



# A Summary of Stakeholder Perspectives on New Mexico's Water Resources and Data Needs 2021

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Prepared by Emily Geery

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## Acknowledgment

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We all know that water is one of New Mexico's most precious and limited resources. We want to thank the individuals who shared another precious and limited resource: their TIME. Through this engagement and sharing of New Mexican's varied views, needs, and hopes, we can inform and prioritize our water data needs and our future plans. Thank you to all who participated and shared time and stories with us.



## Executive Summary

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The Water Data Initiative (WDI), working with the New Mexico Interstate Stream Commission (ISC) Water Planning Program, engaged stakeholders to participate in a questionnaire and interviews about New Mexico's water resources, water data, and building resilience over the next 50 years. The purpose of this document is to summarize information that stakeholders provided in the questionnaires and interviews. This information will be used to inform both the WDI and the development of New Mexico's 50-Year Water Plan. This summary report captures the essence of these interviews, highlighting themes in stakeholders' questions and comments, identifies key data and information related to the water issues, and provides several recommendations to be considered in the WDI and the 50-Year Water Plan.

In total, we collected 37 responses from a diverse range of "water interested" stakeholders, including water managers for municipal, state, and federal agencies; water operators for rural public water systems; ranchers and farmers; professors; water attorneys; Tribes, Pueblos, and Nations; scientists; soil and water conservation districts; business owners; advocacy groups; and environmental non-profits.

During the interviews, people talked openly, providing stories that illuminate the water and data issues that shape communities, economies, and the wellbeing of people, plants, and animals. In short, we learned that New Mexicans care deeply and are concerned about New Mexico's water future. The interviews revealed the following nine key takeaways, not listed in any particular order.

1. New Mexico's leaders need to commit to **prioritizing water** in New Mexico.
2. Water leaders need an opportunity to review water policies and provide a mechanism to **modify outdated water policies** to reflect current institutions, infrastructure, hydrologic conditions, and climate change.
3. State agencies and organizations that share water data need reliable and sufficient **funding** for data collection, data management, and effective planning.
4. New Mexico needs **easily accessible, high-quality water data** in order to make informed water management decisions.
5. New Mexico needs to **assess the risks to water resources** in order to plan effectively.
6. To **manage supply and demand**, New Mexico needs very clear and accurate assessments of water that is available for use, as well as demand projections. Based on this information, water users can exercise options for change, conservation, or sharing.
7. New Mexico needs to understand how **climate change will impact water resources**, especially the impacts of reduced surface water.
8. New Mexicans need accessible information and characterizations of the **quantity and quality of groundwater**.
9. To continue preparing for the future, New Mexico needs a dedicated strategy for raising awareness and **educating** its citizens and leaders about water.

## Introduction

Water planning and water data are interconnected—water plans rely on data, and data inform and drive water management and planning decisions. The focus of water planning is to understand available water supply, current and future water demand patterns, and prepare strategies to meet demand with supply. Water data are the building blocks for planning—the facts, measurements, or properties that describe a water resource or feature. Issues and goals identified through developing water plans can highlight water data needs. Together, water data and water planning support informed decision making, which is particularly important as we consider how to build resilient water resources while facing uncertainty.

We need reliable water data to describe the state of water resources and enable risk assessment, decision making, and planning. The Water Data Initiative (WDI), in response to the New Mexico Water Data Act, aims to identify, share, and integrate key water data in New Mexico. The Water Data Act legislation<sup>1</sup> directs the New Mexico Bureau of Geology and Mineral Resources to convene the effort with other state agencies to "...identify key water data, information and tools needed to support water management and planning; and to [assess] water data and information needs to support water management and planning..." The 50-Year Water Plan, led by the New Mexico Interstate Stream Commission (ISC), aims to provide an assessment of the impact of climate change on water resources in New Mexico over the next 50 years. The plan will describe New Mexico's ability to address the anticipated changes and strategies to increase resilience.

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<sup>1</sup> Water Data Act - From New Mexico House Bill 651, in 2019. In statute: NMSA 1978, §72-4B

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*"My vision is citizens understand the value of clean water and elect representatives who put a priority on water."*

Conservation District Stakeholder

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Consulting with stakeholders is a fundamental process needed to fulfill the direction of the Water Data Act, which led to the creation of the Data Users Work Group as part of the governance structure. This multi-year collaborative effort related to water data will work with diverse stakeholders on an annual basis, or more often as needed. The purpose of this group is to seek to understand the water data needs of the people the WDI serves. To assist both the WDI and the development of the 50-Year Water Plan, the Data Users Work Group asked New Mexicans about their vision for water resources in New Mexico 50 years from now and actions to be taken at the citizen and government level to make New Mexico water resources resilient.

This report summarizes the results of these interviews, highlights repeated themes, identifies key data related to the water issues where possible, and provides excerpts from stakeholders. **The intent of this engagement process was to better understand stakeholders' questions about water resources, their vision for the future, and explore ideas they may have for actions needed to achieve that vision. From these responses and in future work, we can identify water problems and future goals where improved water data are significantly needed.** In some cases, stakeholders provided direct statements about data needs. In other cases, we interpreted the responses to identify the data needed and gaps found in existing data. We also wanted to understand if the data are currently accessible to the stakeholders and the quality or status of the data that they wish to use. Identifying data and information needs is part of the ongoing work of the WDI. This report provides a high-level summary of data and information needs but should not be considered inclusive of all the concerns voiced during the interviews. The WDI intends to support the associated data and information needs by bringing greater awareness to the issues and, where possible, taking specific action. This summary is intended to complement the WDI Annual Plan, which defines the goals, objectives, targets, and metrics for each year.

It is important to note that many of the stakeholders' responses are focused on water topics beyond water data, such as water management, planning, and policies. These broader issues can be considered in the development of the 50-Year Water Plan. Throughout the report, several snapshots of participant questions, comments, and experiences are highlighted to communicate people's voices and stories. The stakeholders' priorities, which reflect peoples' values, are summarized in the key takeaways.

## Process

The Data Users Work Group invited New Mexicans to complete a questionnaire and participate in an optional virtual interview. Virtual meetings and phone calls, rather than in-person meetings, were necessary because of health and safety concerns associated with the COVID-19 global pandemic in 2020–2021. Engagement opportunities were announced on the New Mexico WDI website, in the WDI newsletter, at ISC meetings, at the Water Dialogue Annual Meeting, and by email and word of mouth.

From December 2020 to March 2021, the Data Users Work Group hosted stakeholder interviews with representatives from various water sectors and geographies throughout the state. The purpose of the interviews was to clarify the answers provided, allow participants to elaborate on their answers, strengthen relationships with participants, and continue to build the network of the Data Users Work Group. The virtual interviews were recorded and stored temporarily for the purpose of referring to them for accuracy; interviewers also took notes of responses. The interview responses were then entered into a spreadsheet and categorized qualitatively. Similar comments were combined and used to identify themes to write this narrative. This process allowed us to summarize key themes and data needed. It is beyond the scope of this effort to report the status of specific data or the accessibility of current data.

## Participants

This project is not simply a data project; it is also a people project, gathering stakeholders and learning from their water issues and experiences. Participants representing communities in Northwestern, Southwestern, and Southeastern New Mexico took part in the project (see Figure 1). We interviewed a diverse range of stakeholders, including water managers for municipal, state, and federal agencies; water operators for rural public water systems; ranchers and farmers; academics; scientists; water attorneys; Tribes, Pueblos, and Nations; soil and water conservation districts; business owners; advocacy groups; and environmental non-profits. Leaders in the 16 Regional Water Planning Steering Committees were invited to participate. In total, we received 37 responses from representatives or groups that returned the questionnaire and/or participated in interviews.

## Questionnaire

The questionnaire included seven questions about water resources, developed with two themes:

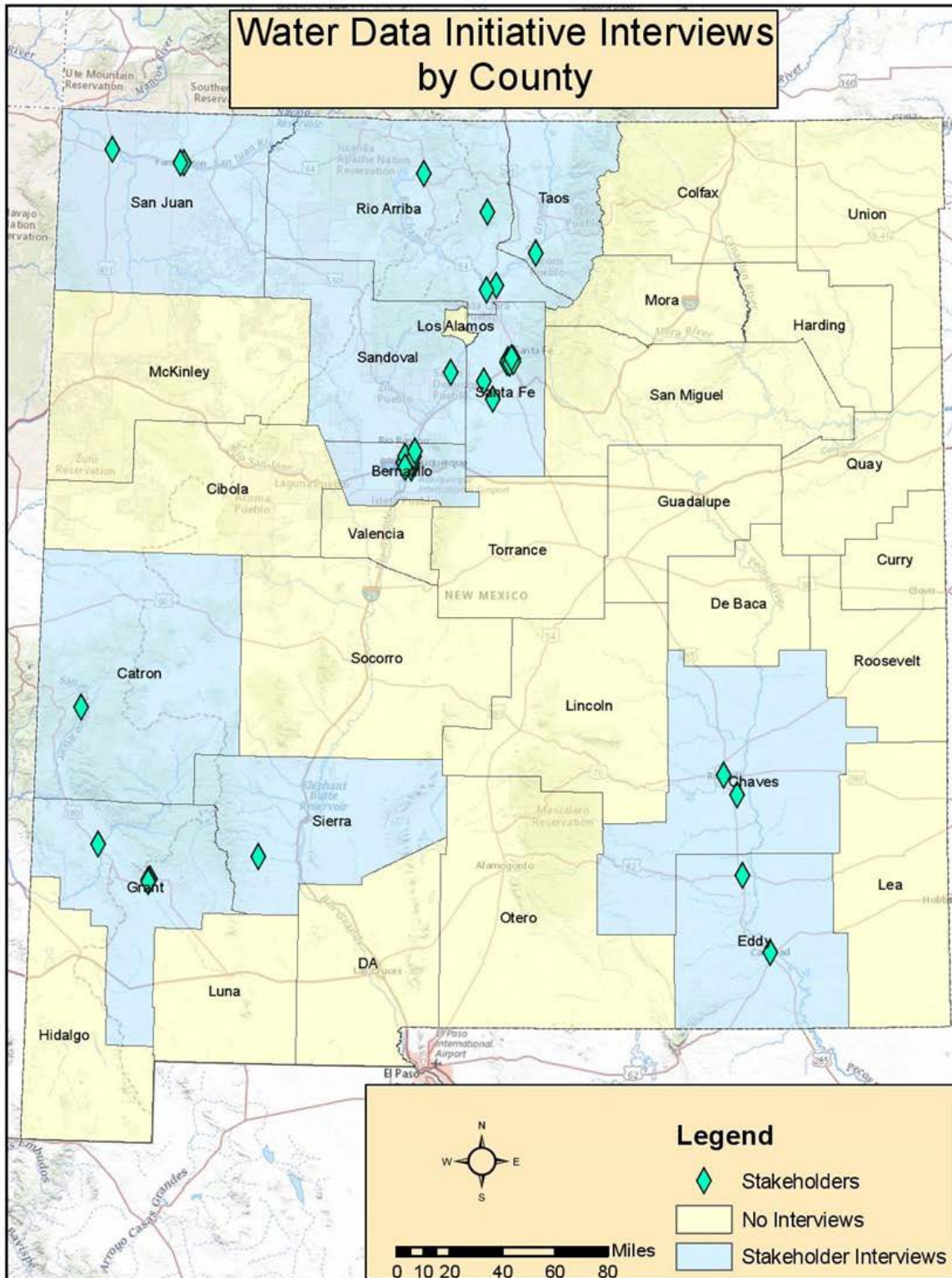
- A vision for water resources in New Mexico 50 years from now, and
- Actions to be taken at the citizen and government level to make New Mexico water resources resilient.

Our questions focused on how participants viewed the data that would be needed to accomplish these two themes. The questionnaire also encouraged respondents to think about the 50-Year Water Plan and to identify concerns about changing water resources and ways to prepare and respond to future conditions. We also sought to learn the three most important topics each respondent wants to know regarding New Mexico's water. Appendix A provides a compilation of stakeholder responses to the following questions:

1. What are three "big" questions you have about New Mexico's water or water in your region?"
2. What do you want New Mexico's or your region's water resources to look like 50 years from now?
3. What specific actions do citizens need to take to make New Mexico's water resources resilient?
4. What actions do local or state governments need to take to make New Mexico's water resources resilient?
5. What are some things we do now that need to change in order to have a resilient water future?
6. What water data do you use most often?
7. What water data do you feel would be most valuable for you locally or for the state for planning a resilient water future?



Figure 1. Approximate locations of interviewed stakeholders.



An interactive map to explore this is available online at <https://newmexicowaterdata.org/maps>  
 Look for Stakeholder Location map, under the Water Planning topic.



