

Communicating About Water in the Floridan Aquifer Region: Part 2—Do People Believe Water Science?¹

Sadie Hundemer and Shenara Ramadan²

It is not enough for the public to *know* basic water science; it is also important that they *believe* it. People are more apt to use water science information if they accept it as true. Moreover, when water science is rejected, policy discourse can devolve into a debate over water facts instead of weighing alternative management strategies.

A 2020 study suggested that political orientation influenced belief in regional water science. Specifically, some partisan individuals indicated they do not believe what they understand to be the consensus of water scientists on topics pertaining to the **Floridan Aquifer**, the underground water reservoir providing drinking water for 10 million people. (For more information on the aquifer, see EDIS publication #FOR375, “[Water’s Journey Through Natural and Human Systems](#).”)

This publication explains the study and how Extension professionals, educators, and other water communicators can take proactive steps, prior to a potential water policy introduction, to increase the likelihood that the public will accept water science.

A Study of Belief in Regional Water Science

As part of Floridan Aquifer Collaborative Engagement for Sustainability (FACETS; floridanwater.org), UF/IFAS researchers surveyed Florida and Georgia residents ($n =$

806) on four water topics—pollution from fertilizer, pollution from septic systems, the impact of climate change on water availability, and the adequacy of future water supply. On each topic, participants answered two questions—one assessing their personal beliefs and the other assessing their perception of what water scientists think. The following are example questions

Which statement most accurately reflects your thoughts?

- I think fertilizer IS a source of water pollution in my state.
- I think fertilizer IS NOT a source of water pollution in my state.
- I don’t know enough to answer.

Which statement is most accurate?

- Most WATER SCIENTISTS think fertilizer IS a source of water pollution in my state.
- Most WATER SCIENTISTS think fertilizer IS NOT a source of water pollution in my state.
- I don’t know enough to answer.

The aim of the questions was to assess the consistency between participants’ personal beliefs and their perceptions of scientists’ beliefs. In other words, did they personally believe what they think scientists believe?

1. This document is AEC781, one of a series of the Department of Agricultural Education and Communication, UF/IFAS Extension. Original publication date March 2024. Visit the EDIS website at <https://edis.ifas.ufl.edu> for the currently supported version of this publication. © 2024 UF/IFAS. This publication is licensed under [CC BY-NC-ND 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/).

2. Sadie Hundemer, assistant professor; and Shenara Ramadan, graduate assistant, Department of Agricultural Education and Communication; UF/IFAS Extension, Gainesville, FL 32611.

Political Orientation and Belief in Regional Water Science

Results of the study showed that for the water science topics illustrated below, each of which has pertinence to the Floridan Aquifer region, some people were found to possess water beliefs that ran contrary to their understanding of scientific consensus. The behavior was observed among some politically right-leaning individuals on the impact of climate change on water availability and on the adequacy of water supply to meet demand in 20 years.

As illustrated above, the fertilizer and septic systems questions depict relative alignment between personal beliefs and perceived scientists' beliefs across all political orientations. This indicates that, regardless of political orientation, participants personally believed what they understood scientists to believe. However, on the topics of climate change's impact on water availability and the adequacy of water supply to meet demand in 20 years, some individuals on the political right possessed personal beliefs that differed from their perception of what scientists' think. Given the political right's preference for relatively lower levels of resource regulation, it makes sense that they could be averse to science that suggests a need for water protective policy (Douglas & Wildavsky, 1982; Haidt, 2012).

Interpreting the Charts

In each chart, the gray points connected by dotted lines indicate the percentage of participants who believe that the idea in the associated statement is or is not what scientists believe. The black points connected by solid lines indicate the percentage of participants who personally believe or do not believe the idea in the associated statement.

If participants believe what they perceive scientists to think, then the lines in each chart should be roughly parallel. There may be some space between the two roughly parallel lines, with personal beliefs above perceived scientists' beliefs, indicating more certainty about their own beliefs (less selection of "I don't know"). If the two lines cross, it suggests that a substantial portion of participants possess beliefs that differ from their perception of what scientists think.

Note that the slope of the lines differs across sets of graphs due to differences in the public's knowledge of the topic.

