PERCEPTIONS OF WATER IN THE AMERICAN WEST: A META ANALYSIS

Produced by

GlobaLocal Visions, LLC
2646 N. Fox Run Dr.
Flagstaff, AZ 86004
(928) 526-3178

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***** DRAFT REPORT *****

EXECUTIVE SUMMARY

GlobaLocal Visions (GLV), LLC of Flagstaff, Arizona was commissioned by the University of Arizona to conduct a meta-analysis of five research reports exploring water issues and policies in Arizona and other Western states. The purpose of the meta-analysis was to highlight what is known about water issues regionally and locally and to identify gaps in knowledge related to individual attitudes, levels of awareness, and behaviors related to water issues.

- Overall, respondents were 'very concerned' about future water supplies, both locally and regionally. While Valley residents, on average, understand that their area is experiencing drought; half of residents in Southwestern states believe that current water supplies in their states are sufficient. Similarly, Valley respondents do not necessarily associate future water scarcity with current levels of consumption in their neighborhoods.

- The availability of clean drinking water and water for personal/household use was identified by Arizona residents as the most important water use issue.

- Regional surveys identified a general lack of knowledge regarding water pollutants. Forty percent of individuals surveyed in the Southwest do not know whether a given pollutant could affect water quality. In Arizona, 80 percent of respondents believe their home drinking water is safe; it is less clear whether Arizona residents are aware about potential pollutants in their area.

- Residential water use records demonstrate a discrepancy between perceived water use and actual water use; this includes issues related to levels of awareness and behaviors. Respondents who engage in water saving measures, such as installing low flow toilets or showerheads believe they had reduced their consumption of water. However, actual water use records indicated otherwise. Similarly, Valley residents perceived that their indoor

water use exceeded their outdoor use, when in fact, particularly during the summer months, outdoor use far exceeds indoor use.

- Results suggest that conceptions of 'what a yard should be' influence water use behaviors in the Valley. Individuals finding greenery more aesthetically pleasing than a desert landscape are more likely to water their lawns. Understanding these preferences and associated behaviors is crucial to developing and implementing effective water conservation programming.

- Both Southwestern and Arizona residents believe that water conservation efforts are 'important' and 'impact' their daily lives. However, many residents also feel that access to water for personal/household use is 'a right' and do not endorse restrictions on household water use as a short-term strategy to conserve scarce water supplies into the future. A better understanding of this tension – between the desire to conserve water and the desire to not have personal use regulated – is central to future research efforts aimed at improving water conservation programming and effectiveness.

- In general, Southwestern residents agree that the government has a role to play in water policy and management decisions; however, respondents desire a more significant voice in the decision-making process and feel that current water laws are not meeting the needs of today's situation. Arizona residents indicate that local government has the highest degree of responsibility for protecting water quality, followed by county, city, and town officials.

INTRODUCTION

This report is a meta-analysis or survey of results from five research projects. Each of the projects investigated individual attitudes, levels of awareness, and behaviors related to water issues and policies in Arizona and other Southwestern states. The purpose of a meta-analysis is to assess the current state of knowledge within a specific policy area, highlighting what is known about a subject and identifying gaps in knowledge. Meta-analysis results are often used to construct agendas for future research in various policy arenas. A brief description of the five studies follows.

DESCRIPTION OF STUDIES

A. The Phoenix Area Social Survey (PASS), 2003

The Phoenix Area Social Survey, first conducted in 2001, is an interdisciplinary research effort designed to study "relationships between people and the natural environment." In particular, researchers are interested in understanding "whether people's perceptions correlate with scientifically measurable environmental conditions."