## Key Takeaways

The key takeaways from the stakeholder questionnaire and interviews are paraphrased statements focused on water data, planning, and policy representing repeated comments offered by multiple stakeholders. This report describes these issues and the resources needed to address them. The interviews revealed the following nine key takeaways, not listed in any particular order.

- 1. New Mexico's leaders need to commit to prioritizing water in New Mexico.** First, stakeholders are calling for the governor and legislature to recognize water as a priority among other important statewide issues. Second, with a growing population, climate change, aridification, and a declining supply of water, citizens expect water management professionals and leaders to set priorities for managing the state's waters and provide points of public engagement as needed. Stakeholders want to know how to help elevate water to a high priority at every level.
- 2. Water leaders need an opportunity to review water policies and provide a mechanism to modify outdated water policies to reflect current institutions, infrastructure, hydrologic conditions, and climate change.** New Mexico's water policies and management decisions need to be based on current priorities, hydrologic conditions, and climate patterns. Water leaders, including legislators and water managers, should create a process that allows an opportunity for periodic review and reform of policies. Today's policies need to be appropriate for the modern world, driven by science, and focused on maintaining a sustainable water supply.
- 3. State agencies and organizations that share water data need reliable and sufficient funding for data collection, data management, and effective planning.** Funding to state agencies that manage water resources and water data has been inconsistent and insufficient in New Mexico. These agencies need adequate and reliable funding for planning, management, data collection, and sharing to make New Mexico's water resources resilient.

### *Water Operator Stakeholder Story*

As she works to provide water to today's customers, a water operator for two rural water systems in Northern New Mexico described the challenges of daily operations, in addition to long-term challenges. She needs improved data and information about the aquifer as she questions how long this water system will be able to reliably use groundwater as its primary source of water. As she considers the future, she questions if the system should allow new customers, and if so, how many?

- 4. New Mexico needs easily accessible, high-quality water data in order to make informed water management decisions.** Legislators passed the Water Data Act in 2019 in response to stakeholders' needs for improved water data. State agencies involved in responding to this legislation have no funding to improve or upgrade outdated (or non-existent) data management systems. Citizens continue to say water data are critical to making informed decisions. The public, technical users, researchers, and agencies charged with managing the state's waters need access to water data, tools, and information necessary to support analysis and decision making.
- 5. New Mexico needs to assess the risks to water resources in order to plan effectively.** Stakeholders emphasize the importance of water risk assessment, planning, and securing funding to implement plans. Through the process of planning, stakeholders can voice their concerns and values, evaluate the condition of the water resources, assess risk, prioritize, create strategies, and implement solutions.
- 6. To manage supply and demand, New Mexico needs very clear and accurate assessments of water that is available for use, as well as demand projections.** Based on this information, water users can exercise options for change, conservation, or sharing. Water is a limited resource and communities in New Mexico are vulnerable to water shortages due to the supply of available water. Understanding water supply, demand, and the gaps between them is essential as stakeholders are concerned about the amount of water available for use now and in the future, and how to adapt.
- 7. New Mexico needs to understand how climate change will impact water resources, especially the impacts of reduced surface water.** Climate change will create broad challenges for the management of water resources and stakeholders need to know how water resource conditions will change. Surface water in New Mexico supplies water for a wide range of uses, including drinking water, agriculture, industry, recreation, fish and wildlife habitat conservation, and other uses. Realistic management options, that allow for flexibility to adjust as conditions change, are needed.
- 8. New Mexicans need accessible information and characterizations of the quantity and quality of groundwater.** Stakeholders recognize the need to better understand groundwater resources. They called for balance in how we use and recharge aquifers and recognized that the state might need new policies and tools for sustainable groundwater management. Because groundwater is less accessible and visual, it is also where some of the largest data gaps exist. Many places in New Mexico have very limited data and information about aquifers, how much water may be available, how it is changing over time, and the quality of the water.
- 9. To continue preparing for the future, New Mexico needs a dedicated strategy for raising awareness and educating its citizens and leaders about water.** We need public education and outreach designed to inform and empower New Mexicans to take action to make water resources sustainable. Water issues are complex and more informed decisions can be made with greater understanding and awareness. According to stakeholders, a range of audiences could benefit from education on water issues, including elected officials, the general public, and children.

# Key Water Data

The Water Data Act instructs the WDI to identify “Key Water Data.” Discussions with stakeholders provide a way to find out what data are “Key” to stakeholder communities and regions in the state. “Key” data can evolve and change with current situations and may be different for different water data users. Therefore, we are using stakeholder discussions to help us refine “Key” data as these data sets relate to issues or themes identified by our respondents for these discussions. We anticipate that “Key” data may change from year to year, and between different discussion groups. The following table provides information and data needed to support the Key Takeaways.

**Table 1. Key Data and Information Related to the Key Takeaways**

| Key Takeaways  | Key Data and Information Needed  |
|--|--|
| 1. <b>Prioritize Water</b>   | Water use data, quantity and quality data, economic data, data to support models and modeling results, water budget and management data, geographic and mapping data, ecology and biology data, data collection and handling processes, economics and funding, and water rights and permitting data                                  |
| 2. <b>Modify Outdated Water Policies</b>                           | Water rights, water use, economics, funding, water demand, and population data   |
| 3. <b>Fund State Agencies involved in Water Data and Planning</b>  | Water use, weather and climate, quantity data, modeling results, budget and management, data collection and handling, geographic and mapping, population data, water demand, funding and transparency, water budgets, locations of water projects, and geographic data   |
| 4. <b>Make Water Data Accessible</b>                               | Data to support models and modeling results, water budget and management data, geographic and mapping data, data collection and handling processes, citizen science data, permitting data, and water rights  |
| 5. <b>Assess Risks and Plan</b>                                    | Water supply, water quantity data, water quality data, modeling results, weather and climate, evapotranspiration, ecology and biology data, geographic and mapping, data collection and handling, water demand, soil moisture, environmental flows, water use records: current/historical/trends, population data, and water budgets |
| 6. <b>Manage Water Supply and Demand</b>                           | Water use, water quantity, economic data, water budget and management, geographic and mapping, data collection and handling, water demand data, population data, permitting data, evapotranspiration, surface water diversion, groundwater diversion, and recharge rate  |
| 7. <b>Address Climate Change Impacts to Water Resources</b>        | Quantity and quality data, weather and climate data, data to support models, modeling results, water budget and management data, geographic and mapping data, geology, ecology and biology data, data collection and handling processes, water demand, environmental flows, and soil moisture  |
| 8. <b>Build Information about Groundwater Quantity and Quality</b> | Groundwater quantity and quality data, data to support models, modeling results, water budget and management data, geographic and mapping data, geology data, data collection and handling processes, aquifer characterization, permitting data, depth to water, well log data, and diversion records                                |
| 9. <b>Raise Awareness and Education About Water Resources</b>      | Water use data, quantity and quality data, weather and climate data, economic data, data to support models, modeling results, water budget and management data, citizen science data, funding (economics) and transparency, population data, and permitting data   |

This is not an all-inclusive list of themes and connected data, but the information above can be used to help define what data should be made available—or Findable, Accessible, Interoperable, or Reusable (FAIR)—to stakeholders for future work and policy development.

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*"A diversified portfolio of water supply solutions would include water conservation, reuse, agricultural efficiency, and efficient water supply infrastructure that is maintained on a consistent basis and that is metered to monitor use and leaks on a real-time basis."*

Non-profit Organization Stakeholder

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## Stakeholder Recommendations

Based on questions around actions that need to be taken, we heard that New Mexicans are eager to develop innovative solutions to address the complex water challenges we are facing. With responses that went beyond water data, actions and solutions seem to lie at the intersection of science, policy, and collaboration.

Stakeholders provided suggestions for actions individuals and governments can take to build resilient water resources at both small (citizen) and large (government) scales. Table 2 provides a summary of some, but not all, recommendations that capture ideas shared by stakeholders.

### *Farmer and Rancher Stakeholder Story*

A long-time farmer and rancher in the Artesia area described the changes in land use during his lifetime. Large swaths of the landscape that were once used for agriculture are now small "ranchettes" or 5-acre lots in subdivisions, each with its own private domestic well. Numerous permits for private domestic wells have been issued by the New Mexico Office of the State Engineer (OSE) in this area, and are often granted with limited or no evaluation, hearing, or public notice. He is very concerned about the impacts of numerous private domestic wells to the local water resources, particularly because monitoring of groundwater and surface water resources in the area is limited or non-existent. He raises questions about the OSE's policy for issuing private domestic well permits and the sustainability of groundwater.

**Table 2 Recommendations from stakeholders for actions and solutions to build resilient water resources.**

| Key Takeaways  | Government Action   | Citizen Action   |
|--|---|--|
| <p><b>1. Prioritize Water</b></p>  | <ul style="list-style-type: none"> <li>• The legislature and governor should make water a priority in New Mexico.</li> <li>• Bold leadership for water resilience in the 50-Year Water Plan and climate action plan is needed. Identify goals, priorities, strategies, and investment needs.</li> <li>• Appropriate and allocate enough funding for State water agencies to fulfill their science and planning mandates.</li> </ul>   | <ul style="list-style-type: none"> <li>• Advocate at state and local levels that elected officials prioritize building resilient water supplies.</li> </ul>  |
| <p><b>2. Modify Outdated Water Policies</b></p>                          | <ul style="list-style-type: none"> <li>• Change the “use it or lose it” policy. This policy is contrary to water conservation and difficult for the OSE to enforce.</li> <li>• Develop policies or update policies on water management to utilize modern data and the most current science.</li> <li>• Craft equitable water rights policy and legal structures.</li> <li>• Shift away from Prior Appropriation (i.e., “first come, first served”).</li> <li>• Local and state governments should urgently address the agriculture sector where most of our water is allocated and come up with new approaches and policies to transition to less evaporative ways to irrigate and support sustainable practices.</li> <li>• Reform the domestic well statutes. These permits are often granted with limited or no evaluation, hearing, or public notice. A more informed process is needed to sustainably manage groundwater resources.</li> </ul> | <ul style="list-style-type: none"> <li>• Find opportunities to voice support for instream flows and non-consumptive water uses.</li> <li>• Foster collaboration among non-governmental organizations, water users, public agencies, and water law and policy experts to identify problems and solutions and to take action.</li> <li>• Elect officials who will advocate for policy reform and appropriations in the legislature.</li> </ul> |
| <p><b>3. Fund State Agencies involved in Water Data and Planning</b></p> | <ul style="list-style-type: none"> <li>• Fund water planning studies and fund water projects.</li> <li>• Local and state governments need to make well-publicized commitments to carefully developed water stewardship goals that will protect the interests of nature and future generations.</li> </ul>   | <ul style="list-style-type: none"> <li>• Demand that agencies be funded and authorized to carry out their missions effectively and transparently.</li> <li>• Collaborate with public water management agencies to identify water security needs and projects, establish criteria for selection, select projects, and seek federal and state funds for implementation.</li> </ul>   |

| Key Takeaways                                   | Government Action  | Citizen Action  |
|---|--|---|
| <p><b>4. Make Water Data Accessible</b></p>     | <ul style="list-style-type: none"> <li>• Be transparent with water data.</li> <li>• Provide funding to increase and support ongoing scientific monitoring.</li> </ul>  | <ul style="list-style-type: none"> <li>• Participate in citizens' science and data collection. Volunteer to provide the high-quality data for natural resource, education, and research applications (e.g., Community Collaborative Rain, Hail and Snow Network [CoCORAHNS], or the Healy Collaborative Groundwater Monitoring Network at the New Mexico Bureau of Geology).</li> </ul> |
| <p><b>5. Assess Risks and Plan</b></p>          | <ul style="list-style-type: none"> <li>• Articulate probable scenarios that we can prepare for and provide information on how to prepare.</li> <li>• Provide technical assistance for rural water systems to assess risk, plan, and conduct asset management.</li> <li>• Government employees should visit field sites and personnel, particularly rural water systems, to improve understanding of on-the-ground conditions.</li> </ul>   | <ul style="list-style-type: none"> <li>• Understand where water is sourced and how water is consumed in your community.</li> <li>• Participate in and contribute to the process of developing local, regional, and statewide water assessments and plans, including the 50-Year Water Plan.</li> </ul>  |
| <p><b>6. Manage Water Supply and Demand</b></p> | <ul style="list-style-type: none"> <li>• Establish forums for explanation and discussion of local, regional, and statewide supply/demand imbalances and how to address them.</li> <li>• Provide technical support to communities interested in developing integrated plans and programs for water resilience.</li> <li>• Engage in hard discussions and conflict management to develop an equitable and balanced water budget.</li> <li>• Communicate to citizens that in many areas of the state, the total water diversions are greater than the physical or legal water supply.</li> <li>• Urban wastewater can be a valuable resource by applying new engineering designs. Educate New Mexicans that water reuse can make a huge contribution to overall water security.</li> <li>• Improve public outreach and transparency.</li> </ul> | <ul style="list-style-type: none"> <li>• Become informed about water resource issues in your community.</li> <li>• Seek opportunities to work in the water realm: Become a water operator, serve on a water board or commission.</li> <li>• Find creative solutions to work together and share or reuse resources.</li> </ul>   |

