Minimizing Disparities and Developing Support by Identifying Differences in Confidence and Knowledge Related to Water Issues

Abstract

Extension educators face challenges as they strive to keep up with critical issues in their communities, such as those surrounding water. A growing population and a diminishing water supply necessitate that Florida residents become more knowledgeable about water issues. We conducted research to determine how confident both the general public and decision makers are in Florida's water resources and to assess how aware both groups are of the state's water policies. The results revealed significant statistical differences between the two groups in almost every category analyzed. We propose relevant ways to engage in targeted programming that will bridge the gap between the general public and decision makers.

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Introduction

Extension educators are facing extreme challenges as they strive to keep up with critical issues in their communities, the transference of knowledge from land-grant universities related to rapidly advancing technologies, and an increasingly diverse clientele with divergent needs (Blewett, Keim, Leser, & Jones, 2008; Raison, 2014; Scheer, Harder, & Place, 2011). On top of this situation, research has shown that for Extension educators to remain relevant, they need to be assisting in the development of informed citizens through education about public policy while avoiding promotion of policy (Boyle & Mulcahy, 1993; Hinkey, Ellenberg, & Kessler, 2005; Singletary et al., 2007). Today, Extension educators often are sought out for advice and information about water, a term synonymous with agriculture and natural resources. Challenges related to water have become the most pressing issue in Florida as well as in other areas of the United States (Leal, Rumble, & Lamm, 2015).

Historically, the most prominent issue Florida faced was that of too much water (Meindl, 2011). At the end of the 19th century, more than 60% of the state was either wetland or lake bottom (Dahl, 1990; Meindl, 2011). At the turn of the 20th century, the state's main concerns were drainage, flood control, and water navigation. As a

result of the state's growing population and years of draining wetlands and rerouting water resources, water issues have shifted dramatically and now revolve around water preservation and restoration(Meindl, 2011).

According to the U.S. Census (2014), Florida is the third most populated state in the nation. Close to 19 million people reside in Florida, and it is presumed that several million more will be added in the coming decades (Florida Office of Economic and Demographic Research, 2015; U.S. Census, 2014). Unlike in the rest of the world, where approximately 70% of freshwater use is devoted to agriculture, in Florida, public and domestic water demand exceeds agricultural demands, due to population growth (Marella, 2009). Approximately 88% of Florida's drinking water comes from groundwater resources, with Floridians extracting almost all available freshwater. For too long, water managers and local politicians have relied on groundwater to accommodate the population, but it seems as though those days are over (Meindl, 2011). Without action, water resources will grow increasingly scarce (Brennan & Dodd, 2009).

It is not just Floridians' use of water that threatens water quality and supply; other factors, such as saltwater intrusion, groundwater contamination, and drought, aggravate the problem. Florida has experienced at least one severe and widespread drought every decade since 1900. Moreover, it is predicted that these droughts will occur more often in the future (van Dijl, Grogan, & Borisova, 2015).

Florida's water issues have become contentious due to conflicting environmental and economic goals, uncertainty about pollution levels, and the varied geography throughout the state (Borisova, Racevskis, & Kipp, 2012). Today, Florida's water resources are regulated and managed by five water management districts under the state's Department of Environmental Protection. Collaborative management processes are undoubtedly influenced by socioeconomic and ecological conditions in a specific watershed, and as a result, policies proposed across the state can take different forms (Borisova et al., 2012).

Local leaders make direct decisions about water regulation and control, in conjunction with the Department of Environmental Protection and water management districts. Although the general public's stances on issues do not have direct impacts on policy, they do affect local decision makers' choices and may influence policies in an indirect way (Overdevest & Christiansen, 2013). Understanding the views and behaviors of all water users is critical to understanding the potential for success of any policy (Lubell, 2004).

We sought to obtain a better understanding of the general public's and decision makers' confidence in Florida's water resources and awareness of water policies. Our research was driven by the following objectives:

1. Describe the general public's and decision makers' perceived confidence in the sufficiency of future water resources and the quality of natural water systems.

2. Describe the general public's and decision makers' levels of knowledge about water-related legislative actions or plans.