Findings from the 2003 PASS survey reflect information gathered from interviews with 217 residents of Phoenix. Area probability sampling of housing units within designated census block groupings was employed to ensure random recruitment of participants throughout Phoenix. Interviewers recruited participants by visiting their households. Participants were offered a pair of movie tickets as an incentive to participate. Once people agreed to be interviewed, the interviews were conducted at the residence or over the phone. Interviews were conducted in both English and Spanish. The interviews were 'nearly equally distributed' across six neighborhoods of varying socioeconomic status in Phoenix; two 'newer' higher income neighborhoods (HN1, HN2), two 'older' middle-income neighborhoods (M1, M2), and two 'older' lower-income neighborhoods (L1, L2). The overall response rate was 43 percent. A majority of the participants had lived in Phoenix for ten plus years; one third had lived in Phoenix for over twenty years.

Participant Demographics

The median age of respondents from HN1 is 47. Eighty-four percent of those surveyed were non-Hispanic white, while 3 percent were Hispanic. In general, participants residing in HN1 are highly educated, own their homes, and have a median annual income of $118,000. The median age of respondents from HN2 is 42. Ninety-seven percent of those surveyed were non-Hispanic white. Respondents from HN2 are also highly educated, own their homes, and have a median annual income of $120,000.

The median age of respondents from MN1 is 42. Seventy-five percent of respondents were non-Hispanic white, while nineteen percent were Hispanic. The racial/ethnic makeup of this neighborhood more closely reflects Maricopa County as a whole, where 66 percent of residents were white and 25 percent were Hispanic. While the median age of respondents from this neighborhood is similar to the higher-income neighborhoods, rates of homeownership and educational attainment are lower, as is the median household income ($40,000). Compared to MN1, respondents from MN2 are slightly younger (40) and have higher rates of homeownership and educational attainment. The racial/ethnic makeup is equivalent (69% white, 22 % Hispanic) and the median household income is identical.

In LN1, respondents were younger (median age 32), less well educated (the most common level of educational attainment reported was high school), and very few respondents own their home (10%). Eighty-seven percent of respondents were Hispanic and 10 percent were white. The median household income was just $20,000. Compared to LN1, respondents from the second lower-income neighborhood were slightly older (median age 32), had far higher rates of homeownership (82%), and a higher median household income ($30,000). Rates of educational attainment were similar, as was the racial/ethnic makeup.

B. The Phoenix Area Social Survey (PASS), 2006

The 2006 PASS survey involved a larger number of participants drawn from a wider geographic area than participated in the 2003 survey. Eight hundred and eight residents from 40 neighborhoods throughout the valley participated in the 2006 study. Researchers drew neighborhood boundaries using U.S. Census maps and 40 out of a possible 100 neighborhoods were chosen for the study. Within each of the neighborhoods, 40 addresses were randomly selected as part of the general population sample. Recruitment letters were sent to the selected addresses. Researchers continued to contact the households until people from 20 households in each of the neighborhoods agreed to participate. Overall, the survey had a 51 percent response rate. Fifty-nine percent of respondents completed the survey online; 34 percent completed the survey by phone; and, 7 percent completed the survey in person. The survey was conducted in both Spanish and English.

Participant Demographics

Slightly over half of survey respondents (56 percent) were women. Sixty percent of respondents were married, and 76 percent owned their homes. All ages were represented, with the majority of respondents falling between the ages of 31-50. Seventy-three percent of respondents were white, 19 percent were Latino, 3 percent were African American, 2 were percent Native American, 2 percent were Asian, and 1 percent reported being of mixed race. All educational levels were represented, with a majority of respondents having either completed high school (26 percent) or college (28 percent). Annual household incomes ranged from less than $40,000 (35 percent) to over $85,000 (36 percent). A majority of respondents have lived in the valley between 6-25 years (49 percent). On the ideological spectrum, 41 percent of respondents self-identified as conservative, 34 percent self-identified as moderate, and 25 percent self-identified as liberal.

C. Water Issues in the Southwest, 2004

This survey was developed by the USDA-CREES Southwest States and Pacific Islands Regional Water Quality Team to "document public awareness, aptitudes, attitudes, and actions toward water quality in the Southwest States." The survey was completed by 1,601 residents of Nevada, Arizona, and California. Survey findings are reported for each state.

