Toward Resilient Groundwater Management in Texas

Identifying Collective Principles

Environmental Defense Fund

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Support for this report was provided by the Cynthia and George Mitchell Foundation and the Meadows Foundation.

This complete report is available online at **edf.org/content/toward-resilient-groundwater-management-texas**.

Project Goals and Methods

Environmental Defense Fund (EDF) has a long history of working with diverse stakeholders to solve water challenges across the United States. In Texas, we hope to strategically partner and collaborate with a diverse set of organizations and identify areas of common ground to jointly advance policy that will ensure our water supplies are resilient for generations to come.

In September 2020, EDF completed a research project examining groundwater management challenges in Texas that included convening two workshops to help identify priority issues and gather perspectives from the participants. The results of this effort are documented in the report, Beneath the Surface. A key takeaway from the report is that there is an array of groundwater users in Texas with diverse positions and seemingly competing interests, and this can make finding common ground on groundwater management policy difficult.

Building on the findings from the Beneath the Surface report, EDF sought to explore potential areas of common ground related to groundwater management in Texas, the results of which are documented in this report. EDF identified five overarching principles of resilience that we believe are essential to ensuring groundwater resources are available in the future for all Texans and solicited feedback on them from a group of 11 stakeholders, seeking input on whether the principles are the right ones to inform policy and management decisions related to groundwater management in Texas.

The 11 stakeholders that participated in this project represent a range of groundwater users and interests, including groundwater managers, agricultural and ranching interests, municipal water suppliers, landowners concerned about protecting groundwater resources (referred to as environmental/landowner interest in this report), academic/technical experts, and conservation and wildlife interests. We provided each stakeholder a questionnaire in advance of an interview. The interviews then delved into specific issues and more detailed discussion based on the responses provided in the questionnaire.

We prepared a report summarizing the responses to the questionnaire and interviews and then met virtually on January 28, 2021, with eight of the 11 stakeholders to obtain feedback. The Texas Water Foundation facilitated the workshop discussion. The workshop presented the initial report findings and facilitated a further conversation on the principles and areas of common ground. The results of the workshop discussion are also included in this final report.

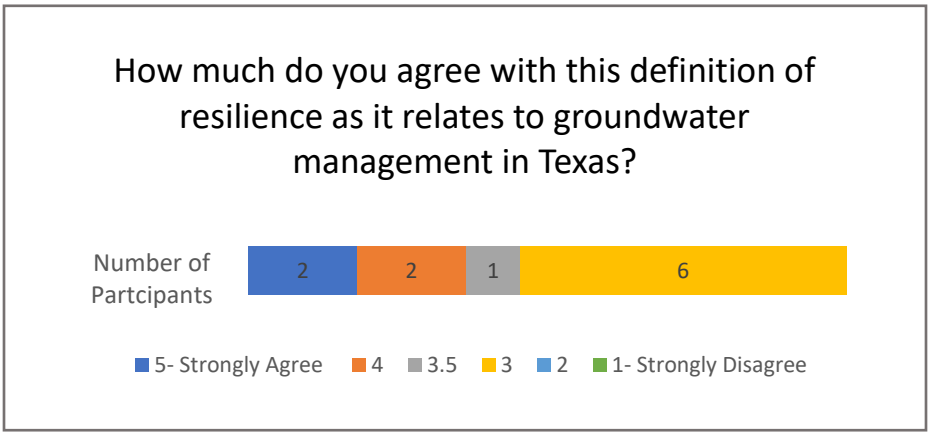
Project Results

Defining resilience

To guide discussions, EDF developed a working definition of "resilience" as it relates to groundwater management.

Working definition of resilience: *A responsive and adaptive framework for proactively managing groundwater that is designed to protect the long-term viability of the resource and support the long-term wellbeing of groundwater users and groundwater dependent ecosystems.*

We asked participants to rank, on a scale of 1 to 5, how much they agreed with this definition of resilience as it relates to groundwater management in Texas, with 1 being the participant did not agree and 5 being the participant was in complete agreement.



