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Cover photo: As Texas continues to face water challenges and drought, many communities are seeking to conserve water in various sectors, including lawn and landscape water use. ©Jose Manuel Gelpi Diaz, Crestock

Public attitudes toward water management and drought in Texas

James W. Stoutenborough¹, Arnold Vedlitz^{2*}

Abstract: Water management in Texas is increasingly salient as the population grows, water supplies continue to be taxed and the planet continues to warm, resulting in more severe, widespread, and frequent droughts in the state. Public support, though, is often essential for governments to enact large-scale projects, like those that may be needed to tackle water management issues. Given the challenges facing the state of Texas, surprisingly few studies explore public attitudes, preferences, and risk assessments about water-related resource allocations. Will the public act to direct or limit the actions of its elected officials on water issues? Is the public ready to consider policies, regulations, and expenditures concerning the potential impacts of increased drought frequency on Texas water resources? We report the results of 2 public opinion surveys of the citizens of Texas that focused on water management and drought issues. We found that the public is willing to support government efforts to manage water, but not if these efforts negatively affect the environment or agriculture.

Keywords: water management, drought issues, public attitudes, risk assessments, Texas drought

¹ Assistant Professor, Department of Political Science, University of Alabama, Huntsville, Alabama

² Professor and Bob Bullock Chair in Government and Public Policy, The Bush School of Government and Public Service; Director, Institute for Science, Technology and Public Policy, Texas A&M University, College Station, Texas

* Corresponding author: avedlitz@tamu.edu

As the planet continues to warm, Texans will need to adapt to their changing environment. In addition to problems such as rising sea levels and more extreme weather events, scientists predict many parts of the world are more likely to experience longer, more intense droughts (e.g. IPCC 2007). Vast expanses of Texas are included in these drought zones (e.g. Banner et al. 2010; Seager et al. 2007; Yu et al. 2006). Complicating things, the aquifer that Texas draws much of its water from, the High Plains Aquifer, has decreased by 27% in the last half century (Lubick 2004). Consequently, droughts have the potential to radically alter the way of life for Texans.

The Texas government will need to become more involved in water management. However, public support is often a necessary ingredient for political action. Studies consistently find that policy-maker decision-making tends to mirror the preferences of the public (e.g. Burstein 2010). If the public does not support a policy, it is very difficult for elected officials to find the will to act.

Understanding public attitudes toward an issue is an indispensable step toward legislating it. However, there are surprisingly few studies that explore public attitudes toward water issues. Will Texans act to constrain the actions of their elected officials? Are Texans ready to consider policies, regulations, and expenditures that address their water supply?

In this paper, we report the results of 2 recent public opinion surveys that focused on water management and drought issues in Texas. First, we describe our survey. Second, we place water issues in their appropriate context. Third, we explore general water views. Fourth, we investigate drought attitudes. Fifth, we survey attitudes toward government response to these issues. Finally, we discuss the implications of this project.

RESEARCH METHODS

We conducted 2 public opinion surveys of adults in Texas. The first survey was administered from 21 February 2013 to 12 March 2013 and resulted in 410 completed surveys for a 49.4% completion rate. The second survey, with identical questions, was in the field from 2 April 2013 through 16 April 2013 and resulted in a total of 412 completions for a completion rate of 38.6%. Both surveys were administered online by GfK (formerly Knowledge Networks). The 2 samples were drawn from KnowledgePanel®, a probability-based web panel designed to be representative of Texas for adults age 18 and over. Descriptive statistics for the demographic characteristics of the samples can be found in Appendix A. The median survey completion time was 27 minutes. Because there were no major water-related emergencies between the 2 surveys, we report the pooled results to simplify the presentation¹.

¹ The Texas Legislature was acting on several water-related policies during this time, which generated some press. However, it is unclear if this coverage

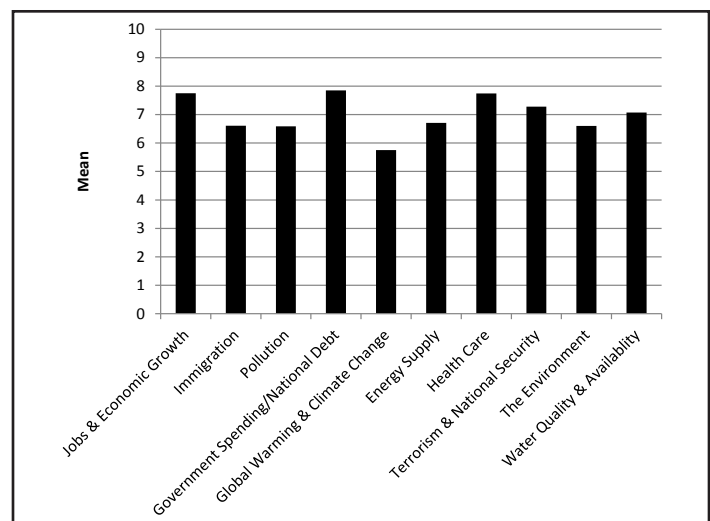


Figure 1. Comparing public concern for water quality and availability against other issue domains.

RESULTS

Comparing water to other issue domains

To understand attitudes on an issue, it is important to place them in their appropriate context. Texans may not view water issues as important in relation to other issues. If so, all of the subsequent opinions and attitudes should receive a lower priority. Without proper context, it is difficult to discern what these attitudes mean and whether policy-makers should act on them.