Participant Demographics

A majority of respondents live in communities with less than 100,000 residents (56 percent) and just over three quarters of respondents have lived in their current state for ten years or longer (76 percent). Roughly 66 percent of respondents were male and 34 percent were female. Most participants had completed some college (31 percent) or obtained an undergraduate degree (33 percent).

D. Arizona Municipal Water Users Association (AMWUA), 2007

This study employed a mixed method approach to "test water conservation awareness, attitudes, and behaviors across nine member cities: Chandler, Gilbert, Glendale, Goodyear, Mesa, Peoria, Phoenix, Scottsdale, and Tempe." The research took place in three stages. First, researchers conducted a series of four focus groups, with English and Spanish speaking single-family households. The information obtained from the focus groups was used to develop a survey that was then piloted to approximately 50 households. Second, a random sample of residents was drawn to participate in a telephone survey. Approximately 1,400 households were interviewed from each of the nine member cities. Third, researchers matched survey results with water use records from all participating cities, except Mesa, to "determine how awareness of water conservation programming and attitudes concerning water conservation correlates with actual water use."

Participant Demographics

English language focus group participants were 50 percent male and 50 percent female. Spanish language participants were also 50 percent male and 50 percent female. Many participants were immigrants of varying age groups and most had never participated in a focus group.

E. Public Perceptions, Preferences, and Values for Water in the West: A Survey of Western and Colorado Residents, 2009

The Colorado Water Institute conducted an Internet survey of 6,250 individuals living in 17 Western states. The purpose of the study was to gauge public perceptions and attitudes toward "water knowledge, perceived water scarcity, strategies for easing scarcity in the short term and long run, reinvestment in rural communities that lose water as a part of their economic base, household conservation of water resources, preferences in public policies and institutions, and attitudes about wildlife and water." Data were collected in two stages. First, three focus groups were held in "selected regions" to "identify water issues of high priority." Second, based on insights gleaned from the focus groups, a survey was developed and administered via the Internet. An email was sent to 203,750 randomly selected households across 17 western states. Of the 6,883 people who opened the email, 6,250 elected to complete the survey, for a response rate of 91 percent. Results reflect responses from Colorado residents specifically and western residents more generally. In Arizona, 530 individuals completed the online survey.

Participant Demographics

A majority of survey participants from the West were female (74 percent) and most fell between the ages of 45-64. Nearly 70 percent of participants in the west reported owning their home and many have resided in the west for 20 years or longer. A majority of survey respondents resided in large cities (greater than 250,000). Most respondents completed some college and have an annual household income of less than $75,000.

FINDINGS AND ANALYSIS

The report findings are grouped thematically around five core issues: (1) water security; (2) water quality and pollution; (3) water use – perceptions and behaviors; (4) water conservation – awareness and behaviors; and, (5) policy preferences – governance and water issues.

A. Water Security

Water security refers to participants' attitudes and levels of awareness related to the availability of drinking water, both at the present time and into the future. Questions probed the implications of water security at the local, state, and regional levels. Out of the five surveys, three directly asked respondents to comment on water security. In the 2003 PASS survey, slightly over half of respondents said they were 'very concerned' about the future water supply in the Valley. Yet, only 21 percent of respondents were 'very concerned' about the amount of water used by their neighbors. According to the report, "Valley residents have evidently internalized the idea that water is scarce in the desert, [but] PASS respondents do not directly associate a future shortfall with residential water consumptions in their neighborhoods."

In the 2006 PASS survey, attitudes toward water scarcity remained similar to those reflected in the 2003 survey. A 'vast majority' of respondents reported being 'very' or 'somewhat' concerned about the amount of water being used by people who live in the Valley. Further, 85 percent of respondents agreed that the Valley is 'experiencing a drought,' and were 'very' or 'somewhat' concerned about the impacts of the drought on the Valley. Importantly, while respondents were clearly aware that the Valley is experiencing a drought and expressed concern over the amount of water being consumed, one-quarter of respondents believe that residents of the Valley have 'the right' to use all the water they need.

