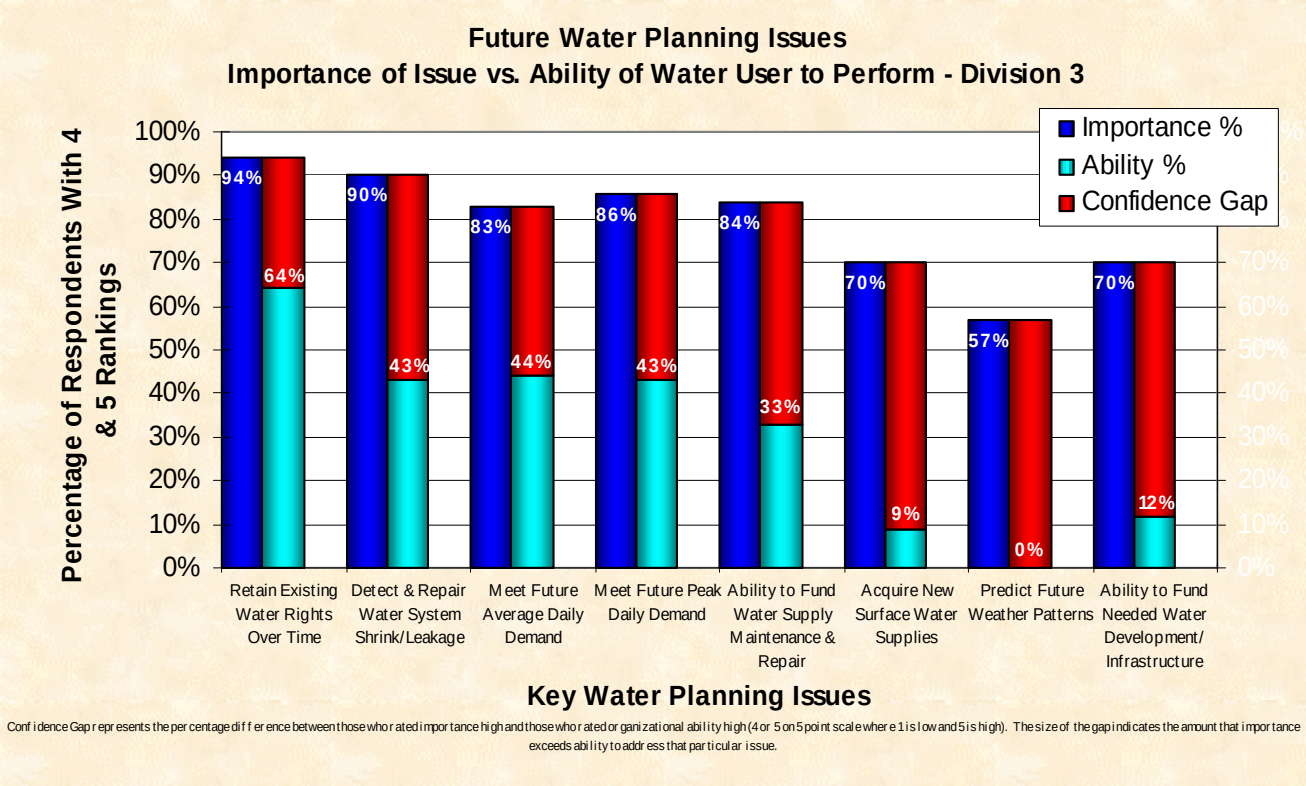
- About 44% of respondents have water conservation plans, vs. 40% statewide, with a strong preference to use public education efforts as a water conservation tool. Agricultural conservation methods (e.g., dry land farming and canal and ditch sectioning were noted as effective water conservation methods.

Recent Drought Impacts (1999-2003)



Division 3 water users indicated that they were impacted by the recent drought, and that the severity of the impacts were in nearly all cases more than the severity of the impacts noted by other water users statewide. Loss of reliable water supply was recognized by almost 2 of every 3 water user surveyed. Loss of crops and loss of livestock were significantly more severe in the Rio Grande basins than was reported by the balance of the state, as was loss of system flexibility. Division 3 water users, who rely on groundwater more heavily than most water users in the other Colorado river basins, indicated that wells going dry or producing sand was an impact at twice the statewide rate.