3. Describe methods the general public and decision makers prefer to use to obtain information about water resources.

On the basis of our findings, Extension educators can determine how to build a sense of urgency in the general public around water issues and how to directly target gaps in knowledge. Resulting efforts will allow Extension to assist in the development of an educated public that is informed when voting and considering local issues. Moreover, our findings can be used in the development of Extension programs that both inform and support local

decision makers. In developing these programs, Extension not only can provide decision makers with the latest research but also can tap into methods the decision makers prefer to use to obtain information. Such efforts will ensure that local decision makers are better informed when developing water-related regulations and public policy and when taking legislative action.

Methodology

To achieve the objectives of our research, we implemented a web-based survey. An online instrument based on the 2012 RBC Canadian Water Attitudes study (Patterson, 2012) was developed. Questions were adapted so that they directly addressed Florida water issues and policies. The research described here was part of a larger research project, with four sections of the instrument applying to our objectives.

To gain an understanding of respondents' perceived confidence in both the sufficiency of future water resources and the quality of natural water systems, we used two sets of statements having 5-point Likert-type scaled response options. The first set of statements related to respondents' confidence in their communities' having sufficient water resources over the subsequent 10 years. The second set related to their confidence in the quality of Florida's natural water systems, including lakes, streams, rivers, wetlands, estuaries, and bays. The scale was as follows: 1 = *not at all confident*, 2 = *slightly confident*, 3 = *fairly confident*, 4 = *highly confident*, 5 = *extremely confident*.

To gauge respondents' knowledge of water-related policies, we included items that involved respondents' indicating their levels of familiarity with water-related legislative actions or plans. A 3-point scale was used (1 = *not familiar*, 2 = *somewhat familiar*, 3 = *very familiar*).

Finally, to identify methods respondents would use to obtain information about water resources, we included an item that asked how they would like to learn more about water-related topics. Respondents were presented with a list and encouraged to select all options that applied. Options related to visiting websites, using mass media, watching demonstrations, and attending events.

A panel of experts with knowledge of water issues in Florida and survey design reviewed the instrument for face content and validity. Minor adjustments were made, the instrument was finalized, and approval was obtained from the University of Florida's institutional review board. A pilot test of 50 respondents was conducted, and the pilot test data were analyzed to ensure reliability. All scales were found to be reliable, with Cronbach's alphas of less than .70.

There were two target populations for the research: Florida residents (age 18 or older) and local decision makers in Florida, including county clerks, county commissioners, and county managers. Different methods were used in collecting data from the two groups.

To collect data from a sample of Florida residents, we used Qualtrics, a public opinion survey research company, to obtain an opt-in, nonprobability-based sample. Qualtrics distributed the survey via email to 582 residents. A response rate of 90% (*n* = 524) was obtained. Several factors can limit the use of nonprobability samples, including potential exclusion, selection, and nonparticipation bias (Baker et al., 2013). For the purposes of minimizing these risks and balancing the results to ensure that the sample reflected the population of interest, weighting procedures were implemented prior to data analysis (Baker et al., 2013).

The survey also was sent to county-level decision makers in Florida. A list of email addresses for all county

commissioners, clerks, and managers (n = 1,212) was created. The process for creating the list involved an online search followed by phone calls when information was not readily available on a website so that as many email addresses as possible could be obtained. Those unavailable either online or through phone contact were excluded from participation. Once the list was finalized, an email was sent detailing the purpose of the study and offering a link to the survey via email. In accordance with the tailored design method (Dillman, Smyth, & Christian, 2009), three reminders were sent over 3 weeks; 181 responses were obtained, resulting in a 15% response rate. To account for nonresponse bias, chi-square tests comparing the respondents' demographics to those typical of the population of interest were performed. The results were nonsignificant for age, gender, and political affiliation; therefore, the respondents were considered representative of the population. However, the low response rate is a limitation, and the results must be interpreted with caution. Results were analyzed through the use of SPSS version 22. Descriptive statistics were used for calculating frequencies, and chi-square tests were used for examining whether differences between the two groups were statistically significant.

Results

There were differences in demographics between the two groups surveyed (Table 1). In terms of sex, the general public respondents were nearly evenly split, whereas over 70% of the decision makers were male. Also, there were more African American respondents in the general public group (16.4%) than in the decision makers group (5.4%). Those in the decision makers group tended to be older than those in the general public group. Moreover, unlike with the general public group, the majority of decision maker respondents (67.5%) had lived in Florida for 30 or more years.