Further, the 2006 PASS survey asked respondents to comment on what they perceived to be the causes of future water shortages. Most respondents identified 'long-term drought,' followed by 'people moving to the Valley,' and 'climate change' as the primary causes of future water shortage in the valley. PASS researchers concluded that residents "perceive a variety of causes for complex environmental problems [but] tend to place more blame on nature and general social trends than their own actions for creating critical problems that face the Valley." Regionally, 'future water scarcity' in the West was identified as a significant concern by a majority of respondents participating in the Colorado Water Institute survey (CWI). Likewise, future water scarcity in respondents' state of residence was identified as a significant concern by a majority of

those surveyed. However, half of respondents perceived that current water supplies in their states were 'sufficient.'

B. Water Quality and Pollution

In the 2004 Water Issues in the Southwest (WIS) survey, the availability of clean drinking water was identified by respondents as being among the most important water use issue. More specifically, Arizona respondents ranked 'clean drinking water' and 'water for household/personal use' as extremely important issues. The WIS survey found a general lack of knowledge among respondents regarding potential water pollutants. Regionally, over 40 percent of respondents did not know whether a "given pollutant affects the water quality in their area." Despite the lack of knowledge, a majority of Arizona respondents believe their home drinking water is safe (80 percent).

The 2003 PASS survey asked respondents to rank their concern about several physical and environmental conditions. The survey gauged responses at the neighborhood level and the Valley as a whole. 'Drinking water safety' was the largest concern in the neighborhoods and a significant concern for Valley residents as a whole. In addition, 9 out 10 respondents consume bottled water or filtered water in their homes. PASS Researchers noted that since recent publicized studies demonstrated the safety of drinking water in the Valley, "it is important to explore in future surveys why many people are concerned about the public water supply."

C. Water Use – Perceptions and Behaviors

The data collected on residential water use suggests a discrepancy between perceived water use and actual water consumption. Roughly half the respondents surveyed by the AMWUA, report making lifestyle changes to reduce their water consumption. These changes include: watering the lawn less frequently, running the washing machine less frequently or only with full loads, and/or installing low-flow toilets or showerheads. However, actual water use records demonstrate that, although respondents perceived they had reduced water consumption, they did not use any less water when compared to respondents who did not report employing water conservation behaviors.

Likewise, most AMWUA respondents perceived that their indoor water use exceeded outdoor water use. However, water use records indicate that outdoor water use far exceeds indoor use, particularly during the summer months when water use nearly doubles; this doubling of water use is the result of activities such as watering the lawn or maintaining outdoor pools.

A majority of the AMWUA respondents characterized themselves as 'average' water consumers and most frequently identified sources other than themselves as consuming the highest amount of water in their communities, such as golf courses, city governments, and 'my neighbor,' These findings suggest a tendency for individuals to externalize concerns about water consumption in their communities, while misperceiving their own rates of consumption.

Findings from the 2003 PASS survey also highlight the discrepancy between perceived water use and actual water use behaviors. This study indicates that residents from higher socioeconomic brackets are less concerned about water use in their neighborhoods compared with middle to lower class residents who report higher levels of concern about water use. However, despite a lack of concern over water use in their neighborhoods, wealthier residents are responsible for "putting more pollutants in the air, soil, and groundwater than middle or lower-income households" (2003 PASS survey: pgs. 29-30) suggesting that higher income residents misperceive the impact their lifestyle choices have on the environment around them.

The AMWUA and the 2003 PASS survey indicate that outdoor watering and swimming pools constitute a 'major component' of water use in the Valley. Seventy percent of all PASS respondents believe that "well watered grass and trees" improve the appeal of their neighborhoods. Similarly, PASS respondents from all socioeconomic backgrounds "desire less desert and more greenery" than they presently have. When asked to elaborate on why they prefer greenery to a more natural desert landscape, respondents replied that grass and trees are more 'attractive,' 'cleaner,' and provide a 'nicer place' for children to play. Those who prefer desert landscaping do so because, it 'looks natural,' 'conserves water,' and is 'low maintenance' are motivating factors. AMWUA researchers conclude that "understanding how landscape aesthetics

shape the Valley's perceptions of what a yard 'should be' is key to developing effective outdoor water conservation programs."