| Key Takeaways   | Government Action  | Citizen Action  |
|---|--|---|
| <p><b>7. Address Climate Change Impacts to Water Resources</b></p>        | <ul style="list-style-type: none"> <li>• Reform state water laws and compact obligations to align with changing precipitation patterns and other effects of climate change.</li> <li>• Transition the state's economy away from fossil fuels.</li> <li>• Incorporate climate change into all levels of water planning.</li> <li>• Promote water conservation practices for every sector of water use.</li> <li>• Invest in water conservation technology and retire wasteful infrastructure.</li> <li>• Experiment with regional demand management plans and programs (e.g., the Middle Rio Grande Water Leasing Program or the Lower Rio Grande Basin Groundwater Pilot Program). Expand successful pilot demand management and shortage-sharing projects.</li> <li>• Document the successes and failures of the many local and regional shortage-sharing programs, formal and informal, in New Mexico's past. Develop written guidance, supported by agency field outreach, for designing, funding, and implementing proven approaches.</li> </ul> | <ul style="list-style-type: none"> <li>• Become and stay more informed regarding New Mexico's current and predicted water future with respect to climate change and reduced water availability.</li> <li>• Use xeriscape and drought-tolerant native plants.</li> <li>• Practice graywater reuse.</li> <li>• Better understand water-related values of other people, especially outside of your own communities.</li> </ul>   |
| <p><b>8. Build Information about Groundwater Quantity and Quality</b></p> | <ul style="list-style-type: none"> <li>• OSE could issue fewer permits and even recall some of the permits that are contributing to the problem of over-allocation.</li> <li>• Use best management practices to improve soil health on municipal lands, parks, and buildings to help recharge aquifers.</li> <li>• Focus funding and effort to improving watershed health toward active recharge to aquifers.</li> </ul>   | <ul style="list-style-type: none"> <li>• Start or continue composting. Compost can serve to inoculate soil with microorganisms that restore soil health. It adds organic matter to our often depleted soils, which creates a "carbon sponge," holding more water in the soil and allowing it to percolate into the ground, recharging groundwater and aquifer storage instead of running off the surface.</li> <li>• Encourage improvements to soil health and educate everyone on how to restore soils by growing plants.</li> </ul> |
| <p><b>9. Raise Awareness and Education about Water Resources</b></p>      | <ul style="list-style-type: none"> <li>• Government agencies could hire or contract with outreach coordinators.</li> <li>• Educate New Mexicans about how water works in New Mexico. Create layperson-friendly materials focused on state and regional information both in text and with illustrations.</li> </ul>   | <ul style="list-style-type: none"> <li>• Continue to engage in dialogue about water, do experiments, pay attention to what works and why.</li> <li>• Learn where your water comes from, who your water provider is, and if the source is groundwater, surface water or both.</li> </ul>   |



## Priority Concerns to Inform the 50-Year Water Plan

The following section summarizes stakeholder comments about water issues related to broader planning, management, and policy topics. Climate change, water management, and education were three recurring topics discussed by participants and could be used to inform the development of the 50-Year Water Plan.

### Priority Concern: Climate change is impacting water resources. What can we expect?

Participants indicated that we can no longer expect a stable climate with regular precipitation patterns. Surface water supplies are expected to change and likely be reduced due to earlier snowmelt runoff, warmer temperatures, increased evapotranspiration (loss of water to the atmosphere), and changing precipitation patterns. This calls for a paradigm shift in water governance because previous assumptions, which influenced historical decisions, such as building dams, and short-term decisions, such as which crops to plant, may be unreliable as the climate changes. This uncertainty calls for a different approach to planning in which we consider the efficacy of alternative strategies across a range of possible future circumstances. This “scenario planning” approach is necessary to find creative approaches, manage risk, avoid dire situations, and create a livable future.

Respondents also asked:

- What is the current and future water budget for our region?
- Will there be enough water in New Mexico to support long-term human water needs for urban and traditional or rural communities?
- Will there be water in sufficient quantity and quality to support aquatic life, other wildlife, and ecosystems?
- How will climate change impact surface and groundwater quantity and quality in New Mexico?

### *River Advocate Stakeholder Story*

A stakeholder from a river advocacy organization discussed how local water planning can empower communities. People want to know what to expect in their community and need a water budget to know how much water is available, the amount being used, the types of uses, when and where it is used, and how much is being returned to the system. Planning at the local level will give community members a chance to determine what water management strategies will work here with people’s values, traditions, lifestyles, and the local economy.



### Example Data and Information Needed to Support Climate Change Impacts to Water Resources

- Current and historic records of water use
- Stream flow
- Groundwater quantity
- Population
- Economic data
- Water rights
- Precipitation
- Snowpack
- Temperature
- Measurements of evapotranspiration
- Historical and real-time water budget data
- Surface and groundwater quality data
- Models for water supply
- Climate models
- Flow targets for different species

## Summarized Concerns and Suggestions

**Incorporate climate change into all levels of water planning.** Climate change is already impacting water resources in New Mexico as observed by many stakeholders. Citizens and water professionals need to understand how conditions will change and the best ways to adjust to these changes. For example, as the temperature increases, producers adapt by growing crops that are more heat tolerant and suitable for an increasingly arid environment.

**Accurate water budgets are needed to respond to anticipated changes in water resources.** Plans need to be built on a realistic picture of supply and demand now and in the future. People need to know how much surface and groundwater is available now in their region, what it is being used for, how much is returned to the system, and what will be available in the future under various climate and demand scenarios. Communities need to plan now to meet the gaps between water supply and demand.

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*"We need a paradigm shift from exploitation to sustainability."*

Government Agency Stakeholder

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## Priority Concern: How can we manage our water to address these anticipated changes?

Respondents felt that water management decisions and policies developed in the past were based on the priorities of that time. Our current water management decisions need to be based on current values, priorities, hydrologic conditions, and climate patterns. Today's policies need to be appropriate for the modern world, driven by science and focused on maintaining a sustainable water supply. Recognizing a need to improve, stakeholders provided recommendations for amendments to water law, policies, and management practices. Additionally, respondents indicated that our approach to decision making can be modernized, with more adaptive tools and technology implemented.

Although there is widespread acknowledgment that water management and policy should address climate change, there is a range of attitudes about the degree of change needed. Some want substantive change and others resist change, with multiple in-between points on the spectrum. Additionally, some responses reflect confusion about how some of the policies and agencies work together (or not) on water regulation and management. This provides insight to where improved education and awareness can be beneficial.

Respondents also asked:

- How can we best incorporate data and scientific understanding into water planning, laws, and management?
- How can we access all available water quality and quantity data from one web platform with a GIS interface?

- How can we improve groundwater management in New Mexico and reduce depletions and increase recharge?
- How can we effectively plan to ensure our water supply for the future considering the predicted reductions in water quantity due to climate change?
- How is the State preparing for drought conditions?

## Summarized Concerns and Suggestions

**Water data are critical to making informed decisions.** Stakeholders highlighted a “chicken and egg” issue around water management and planning, specific to water data. In some cases, the water data needed most is directed by what the plans are for future water use. And in other situations, the water data informs the water management and water planning process. It is important that water data and water management and planning processes are interconnected and mutually supportive. Water planning and management will be ineffective without sound supporting evidence and analysis.

**Recognize there are many data gaps and work to improve metering and monitoring.** Although some monitoring (observing or keeping a continuous record of a process or quantity) and metering (the OSE has the authority to regulate measuring diversions) is happening in some places, respondents indicated that a problem is that much of New Mexico’s water

is not metered and data are limited. Some of these data gaps include 1) metering for all water uses (in real time to the extent possible), 2) groundwater level monitoring, 3) aquifer mapping and characterization, 4) water quality data to help characterize groundwater/surface water connections, 5) weather/precipitation monitoring stations, and 6) improved data coverage on evapotranspiration. In general, most people stated that the network of metering and monitoring water data is not adequate.

**Sustainably manage groundwater by actively monitoring withdrawals and aquifer levels, reducing depletions, and increasing recharge.** As with the regional water planning that led to the 2018 State Water Plan, stakeholders continue to call for better understanding of our groundwater resources and for finding balance in how we use and recharge the aquifers. To know how various management choices impact aquifers, we need improvement in how we track and monitor aquifers, depletions, and recharge.

**Understand the risks to public water systems.** Water systems face many threats. To prepare to meet future needs (or emergencies), water operators and their customers need to understand the risks to water systems and conditions that make the systems vulnerable. At a minimum, conducting a vulnerability assessment will allow water systems to identify the highest risks to mission-critical operations and find measures to reduce those risks. Some water operators shared that they are considering limiting the number of connections to preserve the aquifer and/or connecting to another water system as measures to reduce risk.

## *Water Operator Stakeholder Story*

When land managers and fire fighters lost control of a prescribed fire in Northern New Mexico, the source of water for a small surface water system was severely damaged. For one year, the community did not have water and the water operator needed to provide a different supply of water to customers, use different treatment methods to address water quality issues resulting from the fire, and work with other agencies to coordinate and respond to the situation. In the best of circumstances, the resources available for rural water operators are limited. This particularly difficult situation highlights the immense need for the state to support water systems, particularly small rural systems, to improve their capacity and ability to operate water systems.

**Provide technical support to rural public water systems.** Small or rural public water systems have limited capacity to provide water. In these communities, water operators are often volunteers and may not have all the technical training that they need or the capacity to administer the financial side of the water system. Many of these systems have infrastructure that is old and deeply in need of maintenance and upgrades, which often requires additional work at unexpected times. Sometimes treating and delivering the water requires so much effort that these water systems do not have the capacity to manage assets or set up proactive water management plans.

**Rivers and wildlife need water too.** In New Mexico, people value instream flows, also referred to as environmental flows.<sup>2</sup> People expect water to be in rivers, not only for aquatic life and habitat, but also for recreation, cultural practices, and aesthetics. They recognize the ecological and economic value of the state's unique aquatic and riparian ecosystems, and they also acknowledge the need to develop and apply scientific methods for evaluating these values. Environmental flows need to be incorporated into supply and demand analysis. Knowing how much water natural ecosystems need to be ecologically healthy is important. There is a great deal of technical

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*"We need to better insure that small rural communities are able to solve their water challenges."*

University Stakeholder

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guidance for assessing environmental flow needs. Although the State recognizes instream flows as a beneficial use, water management agencies have not yet developed administrative rules nor a process, as other states have, for dedicating private water rights to the environment.

**Provide protections for agricultural lands and traditions.** Stakeholders described a problematic trend: agricultural water rights are being transferred to other uses. Stakeholders representing the agriculture community said they need to protect and preserve agriculture. Much agricultural land has permanently been lost, along with a loss of culture, lifestyle, and shared sense of history. People in New Mexico have a long history of farming, particularly along the Rio Grande valley, and a deep-rooted acequia tradition in Northern New Mexico. Also, many people in the Albuquerque area, who are not directly involved in farming, are protective of the agricultural landscape that is interspersed and surrounds the city and do not want it to change.

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<sup>2</sup> Environmental flows describe the quantity, timing, and quality of water flows and groundwater conditions required to sustain [freshwater](#) and [estuarine ecosystems](#) and the human livelihoods and well-being that depend on these ecosystems.

## *Conservation District Stakeholder Story*

As a farmer, rancher, and member of a conservation district, this New Mexican talked about how important it is to him to make sure water (and water rights) are not permanently moved out of the agriculture sector. He said population growth is likely to increase urban water use. This presents a problem for him because that means more water is migrating away from agriculture. He says there are logical ways to avoid this unwanted scenario and we need to set up more fluid and flexible water management options to allow for pivoting when needed. For example, we could consider options to fallow fields temporarily when needed. This type of management practice and others could prevent water from permanently being removed from the agriculture sector.