Table 1.
Demographics

Demographic variable	General public (n = 524)		Decision makers (n = 181)[a]	
	n	%	n	%
Sex				
Female	268	51.1	27	29.0
Male	256	48.9	66	71.0
Race				
African American	86	16.4	5	5.4
Asian	13	2.5	0	0
Caucasian/White (Non-Hispanic)	404	77.1	83	89.2
Native American	0	0	3	3.2
Other	21	4.0	2	2.2
Hispanic ethnicity	118	22.5	5	5.4
Age				
18–29	96	18.3	1	0.6
30–39	83	15.8	10	5.6

40–49	96	18.3	34	19.1
50–59	91	17.4	52	29.2
60–69	75	14.3	53	29.8
70–79	50	9.5	25	14.0
80 and older	33	6.3	3	1.7
Years living in Florida				
0–9	106	20.2	12	6.6
10–19	131	25.0	23	12.7
20–29	133	25.4	24	13.3
30 and above	154	29.4	122	67.4

Note. Percentages in some categories may not sum to 100% due to rounding.

aResults in some categories do not sum to 181 because individuals opted out of responding to certain items.

Confidence in Water Resources

Respondents were asked to indicate their confidence in their communities' having sufficient water resources over the subsequent 10 years (Figure 1). Decision makers and the general public answered similarly. In both groups, at least 50% indicated that they felt either extremely or highly confident in the sufficiency of future water resources in their communities.
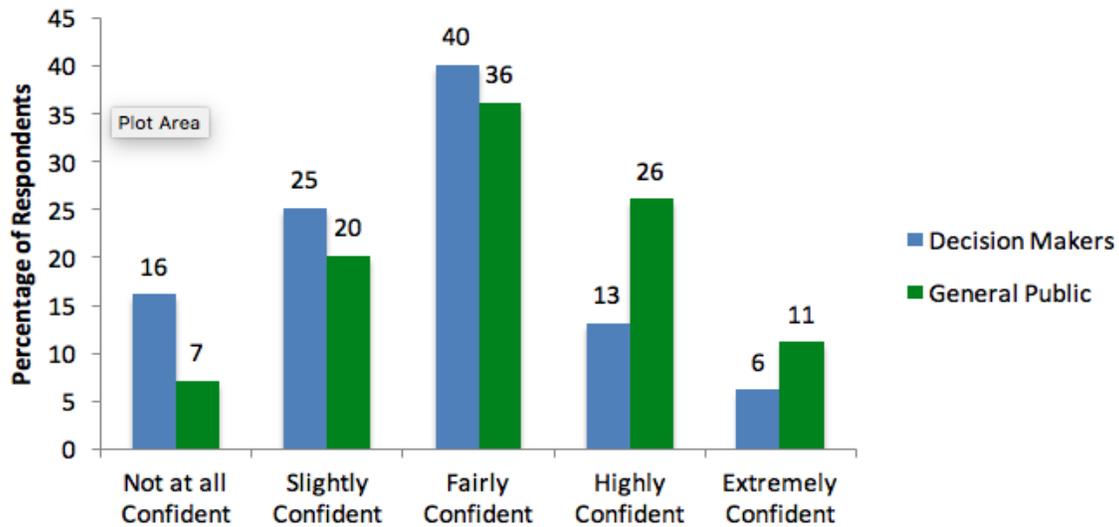
Figure 1.

Floridian Decision Makers' and General Public's Confidence in
Florida Communities' Having Sufficient Future Water Resources
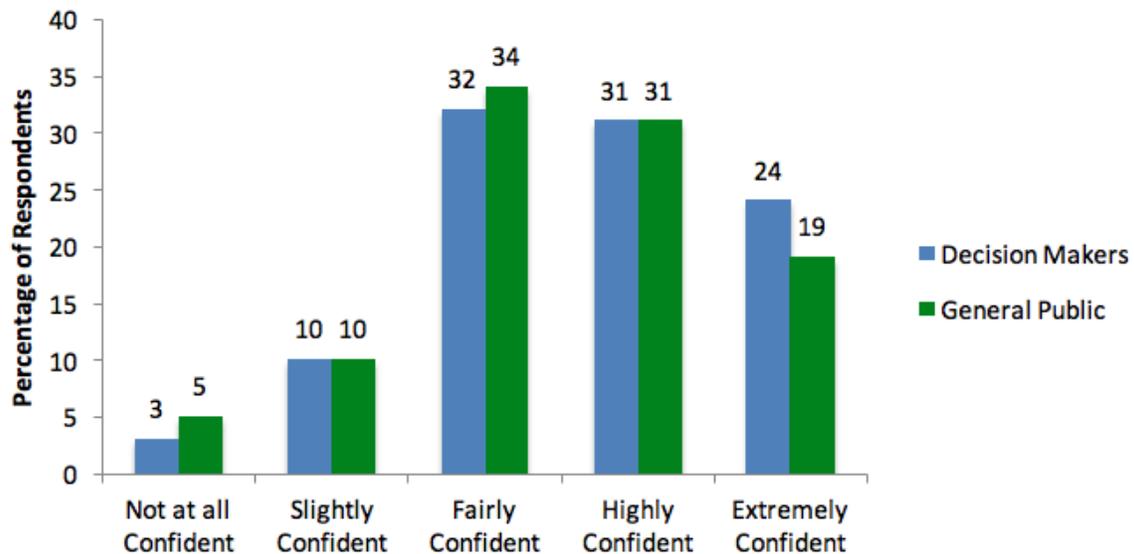
Additionally, respondents were asked how confident they were in the quality of Florida's natural water systems,