- Two participants (rural water supply interest and academic/technical expert), gave the definition a 5, meaning they were in complete agreement with it. One participant (conservation/wildlife) qualified their response by indicating "a 3 without mention of owners and property rights, a 5 with it."
- Two participants (urban water utility and groundwater district manager) gave the definition a 4, although the urban water utility offered some qualifiers including questioning the meaning of "long-term wellbeing" and if social and economic benefits are included.
- One participant (conservation/wildlife) ranked the definition somewhere between 3 and 4, indicating the need include financial aspects and quality of life needs.
- The remainder and majority of the participants gave the definition a ranking of 3 with accompanying comments including:
    - Groundwater's connection to surface water must be included in the definition to ensure that surface water flows are not impacted by groundwater withdrawal

(groundwater/surface water interaction was highlighted by other participants as well).
    - "Users" need to include groundwater owners as well (owners may not currently be users).
    - Economic aspects need to be accounted for, or at least given consideration, including economic sustainability, economic impact, and economic viability.

When asked what they would change about the definition, participants provided the following responses, some suggesting more than one change to the definition:

- Four participants (the two environmental/landowner interests and the two academic/technical experts) indicated the definition needed to encompass a more holistic approach, addressing the connection between groundwater and surface water and placing groundwater in an overall framework of sustainable water management.
- Two participants (agriculture/ranching and conservation/wildlife) stated that the protection of property rights and recognition of groundwater ownership should be included in the definition.
- Three participants (agriculture/ranching, urban water utility, conservation/wildlife) suggested that economics should be added to the definition.
- One participant (groundwater district manager) stated that resilience should include legally and scientifically defensible management.
- Two participants (groundwater district manager and rural water supply interest) said they would not change anything about the definition.

Workshop Discussion of Definition of Resilience

Workshop participants reviewed the definition of resilience and discussed comments and suggestions made by the questionnaire respondents and follow-on interviews. There was general agreement that comments and suggestions were appropriate. Therefore, the working definition has been revised to incorporate these additional thoughts.

Original working definition of resilience: A responsive and adaptive framework for proactively managing groundwater that is designed to protect the long-term viability of the resource and support the long-term wellbeing of groundwater users and groundwater dependent ecosystems.

Revised working definition of resilience: *A responsive and adaptive framework for proactively managing groundwater that is designed to protect the long-term viability of both the groundwater and connected surface water resources, and support the long-term wellbeing of groundwater owners and users and groundwater dependent ecosystems while taking into account the property rights and economics associated with this management*.

Principles for groundwater management

Next, EDF shared five proposed principles for managing groundwater to achieve resilience and asked each participant to rank the principles in order of most important (1) to least important (5). The five principles are as follows:

1. Current scientific information is accessible, easily interpretable and actionable to enable management and forecasting to meet the varied community objectives. **(Science)**
2. A strong set of future conditions is defined based on a full suite of environmental and social benefits from groundwater, so that a rigorous set of management actions to maintain benefits may be designed and evaluated over time. **(Enviro/Social)**
3. Groundwater governance is representative of and protects the interest of all stakeholders who own and rely on groundwater. **(Stakeholders)**
4. Multilevel governance systems are aligned across sectors and at scale to address threats. **(Governance)**
5. Continuous monitoring and feedback enable adaptive, innovative management. **(Monitoring)**

The ranking of the principles is summarized in the following table.

