Public Attitudes and Perceptions about Water Issues in Texas

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Water Issues: A Survey of Public Attitudes

Research goals:

• Gauge the level of public knowledge and concerns about water issues

• Determine priorities for outreach/educational programs

• Measure the impacts of outreach programs and changes in public attitudes at 5-year intervals
Survey Design and Administration

- **Instrument:**
  - Based on the survey developed for US EPA Region 10 (2002)
  - 59 questions

- **Distribution**
  - Random sample of residential mailing addresses
  - August 2008 and April 2014
  - Four-stage mailing procedure following Dillman (2000)
Four-stage mailing procedure following Dillman (2000)

- Cover letter and survey with a self-addressed, stamped envelope mailed
- Reminder postcard mailed 20 days later to nonresponders
- 20 days later, another cover letter, survey and business reply envelope mailed to nonresponders
- 20 days later, another reminder postcard was sent to nonresponders
Survey Instrument

- Importance of water resource issues
- Importance of management actions
- Drinking water issues
- Water quality and water availability
- Water resource information
- Demographics and residence
Survey Instrument

- Direct mail to 1,800 residents
- Removed:
  - Returned to Sender
  - Opting out
  - Deaths
- 1,655
- N = 475 responses
- Response rate of 29%
Research Focus Areas

Public Perceptions and Attitudes about Water Availability Following Exceptional Drought in Texas

Consumer Water Quality Evaluation of Private and Public Drinking Water Sources

Learning Preferences for Water Resource Information from Extension and Other Sources
### Respondent Demographics: 2008 and 2014

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Response Rate</strong></td>
<td>33% of 1275</td>
<td>29% of 1655</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>419</td>
<td>475</td>
</tr>
<tr>
<td><strong>Average Age</strong></td>
<td>57</td>
<td>59</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td>Male: 63%</td>
<td>Male: 49%</td>
</tr>
<tr>
<td></td>
<td>Female: 37%</td>
<td>Female: 51%</td>
</tr>
<tr>
<td><strong>Years in Texas: All my life or more than 10 years</strong></td>
<td>89%</td>
<td>92%</td>
</tr>
</tbody>
</table>

The difference in gender between survey years is statistically significant (Chi-squared test (p<.05))
### Respondent Demographics Cont.

<table>
<thead>
<tr>
<th>Size of Residence Community</th>
<th>2008</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 100,000</td>
<td>48%</td>
<td>54%</td>
</tr>
<tr>
<td>25,000 – 100,000</td>
<td>21%</td>
<td>20%</td>
</tr>
<tr>
<td>7,000 – 25,000</td>
<td>12%</td>
<td>11%</td>
</tr>
<tr>
<td>3,500 – 7,000</td>
<td>9%</td>
<td>6%</td>
</tr>
<tr>
<td>&lt; 3,500</td>
<td>10%</td>
<td>10%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Residence Location</th>
<th>2008</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside City Limits</td>
<td>48%</td>
<td>54%</td>
</tr>
<tr>
<td>Outside City Limits, not engaged in farming</td>
<td>21%</td>
<td>20%</td>
</tr>
<tr>
<td>Outside City Limits, engaged in farming</td>
<td>12%</td>
<td>11%</td>
</tr>
</tbody>
</table>
Repeated Survey of Public Attitudes Following an Extended Period of Exceptional Drought
**Is water quantity a problem in the area where you live?**

- Definitely: 37.2%
- Probably: 24.4%
- I don't know: 10.3%
- Probably not: 21.4%
- Definitely not: 6.8%

**Bar chart showing responses.**
Is water quantity a problem in the area where you live?

- **Definitely**: 37.2%
- **Probably**: 24.4%
- **I don't know**: 10.3%
- **Probably not**: 21.4%
- **Definitely not**: 6.8%


- **2014**:
  - Definitely: 37.2%
  - Probably: 24.4%
  - I don't know: 10.3%
  - Probably not: 21.4%
  - Definitely not: 6.8%

- **2008**:
  - Definitely: 22.5%
  - Probably: 25.4%
  - I don't know: 7.9%
  - Probably not: 29.1%
  - Definitely not: 15.1%
Water Quantity

• Chi-squared test: Significantly different ($p<.00001$) between years (2008 vs 2014)

• Multinomial logistic regression: No significance with socio-demographic variable (gender, community size, age, residence location, education)
The likelihood of your area suffering from a prolonged drought is:

<table>
<thead>
<tr>
<th>Response</th>
<th>2008</th>
<th>2014</th>
<th>Change % Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing</td>
<td>51.6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>69.2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>17.6</td>
</tr>
<tr>
<td>Staying the same</td>
<td>37.9&lt;sup&gt;a&lt;/sup&gt;</td>
<td>22.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-15.8</td>
</tr>
<tr>
<td>Decreasing</td>
<td>2.4&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-0.3</td>
</tr>
<tr>
<td>No opinion</td>
<td>8.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6.6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-1.5</td>
</tr>
</tbody>
</table>

% Respondents

Superscript indicates significance at the .05 level.
Likelihood of Prolonged Drought

• Chi-squared test: Significantly different ($p<.00001$) between years (2008 vs 2014)

• Multinomial logistic regression: No significance with socio-demographic variable (gender, community size, age, residence location, education)
The likelihood of your area having enough water resources to meet all of its needs 10 years from now is:

- **High (likely enough water):**
  - 2008: 20
  - 2014: 7

- **Medium:**
  - 2008: 41
  - 2014: 32

- **Low (likely not enough water):**
  - 2008: 30
  - 2014: 53

- **No opinion:**
  - 2008: 8
  - 2014: 8
• Education
  – (2014) Respondents with more education (p<.001) were more likely to believe there would not be enough water in 10 years
  – All other socio-demographic variables showed no differences
Rainfall Change as a Result of Global Warming

- Chi-squared test: Significantly different ($p < .001$) between years (2008 vs 2014)

- Multinomial logistic regression:
  - More education reduces the likelihood of responding that rainfall will increase ($p < .001$)
Have you or someone in your household done any of the following as part of an individual or community effort to conserve water or preserve water quality?

Superscript indicates statistically significant (Chi-squared test \(p<.05\))
Multinomial Regression

• Landscaping
  – Gender was a significant predictor ($p<.05$)
  – Females were more likely to change the way they landscaped

• Adopting New Technologies
  – Gender was a significant predictor ($p=.006$)

• Watering Yards
  – Gender ($p<.05$) and Years lived in Texas ($p<.05$) were significant predictors
  – The longer respondents lived in Texas and Females were more likely to have changed the way they watered their yard
Conclusions about Water Quantity

- From 2008 to 2014, the percentage of Texans replying that water quantity is an issue in their area increased from 47% to 61% ($p < 0.0001$).

- Texans believing that their area will experience prolonged drought increased from 52% to 69% ($p < 0.0001$).

- Likelihood to not have enough water resources to meet needs 10 years from now increased from 30% to 53%.

- From 2008 to 2014, Texans have made changes to landscape and added new technology in efforts to conserve water.
The Hydro-illogical Cycle:

1. Concern
2. Drought
3. Apathy
4. Rain
5. Panic
6. Awareness
Learning Preferences for Water Resources Information

• How are you getting water resource information?
• What topics would you like to learn about?
• How would you like to receive water resource information?
## Learning Preferences

Table 5. Water resource information sources and respondent residence location. †

<table>
<thead>
<tr>
<th>Information sources</th>
<th>Overall % (n)</th>
<th>Inside city limits % (n)</th>
<th>Outside city limits, not engaged in farming % (n)</th>
<th>Outside city limits, currently engaged in farming % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension</td>
<td>13.4 (52)</td>
<td>10.2 (29)</td>
<td>20.2 (17)</td>
<td>33.3 (6)</td>
</tr>
<tr>
<td>Television</td>
<td>56.9 (242)</td>
<td>61.1 (190)</td>
<td>46.8 (44)</td>
<td>40 (8)</td>
</tr>
<tr>
<td>Newspapers and magazines</td>
<td>63.9 (266)</td>
<td>65.6 (200)</td>
<td>58.7 (54)</td>
<td>63.2 (12)</td>
</tr>
<tr>
<td>City /Municipal water districts</td>
<td>68.2 (296)</td>
<td>73.9 (238)</td>
<td>57 (53)</td>
<td>26.3 (5)</td>
</tr>
<tr>
<td>Environmental groups</td>
<td>31.9 (126)</td>
<td>35.4 (103)</td>
<td>22.4 (19)</td>
<td>21.1 (4)</td>
</tr>
<tr>
<td>Environmental agencies</td>
<td>31.4 (126)</td>
<td>34 (100)</td>
<td>23.9 (21)</td>
<td>26.3 (5)</td>
</tr>
<tr>
<td>Universities</td>
<td>15.2 (60)</td>
<td>15.5 (45)</td>
<td>12.9 (11)</td>
<td>22.2 (4)</td>
</tr>
</tbody>
</table>
Would you like to learn more about any of the following water quality issue areas? (Mark all that interest you)