such as lakes, streams, rivers, wetlands, estuaries, bays, and other sources (Figure 2). The general public had a higher level of confidence in the quality of Florida's natural water systems: 37% of the general public respondents indicated being extremely or highly confident, whereas only 19% of the decision makers expressed those levels of confidence. In fact, over 40% of the decision makers indicated being only slightly confident or not at all confident.

Figure 2.
Floridian Decision Makers' and General Public's Confidence
in the Quality of Florida's Natural Water Systems

Knowledge of Water Policies

There were distinct differences between the general public's and decision maker's self-reported levels of knowledge about water-related legislative actions or plans (Figure 3). For all policies except the Apalachicola River and Bay Management Act, the proportion of general public respondents who reported being very familiar with the policy was lower than the proportion of decision makers who reported being very familiar with it. The proportions of general public respondents who reported being very familiar with legislative actions or plans were highest for the Clean Water Act and the Everglades Restoration Act. The proportions of decision makers who reported being very familiar with legislative actions or plans were highest for the Clean Water Act, the Florida Safe Drinking Water Act, and Total Maximum Daily Loads.

Figure 3.
Floridian Decision Makers' and General Public's Self-Reported
Levels of Knowledge of Water-Related Legislative Actions or Plans
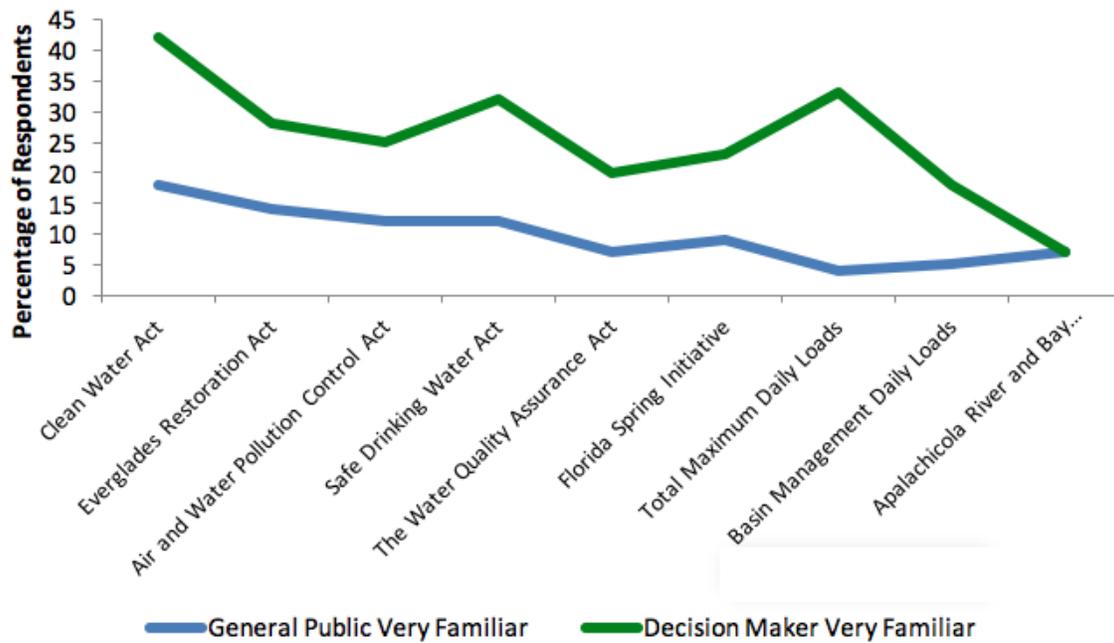
Comparisons in Perceived Confidence and Knowledge Levels

We conducted chi-square tests to determine whether significant differences existed between the respondent groups relative to perceived levels of confidence in sufficiency of future water resources and quality of natural water systems and self-reported levels of knowledge of various water-related policies. There were significant differences ($p < .01$) in every area of interest except confidence in water resources (Table 2).