We used 2 methods to contextualize water issues in Texas. First, respondents were asked to identify their level of concern for different issue domains². The mean levels of concern for each of the issues are illustrated in Figure 1. We found 5 issue domains — jobs and economic growth, government spending/national debt, health care, terrorism and national security, and water quality and availability — weigh most heavily on the public with a mean concern greater than 7. Water quality and availability is the fifth most concerning issue. On average, the public would rate water issues a 7.07 on this scale. Texans are more concerned than not about water issues, and they are

was out of the ordinary or if it became salient to the lay person. To ensure this was not a concern, we conducted T-Tests for several questions, none of which identified a significant difference between the means of the two samples. Additionally, a Texas Tribune poll indicates that, when compared to other important issues, water was a lower priority than the others (Blank and Henson 2013), which suggests that these legislative activities may not have been particularly salient or at least that they are not dominating the public's attention.

² The scaling for all of the survey questions is from lowest to highest. Specific question wording can be found in Appendix B.

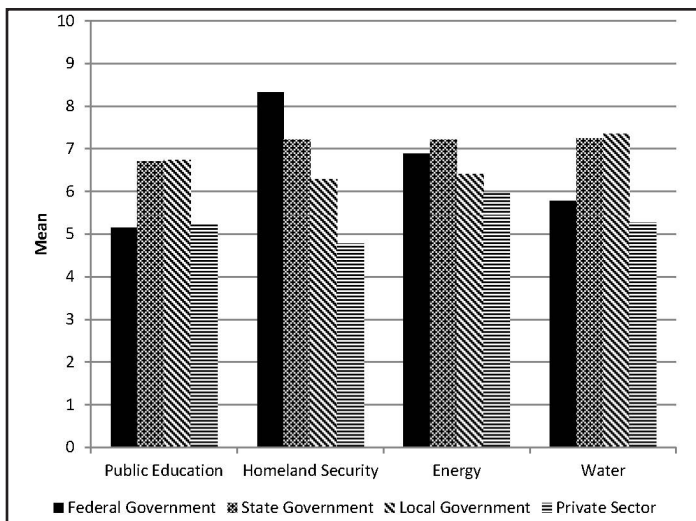


Figure 2. Comparing perceptions of responsibility for water policy against other policy domains.

generally more concerned about water than many of the other issues, which suggests that water quality and availability is an important issue³.

The second manner of comparing water to other issues relates to perceptions of responsibility. Who is responsible for handling a given policy domain? In our federal system, there are realistically only 4 types of institutions that can manage a major public issue — the federal government, state governments, local governments, or the private sector. We asked respondents to indicate how responsible each institution was for handling 4 policy domains: public education, homeland security, energy, and water. As presented in Figure 2, we found that water policy is believed to be the responsibility of state and local governments⁴. This distribution resembles that found with public education where the federal government and private sector are expected to take a back seat to state and local institutions. This distribution differs from homeland security where responsibility begins with the federal government and decreases with each lower level of government. Respondents

³ This interpretation differs from those drawn from the Texas Tribune poll (Blank and Henson 2013). The difference lies in the different approaches to the questions used in these interpretations. The Texas Tribune question forced respondents to identify the most important issue facing Texas and did not allow a respondent to indicate whether any other issues are important or not. Our question allowed a respondent to indicate importance through their level of concern for each of the issues. However, we are unable to definitively say that any one is the single most important issue because that is not what we asked, just as the Texas Tribune poll did not ascertain whether any other issues were important, and if so, how important because that is not what their question asked.

⁴ While some areas of water policy are the responsibility of quasi-state entities, like river authorities, we were primarily concerned with the public's overall expectation for water policy.

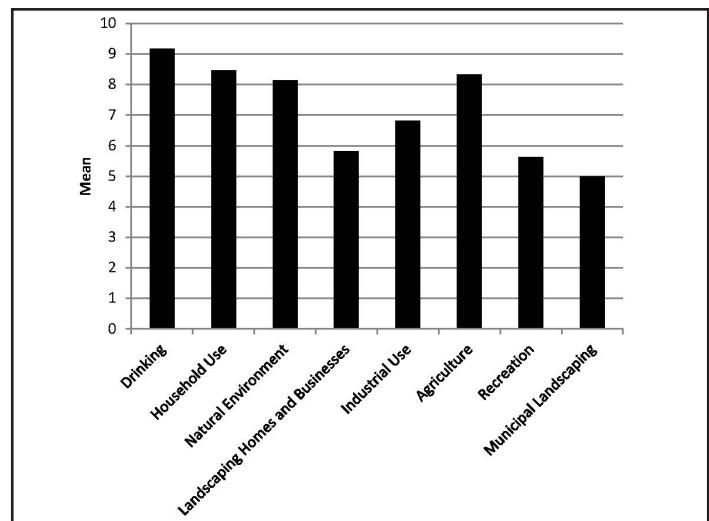


Figure 3. Public views on the importance of various water uses.

generally prefer the state to handle energy issues, but barely more so than the federal government. However, energy policy represents the most clustered distribution with the smallest difference between the most responsible institution and the least responsible. This differs from water policy, where state and local governments are clearly favored. Overall, this suggests that attitudes concerning water issues are most applicable to state and local governments.