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 "retaining existing water rights". This issue was rated as the most important issue by Division 3 water users. These same water users indicated that roughly 2 out of every 3 had the ability to address this issue with in-house resources. To this point, there was a gap of 30% 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 7 of every 10 water users, with only 12% indicating that they had the ability to address this issue; thus identifying a 58% gap between need and ability. Large gaps (i.e., 40% or greater) were also identified for nearly every other planning issue. The number and the size of the gaps for the Rio Grande are consistently larger than for any other basin evaluated under this project.

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 3
New storage for surface water	40%	41%
Large-scale/multi-basin projects	24%	24%
New aquifer storage recovery	21%	56%
New storage for groundwater	19%	36%
New or Upgraded Pipelines	33%	48%
New or Upgraded Water Distribution Systems	33%	50%
Lining of Ditches	19%	27%

Like every other part of the state, Division 3 water users identified various structural projects as effective means to mitigate the effects of drought in their basin. However, the Division 3 water users identified significantly different set of projects that would help to mitigate drought, in part given the large aquifer that underlies much of the basin. New aquifer storage and recovery projects were supported by 56% of the respondents. Water distribution and transmission projects were also close to the top, with about 50% of the water users indicating support for these types of water projects. Water storage on the other hand, which is at or near the top of water projects identified by water users statewide, finished fourth, presumably because water users recognize that storage rights are not reliable in this basin.

When asked to prioritize the structural projects that would best mitigate drought impacts, Division 3 water users listed the following projects (in order of priority):

- New storage for surface water (even given limitations described earlier)
- New or upgraded pipelines
- Install water use meters
- New or deepened wells
- New or upgraded water distribution systems

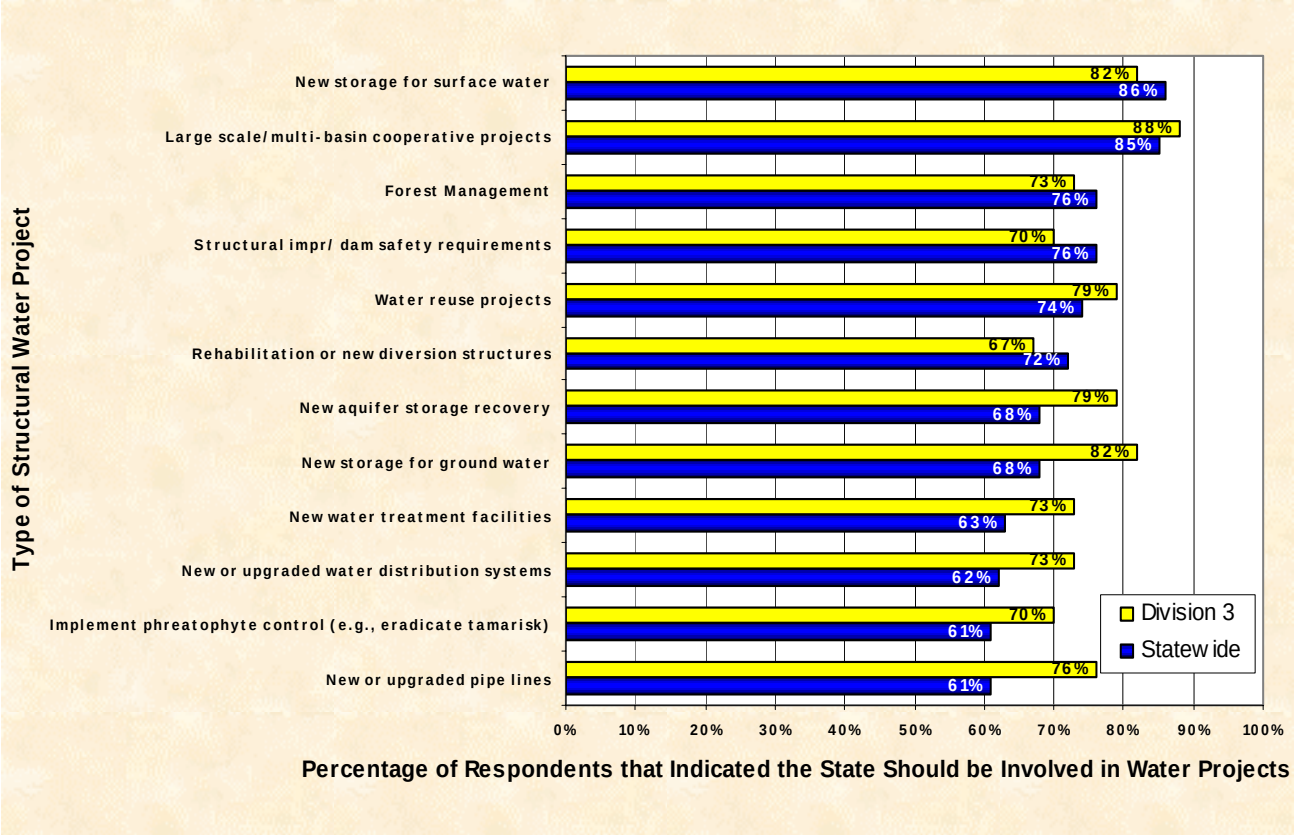
Although water users statewide agreed that new surface water storage was of the highest priority, they did not see as great a need for deepening wells or installing water use meters.