D. Water Conservation – Awareness and Behaviors

With the exception of the WIS report that focuses specifically on issues of water quality in the West, each study examines respondents' levels of awareness and behaviors related to water conservation. Broadly speaking, most respondents living in the Southwest believe that water conservation is 'important' and 'impacts' their daily lives, but respondents stopped short of endorsing a restriction on household water use as a short-term strategy to secure scarce water supplies in the West. In fact, when asked to prioritize how water should be allocated in the short term, 'household use' received the highest ranking from western respondents.

A similar sentiment holds true for respondents living in the Valley. The 2003, 2006, and AMWUA surveys found that water conservation is an important issue that impacts peoples' daily lives. However, as 2006 PASS researchers noted, there is a tension between respondents' "positive attitudes toward conservation and their desire to have more land and water available for private household use." For example, in 2006, 61 percent of PASS respondents report trying to reduce their water consumption, typically by installing water-saving devices such as low-flow toilets or showerheads. Conversely, half of respondents said it would be 'almost impossible' to reduce their home water consumption from the past year.

The AMWUA survey also tracked respondents' awareness of "Water – Use it Wisely (WUIW)," a water conservation program used in nine cities throughout the Valley. Although very few respondents were able to name the program unaided, 84 percent, when aided, were familiar with some of the objectives of the program. Tentatively, WUIW may affect attitudes toward water conservation, as those respondents who were "aware and knowledgeable about the program were more likely to report altruistic motives for conserving water." At the same time, when researchers analyzed the water use records of respondents who were familiar with WUIW, they did not find a statistically significant relationship between awareness of WUIW and observed water use.

E. Policy Preferences – Governance and Water Issues

When asked about the role government should play in water allocation and conservation, many western respondents 'strongly agreed' that the government is responsible for 'managing growth,' and that government entities 'combine land use and water resource planning' (CWI survey: pg. 20). Most participants also strongly agreed that public money should be used to 'develop or acquire new water resources' (CWI survey: pg. 22). Furthermore, respondents felt that local governments in the Southwest should 'require residents to take steps to conserve water' (CWI survey: pg. 22).

In general, western respondents were unsatisfied with government water management policies and practices. Respondents believe that policy-makers 'do not understand their priorities,' and desire a larger voice in water management policy decisions. Participants tended to strongly agree that 'water laws need to be changed to better meet today's situation' (CWI survey: pg. 23). Although western survey respondents largely agreed that the government has an important role to play in water policy and management decisions, when asked to rank who should make water conservation decisions, 'individuals/households' received the highest ranking followed by 'local government,' 'state government,' 'federal government,' and 'businesses/corporations' (CWI survey: pg. 24).

In Arizona, 43 percent of respondents indicated that 'local government' has the highest degree of responsibility for "protecting water quality in their communities," followed by 'county, city, or town officials' (34%), the 'federal government' (12%), and 'individual citizens' (6%) (WIS survey: pg. 3). A slightly higher percentage of Arizona respondents (38%) reported that the environment does not receive enough emphasis from local and/or state elected officials, while 31 percent indicated that the emphasis put on environmental issues by elected officials is 'about right' (WIS survey: pg. 3).

Importantly, the 2006 PASS survey asked respondents to indicate their level of trust in several sources of environmental information. The survey demonstrated that respondents trust

'university scientists' more than any other source of information about the environment, followed by utility companies, local environmental groups, and the local government. As the PASS researchers note, "Public confidence in sources of environmental information is important for convincing people to change behaviors that negatively impact the environment. The high confidence placed in university scientists suggests that the public would be receptive to more direct engagement with scientists" (2003 PASS report: pg. 37).