General water perceptions

Preconceived notions and general attitudes will influence perspectives toward water management and drought. By understanding what Texans generally think about these issues, we will be able to interpret better their more specific attitudes. We began with an examination of water use. Does the public find certain water uses to be more important than others? We asked respondents about 8 water uses, which are presented in Figure 3. The most important uses of water are drinking, household use, natural environment, and agriculture. Conversely, industrial use, recreation, and landscaping uses are of lower importance. Municipal landscaping is viewed as the least important use of water and is the only use that is in the lower half of the scale.

We asked respondents about water availability and their willingness to conserve water. The results can be found in Table 1. We found that Texans are generally not optimistic about their current and future water needs, as both have means in the lower half of the scale (mean less than 2.0). However, they are less pessimistic about their current water needs than their long-term needs. Though the public does not believe that the economy is more important than the environment in water

Table 1. Public perceptions of water availability and willingness to conserve water.

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	Mean
Water conservation for fish/wildlife habitat and economic growth are equally important	2.48	10.41	32.34	45.60	9.17	2.48
There is enough water in my state to meet current needs	9.05	26.02	29.99	30.86	4.09	1.94
Cities should be able to divert water from rural areas if they need more water	6.08	24.57	42.18	23.45	3.72	1.94
In water planning, the economy is more important than the environment	8.67	28.87	39.28	18.96	4.21	1.81
Household water restrictions should be voluntary rather than mandated by the government	10.79	32.88	33.00	16.50	6.82	1.75
There is enough water in my state to meet future needs	13.37	31.68	34.03	18.07	2.85	1.65
I am willing to conserve water under extreme drought conditions	0.99	0.74	9.75	43.58	44.94	3.30
I am willing to conserve water to lower my water bill	1.24	2.22	16.69	58.47	21.38	2.96
I am willing to conserve water to protect the environment	1.85	2.22	20.27	54.64	21.01	2.90
I am willing to conserve water for agricultural uses	1.00	3.61	25.37	53.61	16.42	2.80
I am willing to conserve water for industrial uses	3.71	18.94	45.92	26.86	4.58	2.09
Making efforts to conserve water is inconvenient	12.38	42.08	25.12	18.44	1.98	1.55
The issues related to the conservation and availability of water do not affect me	31.72	39.03	21.69	5.82	1.73	1.06

Values are percentages, except the mean. The mean is calculated using a coding scheme from 0 (strongly disagree) to 4 (strongly agree). A 2.0 represents the midpoint of the scale.

planning, it generally believes that fish and wildlife habitats and the economy are of equal importance. Respondents also disagree with cities diverting water from rural areas, even when in need. This suggests that the public would much rather conserve water than risk hurting agriculture.

Will Texans conserve water, and under what conditions will they do so? Also in Table 1, we found that the respondents recognize that issues related to water availability affect them personally, which suggests saliency. On average, the public prefers government mandates of water restrictions over hoping individuals will act responsibly through voluntary measures, even though most people believe that conservation is convenient⁵. We also found that when framed in different manners, the public is willing to conserve water. Specifically, on average, Texans will conserve to lower their water bill, protect the environment, for agricultural uses, and under extreme drought

⁵ The midpoint of the scale is a 2.0. Values lower than this indicates that the public is, on average, less agreeable to the option. Values higher suggest that, on average, the public is more agreeable.

conditions. Texans are almost evenly divided on conserving for industrial uses, with respondents barely more likely to conserve than not.

Finally, we asked respondents to identify what they believe to be the most important water-related issue. The results are illustrated in Figure 4. We found that 67.33% indicated that they believe water quantity, or drought, is the most important issue. 18.81% believe water distribution, or providing enough water, is the most important issue. Finally, 13.86% consider water quality/pollution as the most important issue. Clearly, the public is more concerned about water quantity than distribution or quality.

Drought options

With water attitudes in their appropriate context, we turn to public drought perceptions. Given the likelihood of increased frequency and intensity (e.g. IPCC 2007), droughts are likely to be a greater water management concern to the people of

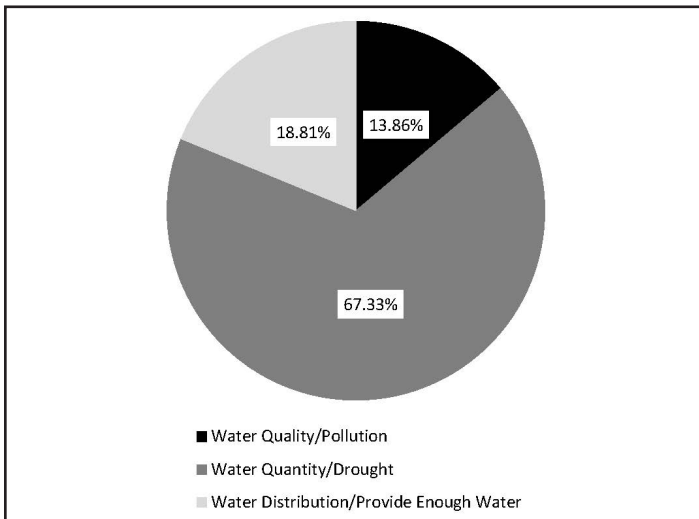


Figure 4. The most important water related issues.

Texas. Texas officials have 2 basic options — be proactive or reactive. Since governments can be constrained by a lack of public support, understanding public attitudes and beliefs with regards to droughts is important.