### Example Data and Information Needed to Support Adaptive Water Management

- Water use data
- Groundwater quantity and quality data
- Surface water quantity and quality data
- Precipitation data
- Evaporation / Transpiration data
- Aquifer properties
- Population projections
- Metering data
- Flow targets for different species
- Geologic data
- Aquifer characterization
- Groundwater use permits
- Water budget data
- Water supply: meter and monitoring data
- Robust modeling
- Locations of water infrastructure
- Funding data transparency
- Water economics data
- Water rights
- Soil moisture data
- Soil health data
- Historic and current records of water use in farming
- Water metering

**We live in an arid state and certain types of agriculture do not make sense here.** Stakeholders stated certain types of agriculture do not make sense in New Mexico, particularly mega dairies, livestock crops, and commercial export crops. The amount of water used to support these practices is unsustainable and not practical for this region of the country.

**Protect groundwater quality.** Establish a proactive, preventative perspective on protecting water quality. Once groundwater is contaminated, it is very costly and difficult to remediate. Take steps in all directions to prevent contamination from occurring in the first place.

**Improve understanding of the impacts of groundwater withdrawal.** In some regions of New Mexico, groundwater is pumped unsustainably, where the rate of pumping exceeds the rate of recharge and aquifers are rapidly being drained/depleted. This can be seen in areas where groundwater levels are dropping over the last few years. Stakeholders are concerned that OSE issues too many groundwater permits, leading to the declining groundwater levels in aquifers, and suggest that the OSE issue fewer permits and even recall some of the permits that are contributing to the problem of over-allocation.

**Water plans need to be holistic and protect watershed health.** All water within a watershed is hydrologically connected. Using an integrated approach that considers watershed health, forest restoration, aquifer conditions, wildlife, habitat, water quality and quantity is effective for sustainable water planning. It is important to recognize the impacts of water use to the water resource.

**Complete water adjudications.** Adjudications establish all water rights in a designated place (e.g., a basin) and provide protection to water users. When adjudications are finalized, or a process to streamline and clarify these rights, New Mexicans will know what to expect and they can plan accordingly.

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*"New Mexicans need to work together respectfully to have the hard conversations in water short areas and make sustained commitments for improving water security, resulting in action on-the-ground to protect and restore healthy watersheds."*

Non-government Organization Stakeholder

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**Simplify transferring water rights.** The current system seems too legalistic and places too much of a burden on the OSE and the water rights holder. It is necessary to improve the efficiency of transferring water rights. Conceptually, if someone has more water than they can use, a method for easier temporary sharing to others could be considered.

**New Mexico needs to meet compact compliance obligations.** Surface water is needed to ensure the State provides the required water deliveries defined in compacts. Stakeholders recommended storing water at higher elevation or in aquifers to reduce evaporation.

**Promote shortage sharing as standard practice.** Traditional acequia communities have been practicing shortage sharing and could be a model for other water users. During times of drought, it will be particularly important to manage water to protect basic health and safety, at a minimum.

**Surface water quality needs to be protected.** Legacy or future water contamination from sources such as extractive industries, or the addition of toxic pollutants such as per- and polyfluoroalkyl substances (PFAS), need to be identified, stopped, and mitigated. Our water supply is limited and our surface water is intimately connected to our groundwater. If left unaddressed, the next generations will be dealing with more of these water contamination issues.

**State agencies responsible for managing water need consistent and adequate funding.** Currently, many state agencies that manage water (ISC / OSE) may not be adequately funded. These agencies

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*"We have a lot of tools to make water resources resilient, but we do not have the horsepower and funding."*

Non-government Organization Stakeholder

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need funds to meet the mandate of the agency and address newly added mandates that come with climate change. State agencies rely on funding from a variety of sources, such as the legislature, that do not consistently appropriate the funds that agencies need to accomplish their mandated work. State agencies lack the resources needed to carry out their duties, including staff, data, or capacity to manage the resource.

### **Priority Concern: How do we best educate New Mexicans, specifically legislators and leaders, about water resources in New Mexico?**

Stakeholders consistently stated that there is a need for education and awareness about water resources in New Mexico. Different levels of engagement—from government to the public to children—are needed. Respondents indicated that public education and outreach designed to inform and empower New Mexicans to act would help to make water resources sustainable. Water education is needed at three different levels—Awareness of Water Issues, Executive Education, and Public Education—as described below.

## *Water Commissioner Stakeholder Story*

Recognizing a need to educate new members to accommodate Board Member turnover, a Water Commission responsible for managing the delivery of water for municipal and industrial supplies to communities located in the San Juan Basin recommended offering a Water 101 training for new members each year. During this training, the existing members provide a history of water management in the region, a review of the important local water issues, and an overview of the role of the Commission. This training has been very beneficial to new members, as well as current members, in providing an educational foundation about water resources.

### Example Information and Data Needed to Support Education

- Water data tools (search and find)
- Interactive maps
- Citizen science data
- Ready-to-use water data that has been reviewed for quality assurance/quality control
- Aquifer trends/summary statistics
- Surface Water Trends

## Summarized Concerns and Suggestions

**Awareness of Water Issues.** The target audience is the public, decision makers, and elected officials. Increasing the level of understanding about why water issues matter is a top priority. Many stakeholders talked about people’s disconnected understanding about water resources and water use. It has been recommended that New Mexico create a campaign to raise awareness about water based on other successful campaigns such as “buckle up” that have increased awareness and led to behavior change. Providing information can increase awareness, but information alone does not lead to behavior change. Interactive communication can lead to behavior change, and people are interested in experiential education, such as taking field trips to learn about watersheds and gaining on-the-ground information, to better understand why and where certain activities are taking place and the consequences of the activities.

**Executive Education.** The target audience is New Mexico’s legislators, other elected officials, and decision makers. Education about water resources needs to be focused on science, data, needs, and priorities. Citizens want to trust that leaders are knowledgeable about water issues; however, they currently do not have high levels of confidence. Understanding the complex and competing interests related to water is important because the decisions made by today’s leaders will impact future generations.

**Stakeholders recommended creating a task force consisting of elected leaders and heads of state agencies to engage in dialogue, ask questions, and invite differing opinions.** These conversations would enable elected leaders to deeply understand the pros and cons of each issue, to make educated decisions, and to

prioritize water issues. Alternatively, stakeholders also recommended a grassroots approach and suggested bringing youth to engage and educate legislators and decision makers. This process could provide mutual benefits: the legislators would have the opportunity to hear from the youth, and the youth are educated about water resources and have the opportunity to present information to the legislators.

**Public Education.** The target audience is the general public, including adults and youth. Basic hydrologic science, principles of water conservation, and water management need to be the core components of education for this audience. In the past, state and local governments were more active in engaging with the public. Perhaps the decline is due to available resources. However, there is a call for state agencies to improve transparency and public outreach. Specifically, some stakeholders recommend that state and local governments hire outreach coordinators. Youth should be provided educational opportunities to learn about water resources and participate in water planning and management, as appropriate, to establish interest and value in water resources in the future. To serve both youth and adults, people are calling for better access to information and data. We also need to develop water resilience metrics to make water relatable in commonly understood metrics like glasses of water or dollars. Using a common language is one of the first steps in creating understanding.

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*“The youth are truth tellers and do not calculate the consequences of everything they say. And this truth has value.”*

Tribal Stakeholder

## Stakeholder Perspectives

People's perspectives on water drive how water issues are approached. During the interviews, we heard additional perspectives regarding water resource management, values, and willingness to change. Stakeholders provided varied and sometimes wide-ranging perspectives.

Water resource controversies, often fueled by divergent interests and water scarcity, were the impetus for interesting discussions and revealed a full spectrum of views. Stakeholders described some of the major current controversies about managing water resources, such as: Will there be enough water? How will we adapt to water scarcity conditions? What are we doing to ensure our water supply for the future?

Respondents talked about their water experiences, values, and their relationship with water. Stakeholders have come to know water through many channels, including formal training and education, family and culture, on-the-ground experiences, and work experiences. The places respondents live also have a large influence on their water perspectives.

Experience seems to shape an individual's understanding of water. For example, stakeholders representing locations in Northern and Southwestern New Mexico were accustomed to seeing rivers, sometimes full of water and other times dry. Participants talked about their observations and experiences of seeing water in a river or an acequia as well as signs, symbols, and messages across the landscape that provided visible clues about the water conditions.

Stakeholders from these regions were much more likely to discuss instream or environmental flows. Conversely, instream flows were rarely mentioned by stakeholders from locations where surface water is minimal. In the absence of flowing water, stakeholders focused on other issues, such as the impact of domestic wells on the aquifer, notably when many wells are drilled in a relatively short time frame. These types of comments highlighted the intersection of peoples' experiences with water and peoples' values.

Many stakeholder responses focused on the economic value of water or the cultural and social values of water. The importance of these values varies from one stakeholder to another depending on their experiences, cultural heritage, availability of water, and the water concerns of the region. For example, some people view water as a commodity, to be bought and sold, and others view it as a common good, or something that is shared and beneficial to all.

## The Concept of “Zero-Sum Game”

Zero-Sum Game refers to the concept that “one person’s gain is equivalent to another person’s loss, so the net benefit is zero.” This “winner take all” attitude is seen as a threat and polarizes people. Some interviewees called for a shift, to encourage holistic thinking and development of solutions that are not exclusively designed to serve one interest at the cost of another interest. For example, some stakeholders discussed the controversy providing water for the Rio Grande silvery minnow (*Hybognathus amarus*) (a federally endangered fish native to the Rio Grande and Pecos Rivers) versus diverting water for agriculture. Instead of only considering these two options, they suggest exploring options for meeting both needs and finding a solution that considers everyone’s needs not just an individual’s needs. The theme arose noting that compromise distributes the benefit and loss more evenly and can allow everyone to win a little or lose a little instead of some winning all and others losing all.

## Water Resources May Be Changing, But Are People Willing To Change?

Some stakeholders said that change is inevitable, and thus they would like to act now or plan to avoid problems. Others understand that water conditions are changing but were dismissive about changing their behavior. For example, stakeholders discussed needing additional aquifer data, but many people are unwilling to meter domestic wells. However, the interviews confirmed and clarified that people do understand the risks associated with changes to water resources, but risk perception is complicated. Views of perceived risks are impacted by competing interests, exposure, ability to respond, and other factors. When people feel that risk is high, they are more likely to make changes and, conversely, when the risk is perceived to be low, they are less inclined to change.

Some stakeholders said that New Mexico “has a water scarcity problem,” while others said that “there is plenty of water, but we have a water management problem.” Adding to this challenge is the perception that we can

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*“Why is there a lack of political priority for water?”*

Conservation District Stakeholder

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come up with a creative solution, versus the thinking that water issues are too complex and we are stuck. Some people are willing to adapt, and others wish to remain the same.

## Competition for Water: Humans versus Plants, Animals, and Rivers

Ensuring water for human needs versus ensuring water for all living beings is a topic that stimulates controversy. All living things need water, but rivers, plants, and animals do not have a voice. Advocates of these silent interests say biodiversity, ecosystems, and habitat need water not only to survive, but to thrive. If we manage water poorly, nature also suffers. Although everyone knows that all life needs water, proving how much water is needed to support wildlife and ecosystems can be difficult because data are often unavailable and measuring the water needs of other (non-human) life can be difficult.

## Contrasting Views of the Water Cycle: Interconnected or Separate?

One stakeholder shared a tribal perspective that we are all connected by water. The water cycle is an example of the interconnectedness. The water cycle describes the continuous movement of water within the earth and atmosphere. It is a complex system that has different processes. From this perspective, it is important to look at, have respect for, and allow the whole cycle to function. Water connects all things. When we use water, it is a temporary use and then the water is returned to the cycle and will be used by another living being or put to another use. Conversely, others view water as an available resource to be used to serve a purpose. The available water is seen as a resource to be used without consideration of the hydrologic cycle or how using the water will impact the whole system.



## Water as a Common Good versus a Commodity

Some stakeholders suggested looking to traditional practices of water management to find a path forward. Acequias and other communities have a long history of managing water using an alternative approach to the prior appropriation doctrine. Recognizing water as a common good, relied on by everyone and benefiting everyone, is different than viewing water as a commodity to be bought and sold for the benefit of individual or private interests. Values focused on protecting the best interest of the whole versus the individual are at the root of this controversy.

## People Are Calling for the Legislators and Other Leaders in New Mexico to Make Water a Priority

Stakeholders expressed a need for legislators and leaders in New Mexico to establish priorities for water, especially when it is in short supply. Establishing priorities, not specific step-by-step instructions, gives people flexibility. When people understand the intent, they can also adapt to generate their own solutions. For example, leaders in New Mexico have encouraged people to reduce their water usage at home, and people have modified water uses in different ways to meet this goal, which has been observed in decreasing rates of gallons per day per capita over time, particularly in urban areas. Knowing the priorities enables people to identify or create the resources and tools needed to address water issues.