The Impact of Scientific Water Knowledge on Belief

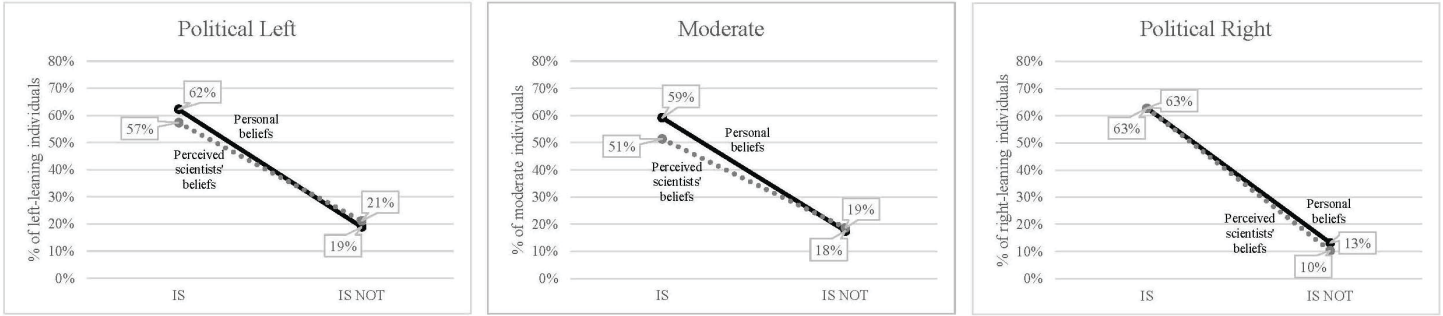
Study participants also completed the OWSK (Ordinary Water Science Knowledge) assessment detailed in Part 1 of this series, EDIS publication #AEC786, "[What Do People Know About Water Science?](#)" Analyzing OWSK scores in conjunction with personal water beliefs revealed that water science knowledge was not a statistically significant factor in the political right's beliefs about the assessed water topics. In other words, it appears that the political right's water beliefs were not based on their scientific knowledge—other factors led to their water beliefs. Although this observation was not made with politically left-leaning individuals, there were preliminary indications that the political left may also exclude scientific knowledge in some of their water perspectives.

Solution Aversion May Contribute to Water Beliefs

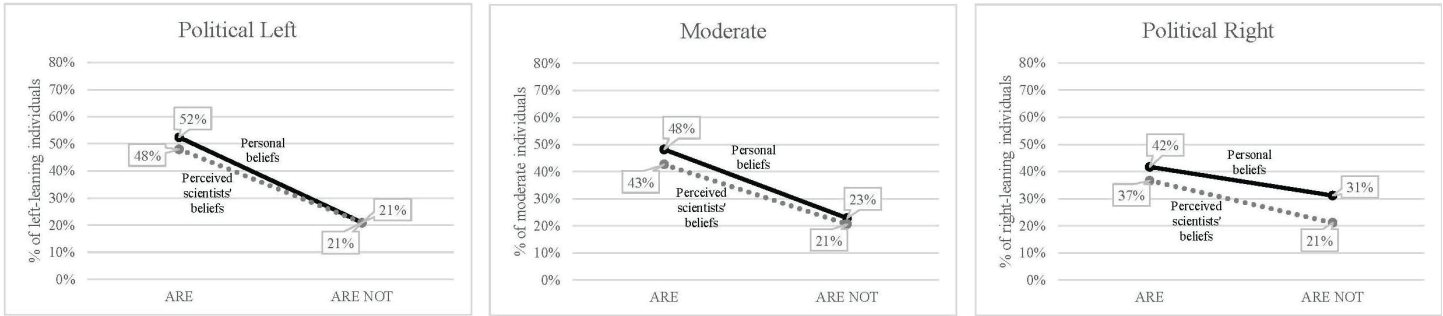
Solution aversion can help explain partisans' dismissal of water facts. A person who is solution averse rejects the validity of scientific information because they oppose what potential interventions may be proposed if the science were true (Campbell & Kay, 2014). In the context of climate change, for example, an individual may reject the validity of climate science because they are opposed to regulations that reduce carbon emissions. Unaware they are doing so, solution-averse individuals reject science as a preemptive means to reject policy action—if the science is not true, there is no need for the policy.

Because policy preferences vary across political ideologies, solution aversion may present itself on only one side of the political spectrum, and the matter of which side depends on the topic. Regarding the water topics examined here, water beliefs may be influenced by an assumed association between water facts and increased water regulation. Water communicators can reduce solution aversion by clarifying that the science does not dictate a specific course of policy action. This is further discussed in Part 3 of this series, EDIS publication #AEC778, "[How the Right Messages and Messengers Can Increase Bipartisan Support for Water Policy.](#)"

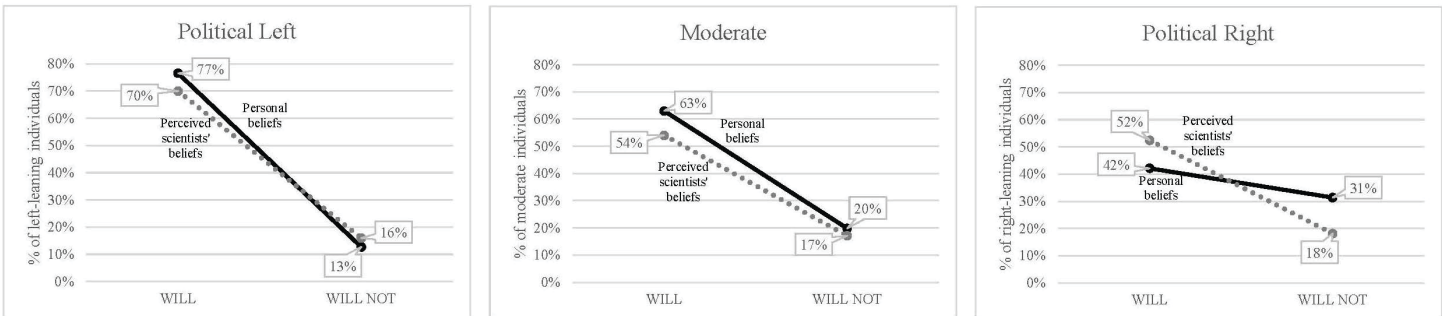
Fertilizer [IS or IS NOT] a source of water pollution in my state.