Need for Non-Structural Drought Mitigation Projects

Division 3 water users identified the need and/or benefit of non-structural projects for drought mitigation identifying needs much different than those identified statewide. In particular, the Division 3 water users indicated their overwhelming need for technical support in water supply planning, drought planning and water conservation planning, more so than in any other basin in the state. Water users also indicated a greater need for improved water conservation methods than did their counterparts statewide.

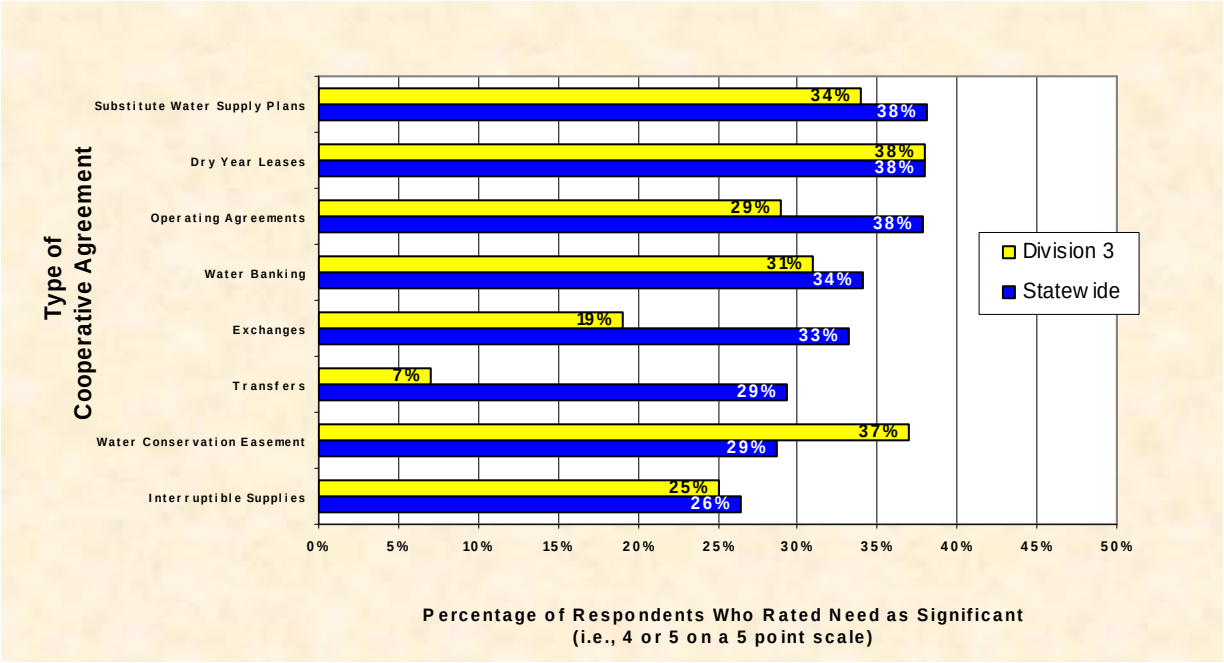
Non-Structural Project	Statewide	Division 3
Public education & awareness	46%	47%
Improved water conservation methods	46%	53%
Technical support in water supply planning	43%	70%
Technical support in drought & conservation planning	42%	67%
Improved water conservation measurement methods	29%	41%

Support for State Involvement in Structural Water Projects



Support for state involvement in structural water projects is significant, both statewide and within Division 3 as indicated in the figure above. State involvement appears to be most welcome related to large projects, such as new surface water storage, new storage for groundwater including aquifer storage and recovery systems, and large scale/multi-basin projects. The Rio Grande 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 3 water users indicated less need for or use of cooperative agreements than elsewhere in the state, with the exception of water conservation easements. Exchanges and transfers are particularly less useful to Division 3 water users, in comparison to water users statewide, perhaps in part due to the lack of large municipalities near by or other large diverse uses (e.g., power, recreation, etc.).