## Conclusion

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This project has provided stakeholder-identified priorities and concerns about New Mexico's water data, water resources, and water resiliency, which will be valuable to both the WDI and the 50-Year Water Plan. Stakeholders' comments regarding actions to make New Mexico's water resources resilient shed light on people's high level of understanding of water resource issues in New Mexico. Their questions about water resources provided useful information about water data needs as well as priorities. Engagement activities help to refine key water data and identify data gaps, which

serve two goals of the Water Data Act. Funding, of course, is paramount to resolving these issues.

**In summary, New Mexicans are calling for leaders to make water a priority in New Mexico.** Recognizing that the longer we wait, the harder it will be to stop the negative impacts of climate change, many say we need to act now. Climate change not only presents problems, but also opportunities. Depending on the choices we make, we may have an opportunity to create a more equitable, healthier, and more water-secure state.



# **Appendix A**

## **Compilation of Stakeholder Responses**

## Question 1: What are three “big” questions you have about New Mexico’s water or water in your region?

| Participant # | Answers to Question 1  |
|---------------|--|
| 1             | <p>There is a saying that whisky is for drinking and water is for fighting. But here in NM, we also have the living legacy of sharing water through the acequia culture and strong relational and community ties within our indigenous communities. My biggest question concerning water is how can we regain values of sharing a commons instead of treating water as a commodity that can be bought, sold and fought over?</p> <p>Another mostly overlooked solution to our water crisis is the connection between water and soil health. How can we best educate everyone in the state of New Mexico on the value of soil health to make the most of our scarce water resource?</p> <p>The underlying big question to both these question is -how can we shift the dialogue from a perception of scarcity to one of abundance, realizing that there is enough water for everyone and enough to share if we manage our water and soil with care, humility and frugality.</p> |
| 2             | <p>What is the plan here? Can we get official data from State Engineers office regarding collected ditch data?</p>   |
| 3             | <ol style="list-style-type: none"> <li>1. To have the modeling capabilities to model water supply and demand to meet demand with available supply.</li> <li>2. For NM to have finished adjudication of water rights for both surface and groundwater</li> <li>3. Climate Change is going to make water availability much more tenuous and therefore shortage sharing needs to become standard practice.</li> </ol>   |
| 4             | <p>It is difficult to even interpret this question. I honestly do not know what you mean by what “resources look like”. A better question for me is what I would like my community to look like. It is described in the Community Plan. We would like the San Marcos Community to continue to be quasi-rural. We would not like to see Cerrillos Road have commercial development farther south than the State Prison. I would like to see Eldorado on County Water so that the underground flows would reach our area which is alongside of SR10 which is the extension of Cerrillos Road.</p>  |
| 5             | <p>I’d like to see NM’s water resources meet the needs of multiple use sectors as it has in the past and does today...oil/gas and energy development, agricultural use, residential and commercial uses too. The economy of NM is dependent on multiple industries and sectors; I’d like to see infrastructure investments and improvements made today and over the next 50 years by the Feds and State. Federal funding should target water/wastewater infrastructure needs in NM. Roads are all things to all people like most politicians seem to think...I’d rather have safe, reliable drinking water than a paved road to my house.</p>  |

| Participant # | Answers to Question 1   |
|---------------|---|
| 6             | <p>In three words, Diverse, Balanced, Resilient – governed and allocated fairly. Administered fairly, effectively, and with skill based on best available science and data, modern data systems, and adequate staff resources. Water is allocated to support farming, riverine and riparian environments providing habitat, with assured supply for domestic uses that are truly conserving, while explicitly recognizing and making allocations for traditional and cultural values. Specifically:</p> <ul style="list-style-type: none"> <li>a. Middle Rio Grande— <ul style="list-style-type: none"> <li>(i) Changes have been made to water governance and to allowable surface water and groundwater withdrawals.</li> <li>(ii) Surface water storage losses have been reduced by changes in infrastructure operations and new infrastructure to store water at higher, cooler elevations and underground and other available mechanisms.</li> <li>(iii) Changes have been negotiated to the Rio Grande Compact rules to allow upstream storage that reduces losses of water destined for the Lower Rio Grande. Changes have also been made to establish shared interstate responsibility to provide for listed species, excessive depletions caused by maintaining listed species habitat, and tribal prior and paramount water.</li> <li>(iv) Agreements have been negotiated among tribes, the state, irrigators and urban users to adapt to climate change based on the best available science (our best effort at projected hydrologic reality)</li> </ul> </li> <li>b. New Mexico— <ul style="list-style-type: none"> <li>(i) Has achieved managed, routine compliance with interstate stream compact apportionments of water</li> <li>(ii) Is proactively addressing the fact that some aspects of the apportionments and constraints need to change, such as upstream surface water storage and cooperative underground storage of “Useable Water”.</li> </ul> </li> <li>c. New Mexico— <ul style="list-style-type: none"> <li>(i) Demand has been reduced in closed basin aquifer systems (e.g., Estancia Basin and Mimbres Basin) and local aquifer systems so that aquifers have a minimum future lifetime for designated uses spanning centuries.</li> <li>(ii) Decisions have been made based on best available science basis after first investing in geohydrologic investigations and ongoing data collection deemed necessary to provide an adequate scientific foundation for water supply resilience planning. Plans should be prepared to be adapted to improved scientific understanding and new data</li> </ul> </li> </ul> |

| Participant # | Answers to Question 1  |
|---------------|--|
| 7             | <ol style="list-style-type: none"> <li>1. Will the State of NM incorporate the need to consider ecological flow requirements in water allocation? Even if it requires new data/models to determine healthy function?</li> <li>2. Will the Colorado River DCP impact (reduce) San Juan-Chama Project availability?</li> <li>3. Can rotational fallowing in the MRG be implemented to address reduced water availability?</li> </ol>   |
| 8             | <ol style="list-style-type: none"> <li>1. How can we integrate important aspects of water and water use in New Mexico?</li> <li>2. How do we support water sustainability in rural New Mexico (for communities and agriculture)?</li> <li>3. Who really has access to our water, how can we make that more transparent, and guarantee that water that "belongs" in New Mexico stays with New Mexicans?</li> </ol>  |
| 9             | <p>Concerned about the drought we are having. Would like to know more about our Rio Grande Basin aquifer and if it can continue to accommodate us located in this region? These two entities are located close to rivers, but during the dry season, we tend to get people who want to connect to our water systems due to low water pressure, bad tasting water, or not enough water from their wells. Most of these wells are 30 to 50 ft deep, shallow wells, dry out in drought. So, my question is, should we (Mutual Domestics) have a cut-off number of water connections to keep our aquifer viable? Another question is Chamita's water has uranium, but we are still under the designated MCL, and I am blending wells, so why don't we have more information on uranium treatment as we do about arsenic?</p> |
| 10            | <ol style="list-style-type: none"> <li>1. What are the projections of groundwater supply for drinking water for rural communities in northern NM?</li> <li>2. What is the feasibility of developing deep-water aquifers for municipal use?</li> <li>3. Can communities rely on shallow groundwater wells and surface water in times of drought if better conservation policies are established.</li> </ol>   |
| 11            | <ol style="list-style-type: none"> <li>1. Why is there a lack of political priority for water.</li> <li>2. Why no connection recognized between watershed health and water quantity and quality?</li> <li>3. What causes prejudice against agricultural water use?</li> </ol>  |
| 12            | <ol style="list-style-type: none"> <li>1. How do protect our water source?</li> <li>2. Do we have adequate infrastructure for delivery of water?</li> <li>3. How do we maintain that infrastructure?</li> </ol>  |
| 13            | <ol style="list-style-type: none"> <li>1. Is there wet water for the water rights we own?</li> <li>2. What are our long term needs for water?</li> <li>3. Are we going to be able to afford our future water needs?</li> </ol>   |

| Participant # | Answers to Question 1  |
|---------------|--|
| 14            | <ol style="list-style-type: none"> <li>1. In 50 years, will there be enough water in New Mexico to support urban and traditional/rural human communities?</li> <li>2. In 50 years, will there be water in sufficient quantity and quality (cool temperature) to support populations of trout and other wildlife.</li> <li>3. How will we preserve effective traditional water management strategies - acequia shortage sharing - into the 50 year future.</li> </ol>   |
| 15            | <ol style="list-style-type: none"> <li>1. Demand Management/Drought Contingency Plan.</li> <li>2. Water Modeling.</li> <li>3. Regional Water Planning/State Water Planning.</li> </ol>   |
| 16            | <ol style="list-style-type: none"> <li>1. What is the true role and value of agriculture (commercial, non-commercial, cultural, hobby) in the Middle Rio Grande Valley</li> <li>2. How much farther than urban conservation take us</li> <li>3. How do New Mexicans value non-extractive uses of water - instream flows.</li> </ol>  |
| 17            | Limited Supply but State allows unlimited domestic drilling and usage  |
| 18            | <ol style="list-style-type: none"> <li>1. How can we increase groundwater levels?</li> <li>2. Will there be state initiatives re-distributing water use?</li> <li>3. How can we best incorporate improved data and scientific understanding into water distribution laws that predate those improvements?</li> </ol>   |
| 19            | <ol style="list-style-type: none"> <li>1. How to sustain a growing population in the face of megadrought?</li> <li>2. How are surface waters and groundwater connected on local watershed basis?</li> <li>3. How can we increase sustained "wet" hydroperiods in our streams and rivers with improved watershed practices?</li> </ol>  |
| 20            | <ol style="list-style-type: none"> <li>1. How do we incorporate the needs of rivers (environmental flows) into supply and demand analyses?</li> <li>2. How can we improve groundwater management in NM and reduce depletions and increase recharge?</li> <li>3. How can we make NM's water supply (for people and nature) more resilient as we navigate climate change?</li> </ol>   |
| 21            | <ol style="list-style-type: none"> <li>1. What are the projected gaps between the demand for water for agricultural, municipal, industrial, environmental and recreational uses and the projected supply of water under alternative scenarios.</li> <li>2. How realistically can the state deal with/address these gaps? New storage? Voluntary shortage sharing? Water rights enforcement? Conservation?</li> <li>3. How can the State fund necessary water management initiatives sustainably i.e. without going from feast to famine from one year to the next</li> </ol> |

| Participant # | Answers to Question 1   |
|---------------|---|
| 22            | <ol style="list-style-type: none"> <li>1. How much water do our natural ecosystems (rivers, wetlands and aquifers) need to be ecologically healthy?</li> <li>2. What steps are being taken (or should be taken) to reduce agriculture's water footprint and increase water use efficiency?</li> <li>3. What commitments are we (including political leaders and water managers) prepared to take to safeguard our water for future generations?</li> </ol>  |
| 23            |   |
| 24            | <ol style="list-style-type: none"> <li>1. Will the Rio Vallecitos surface water supply be adequate to supply our community's drinking water? NOTE: Last summer it got very low</li> <li>2. What efforts are being made to limit the impact of wildfires and prescribed fires on surface water? NOTE: Our water system was badly impacted by Bonita Managed burn 2017</li> <li>3. Can coordination between USFS, acequias and community systems be improved?</li> </ol>  |
| 25            | <ol style="list-style-type: none"> <li>1. What is the current and future water budget for our region? I would like an accurate and trustworthy picture of supply and demand that takes into consideration climate change impacts, environmental needs/flows, what is the gap in supply and demand, what are the areas of risk and uncertainty and their magnitude, and what is the range of alternatives to meet the gap between supply and demand and minimize risk/increase resilience?</li> <li>2. I would like to understand the extent of groundwater contamination in our region and around the state as a limit to supply - what are the sources of contamination, can water supplies be cleaned up and treated, and what is the magnitude of the cost of cleanup and treatment?</li> <li>3. What are the environmental flow needs in our region and across the state necessary to maintain healthy riparian ecosystems?</li> </ol>  |
| 26            | <ol style="list-style-type: none"> <li>1. The primary local issue is the proposal to reopen Copper Flat Mine. PAWA is involved in 2 litigations on this issue, an appeal of an inter se action in the Lower Rio Grande Basin adjudication and a protest of the transfer of water rights for use at the mine before the OSE.</li> <li>2. Because of this legal background, my concern for the future of NM water is focused on the legislative, executive, and judicial creation, administration, and interpretation of water law and their impact on water availability in terms of both quantity and quality. Basically, I think the Constitution needs to be changed to ensure sufficient and equitable water use in the future.</li> <li>3. Like many NM counties, Sierra County is economically strapped. It cannot and will never be able to compete for water rights on the open market. Water rights will therefore tend to leave the county as unused water rights are purchased and moved out of county. In the long run, growth in the county is doomed. In the last two decades the population has fallen. Part of the problem is the market itself. Part of it is that water rights are treated legally as private property.</li> </ol> |