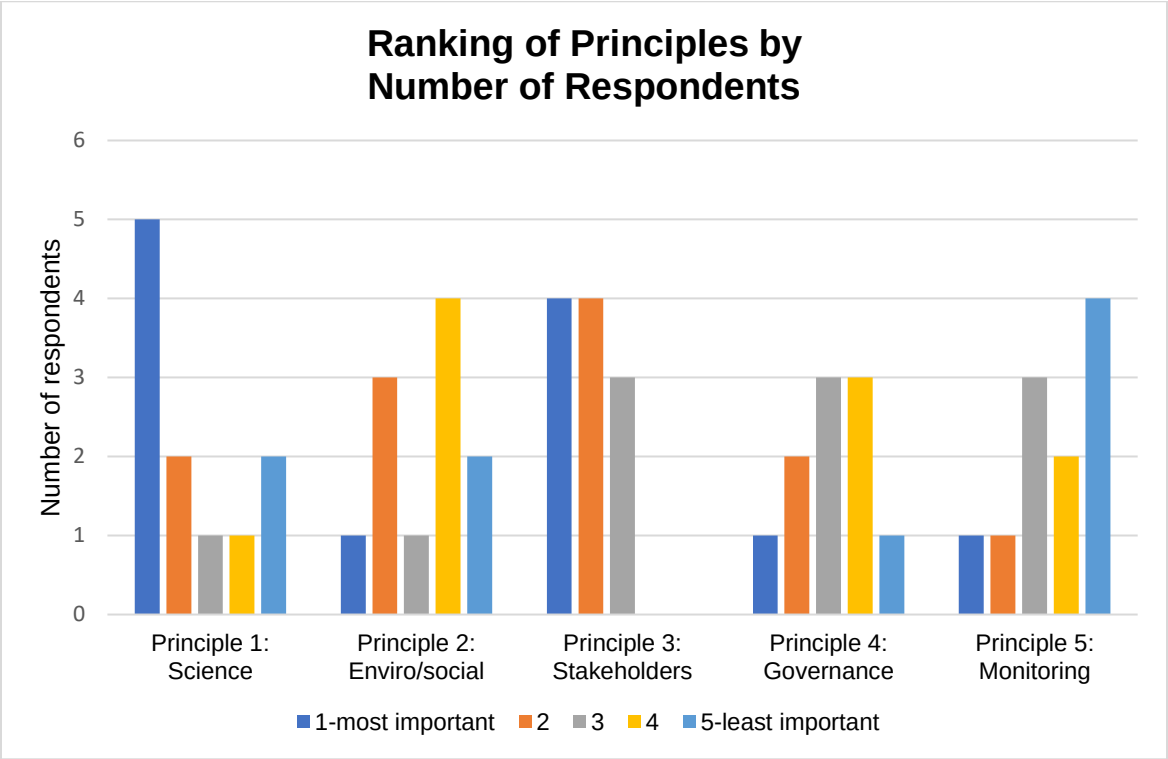
Ranking of Principles by Respondent

Top choice highlighted for each respondent

RESPONDENT TYPE	PRINCIPLE				
	1 Science	2 Enviro/ Social	3 Stake-holders	4 Govern-ance	5 Monitor-ing
Municipal Water Interest (Rural)	4	5	1	2	3
Municipal Water Interest (Urban)	1	4	2	3	5
Agricultural/Ranching Interest	1[1]	4	2	3	1[1]
Conservation/Wildlife Interest	1	2	3	4	5
Conservation/Wildlife Interest	1	2	3	4	5
Environmental/Landowner Interest	2[2]	3	1	4	2[2]
Environmental/Landowner Interest	3	4	1	2	5
Academic /Technical Expert	5	1	2	3	4
Academic /Technical Expert	5	2	3	1	4
Groundwater District Manager	2	4	1	5	3
Groundwater District Manager	1	5	2	4	3

Note 1 – Agricultural/Ranching participant ranked principle 1 (science) and 5 (monitoring) as equally most important (ranking of 1). Therefore, there is not a 5th ranking.
Note 2 – Environmental/landowner participant ranked principle 1 and 5 as second most important (ranking of 2). Therefore, there is not a 5th ranking.

How often each principle was ranked 1 through 5 is summarized below. Principle 1 (science) was ranked highest by the most respondents (five respondents) followed by principle 3 (stakeholders, four respondents). Combining the two highest rankings (1 and 2), principles 1 and 3 were rated highest by equal number of respondents (seven respondents for each).