Summary of Results for the Rio Grande River

The Rio Grande River supports some of the oldest water users in the state, with local farms and ranches dating back centuries. Water supply within Division 3 has long been dominated by agriculture, with both surface water and groundwater production, especially in the San Luis Valley. However, the basin is over appropriated to the point that groundwater production exceeds recharge rates.

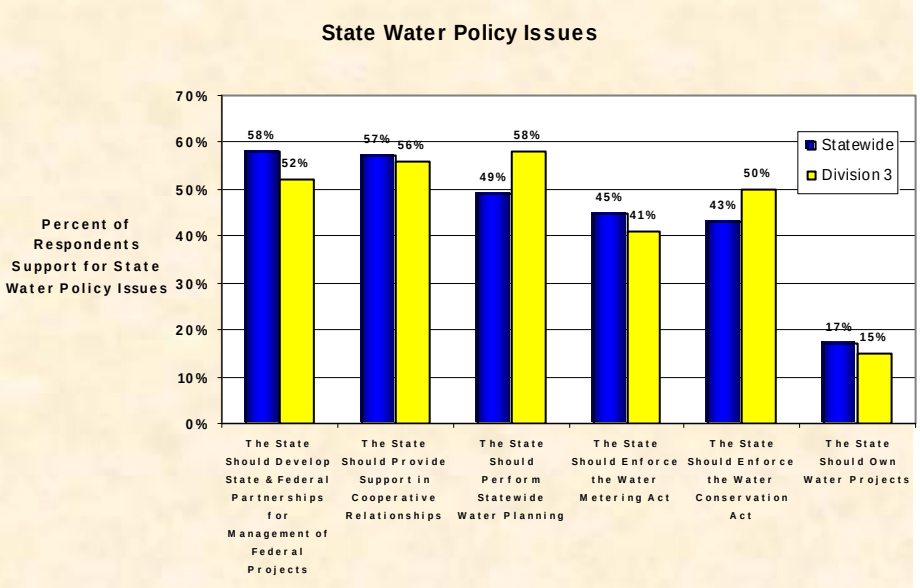
In addition, the Rio Grande water users have been particularly hard hit by drought, in part given the general susceptibility of agriculture to water scarcity. The recent drought has had substantial detrimental impacts on water supply reliability and flexibility, crop yield and livestock, and well production.

Water users in the Rio Grande basin also lack the resources to plan for future water supply needs or drought. The basin water users indicated that there was a substantial gap between their needs and their available resources—including areas of project funding, water availability, and technical assistance. For example, Division 3 water users identified a need for technical assistance to support water supply, drought and water conservation planning that was 60% greater than was identified by their counterparts statewide. The Rio Grande water users also consistently identified large gaps between future water supply issues and their current ability to address these issues—with larger gaps than any other basin in the state.

Unfortunately, water availability is also stretched in Division 3 such that the lack of water dramatically impacts the demand for (and effectiveness) of water projects to mitigate drought in this basin. Aquifer recharge projects were identified as the most effective means to mitigate drought, followed by new or upgraded pipelines and water distribution systems, however there is not a readily available source of recharge water. Similarly, water users indicated that new storage for surface water is the highest priority for future drought preparation, however the same water users indicated that surface water rights are not available to fill new reservoirs on an annual basis.

Overall, the Rio Grande basin must face challenges balancing current water supplies with existing demands in light of the limited resources available to the local water users. Insomuch as agricultural users do not generally have many options available to them for water conservation and drought management (especially if they cannot utilize temporary leases or cooperative agreements leasing water on a short-term basis to other water users), the water users in this basin will likely continue to suffer through periods of water scarcity that at times may be significant without recourse.

State Water Policy Issues (all basins)



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.