| Participant # | Answers to Question 1  |
|---------------|--|
| 27            | <ol style="list-style-type: none"> <li>1. How can the OSE get funding to implement existing water rights settlements and adjudications?</li> <li>2. What are we doing to ensure our water supply for the future? This is tricky because we don't really know what the future supply will be. It may not even be what we have relied on historically.</li> <li>3. Does this initiative recognize the holism of water in relation to the environment and the human race (population, infrastructure, development, energy, waste management, transportation, etc.)? I guess maybe that's the internet of everything.</li> </ol> |
| 28            | <ol style="list-style-type: none"> <li>1. Water resilience metrics</li> <li>2. Public/Private funding for water projects by county/hydro region</li> <li>3. Cost of water delivered by sector and county/hydro region</li> </ol>   |
| 29            | <ol style="list-style-type: none"> <li>1. How to access all available NM-generated water quality and quantity data from one web platform with a GIS interface?</li> <li>2. How NM is planning for predicted reductions in water quantity due to climate change?</li> <li>3. How to promote and implement new requirements that will ensure less evaporative loss through less reservoir storage and more aquifer storage?</li> </ol>   |
| 30            |  |
| 31            | How can we restore and create resilient aquatic and riparian ecosystems and maintain a vibrant agricultural community with probable reductions in water supply? Oh yes, and supply water needs to our expanding urban areas!   |
| 32            | The aquifer under El Dorado, Santa Fe, and La Cienega. Drought. Radiation from the Buckman Diversion from LANL.  |
| 33            | <ol style="list-style-type: none"> <li>1. Why are residents getting waste water?</li> <li>2. Why we have moved away from irrigating, farming, and livestock with our water rights?</li> <li>3. Why local requirements of water have been kept from its use and moved to other areas when it is right to that land and must be managed for that area and benefit and if not to be stored in its area for future use in its responsibilities in the growth of New Mexico.</li> </ol>   |



| Participant # | Answers to Question 1  |
|---------------|--|
| 34            | <ol style="list-style-type: none"> <li data-bbox="412 289 1453 464">1. Oil and Gas Production - Has there been any consideration of having an industry standardized requirement for oil and gas operators in NM requiring them to have ability to measure real time data values of the produced water right off the wellhead? Then further downstream having another bulk measurement of all produced water coming from all wellheads for the facilities design?</li> <li data-bbox="412 478 1453 512">2. Oil and Gas operators and recycling water for reuse.</li> <li data-bbox="412 527 1453 762">3. Standards specific to the oil and gas industry directly for - Wellhead direct point of measurement required for NM operators at each wellhead (new wells). This standard would serve as a data-reporting location of measurement for quantity and quality prior to any downstream treatment or changes of the produced water's key data driven information before it has been changed by human interaction. This will also serve the up and coming midstream water markets as they begin developing new standards and technologies as well.</li> </ol> |

## Question 2: Describe your vision for what you want New Mexico's or your region's water resources to look like in 50 years?

| Participant # | Answers to Question 2  |
|---------------|--|
| 1             | I envision a rehydrated New Mexico. Arroyos are starting to heal. The rangelands are covered in grasses that are once again stirrup high and full of biodiversity. Acequia culture is flourishing, small diverse farms and gardens are everywhere, judiciously watered and managed to maximize soil health. Young people have returned to our rural communities to pursue this ancient lifestyle as it has become once again prosperous. New technology joins forces with indigenous practices to make the most out of every drop the skies offer. Cienegas return and wildlife is abundant.   |
| 2             | Have an updated adjudication.  |
| 3             | One is more infill/rehabilitation rather than creating more outfill/sprawl development with increased use of a limited resource.<br><br>Two is continue to reduce lawns and non-native plantings<br><br>Three create more infiltration galleries within the urban areas<br><br>Four is encourage agriculture to move to less evaporative ways to irrigate (drip instead of flood, etc.)<br><br>Five is to repair watersheds to promote infiltration to groundwater and filtration of runoff while slowing the runoff through urban areas   |
| 4             | There is not much that an individual can do. You may not like that answer but it is reality. I interpret the question as an attempt to shift the responsibility of poor management by the US and the NMOSE/ISC on to others.   |
| 5             | Citizens need to be more proactive in seeking out information about water resources and take the time to educate themselves on local, state and federal initiatives happening in NM-there are lot of stakeholders with water interests doing great things in various water sectors around the state. The media should take more interest in natural resource issues and publish related information.   |
| 6             | <ol style="list-style-type: none"> <li>1. Acknowledge that water has actual value, is inequitably apportioned and distributed, and is limited. Not all demand can be met.</li> <li>2. Advocate for substantive water planning to avoid disastrous surprises</li> <li>3. Demand that agencies be funded and authorized to carry out their roles effectively and transparently</li> <li>4. Admit that in many areas of the state total water diversions outstrip the current legally or physically available water supply, whichever is more constraining, and that facing that fact is necessary if we are to transition to resilient water supply systems while acting on our moral obligations to protect water for future generations and to riverine and riparian ecosystems and habitat</li> </ol> |
| 7             | Water development is centered on water-sharing, sustainable agriculture and meeting minimum requirements of river ecosystems.  |

| Participant # | Answers to Question 2   |
|---------------|---|
| 8             | <ol style="list-style-type: none"> <li>1. For drinking water systems, water quantity and quality begin in the watershed and the aquifer. In 50 years, these connections should be an integral part of the way the State and individual communities approach sustainable water issues. The State (in its various offices and departments) would focus more on addressing issues, facilitating sustainability, and transparency, and focus less on violations - work to solve the problems instead.</li> <li>2. The idea of "use" and use-it-or-lose-it in New Mexico's water law is revisited and revised with a realistic understanding of New Mexico's current water obligations, climate change, development, and a valuing for sustaining traditional and rural communities through access to their own good quality water.</li> </ol> |
| 9             | My vision is trying to connect to other groundwater system close by to ensure that we can sustain ourselves by sharing our water resources. The acequias are different they already run close to their neighbors, if they could get along they could pull resources and share water for crops, alfalfa etc.. I just heard this morning that because of the drought someone is talking about selling his cows to keep from having to skimp on the acequia water for alfalfa. It's a hard choice for some, while others don't plant. Those who don't use water could give their neighbor their share of water and maybe share the alfalfa between them. ??  |
| 10            | Water for drinking and ecosystem services is available during times of drought, with non-recharged groundwater only used as a supplement in time of drought. Water intensive crops are not farmed in arid regions.  |
| 11            | The Southwest develops Increased capture and storage facilities, forests are thinned, woody vegetation reduced in riparian zones, citizens understand the value of clean water and elect representatives who put a priority on water.   |
| 12            | To provide a potable water supply for the residents of the entire region and to have sufficient water to enhance our economic opportunities.  |
| 13            | To be able to supply the water needs for our region, whether it be for drinking, recreation, farming, or any other beneficial use while not harming the environment.  |
| 14            | Upper watersheds should be prioritized for their still-existing (though diminishing) potential to enable water resiliency in more developed downstream areas.   |
| 15            | N/A   |
| 16            | I would like the structure and function of our water-dependent communities to adapt and therefore endure in the face of shrinking supplies.   |
| 17            | Maintain Agriculture  |
| 18            | I hope to see a cultural shift in the understanding of water resources where communities and individuals have a better understanding of the relationship between water use and water resources and use that understanding to develop efficient and mindful water use practices tied to local conditions.  |
| 19            | The quality and quantity of water is sufficient to provide water security for all New Mexicans and still deliver water to our downstream neighbors  |
| 20            | Water management incorporates water security for people and water for rivers & aquifers.  |
| 21            |   |

| Participant # | Answers to Question 2  |
|---------------|--|
| 22            | I want to see a New Mexico with healthy rivers, wetlands and aquifers including aquatic/riparian biodiversity, and I want to see New Mexicans drinking high quality tap water, eating a good portion of locally grown food, and enjoying healthy lives not adversely affected by contaminated water.   |
| 23            | No particular vision   |
| 24            | I value the beauty of the Rio Vallecitos and our village depends on it for survival, but its viability has been hurt by an Army Corp of Engineers project in about 1959 to straighten it. Similarly, in 2017 the USFS decided to manage a burn in the forest in spring 2017 and then not to pursue certain expensive measures to prevent fire debris entering the river, This was despite our expressed concerns at meetings that our water system would be impacted and we were without drinking water for over a year. In our area, which is an in domain in the Carson National Forest, it seems that many decisions have been taken at a US government level without much input from locals. On the other hand we have clean air and beautiful surroundings.   |
| 25            | My vision for southwest NM's water resources includes living within our means (i.e., balanced water budget) with a diversified portfolio of water supply solutions that enables flexibility to achieve water supply resilience. Our 50-year plan would also include provision of flows necessary to maintain healthy riparian ecosystems and reduce pressure on the Mimbres and Gila rivers, protection and restoration of our watersheds and implementation of green infrastructure in urban settings to increase aquifer recharge and minimize water quality impairments to surface water. A diversified portfolio of water supply solutions would include water conservation, reuse, agricultural efficiency, and efficient water supply infrastructure that is maintained on a consistent basis and that is metered to monitor use and leaks on a real-time basis, |
| 26            | Because water is controlled by water rights and because water rights are worth a lot of money, water policy and management cannot be equitable without the power of government thrown into the negotiated balance between users. I would like water use in NM to be equitable and considered a common good as the amount of clean water declines.  |
| 27            | Everyone should have access to clean water for living (maybe not for boating) and that water should be affordable for all. We need to move toward sustainability and preservation and move from exploitation. We need a paradigm shift.  |
| 28            | Sustainable, Resilient, transparent cost and pricing   |
| 29            |  |
| 30            |  |
| 31            | We have traded the loss of some of the most ecologically diverse ecosystems for the production of relatively low value crops such as alfalfa to feed cattle. Make efforts to shift to higher value crops that use less water. Emphasize the ecological and economic value of our unique aquatic and riparian ecosystems. Look into alternatives to storing water in large reservoirs with high rates of evaporation. For instance, how much water could be saved by storing Elephant Butte in adjacent gravel beds underground, then pumping out as needed using power from wind turbines?   |
| 32            | More careful residential use, more drip irrigation for agriculture.  |

| Participant # | Answers to Question 2   |
|---------------|---|
| 33            | Fresh clean water use for the residents and the distribution of those waters. That every water right to that land be used or stored for its future and present purpose of use in its right. The water use must have its focus in producing healthy foods and livestock and bring the wildlife and recreation of land for future growth within it. |

### Question 3: What specific actions do citizens need to take to make New Mexico's water resources resilient?

| Participant # | Answers to Question 3   |
|---------------|---|
| 1             | We need to make the most out of the water we do get -preserve and conserve. This includes storing water within soils -in order to effectively do so, we need to first restore and regenerate our soil. It also includes greywater harvesting. Nothing should be wasted. We need to value water, every drop. Then we will have enough to share.  |
| 2             | Gather basic understanding of water in our area.  |
| 3             | <ol style="list-style-type: none"> <li>1. Enforce existing regulations.</li> <li>2. Continue to increase water use monitoring.</li> <li>3. Require flow meters on all water usage.</li> </ol>   |
| 4             | <ol style="list-style-type: none"> <li>1. For the short term move forward with first a demonstration cloud seeding project and then an expansion of that project. The extreme limit is creation of 100,000 additional afy for the Rio Grande. I do not have an estimate for the yield from cloud seeding in the Pecos but it would be less but substantial. It may also be possible to increase the precipitation that supplies SJC.</li> <li>2. The problem of conveyance losses from the Northern Mountains to Albuquerque and to EBID will get worse as the temperature increases. It will not matter what the efforts are re reducing Greenhouse Emissions for the next 50 years. That is because the feedback loops in the system continue to play out even if GHG is reduced. It is the difference between the TCR and the ECS.</li> <li>3. Begin to transition from outdoor farming to indoor farming and aquaponics etc.</li> </ol> <p>New Mexico may have a competitive advantage in this area because solar energy can play a role.</p> |
| 5             | State governments should continue to prioritize and implement projects based on need; monies should continue to be allocated for infrastructure improvements for water delivery, water quality and water conservation efforts statewide.  |
| 6             | <ol style="list-style-type: none"> <li>1. Equitably balance water uses in MRG to comply every year with the surface water sharing agreement called the Rio Grande Compact</li> <li>2. Address implementation of actions that are identified in existing water plans</li> <li>3. Develop a statewide plan for scientific water monitoring and measurement in distinct hydrologic regions that is sufficient to provide the basis of state and regional water planning for scarcity and our changing climate</li> <li>4. Develop and implement plans to stop draining aquifers toward extinction</li> <li>5. Implement integrated water resources management</li> <li>6. Allocate resources and design programs to accomplish the above</li> <li>7. Reform water planning statutes, particularly for regional water planning. Require the OSE/ISC to follow the guidance in f, g, and h [in Question 4] below</li> </ol>  |
| 7             | Many (every sector) conservation actions; requires activating the conservation ethic broadly.   |