Five participants stated that principle 1 (science) is most important to managing groundwater to achieve resilience**:** one groundwater district manager; the two conservation/wildlife stakeholders; one agricultural stakeholder; and one urban municipal water supplier. In general, participants who ranked principle 1 first indicated that it is important to have "good, solid information to base decisions on," and that "science-based decision-making is critical to groundwater management."

Four participants stated that in their opinion, principle 3 (stakeholders) is most important to managing groundwater to achieve resilience: the two environmental/landowner interests; one groundwater district manager; and one rural water supplier. In general, participants who ranked principle 3 first indicated that "good governance" and stakeholder representation is important.

Interestingly, both academic/technical experts ranked principle 1 (science) the least important principle, stating that there is a "perceived" lack of data and science, when in reality, a lot of science already exists, and if science is always the most important element, "you end up in a

never-ending cycle of always having to develop new science," and never make decisions as a result.

Workshop Discussion on Resilient Groundwater Management Principles

Of the five resilient groundwater management principles, principle 2 (related to set of future groundwater conditions) and principle 4 (related to multilevel governance systems) elicited discussion of rewording to capture input from the questionnaire/interview process and subsequent workshop conversation.

As part of the interview process, a recommendation was made to add "economic considerations" to "social benefits of groundwater" as part of future conditions to be used for setting groundwater management actions. This recommendation was presented to the workshop participants and via further discussion, the recommendation was made to also revise text related to describing the vision for future conditions relating specifically to desired future conditions.[1] The revised text for Principle 2 reads (original text presented for comparison) as follows:

Principle 2 Original Text

A strong set of future conditions is defined based on a full suite of environmental and social benefits from groundwater, so that a rigorous set of management actions to maintain benefits may be designed and evaluated over time.

Principle 2 Revised Text

A strong vision of future resilient groundwater conditions, specifically desired future conditions (DFCs[1]), to be used for planning is defined based on a balance of a full suite of environmental and social benefits from groundwater coupled with economic considerations, so that a rigorous set of management actions to maintain benefits may be designed and evaluated over time.

Discussion during the workshop concerning principle 4 included a recommendation to replace "threats" with "challenges and opportunities" and to acknowledge the need for funding and resources to properly accomplish this effort. The revised text for principle 4 reads (original text presented for comparison) as follows:

Principle 4 Original Text

Multilevel governance systems are aligned across sectors and at scale to address threats.

Principle 4 Revised Text

Multilevel governance systems are aligned across sectors, at scale, and with the capacity to address challenges and opportunities.

The remaining three principles remain unchanged from those presented earlier in this report.

[1] In its most basic form, a desired future condition (DFC) is a long-term management goal for an aquifer "that captures the philosophy and policies addressing how an aquifer will be managed." Robert E. Mace et. al., A Street Car Named Desired Future Conditions at 3 (2008).

Collective Principles for Groundwater Management

1. Current scientific information is accessible, easily interpretable and actionable to enable management and forecasting to meet the varied community objectives.
2. A strong vision of future resilient groundwater conditions, specifically DFCs, to be used for planning is defined based on a balance of a full suite of environmental and social benefits from groundwater coupled with economic considerations, so that a rigorous set of management actions to maintain benefits may be designed and evaluated over time.
3. Groundwater governance is representative of and protects the interest of all stakeholders who own and rely on groundwater.
4. Multilevel governance systems are aligned across sectors, at scale, and with capacity to address challenges and opportunities.
5. Continuous monitoring and feedback enable adaptive, innovative management.

Notable responses on principles

Next, EDF asked each participant what features need to be present in groundwater management to achieve each principle. Below are notable responses, which have been edited and condensed for clarity:

Principle 1: Current scientific information is accessible, easily interpretable and actionable to enable management and forecasting to meet the varied community objectives.