Table 2.

Differences Between General Public and Decision Maker Respondents

| Area of interest	$χ^2$	p
Confidence in quality of Florida natural water systems	28.41	.00**
Confidence in sufficient future water resources	3.80	.43
Knowledge of water-related legislative actions or plans		
Total Maximum Daily Loads	138.95	.00**
Basin Management Action Plans	73.65	.00**
The Water Quality Assurance Act	59.68	.00**
Florida Spring Initiative	53.08	.00**
Safe Drinking Water Act	48.00	.00**
Air and Water Pollution Control Act	42.99	.00**
Clean Water Act	39.47	.00**
Apalachicola River and Bay Management Plan	29.39	.00**
Everglades Restoration Plan	19.15	.00**

**$p < .01$.

Information-Seeking Preferences

Finally, respondents were asked about their preferred methods for learning about water-related topics (Figure 4). The general public preferred to learn by visiting a website, watching TV coverage, or watching a video. Decision makers preferred to visit a website, read a newspaper article, attend a course or workshop, or attend a seminar or conference.

Figure 4.
Respondents' Preferred Methods for Learning About Water-Related Topics
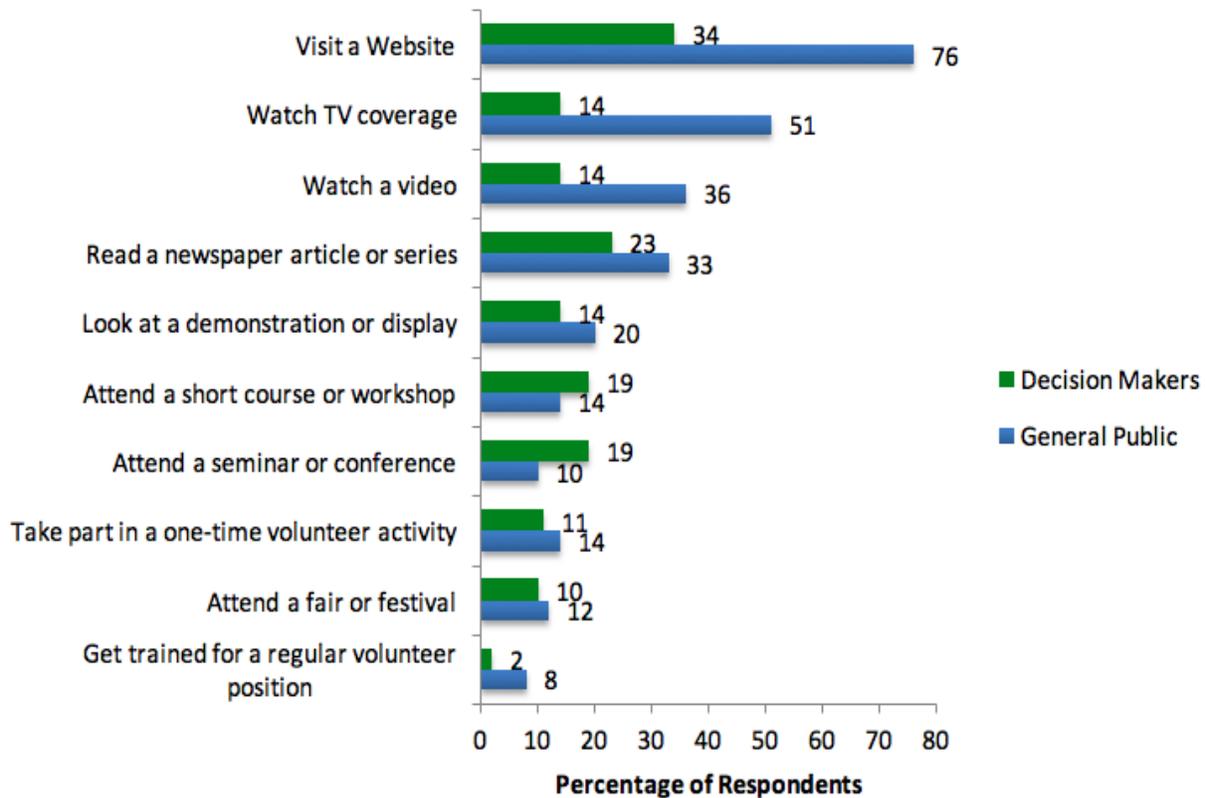
Discussion