An informed citizenry is a necessary step toward gaining

public support on the issue. Studies indicate that knowledge is an essential component of problem-solving (e.g. Hmelo-Silver 2004). Additionally, Ostrom (2007) argues that imperfect information increases the likelihood of selecting improper strategies to solve problems.

We asked respondents their level of agreement with potential causes of droughts or water shortages, which are found in Table 2. On average, Texans agree that all 5 of these potential causes are likely responsible for drought conditions or water shortages in Texas. The public is most convinced about the impact of short-term changes to rainfall.

We also wanted to know if attitudes reflected those outlined by the Intergovernmental Panel on Climate Change (2007). Do Texans believe droughts are becoming more common and more severe? Table 3 presents the results of this assessment. The majority of Texans believes droughts are occurring more frequently, while a slim majority believes they are as severe as they have always been. However, a substantial minority, 45.29%, believes droughts are more severe. Less than 5% of Texans believe droughts are less severe or less frequent.

Several water-related risks have been linked to droughts (NDMC 2013). Does the public recognize the likelihood of these risks? We asked respondents to evaluate the likelihood

Table 2. Public perceptions of the cause of droughts or water shortages

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	Mean
Short-term changes in annual rainfall levels	0.99	2.41	11.61	51.42	33.57	3.14
Increased demand from water users	1.70	7.66	26.10	51.63	12.91	2.66
Climate change	7.40	9.25	25.46	38.69	19.20	2.53
Inadequate management of water resources	1.99	11.51	39.49	37.50	9.52	2.41
Overuse of water	2.27	14.63	32.67	41.05	9.38	2.40

Values are percentages, except the mean. The mean is calculated using a coding scheme from 0 (strongly disagree) to 4 (strongly agree). A 2.0 represents the midpoint of the scale.

Table 3. Public perceptions on drought occurrence and severity

	Less	Same	More	Mean
Are droughts in your region becoming more common, less common, or continuing to occur at the same rate?	2.28	42.88	54.84	1.52
Are droughts in your region becoming more severe, less severe, or continuing to occur with the same severity?	3.57	51.14	45.29	1.41

Values are percentages, except the mean. The mean is calculated using a coding scheme from 0 (Less) to 2 (More). A 1.0 represents the midpoint of the scale..

Table 4. Perceptions of the likelihood of drought risks.

	Very unlikely	Somewhat unlikely	Unsure	Somewhat likely	Very likely	Mean
Increased food prices	2.23	2.36	16.50	41.69	37.22	3.09
Increased water costs	2.22	1.73	17.31	41.66	37.08	3.09
Increased fires	2.73	4.22	22.08	38.21	32.75	2.94
Increased water-user conflicts	2.48	3.22	32.71	39.53	22.06	2.75
Damage to animal and plant species	3.95	7.65	27.28	37.04	24.07	2.69
Loss of recreational activities	4.09	8.80	35.69	33.71	17.72	2.52
Disruption of water supplies	3.95	10.62	35.56	32.72	17.16	2.48
Reduced water quality	5.82	11.76	40.10	26.49	15.84	2.34

Values are percentages, except the mean. The mean is calculated using a coding scheme from 0 (very unlikely) to 4 (very likely). A 2.0 represents the midpoint of the scale.

of 8 risks, which can be found in Table 4. We found that the public is, on average, likely to recognize the possibility of each of these risks during drought conditions. Risk perceptions are strongest for increased food prices, water costs, and fires. While still perceived as more likely than not, Texans report the threat to water quality as the least likely of these risks.

Government response to drought

Since water is typically distributed through public utilities, it is the government’s responsibility to prepare for and/or respond to drought conditions to ensure an adequate supply of water. Given the decreasing supply of water and increasing demand, governments are facing some potentially costly investments to

secure long-term water security (see EPA 2002). If public support is a necessary component for government action, what actions will the public support? The first step toward understanding the public’s preferences for government response is to determine which water use should be the first to conserve. As illustrated in Figure 5, a slim plurality, 32.51%, believe that cities should be the first to reduce water use. This reflects the results in Figure 3, which found that municipal water uses are the least important. In a close second, 32.39% think that they, themselves, should be the first to reduce. Interestingly, the difference between first and third is only 1.23%, as 31.28% of Texans believe industry should be the first to reduce. Finally, consistent with previous question batteries, only 3.82% think that agriculture should be the first to reduce its water use. With

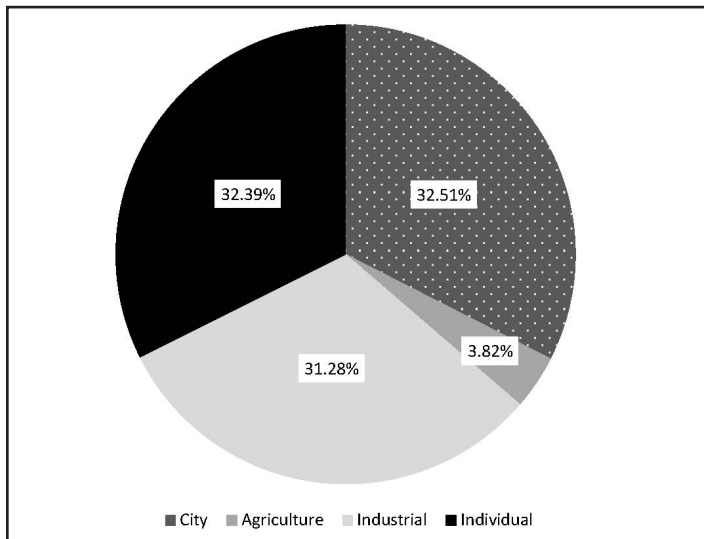


Figure 5. Which water use should be reduced first?