The CWI survey asked western respondents to indicate their policy preferences to secure water supplies and meet demand, both in the short term, and the long term. To meet demand in the short term, results suggest a preference for restricting public and private watering, followed by limiting industry use. 'Permanent transfers' from farms to cities was the least preferred strategy for meeting demand in the short term. To meet demand in the long term, results suggest a strong preference for 'building reservoirs' and 'reusing water.' The least popular strategy was 'buying water from farmers.' To fund these strategies in the long terms, respondents indicated a preference for 'increased water rates – based on use,' and 'increasing fees on new housing development.' The least popular funding strategies were increased rates on 'all water bills' and policies that reallocate city budget funds to water.

CONCLUSIONS

In summary, this meta-analysis suggests that Arizona residents, and Southwestern residents more broadly, are aware that water scarcity is a significant issue facing the West now and into the future. As the findings indicate, several important discrepancies exist between respondents' awareness of water scarcity issues and their actual water use behaviors, perceptions, and preferences. For example, respondents tended to externalize their concerns about consumption; citing their neighbors, the city, or private businesses (i.e. golf courses) as the largest consumers of water, while misperceiving their own rates of consumption. Further, although a majority of respondents understand that water is a scarce resource that warrants conservation efforts, many believe they have 'the right' to use all the water they need. Thus, securing water for personal use

now and into the future, was selected by respondents as the top 'water use' priority. This contradictory sentiment- the desire to conserve water, a threatened resource, *and* have an unlimited supply of it for personal/household use – highlights a persistent tension found throughout the reports.

This meta-analysis also suggests a misunderstanding related to how lifestyle choices can impact water consumption. For example, AMWUA respondents perceived that indoor water use exceeded outdoor use, when in fact the opposite is true. During the summer months outdoor water use, largely due to lifestyle choices, such as maintaining a swimming pool, nearly doubles. Likewise, individual conceptions of landscape aesthetic play an important role in determining how household water will be allocated. Individuals who believe, as seventy percent of PASS respondents do, that "well watered grass and trees" improve the appeal of their neighborhood, will likely use greater quantities of water than those who prefer desert landscaping.

Although tentative at best, the 2003 PASS survey indicated that socioeconomic status may affect rates of water consumption and water use behaviors. If wealthier individuals/households are indeed responsible for putting a greater share of pollutants into the groundwater and less concerned about water use in their neighborhoods, more intensive water conservation efforts and programming may be needed in wealthier communities.

These findings provide researchers at the University of Arizona with a better understanding of individual attitudes, levels of awareness, and behaviors related to water issues and policies in Arizona and the West more broadly. However, in order to move toward a more complete picture of water use behaviors and preferences in Arizona there are some gaps in the extant research that need further exploration. These gaps are identified and discussed in the following section.

RECOMMENDATIONS FOR FUTURE STUDY

Further exploration of the following areas is recommended:

1) Implement research targeting rural communities and communities of color. The studies reviewed herein focused largely on urban areas in Arizona and a vast majority of those surveyed were white men and women. For example, how does class/race/gender/geographic location/age affect how we think about water issues?
2) Better understand how issues involving water use are conceptualized by people. Do people see the issue as an individual problem, a community problem, or a national problem? There is a need to better understand how people understand and think about this issue (what motivates people to conserve water?) in order to implement effective programming.
3) What motivates people to get involved in issues involving water? People in the West are unsatisfied with government water management policies and practices and desire a larger voice in policy decisions. Additional research in Arizona could work to better understand this sentiment and determine ways to empower residents to have a greater voice in water management decisions.
4) How are youth understanding issues involving water? Youth are growing up in an age of unprecedented information, use digital technology, and access to disposable income. Are youth thinking about water issues differently than previous generations?
5) Are current water conservations programs working? Do programs change behaviors? Are people open to learning new information and acting differently once they understand this information?

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