Academic/Technical Expert: "*There should be requirements for groundwater conservation districts to post any technical studies they've commissioned and to share any data they've developed with the Texas Water Development Board. There could be a central district database for the public to access the data, a scaling up that helps address data in the same aquifer over multiple districts. Permits and permit data should also all be online*."

Municipal Water Interest (Rural): *"There needs to be a centralized, reputable source for scientific information and for analyzing that information that is utilized uniformly statewide. At the local level, there needs to be engagement from all stakeholders to ensure they are represented in the development of community objectives. Currently, the regional planning process in Texas tends to be dominated by the bigger players (cities) in the regions and the perspective and input from small rural utilities may not be considered."*

Groundwater District Manager: "*An enormous amount of science must be developed and implemented to achieve this goal. There is currently a severe shortage of science-based reliable information in most situations of groundwater management in this state.*"

Environmental/Landowner Interest: *"I doubt many if any outside each GCD or GMA are familiar with nor have easy access to the groundwater data that are prepared and published to their own small circle of constituents. Certainly, groundwater information — much less surface water-groundwater interaction information — is not cataloged in one place."*

Conservation/Wildlife Interest: *"We need easily digestible science on groundwater — as a layperson, the science is impenetrable. Need good solid information to base decisions on whatever frame is, otherwise, it is garbage in and garbage out."*

Agriculture/Ranching Interest: *"This is the most important. We talk about the science and understanding the aquifers and how the decisions we are making impact aquifers, but we still need more science."*

Principle 2: A strong set of future conditions is defined based on a full suite of environmental and social benefits from groundwater, so that a rigorous set of management actions to maintain benefits may be designed and evaluated over time.

Agriculture/Ranching Interest: *"This is what the current DFCs are supposed to do. Economic benefits should be considered. Supposed to take this into consideration in explanatory report, but this is inconsistent."*

Academic/Technical Expert: *"This is critical because it defines everything that comes after (rules, enforcement). For districts to do this, there needs to be a legal requirement to do rather than a consideration."*

Municipal Water Interest (Urban): *"I would also include adequate stakeholder representation in a determination of future conditions and availability, which would foster buy-in in the 'strength' and validity of the future conditions. There must also be equity in and predictability in application of management actions, as well as adequate notice for implementation. The overall management system must factor in statewide and regional as well as local needs."*

Groundwater District Manager: *"DFC process does this, but you can't manage what you don't measure. To achieve principle Two, there needs to be required monitoring of the DFC."*

Conservation/Wildlife Interest: *"To achieve principle 2, groundwater management should incorporate grazing and land management. Grazing improves groundwater and root systems, allowing rate of runoff, increasing soil water-holding capacity, and thus refilling aquifers and watersheds."*

Environmental/Landowner Interest: *"Springflow is not recognized but other uses are. The environment is not recognized. However, the reality is that economics are important because people are using groundwater; they are making a living out of the water. How do we balance that? The bottom line is sustainability. The ecologies that go with springs and groundwater need to be factor in the balance."*

Principle 3: Groundwater governance is representative of and protects the interest of all stakeholders who own and rely on groundwater.

Academic/Technical Expert: *"This is a hard one given the current model of elected board members. There is precedent for externally appointed members on boards (even one appointed by the governor!) so perhaps board seats are created on district's boards to represent certain stakeholders. Another approach may be to set desired future conditions through a stakeholder-driven process like the regional water planning system."*

Municipal Water Interest (Rural): *"The makeup of the boards of groundwater districts influences how they manage the resource. We find that if water utility interests are represented on the board, there's a fair allocation to utilities that takes into account what is needed for local household and business water use."*

Agriculture/Ranching Interest: *"Movement away from elected boards to appointed boards has created a conflict of interest. Each major stakeholder group gets someone on the board. So people adopting regulations are the people who are regulated. This creates an inherent conflict of interest. Groundwater governance also needs to respect property rights".*

Groundwater District Manager: *"All districts should be elected and funded to a level they can be effective. While elections can be flawed, they still provide more accountability than appointed boards."*

Environmental/Landowner Interest: *"GCDs, contrary to their claims, do not represent all stakeholders who rely on groundwater. They do not seriously represent landowners and domestic well owners and certainly, in most cases, do not represent private and/or public interests in the environmental impact of groundwater pumping."*

Conservation/Wildlife Interest: *"In a perfect world all GCD boards would be elected."*

Principle 4: Multilevel governance systems are aligned across sectors and at a scale to address threats.