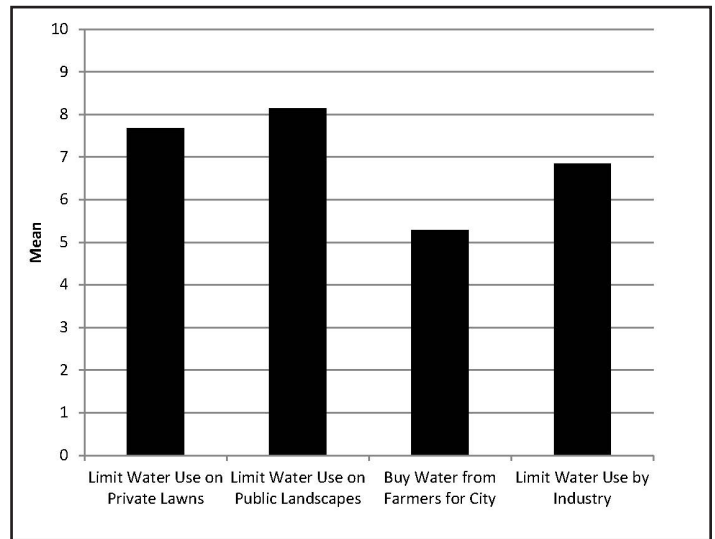


Figure 6. Favorability of short term drought strategies by cities.

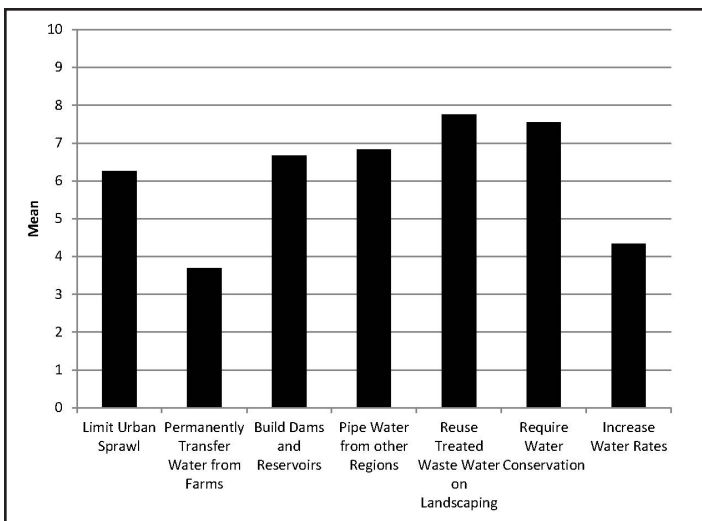


Figure 7. Favorability of future drought strategies by cities.

the exception of agriculture, Texans are evenly divided as to who should be the first to reduce water use.

Cities often have limited available options when facing a drought. We wanted to understand what actions the public would support in response to a short-term drought. Figure 6 presents the public's favorability toward potential strategies. Not surprisingly, the public is generally in favor of limiting the use of water on private and public lawns. This is also consistent with what we found in Figure 3. Texans also favor limiting water use by industry. Even in short term situations, the public is less favorable toward diverting water from agriculture to use in a city.

Cities also have the ability to prepare for droughts. However, these projects are often costly, and it is not clear the extent to which the public would support these projects⁶. Public support for future drought strategies is found in Figure 7. Tex-

⁶Not all of these projects are costly. For instance, the cost associated with raising water prices and conservation is limited. However, the cost of investing in infrastructure projects can be quite large. The EPA (2002) predicts that cities will need to invest more than \$274 billion between 2000 and 2019 to ensure adequate levels of drinking water, and this does not include the estimated \$388 billion needed for clean water. These numbers will only increase as the population continues to increase, and as the public migrates to arid or semi-arid areas, including Texas, where the supply of water is already stressed.

ans are generally supportive of all of these long-term strategies except permanently transferring water from farms to cities and increasing water rates. Respondents are most supportive of reusing treated waste water on landscaping as an alternative to using fresh water. Texans are generally supportive of the city requiring water conservation⁷ and limiting urban sprawl⁸. The public also supports building more dams and reservoirs and investing in water pipelines from other regions of the country.

The above strategies were framed in terms of a city's response to droughts. It is possible some respondents may not favor cities taking on these responsibilities, but may be supportive if other governmental units were overseeing these projects. Therefore, we decided to frame various strategies in terms of policy options, but we did not associate them with any particular level of government except for one that is framed with the national government.

The policy battery results can be found in Table 5. Generally, the public is supportive of all the policy alternatives. The public most strongly supports policies that would build infrastructure to support water demands and protect some water resources to preserve wildlife and fishery habitats. There is also strong support for policies that require lawn watering using reclaimed/reused water instead of drinking water, that conduct campaigns for voluntary water conservation, that give tax incentives for the installation of water-saving equipment, and that require low water-use landscaping. The public is also more supportive than not for providing tax cuts to companies to reduce their water use, requiring mandatory water conservation, and developing a comprehensive national plan for allocating water across state borders. The public is consistent in its

⁷We are unable to determine if the respondent presumed conservation was related to long-term efforts such as retrofitting toilets or short-term drought-related efforts such as limiting water use for landscaping.