We identified significant differences between the general public and decision makers relative to confidence in water resources and knowledge of water policy. The findings of our study can provide insights into developing water policy–focused Extension programs that target both groups, but it is important to recognize the study's limitations. First, the decision maker target audience for the survey was limited to a small sample of local decision maker respondents, several of whom opted out of answering certain demographics questions. A survey of a larger group would provide more insights, and the findings here should be used with caution. An additional limitation was the use of a collection method that resulted in a nonprobability sampling of general public respondents. Although weighting methods were used, the relationship between the sample and the whole population is unclear.

Limitations being recognized, the study nevertheless revealed insights that can be used to help Extension educators create targeted programs. Most critically, the findings suggest the importance of exposing the general

public to the state's water-related legislative actions and plans. Statistically significant differences were found between the two groups' knowledge levels for all the water policies listed on the survey instrument. This finding indicates that a knowledge gap exists in regard to political matters of importance to both decision makers and the general public. Extension educators often are sought out for advice and information; therefore, it is imperative that they assist in the development of informed citizens through education about public policy, which is currently lacking (Boyle & Mulcahy, 1993; Hinkey et al., 2005; Singletary et al., 2007).

For Extension educators to reach both groups, it is important to know how they would like to learn about water-related issues. The "visiting a website" method was the number one choice for both the general public and decision makers. Extension educators, along with legislative groups, could create a water issues resource on the web as a tool for improving the general public's knowledge of water policy and reducing the knowledge gap between the two groups. As mentioned previously, it is critical for Extension educators to understand the views and behaviors of all water users to be able to directly target gaps in knowledge and thereby assist in the development of an educated public.

In addition to developing a website, Extension educators should consider generating video coverage of these topics for use on television or online. Creating a public relations surge on a mass media forum such as social media or television could increase knowledge levels and enhance public understanding of water issues. The coverage should include identification of water policies and explanations of why they are in place. Creating a TV show or purchasing airtime on a major network can be costly; therefore, it has been proposed that Extension educators create Internet video programs that can be viewed via YouTube, Vimeo, or Lynda.com (Rice, 2014). For example, the Texas A&M AgriLife Extension service has contracted with a digital streaming device (Roku, Apple, etc.) to create a WaterSmart channel. Teaming with a network is useful for Extension because the network can provide server hosting, management, and an established audience of interested viewers (Rice, 2014). Previous studies have shown that whatever program is implemented, the impact of the program must be evaluated (Seacrest & Herpel, 1997). Effective programming can be a catalyst for behavior change and can help define what participants take away from the learning experience.

Above all, Extension educators need to build a sense of urgency around water issues. The general public has a positive outlook on future water resources that does not align with that of decision makers. Knowledge of issues is essential for informed voting decisions and could, in fact, influence water policies.

Perhaps there are more factors that may provide additional insight, such as geographical location of the decision makers as compared to the general public. Those in coastal communities are thought to have a higher level of exposure to water-related issues as they pertain to their communities. A similar survey with a larger decision maker sample, or a survey of decision makers at the state level rather than the county level, would provide confirmation of the findings associated with the research reported here. Also, it would be worth duplicating our research in geographic locations where agriculture uses the majority of the water supply to determine whether the results are similar.

References

Baker, R., Brick, J. M., Bates, N. A., Battaglia, M., Couper, M. P., Dever, J. A., . . . Tourangeau, R. (2013). *Report of the AAPOR task force on non-probability sampling*. Oakbrook Terrace, IL: American Association for Public Opinion Research.