Conservation/Wildlife Interest: *"Biggest risk right now are unregulated white zones. I do not believe that there should be any part of the state that should be unregulated. TCEQ has authority to resolve this issue. This is the biggest disparity. Some sort of regulation versus no regulation. The question is whether there is a way to harmonize or standardize GCD regulation and what they can and can't do and what they should be doing. But to tear the*

system down and build something new would be a mistake. Too disruptive. State regulation is a grenade and a hill that people will die on."

Municipal Water Interest (Urban): *"Alignment of governance systems is important. Predictability and consistency are key from the municipal perspective. I would point out that alignment is important not just in terms of different levels of regulation, but consistency at the same level, for example, among groundwater districts regulating the same resource."*

Groundwater Manager: *"We have spacing requirements and 2 acre-feet per acre allocations. But neighboring GCDs have larger permit allocations. We need to resolve issues where GCDs in a GMA have completely different rules. It might be a good idea to combine districts, but then landowners lose out and local voices are not heard. But something has to move us forward to closer regulation."*

Academic/Technical Interest*: "GCDs need more tools to facilitate communication across boundaries and with water users and stakeholders."*

Academic/Technical Interest*: "The Edwards Aquifer Authority is managed by its physical boundary because physical properties align within the time frame of management decisions. In other areas, physical properties are not realized in a short response time. A lot of our concepts of groundwater management are driven by how we view surface water management, where impacts are seen within a planning cycle. But this does not work across the board in aquifers."*

Environmental/Landowner Interest: *"Water marketers are a horrible challenge and without local control, the water marketers will take over. Two miles south of the headwaters spring on my ranch is the county line and a different water district. You need local control but you base local control on a bigger region/aquifer so that it is not broken down into county lines."*

Agriculture/Ranching Interest: *"Situation between Bell County and Williamson County is an example (of how county/local based management of groundwater in Texas makes effective groundwater management difficult). We support local groundwater districts."*

Principle 5: Continuous monitoring and feedback enable adaptive, innovative management.

Academic/Technical Expert: *"In many aquifers we don't know exactly how they will respond to new stresses. Real data and adaptive management are key in responding correctly. Adaptive management practices must be transparent and explicit."*

Municipal Water Interest (Rural): *"In a state with diverse geography and climate, natural disasters require us to be adaptive and innovative. Centralized reputable sources of data (are needed). The data will need to be localized and relevant to the local decision-makers."*

Municipal Water Interest (Urban): *"Adaptive management is important to address changes in both science and water production. There is a need to look to ways to incentive innovation in both regulatory and financial aspects in response to challenges such as drought."*

Groundwater District Manager: *"There is a need to register all wells, build a database of these wells, have a robust monitoring system, and public transparency of all of these coupled with adequate funding. (There is the need for) more funding for better science, which will lead to more certainty and innovation."*

Environmental/Landowner Interest: *"Need strong public and environmental advocacy at the state level and operating independently on behalf of the environment. (Those tasked with planning and permitting must use) field data gained from monitoring both surface and groundwater ecosystems in making decisions. All stakeholders must have an equal chance to participate in the regulatory process (and) tools and resources need to be available to evaluate and measure progress."*

Conservation/Wildlife Interest: *"More information is always better. Adaptable could mean that the goal posts could always be moving so this information must be dependable, predictable, durable, and consistent."*

Final Question: Each participant's interview closed with the final question, "In your opinion, what is the biggest challenge with respect to groundwater management in Texas?" A summary of responses is below.