⁸Urban sprawl results in greater residential water use per capita when compared to urban users. New residential developments tend to be lower in density, which means larger lawns and the increased availability for space that would allow private swimming pools, resulting in a greater demand for water for these areas to keep the larger lawns green and the pools full than the demand in more densely populated areas. The EPA (2013) estimates that approximately 30% of a household's water use is for outdoor uses, such as watering lawns and gardens. Since more densely populated areas do not have large lawns or gardens, the majority of this water use is occurring in less dense areas, such as suburbs and exurbs. Limiting sprawl encourages greater population density, which decreases extraneous water uses. Moreover, Southwestern states, including Texas, already have residential water-use levels that exceed the rest of the nation (EPA 2006), and sprawl will exacerbate this.

Table 5. Public support for water policy proposals

	Strongly oppose	Oppose	Unsure	Support	Strongly support	Mean
Build infrastructure (dams, reservoirs, pipelines) to support water demands during a drought	1.13	2.02	29.35	47.61	19.90	2.83
Protect some water resources to preserve wildlife and fishery habitats	2.02	3.16	23.23	53.03	18.56	2.82
Give tax incentives for the installation of water-saving equipment	3.03	5.30	23.86	49.37	18.43	2.74
Require that lawn watering use reclaimed/reused water instead of drinking water	2.28	6.32	26.42	44.12	20.86	2.74
Conduct campaigns for voluntary water conservation	2.42	5.47	25.45	50.89	15.78	2.72
Require low water-use landscaping	3.68	6.21	23.07	48.92	18.12	2.71
Provide state tax cuts to companies that reduce their water use	3.68	7.73	32.45	45.88	10.27	2.51
Require mandatory water conservation	3.94	11.44	31.51	38.88	14.23	2.48
Develop a comprehensive national plan for allocating water across state borders	6.58	9.37	39.11	33.80	11.14	2.33

Values are percentages, except the mean. The mean is calculated using a coding scheme from 0 (strongly oppose) to 4 (strongly support). A 2.0 represents the midpoint of the scale.

belief that the federal government is less responsible than state or local governments, as the proposal of the national plan is the least supported policy option in the battery, which is reflected in the largest rate of “unsure” and “strongly oppose” responses.

DISCUSSION

We began this project by trying to better understand Texans’ attitudes toward water management and droughts. Due to the shortage of public opinion on this issue, we wanted to report the results of our public opinion surveys of the people of Texas to the larger Texas research community. We believe that the data presented here can be helpful for government practitioners and researchers, and that there are several important implications.

First, Texans are generally supportive of government efforts to manage water resources during a drought and to implement plans that reduce the impact of future droughts. We found quite a bit of support for government policies and action. We anticipate that the public most likely believes that these actions will be carried out by the state or local governments (Figure 2).

Second, we found that the public consistently supports efforts so long as these efforts do not negatively affect agriculture. As presented in Figure 5, agriculture is the last place the public wants to look for water supply savings. The evidence suggests that the public recognizes that disruptions in the water supply will likely increase the cost of food (Table 4) (e.g. Fan-

nin 2011; Trostle 2008) and is much more willing to accept the costs of conserving water than burden agriculture (Figure 5). The consistency of these findings throughout the survey indicates that these are strong beliefs.

Third, we found a similar pattern with the environment. The public identifies the natural environment as the fourth most important use of water (Figure 3). The public also believes that fish and wildlife habitats are just as important as the economy (Table 1). Respondents were highly likely to agree or strongly agree (75.65%) that they would conserve water to protect the environment (Table 1). The public recognizes that droughts are likely to damage animal and plant species (Table 4). Additionally, 71.59% of Texans would support or strongly support a policy that would protect water resources to preserve wildlife and fishery habitats. Clearly, the public wants to protect the environment from water shortage issues.

We found conflict in opinions between the environment and infrastructure investment. It is possible several camps could exist here. Many of the infrastructure projects certainly would influence the environment in a negative manner. From the disruption of natural streamflow to the destruction of habitats, the creation of a reservoir has many large ecological implications (e.g. McCully 2001). Although we are unable to determine this from our survey, we suspect that this is more a reflection of the public’s lack of understanding about what is involved in the creation of a reservoir. On the other hand, the recycling of waste water for irrigation would have 2 impacts.

First, and arguably a positive impact, the waste water would not be reintroduced to fresh water supplies, which would decrease the amount of chemicals and other foreign bodies in rivers and streams. Second, it is unclear the extent to which this recycling would impact water levels downstream. If the treated waste water is no longer pumped into the streams or pumped at a much lower rate, will this cause streams to dry because demand would be greater than supply? Conversely, if recycled water is being used for irrigation purposes, this would decrease the demand on natural streamflow, which would potentially decrease the potential negative trade off. Additional research is needed to answer these questions.

Fourth, we were not sure how the public would respond to the use of recycled water due to the potential “gross” factor associated with waste water. We found that the public is quite supportive and see this as one of the best ways to limit the impact of future droughts (Figure 7). While our questions focus on using the recycled water for irrigation, it is unclear if the public would support using this water for potable uses.