| Participant # | Answers to Question 3  |
|---------------|--|
| 8             | A greater awareness of how water works in New Mexico - where it is, how and why quality varies, who can use it, etc. Not just the typical picture of an aquifer or watershed - but perhaps specific, layperson-friendly state and regional information that is written and drawn. New Mexico's citizens need to be empowered to have a role in making water resources more resilient. This means educating them (see above), then *including* them in decisions. New Mexicans can be experts about their communities. Their role at a table should not be to just tick the box of "community involvement" but to actively hear and incorporate their knowledge, as well as concerns, into water projects and issues. |
| 9             | Stop waste. Share. It's difficult right now to share anything because of this pandemic and it seems that everyone is washing hands and bodies more frequently because of it, so until we resolve this pandemic we're going nowhere.<br><br>I know, customers are using more water now that everyone is home, it shows in their water bills.  |
| 10            | Be more accepting of water conservation technologies such as graywater harvesting and drinking water treatment. Understand how water is consumed in their communities.   |
| 11            | Elect better officials who understand and value water for food production.   |
| 12            | Citizens need to be educated on how to protect our water sources.  |
| 13            | Communicate  |
| 14            | Household conservation and restore watershed function.   |
| 15            | Understand their resource and need to address issues.  |
| 16            | Better understand the water-related values of other people, especially outside of their own communities.   |
| 17            | Secure water rights for their demand   |
| 18            | Citizens need to find opportunities to make their voices heard about the values of non-consumptive water uses.   |
| 19            | Work together respectfully to have the hard conversations in water short areas and make sustained commitments for improving water security, resulting in action on-the-ground to protect and restore healthy watersheds, or mitigate damage done by past or current land uses.   |
| 20            | Conserve water. But if ag uses 80%, the focus should be on ag.   |
| 21            |  |
| 22            | I feel the most important thing citizens can do for resilient water resources is to hold local and state government leaders accountable for careful management of our water resources. Citizens need to be "good citizens" and use water responsibly, but it is up to government to regulate water use to be consistent with ecological principles of sustainability.  |
| 23            | They are resilient now. We need to prevent the Legislature from micro-managing the State Engineer. As I watch hearings there are only a few who understand the issues and Rep Is the most knowledgeable  |
| 24            | Conserve water, be mindful of pollution from fertilizers and economic activities   |
| 25            | Rainwater harvesting, grey water reuse, water conservation, green infrastructure, use of drought-tolerant native plants in landscaping, advocating at state and local levels to demand that elected officials prioritize building resilient water supplies.  |

| Participant # | Answers to Question 3   |
|---------------|---|
| 26            | Discuss and reform the basis of western water law. Alfred Deakin, lawyer by training, founding father of the Australian Commonwealth, three times Prime Minister of Australia, visited California in 1884 as the minister of water and public works for the state of Victoria and head of a royal commission on water and irrigation. The following year he published his study of western water laws and systems (what we now call the Colorado system of prior appropriation which NM follows). Deakin there said, as he reported to the legislature, that Australia must not follow the steps of the western United States in creating first come first serve system of water rights. His book was republished in the United States, but it did not deter us in following the frontier rationale of taking as much as one can. Instead, Australia created a system of public ownership and administration, following the civil system of Spain and Mexico. Some shift to that common, civic based notion of law is needed today in NM to offset the fact that with decreasing supply and increasing value, water rights are a site of greed. |
| 27            | Awareness.  |
| 28            | tbd   |
| 29            | Become and stay more informed regarding NM's current and predicted water future with respect to climate change and reduced water availability.  |
| 30            |   |
| 31            | While some urban uses can be reduced, notably, conversion to xeriscape, the big water use is agriculture. Most urban use is returned to the system via treatment plants.  |
| 32            | Be aware, be careful, respect natural water systems.  |
| 33            | Take back their right to the water of their land and put it to use as it was at one time  |
| 34            |   |



## Question 4: What actions do local or state governments need to take to make New Mexico's water resources resilient?

| Participant # | Answers to Question 4   |
|---------------|---|
| 1             | <p>A surprising answer might be to scale up composting! Compost can serve to inoculate soil with microorganisms that restore soil health. It adds organic matter to our often depleted soils, which creates a "carbon sponge"; holding more water in the soil and allowing it to percolate into the ground, recharging groundwater and aquifer storage instead of running off the surface.</p> <p>Generally encouraging soil health and educating everyone on how to restore soils by growing plants. Employing soil healthy and water conserving methods on municipal lands, parks and buildings, to set an example.</p>   |
| 2             | <p>Good question.</p>   |
| 3             | <p>One is the irony of asking people to conserve water and then saying there is a surplus that allows thousands of new homes.</p>   |
| 4             | <ol style="list-style-type: none"> <li>1. It should take less than 15 years for Santa Fe to design and implement a system to avoid the loss of treated effluent because the flow down from the wastewater treatment plant does not make it to Cochiti. City and County officials should have served jail time for this. Simply not getting return flow credits is not sufficient incentive for action. Wasting water is contrary to Conservation and willful wasting of water by City and County officials should be acted on by the relevant Government Agency which I believe is the ISC.</li> <li>2. There is an opportunity to receive carbon credits and possibly reduce water use but I am not sure of that second goal by promoting the use of humate a resource which is abundant in New Mexico. It will reduce the need for nitrogen fertilizer and reduce the generation of nitrous oxide which is a powerful GHG. New Mexico is too small to change the trajectory of Global Warming but not too small to generate a large amount of carbon credits which are worth money. Compost is good but there are better carbon sources and humate is probably the best. Such treated soil may be able to deal with flash drought better by holding more moisture.</li> <li>3. We confuse the issue by such things as the low-flow toilet scam. Indoor uses of water that then go to a wastewater treatment plant do not involve loss of water. For some reason, the Low-flow toilet scam was employed which I am sure made toilet manufacturers happy and contractors happy. When you do things that are not science-based, you may think you are doing something useful when you are not. It is certainly a turn-off to me as I do not like scams or stupidity.</li> <li>4. Stop listening to the same voices. Using the Water Dialogue is a good example of listening to the same voices. One can call it insanity or corruption. I think it is both.</li> </ol> |
| 5             | <p>Attitudes need to change; the basics about living in an semi-arid climate and a water scarce state should be taught to school-aged children across the state. For example, every 4th grade class should be taught as part of the PED curriculum about water in New Mexico. Water campaigns with topics geared towards children should be developed to educate about conservation, water data, forest health, engineering, medicine, agriculture, energy production, daily living in NM and the relationship they have to water.</p>  |

| Participant # | Answers to Question 4   |
|---------------|---|
| 6             | <p>What are some things we do now that need to change to have a resilient water future? Assume "we" in the question means the agencies, ISC/OSE:</p> <ul style="list-style-type: none"> <li>a. Improve the OSE/ISC's transparency and public outreach</li> <li>b. Admit, along with the citizenry, that New Mexico has multiple serious water problems in many of the state's distinct hydrologic regions, now and as exacerbated in the future and act accordingly</li> <li>c. Develop specific plans for each hydrologic region where demand outstrips the legally and physically available water supply, now or as projected in the future due to our changing climate</li> <li>d. Change ISC process so that water plans are approved for content, not accepted for filing (just to be placed on shelf)</li> <li>e. Be credible: create a description and set of briefing materials that emphasize the need for and the utility of water planning to help secure funding for detailed planning, approval of plans, and implementation of the approved plans.</li> <li>f. Insist that approval of water plans requires that they then be implemented and commit the agencies to those ends</li> <li>g. Ensure water plans contain evaluated and prioritized actions.</li> <li>h. Ensure all water planning has a firm legal/scientific/hydrologic reality basis</li> </ul> |
| 7             | Too numerous to mention   |
| 8             | <p>More outreach, less self-excuses of understaffing and underfunding. I know that these are real issues, and therefore it is important for people throughout local and state government to advocate for the resources they need. There are inequities in expecting citizens to comply with regulations and laws, when the governments are focused on enforcing compliance instead of fulfilling their larger mission. I have noticed that many government departments (staff) are pretty siloed, and even the most relevant resources, if in another bureau or department, are unknown to them. This is both a resource and culture issue.</p>   |
| 9             | <p>I would like them to get out of their offices and come visit us instead of surveys and questions. I participated in a Zoom meet with EPA a couple of months ago and after their questions about Sanitary Surveys, which is a requirement from Environmental; I invited them to come out and see who we are, I got no response.</p> <p>We are considered Special Districts under Local government, but I don't know what that means. We have the same requirements as a big business has. We have a staff of one or two if we're lucky to afford them.</p> <p>I'm getting away from the question, but my point is that Government needs to understand us by learning and listening to us. I'm concerned about the future of Mutual Domestic, we cannot compete with Cities and County water utility, but yet we are needed in these poor Northern Communities. Our water is among the best because we actually drink it. I ask again, come out and see who we are, what we provide. Help us.</p>  |

| Participant # | Answers to Question 4   |
|---------------|---|
| 10            | Demand and craft an equitable water rights policy and legal structure. Invest in water conservation technology and retire wasteful infrastructure. Safeguard water quality in industrial and agricultural areas.  |
| 11            | Support development of efficient water storage and infrastructure. Increase knowledge base on efficient use of water for agriculture production. Get out on the ground to look and see and speak with the water users rather than depending on computer models and "experts."   |
| 12            | Funding for infrastructure, technical assistance, funding for asset management  |
| 13            | Stop all the politics   |
| 14            | Pay attention to water. Seriously, many management entities talk about water but ignore immediate opportunities like restoration.   |
| 15            | The need to fund water planning studies and fund water projects   |
| 16            | We need to better insure that small rural communities are able to solve their water challenges.   |
| 17            | Everyone should have a water right and meter to pump.   |
| 18            | Local governments need to keep working to match water planning with community values, and the state needs to take proactive steps to address the impacts of climate change, to roll back the over-allocation of groundwater rights, and to coordinate the management of natural resources across state agencies and universities. |
| 19            | Develop progressive LID and Green Infrastructure policies and enforce them for future development and begin retrofitting existing infrastructure to be more river, people, and wildlife friendly  |
| 20            | Planning that incorporates climate change and recognizes that rivers & floodplains need to remain functional to benefit both people and nature. We need greater flexibility and more tools for better water management (i.e. broadening the definition of beneficial use, water leasing options, e-flows, etc.)                   |
| 21            |   |

| Participant # | Answers to Question 4   |
|---------------|---|
| 22            | <ol style="list-style-type: none"> <li>1. First of all, local and state governments need to make well publicized commitments to carefully developed water stewardship goals that will protect the interests of nature and future generations. This probably means reforming state water laws and compact obligations to align with changing precipitation patterns and other effects of climate change. It would certainly mean transitioning the state's economy away from fossil fuels (where huge volumes of water are being sacrificed to create energy resources that are relentlessly harming the planet) and going "all in" for renewable energy. This is, of course, more than a water problem, but the water dimension of the problem (contamination of vast volumes of very scarce water at the state level) is itself serious enough to warrant a transition away from fossil fuels even if the climate was not being affected!);</li> <li>2. Secondly local and state governments should urgently address the agriculture sector where most of our water is allocated, and come up with new approaches and policies to transition away from mega dairies which use vast quantities of water in their supply chain (alfalfa) as well as in their operations and from the effluent. We need agriculture but a very different kind of agriculture. Similarly we need improvements in livestock management and range management to encourage healthy range grasses and protect the soils (which comprise the watersheds of our rivers);</li> <li>3. Legacy water contamination from LANL, various industries, uranium mining, and toxic pollutants such as PFAS need to be identified and cleaned up. We are losing a large and largely unknown portion of our scarce water through inaction and magical thinking that maybe the contamination problems will go away. They won't, and it is the next generations that will be dealing with the results;</li> <li>4. Urban wastewater can be a valuable resource instead of an expensive headache, by applying the new engineering designs to capture nutrients and heat to cover the costs of running wastewater treatment plants, and then putting that harvested energy to work in treating the wastewater to drinking water standards and reusing it for water supply. Water reuse can make a huge contribution to overall water security (and consequently economic security) even when kept to a modest 50% blend of reused water and so-called fresh (river) water. There are many options for direct or indirect water reuse but it's important to break the cycle of conventional water treatment plants at the earliest opportunity. Aside from the benefits of generating a new supply of (reused) water is the public education value in a citizenry that knows and takes pride in their commitment to treating their wastewater to international space station standards.</li> <li>5. Political leaders need to take the lead (after all, they are supposed to be "leaders") in declaring our dependence on healthy rivers and aquifers and get over the 20th Century paradigm that humans are in competition with nature. Science doesn't believe that; the controversy among scientists is whether nature needs 50% of the natural water supply or only 30%. Yet the Rio Grande is getting some tiny fraction of what it would need to be reasonably healthy....</li> </ol> |
| 23            | Leave the State Engineer alone. He does a good job.   |
| 24            | More assistance to rural communities with limited resources   |