Groundwater and Surface Water Connections
The importance of recognizing and addressing the interaction between groundwater and surface water was highlighted multiple times.

- One respondent specifically mentioned that because groundwater is not seen, there is only a call to action when groundwater withdrawal impacts surface water.
- Another participant commented that maintaining stream flows and creating a sustainable use model is the biggest challenge.
- One participant stated that the biggest challenge is the resolve to manage sustainably and recognize surface water and groundwater connections.

Political Will
Several stakeholders felt that the biggest challenge of groundwater management is political will or the current political climate.

- As stated above, one respondent mentioned that the biggest challenge is the resolve to sustainably manage groundwater and address groundwater and surface water connections.
- Another participant felt that the biggest challenge is the lack of political will to address unregulated areas.

- One stakeholder stated that "people, politics and communication" is the biggest challenge.
- Finally, a participant explained that although Texas has some of the best groundwater laws to manage groundwater resources, we need a change in governance to interpret these laws in a way that is favorable to the environment.

Balancing Property Rights with Protecting Groundwater
Several stakeholders explained that achieving balance between the protection of property rights and the need to conserve groundwater is the biggest groundwater management challenge.

- One participant suggested that the biggest challenge is balancing groundwater ownership with the demand for it — the urban/rural imbalance of resources and supply/demand.
- Another stakeholder explained that achieving resilience, which requires balance, is the biggest challenge.
- One participant expressed that property rights versus protection of the groundwater resource is a current challenge not to be easily or quickly resolved. The ramifications of this challenge include the right to pump groundwater now versus the right to save it for the future.

Ensuring Future Water Supplies
Both municipal water supply interests said the biggest challenge is ensuring access to future water supplies.

- For the rural water utility interest, the concern is passage of laws requiring utilities to have sufficient land ownership to pump groundwater — a system that is contrary to how utilities have operated in the past.
- For the urban water utility interest, the concern is ensuring that there is consistency and equity in the establishment of desired future conditions and GCD rules, which are important in being able to scale large municipal projects and to ensure that the state's future water supply needs can be met.

Identifying Common Ground

The discussions with stakeholders revealed that among this diverse group, there are areas of common ground related to groundwater management challenges, paving the way to potential solutions. The workshop participants discussed common ground in further detail, exploring the following perspectives:

- Is it truly common ground?
- What would it take to make it consensus?
- Barriers/action needed

More science
The majority agreed that science is the first and most important element of resilience and that good policy cannot be developed without it. There was a difference in opinion, however, about whether there is currently enough science to develop sustainable groundwater management policies, with two stakeholders (the academic/technical experts) indicating that the science exists — rather it is the political will that is lacking.

Discussion of common ground and areas of consensus

- Most stakeholders agreed with the premise that good science makes for better decisions.
- Good science is needed to back up whatever regulation being considered for adoption.
- Make a decision today that can be changed based on information tomorrow.
- Managing or permitting in a way that is based in a clear DFC and that it is clear that permitting is based on variability.
- There is a need for a balance in the science. This could mean a need for a state models that GCDs use in permitting.
- Address the question "does TWDB have an advisory board that reviews 'best available science?'"

Questions that still need addressing include:

- How do we adapt based on science, but still protect property rights, or operational obligations?
- Should there be a higher threshold or set standard for the type of science for what the GCDs should be using?
- Is the best available science sufficient?
- Who decides what the best available science is? Should the Texas Water Development Board have an advisory board that reviews 'the best available science?'

Barriers/Actions

- Adaptive management is important to allow for changes in science. Adaptive science is incorporated into DFC process.
- Synergy/opportunity: move away from ours and your science but make it collaborative.
- Science may or may not support the desired policy outcome.