Finally, it appears that the public will generally be supportive of government action to reduce the impact of droughts. However, the government may need to explain why a given action is necessary (Table 1). The public will act if it is in response to a severe drought. Given the consistency in these responses, it is also possible that in non-drought conditions the public’s desire to protect the environment and agriculture will cause it to support water management projects so long as the projects are framed in this manner. However, efforts to take advantage of these general dispositions will likely need to be more specific than what is often found during non-drought conditions. The legislative environment looks favorable for Texas officials since many Texans already believe droughts are more severe and more frequent. The question is whether the Legislature is able to corral this base support.

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APPENDIX A

Appendix Table 1: Descriptive statistics

	Survey 1	Survey 2	Combined
Gender			
Male	51.71	55.58	53.65
Female	48.29	44.42	46.35
Education			
Less than high school	10.49	7.04	8.76
High school	28.05	30.58	29.32
Some college	31.46	30.83	31.14
Bachelor's degree or higher	30.00	31.55	30.78
Race			
White	56.59	56.55	56.57
Black	10.00	10.92	10.46
Hispanic	26.59	27.43	27.01
Multiracial	4.63	2.67	3.65
Other	2.20	2.43	2.31
Age			
18-24	6.10	5.58	5.84
25-34	10.24	17.96	14.11
35-44	14.63	14.32	14.48
45-54	20.73	20.15	20.44
55-64	25.37	17.48	21.41
65-74	16.83	17.48	17.15
75+	6.10	7.04	6.57
Income			
Less than \$15,000	12.68	9.95	11.31
\$15,000 – \$29,999	12.93	13.35	13.14
\$30,000 – \$49,999	19.76	22.09	20.92
\$50,000 – \$74,999	19.51	19.17	19.34
\$75,000 – \$99,999	13.66	13.11	13.38
\$100,000 – \$149,999	14.63	14.08	14.36
More than \$150,000	6.83	8.26	7.54
Party identification			
Democrat	34.35	35.25	34.80
Republican	34.61	36.25	35.44
Independent	31.04	28.50	29.76
Number of observations	410	412	822

All values are percentages.

APPENDIX B

Appendix Table 2: Variable definitions

	Question wording	n
Figure 1		
<i>Battery prompt</i>	"On a scale from 0 to 10, with 0 indicating not at all concerned and 10 indicating extremely concerned, how concerned are you about each of the following issues?"	
Jobs & economic growth	"Jobs and economic growth"	815
Immigration	"Immigration"	815
Pollution	"Pollution"	810
Government spending & national debt	"Government spending/national debt"	817
Global warming & climate change	"Global warming and climate change"	818
Energy supply	"Energy supply"	814
Health care	"Health care"	814
Terrorism & national security	"Terrorism and national security"	817
The environment	"The environment"	815
Water quality & availability	"Water quality and availability"	816
Figure 2		
<i>Public education battery prompt</i>	"Different levels of government claim responsibility for specific policy areas. Using the following 0 to 10 scale with 0 being Not at all Responsible and 10 being Completely Responsible please indicate which group you believe should be responsible for managing public education policy."	
Federal government	"Federal government"	809
State government	"State government"	809
Local government	"Local government"	810
Private sector	"Private sector"	809
<i>Homeland security battery prompt</i>	"Different levels of government claim responsibility for specific policy areas. Using the following 0 to 10 scale with 0 being Not at all Responsible and 10 being Completely Responsible please indicate which group you believe should be responsible for managing homeland security policy."	
Federal government	"Federal government"	797
State government	"State government"	791
Local government	"Local government"	791
Private sector	"Private sector"	789
<i>Energy battery prompt</i>	"Different levels of government claim responsibility for specific policy areas. Using the following 0 to 10 scale with 0 being Not at all Responsible and 10 being Completely Responsible please indicate which group you believe should be responsible for managing energy policy."	
Federal government	"Federal government"	805
State government	"State government"	805
Local government	"Local government"	805
Private sector	"Private sector"	805

Appendix Table 2 (cont.)