Blewett, T. J., Keim, A., Leser, J., & Jones, L. (2008). Defining a transformational education model for the

engaged university. *Journal of Extension*, *46*(3) Article 3COM1. Available at:
http://www.joe.org/joe/2008june/comm1.php

Borisova, T., Racevskis, L., & Kipp, J. (2012). Stakeholder analysis of a collaborative watershed management process: A Florida case study. *Journal of the American Water Resources Association*, *48*(2), 277–296. doi:10.1111/j.1752-1688.2011.00615.x

Boyle, P. G., & Mulcahy, S. H. (1993). Public policy education: A path to political support. *Journal of Extension*, *31*(4) Article 4TP1. Available at: https://www.joe.org/joe/1993winter/tp1.php

Brennan, M. A., & Dodd, A. (2009). Exploring citizen involvement in the restoration of the Florida everglades. *Society & Natural Resources: An International Journal*, *22*(4), 324–338. doi:10.1080/08941920802029383

Dahl, T. E. (1990). *Wetlands losses in the United States, 1780's to 1980's*. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. Retrieved from https://www.fws.gov/wetlands/Documents/Wetlands-Losses-in-the-United-States-1780s-to-1980s.pdf

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2009). *Internet, mail, and mixed-mode surveys: The tailored design method* (3rd ed.). Hoboken, NJ: Wiley.

Florida Office of Economic and Demographic Research. (2015). Paper presented at Demographic Estimating Conference Florida Demographic Forecast, 9–15 July. Retrieved from http://edr.state.fl.us/content/conferences/population/demographicsummary.pdf

Hinkey, L. M., Ellenberg, K. T., & Kessler, B. (2005). Strategies for engaging scientists in collaborative processes. *Journal of Extension*, *43*(1) Article 1FEA3. Available at: https://www.joe.org/joe/2005february/a3.php

Leal, A., Rumble, J., & Lamm, A. (2015). Setting the agenda: Exploring Florida residents' perceptions of water quality and quantity issues. *Journal of Applied Communications*, *99*(3), 53–67.

Lubell, M., (2004). Collaborative watershed management: A view from the grassroots. *The Policy Studies Journal*, *32*(3), 341–361.

Marella, R. L. (2009). Water withdrawals, use and trends in Florida, 2005 and trends 1950–2005. *U.S. Geological Survey Scientific Investigations Report* 2009-5125, 49.

Meindl, C. F. (2011). Water, water, everywhere? Toward a critical water geography of the south. *Southeastern Geographer*, *51*(4), 615–640.

Overdevest, C., & Christiansen, L. (2013). Using "cultural cognition" to predict environmental risk perceptions in a Florida water-supply planning process. *Society & Natural Resources: An International Journal*, *26*(9), 987–1007. doi:10.1080/08941920.2012.724152

Patterson, L. (2012). *2012 RBC Canadian water attitudes study*. RBC Blue Water Project. Retrieved from http://www.rbc.com/community-sustainability/environment/rbc-blue-water/index.html

Raison, B. (2014). Doing the work of Extension: Three approaches to identify, amplify, and implement outreach. *Journal of Extension*, *52*(2) Article 2FEA1. Available at: http://www.joe.org/joe/2014april/a1.php

Rice, G. G. (2014). Delivering Extension to the living room using Internet TV. *Journal of Extension*, *52*(6) Article

6TOT4. Available at: http://www.joe.org/joe/2014december/tt4.php

Scheer, S. D., Harder, A., & Place, N. T. (2011). Competency modeling in extension education: Integrating an academic extension model with an extension human resource management model. *Journal of Agriculture Education*, *52*(3), 64–74. doi:10.5032/jae.2011.03064

Seacrest, S. S., & Herpel, R. (1997). Developing a results-oriented approach for water education programs. *Journal of the American Water Resources Association*, *33*(2).

Singletary, L., Smith, M., Hill, G., Daniels, S., Smutko, S., Ayres, J., & Haaland, K. (2007). Strengthening Extension's capacity to conduct public issues education programs: Results of a national needs assessment. *Journal of Extension*, *45*(3) Article 3FEA1. Available at: http://www.joe.org/joe/2007june/a1.php

U.S. Census Bureau. (2014). *Florida passes New York to become the nation's third most populous state, Census Bureau reports* [Press Release]. Retrieved from http://www.census.gov/newsroom/press-releases/2014/cb14-232.html

van Dijl, E., Grogan, K., & Borisova, T. (2015). Determinants of adoption of drought adaptations among vegetable growers in Florida. *Journal of Soil and Water Conservation*, *70*(4), 218–231.