- Protecting public drinking water supplies: 57.4%
- Water management in home and garden landscaping: 55.8%
- Fish and wildlife water needs: 32.1%
- Community actions concerning water issues: 31.5%
- Restoring fish and aquatic habitat: 28.6%
- Watershed management: 27.2%
- Water policy and economics: 25.6%
- Landscape buffers: 25.6%
What Topics Would You Like to Learn About?

- **2008 vs. 2014 (Chi Square)**
  - Increase in home and garden landscaping (34% to 56%; likelihood ratio p. <.003)

- **Binary Logistic Regression**
  - More likely to want to learn about home and garden landscaping
    - Females (p<.01)
    - Lived in Texas shorter amount of time (p<.012)
  - More likely to want to learn about protecting drinking water
    - Respondent in city limits (P<.005)
<table>
<thead>
<tr>
<th>Water Resource Topic</th>
<th>Inside city limits (n=266)</th>
<th>Outside city limits, not farming (n=79)</th>
<th>Outside city limits, farming (n=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protecting Public Drinking Water Supplies</td>
<td>63.2%</td>
<td>41.8%</td>
<td></td>
</tr>
<tr>
<td>Septic System Management</td>
<td></td>
<td>39.2%</td>
<td></td>
</tr>
<tr>
<td>Private Well Protection</td>
<td></td>
<td>35.4%</td>
<td>55.6%</td>
</tr>
<tr>
<td>Watershed Management</td>
<td></td>
<td></td>
<td>44.4%</td>
</tr>
<tr>
<td>Fish and Wildlife Water Needs</td>
<td></td>
<td></td>
<td>38.9%</td>
</tr>
<tr>
<td>Home and Garden Landscaping</td>
<td>59.4%</td>
<td>51.9%</td>
<td></td>
</tr>
<tr>
<td>Watershed and Stream Restoration</td>
<td></td>
<td></td>
<td>44.4%</td>
</tr>
</tbody>
</table>
If you had the following kinds of opportunities to learn more about water issues which would you be most likely to take advantage of?

- Visit a web site: 53.5%
- Read fact sheets, bulletins, or brochures: 51.2%
- Watch TV coverage: 44.5%
- Read newspaper article/series: 38.5%
- Watch a video of information (YouTube): 19.1%
- Attend a short course or workshop: 13.6%
- Look at demonstration/display: 11.8%
- Download app: 10.8%
## Opportunities by Age Group

### Table 7. Preferred learning opportunities and respondent age

<table>
<thead>
<tr>
<th>Learning Method</th>
<th>18 - 34 (n=18)</th>
<th>35 - 49 (n=72)</th>
<th>50 - 64 (n=155)</th>
<th>65 and Older (n=135)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visit a website***</td>
<td>55.6%</td>
<td>56.9%</td>
<td>58.7%</td>
<td>36.3%</td>
</tr>
<tr>
<td>Read fact sheets, bulletins, or brochures*</td>
<td>33.3%</td>
<td>37.5%</td>
<td>45.2%</td>
<td>57.0%</td>
</tr>
<tr>
<td>Watch TV coverage</td>
<td>33.3%</td>
<td>30.6%</td>
<td>36.1%</td>
<td>48.1%</td>
</tr>
<tr>
<td>Read newspaper article/series*</td>
<td>27.8%</td>
<td>25.0%</td>
<td>32.9%</td>
<td>44.4%</td>
</tr>
<tr>
<td>Watch a video of information (YouTube)*</td>
<td>33.3%</td>
<td>19.4%</td>
<td>18.7%</td>
<td>10.4%</td>
</tr>
</tbody>
</table>

* Probability level of 0.05.

*** Probability level of 0.001.
Conclusions

• The most frequently identified source of information was city and municipal water districts for
  – 68.2% of all respondents, and
  – 73.9% of those living within city limits

• From 2008 to 2014, visiting a website went from fourth to the most popular learning method.

• Younger respondents were more likely to visit a website or watch a short video, while those older were more likely to prefer printed material.
Thank You
Locations of 2014 Respondents