	Question wording	n
<i>Water battery prompt</i>	"Different levels of government claim responsibility for specific policy areas. Using the following 0 to 10 scale with 0 being Not at all Responsible and 10 being Completely Responsible please indicate which group you believe should be responsible for managing water policy."	
Federal government	"Federal government"	804
State government	"State government"	809
Local government	"Local government"	805
Private sector	"Private sector"	806
Figure 3		
<i>Battery prompt</i>	"On a scale from 0 to 10, with 0 indicating Not at all Important and 10 indicating Extremely Important, rate how important each of the following water uses is to you?"	
Drinking	"Water for drinking"	812
Household use	"Water for household use (e.g. showers, laundry, and toilets)"	813
Natural environment	"Water for the natural environment such as fish and wildlife habitat"	811
Private landscaping	"Water for landscaping homes and businesses"	807
Industrial use	"Water for industrial use (e.g. manufacturing, mining and energy generation)"	815
Agriculture	"Water for agriculture (e.g., crops and livestock)"	811
Recreation	"Water for recreation (e.g., pools and boating)"	811
Municipal landscaping	"Water for municipal landscaping (e.g., parks and golf courses)"	811
Table 1		
<i>Battery prompt</i>	"Please indicate whether you Strongly Disagree, Disagree, Neither Disagree Nor Agree, Agree, or Strongly Agree with each of the following statements."	
Water to meet current needs	"There is enough water in my state to meet current needs."	807
Water to meet future needs	"There is enough water in my state to meet future needs."	808
Economy vs. environment	"In water planning, the economy is more important than the environment."	807
Fish/wildlife vs. economy	"Water conservation for fish/wildlife habitat and economic growth are equally important."	807
Cities divert from rural areas	"Cities should be able to divert water from rural areas if they need more water."	806
Conservation affects me	"The issues related to the conservation and availability of water do not affect me."	807
Voluntary conservation	"Household water restrictions should be voluntary rather than mandated by the government."	806
Conserve: inconvenient	"Making efforts to conserve water is inconvenient."	808
Conserve: lower water bill	"I am willing to conserve water to lower my water bill."	809
Conserve: environment	"I am willing to conserve water to protect the environment."	809
Conserve: industrial use	"I am willing to conserve water for industrial uses."	808
Conserve: agriculture	"I am willing to conserve water for agricultural uses."	804
Conserve: drought conditions	"I am willing to conserve water under extreme drought conditions."	810
Figure 4		
Most important water issue	"What do you think is the most important water related issue in your state?" 1) "Water Quality/Pollution;" 2) "Water Quantity/Drought in areas;" 3) "Water Distribution/Provide enough water to all users"	808

Appendix Table 2 (cont.)

	Question wording	n
Figure 2		
<i>Battery prompt</i>	Indicate whether you Strongly Disagree, Disagree, Neither Disagree Nor Agree, Agree, or Strongly Agree that each of the following has been a cause of drought or water shortage in your region.	
Annual rainfall	"Short-term changes in annual rainfall levels"	706
Overuse of water	"Overuse of water"	704
Inadequate management	"Inadequate management of water resources"	704
Increased demand	"Increased demand from water users"	705
Climate change	"Climate change"	703
Table 3		
Drought frequency	"Are droughts in your region becoming more common, less common, or continuing to occur at the same rate?"	702
Drought severity	"Are droughts in your region becoming more severe, less severe, or continuing to occur with the same severity?"	700
Table 4		
<i>Battery prompt</i>	"How likely are the following drought impacts to occur in your region in the next five years?" Very Unlikely, Somewhat Unlikely, Unsure, Somewhat Likely, or Very Likely	
Disruption of water supply	"Disruption of water supply"	810
Increased food prices	"Increased food prices"	806
Increased water costs	"Increased water costs"	809
Loss of recreational activities	"Loss of recreational activities"	807
Damage to animals & plants	"Damage to animal and plant species"	810
Reduced water quality	"Reduced water quality"	808
Increased fires	"Increased fires"	806
Increased water-use conflicts	"Increased water-use conflicts"	807
Figure 5		
Which use should be reduced first	"Which of the following water uses should be reduced first to lessen the impacts of drought?" 1) "City use;" 2) "Agricultural use;" 3) "Industrial use;" or 4) "Individual use"	812
Figure 6		
<i>Battery prompt</i>	"During times when water availability is limited due to a short-term drought (lasting less than two years), a city may adopt several strategies to ensure it has enough water. Please rate the strategies that a city might consider on a scale of 0 to 10 with 0 being Not Favored by you and 10 being Highly Favored by you."	
Limit use on private lawns	"Limiting water use on private lawns"	812
Limit use on public lawns	"Limiting water use on public landscapes"	811
Buy water from farmers	"Buying water from farmers to use in cities"	810
Limit water use by industry	"Limiting water use by industry"	810
Figure 7		
<i>Battery prompt</i>	"Increasing population means that cities will need more water for the long run (more than ten years in the future). Listed below are several possible strategies that a city might consider to ensure adequate water supplies in the future. Please rate the strategies on a scale of 0 to 10 with 0 being Not Favored by you and 10 being Highly Favored by you."	
Transfer water from farms	"Permanently transferring water from farms to the city"	809

Appendix Table 2 (cont.)

	Question wording	n
Build dams & reservoirs	"Building dams and reservoirs"	808
Pipe water	"Constructing pipelines to bring water from other regions"	807
Reuse treated waste water	"Reusing treated waste water on lawns and landscapes"	809
Require conservation	"Requiring water conservation"	805
Limit urban sprawl	"Limiting urban sprawl"	805
Increase water rates	"Increasing water rates"	808
Table 5		
<i>Battery prompt</i>	"A number of policy options have been proposed to manage water resources. Please indicate whether you Strongly Oppose, Oppose, Support, or Strongly Support each of the following options." Respondents were also allowed to choose "Unsure."	
Build infrastructure	"Build infrastructure (dams, reservoirs, pipelines) to support water demands during a drought"	794
Voluntary conservation	"Conduct campaigns for voluntary water conservation"	786
Require conservation	"Require mandatory water conservation"	787
Tax incentives	"Give tax incentives for the installation of water-saving equipment"	792
Comprehensive national plan	"Develop a comprehensive national plan for allocating water across state borders"	790
State tax cuts	"Provide state tax cuts to companies that reduce their water use"	789
Low water-use landscaping	"Require low water-use landscaping"	789
Protect wildlife & fish habitat	"Protect some water resources to preserve wildlife and fishery habitats"	792
Reuse treated waste water	"Require that lawn watering use reclaimed/reused water instead of drinking water"	791