| Participant # | Answers to Question 4   |
|---------------|---|
| 25            | State and local governments need to demonstrate leadership on this issue. The state needs to help local governments get prepared for the impacts of climate change. We need better collaboration at local and state levels and between the state and local governments. Modernization of our water supply infrastructure, planning, management, and governance. Regionalization of water supply infrastructure where it makes sense. Innovation in financing of water supply infrastructure - we have a backlog of deferred maintenance. We need a constant source of funding to upgrade and maintain aging infrastructure. The state needs to provide more technical assistance to local governments and entities for water planning and management. We need more and better data. We are operating in the dark without data on groundwater supplies, water quality, surface water, real time water use. |
| 26            | Local and state governments need to be given legal power to balance the interests of commerce, which always looms large.  |
| 27            | Should we (the OSE) prioritize purposes of use? Is growing food for livestock in the semi-arid high desert really equal to growing food crops in the greenbelt? Stricter enforcement of beneficial use requirements.  |
| 28            | Water resource planning and transparency consistent with articulated water resilience goals   |
| 29            | More staff and infrastructure resources. Better and more transparent data management and web access to data. Fund and hire outreach coordinators to provide education and outreach to students, permittees, and stakeholders.   |
| 30            |   |
| 31            | Look first at successful conservation of water in other xeric places in the world. How do they handle their ag. and urban needs?<br>Pay attention to the history of irrigated ag. Read Sandra Postel's well research, especially in "Pillar of Sand". Treat hatch groundwater at every opportunity. It is the best place to store water for future needs and emergencies, and it doesn't evaporate there.   |
| 32            | I don't know. That's your job.  |
| 33            | Understand how it was used to grow our state and the control of water rights by the state engineer office has caused our state to deplete in all those areas  |
| 34            | Have thorough knowledge of where the produced water from oil and gas operations can be directly measured for quality and quantity. MEASUREMENT NEEDS TO HAVE A CORE FOUNDATION OF BEING - MASS FOCUSED, NOT VOLUME.   |

## Question 5: What are some things that need to change now - in order to have a resilient water future?

| Participant # | Answers to Question 5   |
|---------------|---|
| 1             | We need to stop treating water as a commodity and return to treating water as a commons.  |
| 2             | We need to put more resources into water issues. (money, time, personnel)   |
| 3             |   |
| 4             |   |
| 5             |   |
| 6             |   |
| 7             | Conservation of water/Public Welfare determinations based on sustainability-deliberately for habitat and rivers for future generations.   |
| 8             | The State's approach to water needs to change - OSE needs to get on top of its work; NMED needs to be flexible enough that it doesn't require small communities to comply - e.g., have the same resources - as Albuquerque; planning not only for development but for watershed health, forest restoration, and aquifers (?) need to be integrated - human communities are part of this environment, and should be factored in along with the trees, bugs, and critters. Public education and outreach designed to inform and empower New Mexicans to take a part in making New Mexico's water resources sustainable.   |
| 9             | Again, educate our Legislators and Senators about groundwater, acequias. Some won't even know where it comes from. I can attest to that because I was one of those who just knew it was there, didn't have a clue where it came from, or what was in it, until I became involved in the process and educated myself. Most mutual domestics have old systems we need money to sustain ourselves, yes we get Capitol Outlay monies for projects, but if you don't meet the requirements at the time you can't use it, and the government is not forgiving, they recoup the money to complete their budget. We need more flexibility; our water systems fail us sometimes. |
| 10            |   |
| 11            | Proper education about water resources and uses in schools rather than propaganda and misinformation. The same for politicians.   |
| 12            | Education on water conservation, education on where we are as a local, region or state as far as water resources  |
| 13            | Talk  |
| 14            | Prioritize restoration.   |
| 15            | Need to devote more resources into water planning and water infrastructure.   |
| 16            | See answer to [Question] 4 above - addressing risk of/to rural communities, especially Tribes and Pueblos.  |
| 17            | Stop unlimited drilling. Stop water export/no return flow uses  |
| 18            | Climate change needs to be incorporated into water planning at all levels.  |
| 19            | Enforce existing laws re: prior appropriation (nix the current "temporary permits" the SEO now is giving out) and make massive investments in watershed restoration from mountains to lowland floodplains that also hires local youth and contractors to do this work.  |
| 20            | Hard discussions about how to balance the water budget equitably.   |

| Participant # | Answers to Question 5  |
|---------------|--|
| 21            |  |
| 22            | See items #1-4 [Question 4] above. They all need to be done together. The last item (#5) which calls on leaders to lead -- that will take a long time anyway so better to concentrate on #1-4.   |
| 23            |  |
| 24            | Far greater conservation measures in Albuquerque and other urban areas   |
| 25            | Water planning and data are needed immediately in order to build a resilient water future. We need to fix regional and state water planning - directly address climate change, revamp the technical platform used in last round of regional water planning, directly address the solutions needed to meet gaps in water supply and demand and get local communities planning now to meet those gaps, and better integration between state and regional data and planning. We need to develop innovative solutions, financing and governance structures to facilitate building resilient water supplies. Look to California or Colorado or other parts of the world for successful models to apply here in NM. We need to have credible data and information upon which to base water management decisions. We need to be metering in real time all groundwater and surface water diversions. |
| 26            | Amend the Constitution so that all water, not just unappropriated water, belongs to the people. Define the obligations involved in water rights that are conditional.  |
| 27            | This is a great step forward!  |
| 28            | Funding, staffing, increased policy priority by all stakeholders - especially integrated across levels of government/utilities/districts/acequias, etc   |
| 29            | NM needs to reduce inefficient flood irrigation practices in our arid state.   |
| 30            |  |
| 31            | Continue the dialog, do some experiments, pay attention to what works and why, look into the history of successful long term irrigated Ag. Provide incentives for water conservation.  |
| 32            | I don't know.  |
| 33            | New Mexico must get back to its livelihood and purpose of irrigation   |
| 34            |  |

## Question 6: OPTIONAL: What water data do you use most often?

| Participant # | Answers to Question 6  |
|---------------|--|
| 1             |  |
| 2             |  |
| 3             |  |
| 4             |  |
| 5             |  |
| 6             |  |
| 7             | Streamflow gauging   |
| 8             | I use information associated with public water systems most - currently limited primarily to some specific groundwater level monitoring data and information available through NMED DWB. I am planning, however, to explore the data to see if there are other data sets that will help me to identify areas of need w/ specific reference to rural public water systems that will help direct my work in source water protection.   |
| 9             | I might not understand this one but we have master meters in our wells that tell us how much water we have produced, then, we have a billing software that gives us how much we bill the customers, so you can do a variance of water loss; but Fire Departments don't provide you with how much water they use for fires or training. We need that data also to see where we are losing water. We need a policy/agreement developed between county and Mutual Domestics to make them provide us with such data. |
| 10            | USGS groundwater and stream gauge data.  |
| 11            | SNOTEL, USGS Stream Flow and Storage, and personal groundwater monitoring.   |
| 12            | Groundwater monitoring   |
| 13            | Pumping and consumption data   |
| 14            | USGS stream gauge info   |
| 15            |  |
| 16            | USGS streamflow data, USBR/USACE reservoir level data  |
| 17            |  |
| 18            | Meter data & billing data  |
| 19            | USGS Real-time water data and <a href="http://immappler.com/riversource/">http://immappler.com/riversource/</a>  |
| 20            | USGS stream / river data & ditch data.   |
| 21            |  |
| 22            | I use flow data and volumes devoted to this or that economic use, much as an accountant would look at where the money is going.  |
| 23            | U.S.G.S.   |
| 24            | Water Quality and water flow volume measures on local rivers, I also do relatively frequent sampling as a water operator   |
| 25            | Water quality and stream flow data   |
| 26            | Because of my involvement in litigation, aquifer studies are most essential for me.  |
| 27            | Water rights info from the OSE. USGS stream flow.  |
| 28            | Stream flow, reservoir volume, snowpack, demand summaries, planning metrics  |
| 29            | Surface and groundwater quality. Depth to water.   |



| Participant # | Answers to Question 6                  |
|---------------|--|
| 30            |  |
| 31            |  |
| 32            | I look out my window; I walk the land. |
| 33            | None available                         |

**Question 7: OPTIONAL: What water data do you feel would be most valuable for you locally or for the state for planning a resilient water future?**

| Participant # | Answers to Question 7   |
|---------------|---|
| 1             |   |
| 2             |   |
| 3             |   |
| 4             |   |
| 5             |   |
| 6             |   |
| 7             | Threshold analysis of hydrology requirements to maintain/restore 90% native species/habitats.   |
| 8             | Data that informs on water quality and quantity issues - where can a community find a secondary water source? What kinds of water treatments would they need? I realize these are pretty specific questions - even general resources (and information for the layperson/Board member on how to access these data) would be helpful. More importantly, for me, is the ability to integrate data so that the foundation of New Mexico's resilient water future is a holistic approach with a comprehensive understanding of the various sciences (geology, hydrology, ecology, and cultural). |
| 9             | We need to know where our water losses are. But, in a keep it simple way, we don't need another five page, document that we have to spend days on, we don't have that kind of time. The state has some fine people whom I respect sincerely. I have learned a lot from them also. I think we have to work together, not just the government, to get these answers.  |
| 10            | Outlook for future supply under most likely future climate and demand scenarios.  |
| 11            | More groundwater monitoring. Increased number of weather stations that include collection of evaporation rates.   |
| 12            | Mapping, capacity of wells, age of system, asset management   |
| 13            |   |
| 14            | More information on groundwater surface water interaction, particularly with acequias.  |
| 15            |   |
| 16            | Clearer data on evapotranspiration of the Rio Grande Bosque.  |
| 17            |   |
| 18            | Metering and gaging data to improve the accuracy of groundwater modelling and the interactions with surface water and water use.  |
| 19            | Interactive data visualization of existing and newly developing data sets on groundwater, surface water, and land use on a small to mid-sized scale (20-100 sq. miles, for example)   |
| 20            | Better aquifer mapping and understanding depletions. others too...  |
| 21            |   |

| Participant # | Answers to Question 7   |
|---------------|---|
| 22            | Data isn't the main limitation to planning a resilient water future; the more important limitation is "values" and reaching consensus on how we should be investing the state's scarce water. It's not that our values are bad or in conflict (though they are often both!) - The main problem, in my view, is that we don't invest enough time and energy in exploring the implications of our values about water. Few water managers would agree that nature needs as much water as people need, but with enough aquatic ecologists and hydrologists in the discussion, they might be persuaded about the principle that nature's health is important for human health and wellbeing over the long run. Once the disputing parties can agree on these big-picture values, specific water data become useful for building models to see how multiple water values can be realized. |
| 23            | Not much. Data is already abundant.   |
| 24            | More frequent measuring of the [water quality and water flow volume on local rivers]  |
| 25            | Accurate and trustworthy groundwater data for the Mimbres Basin. Real-time diversion and consumptive use for the Gila River.  |
| 26            | I notice that the work Waterdata has done with the issue of WOTUS goes beyond geohydrological data into social subjects. I welcome that and wonder if there is not some data that can bring in water rights relative to water quantity.   |
| 27            | Understanding our aquifers and their potential for the future. Is there enough water for us going forward? How reliable are our surface supplies? Of course we cannot predict the future from the past because climate change has altered the weather patterns and thus surface water supplies (as well as growing seasons).  |
| 28            | see [answers to Questions] 4,5,6 above  |
| 29            | One on line GIS-based platform with real time (if possible) GW and SW water quality and quantity data   |
| 30            |   |
| 31            | How much water is lost for storage, delivery and ET in our state for Ag. How can that be reduced?   |
| 32            | Use per capita; use per household; use per city would be helpful.   |
| 33            | Digital meter access online to all underground water wells and streams. Levels and use of required amounts for the location assessed and preparing for its necessity in its future need by storing its limit of water that is saved by its residents and users.   |
| 34            |   |