Support for elected boards
From the questionnaire and subsequent interviews, it appeared there was consensus among the stakeholders that elected groundwater conservation district boards are preferred because elected boards are more likely than appointed boards to ensure that groundwater governance is representative of and protects the interests of all stakeholders who own and rely on groundwater. The workshop discussion revealed more nuances on this issue.

Discussion of common ground and areas of consensus

- Philosophical premise is based in local accountability. If a local entity is regulating you or affecting your taxes or property, it's about accountability.

- The politics behind newer districts being appointed rather than elected is that county government was getting involved in the negotiation.
- Appointed boards were built with the representation of the water users in area before the creation of the district. Elected is great until you have a stakeholder or group willing to spend money to sway votes and thus garner representation.
- Need some balance between local accountability and making sure varied interest groups are represented.

Barriers/Actions

- Possible solution is a hybrid mix.
- Potentially more opportunities to diverse stakeholders to input management considerations.
- A potential issue that is being raised with this discussion is that there is a need for more voices to be at decision-making table than just the Board.

County-based management is problematic

While most of the stakeholders indicated that local control is the preferred framework for managing groundwater, all the stakeholders indicated that county-based regulation, without regard to aquifer boundaries, is problematic. Some of the stakeholders felt that county-based regulation creates difficulties managing groundwater and surface water more holistically. Others indicated that differences in GCDs' rules and desired future conditions make the framework inconsistent. The challenge is how to maintain local control and voices while working within a more regional, aquifer-based framework.

Discussion of common ground and areas of consensus

- Statements made by participants included "aquifer specific management seems to make the most sense".
- Local control and representation is needed to make sure private property rights are protected, but county-wide management is not viewed as effective.

Barriers/Actions

- Need aquifer specific management.
- Increase/improve joint management process to allow for aquifer wide management.
- All areas of Texas would need to be in a GCD for aquifer specific management.

Property rights must be protected and balance must be achieved

Whether it is the right to pump groundwater for agriculture or municipal water supply or the right to conserve it for future use or the environment, there was consensus among the stakeholders that protecting property rights is an important aspect of groundwater management and that finding a balance between interests is vital to achieving resilience.

Discussion of common ground and areas of consensus

- So long as it is both the protection of rights to pump and the right to protect, yes there is consensus.
- In essence, DFC's are about finding the balance between those who are currently utilizing groundwater and those that may utilize groundwater in the future.
- It is important that landowners feel that their property rights are protected.
- Protecting the right of those who don't want to pump is based on the DFC.
- The right science so that GCDs can ensure they are protecting the right of those who want to pump and those who want to conserve.
- The only way that would work is if the system is working sustainably.

Barriers/Actions

- A lack of science that helps GCDs protect the right of those who want to pump and those who want to conserve.
- A question to be addressed, "should the state/GCDs have the ability to implement caps on production in order to protect everyone's rights or stream flow?".

Conclusion

Recent years have seen a rising intensity of debate and concern around the current condition and future of groundwater resources in Texas. The issues arising in discussions of groundwater span a wide range of topics, including the benefits and costs of marketing and exporting groundwater; the risks that groundwater pumping poses to surface water rights, and river and spring health; the impact of current management on the long-term viability of groundwater supplies themselves; and the extent to which groundwater conservation districts, with their limited capacity and funding, can regulate to protect groundwater resources and simultaneously protect property rights.

When it comes to groundwater management in Texas, there seem to be more challenges than solutions and more uncertainty than clarity. Yet it is imperative that Texas has an effective framework for managing groundwater, as this is crucial to ensuring our water supplies and the communities and ecosystems who depend on them are resilient. Despite the challenges, water policy in Texas has always been stakeholder driven and collaborative. For this reason, EDF sought to convene stakeholders, as discussed in this report, to communicate about the challenges and uncertainty related to groundwater management and to explore where different interests have common ground, moving us closer to solutions. The result was a robust conversation, identification of areas of common ground and consensus, and a set of mutually agreed upon principles that all stakeholders can build upon to continue the dialog and collaboration and use to move Texas toward resilience.

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