Septic systems [ARE or ARE NOT] a source of water pollution in my state.



Climate change [WILL or WILL NOT] impact the availability of water in my state.



In 20 years there [WILL or WILL NOT] be enough surface and ground water to meet demand throughout my state.

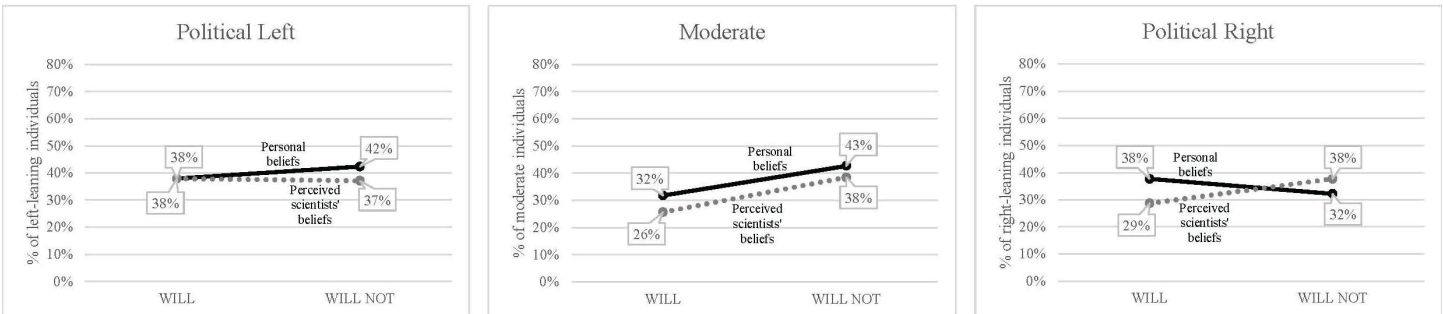


Figure 1. Alignment or misalignment of personal beliefs with perceived scientists' beliefs by political orientation. Note: responses indicating, "I don't know enough to answer" are not represented. Sample sizes: political left, n=307; moderate, n=257; political right, n=242.

Credits: Reprinted from Hundemer et al. (2022)

How to Use this Information When Communicating Water Science

Based on the findings of the previously outlined study, we recommend you consider the following guidelines when engaging public audiences on water science topics.

Recognize that water scientists' words may not be accepted as fact. This study found that individuals on the political right possessed some personal water beliefs that differed from their perception of what scientists' think. The study also found indications of similar tendencies on the political left. These observations were made in an experimental setting with limited external influences. In a real-world context, in which multiple interest groups attempt to sway the public perception, the rejection of scientific consensus could be much greater and appear across ideologies.

Be cautious, as water policy may be primed to split along party lines. If the public is divided in their beliefs on water science, they are also likely to divide on water policies. After all, why would someone support a policy based on science that they do not believe?

Encourage value-based discussion. As climate change discourse makes apparent, debates over scientific fact are often unproductive (McCright & Dunlap, 2011; Wong-Parodi & Feygina, 2020). Holding a value-focused discussion is often more effective than trying to convince someone that a scientific fact is true. If policies are designed and communicated in a manner that appeals to values across political orientations, then people may feel less inclined to reject science as a preemptive way to reject the policy.

Avoid stoking debate over scientific facts. Currently, the departure of personal beliefs from perceived scientists' beliefs may be of little consequence. In the Floridan Aquifer region, water issues have not yet risen to the level of public awareness as observed in other parts of the United States. Therefore, tendencies toward partisan water division may be largely inactive among the general public. However, when water issues become more salient, with the introduction of a new water policy or a severe environmental event, the public could become more engaged with and divided on water.

Do not assume that public water partisanship is inevitable. This research suggested that the public *could* politically divide on water topics, not that they *will* divide. The findings are a canary in the coal mine, providing a warning signal that if intervening measures are not taken, then partisanship could grow and impede future water action.

Among the steps that can be taken to minimize the polarization of water topics is the use of communication framing that associates water security measures with the values and motivations of the political right (Feinberg & Willer, 2013; Wolsko et al., 2016). This approach is detailed in Part 3 of this series, EDIS publication #AEC778, "[How the Right Messages and Messengers Can Increase Bipartisan Support for Water Policy](#)".

Summary

A 2020 study found that partisan individuals possessed water beliefs that conflicted with their perceptions of scientists' beliefs. The results suggested that scientific communication relying solely on communication of scientific facts may not be successful. Water communicators may need to engage the values of their audiences to increase adoption of scientifically accurate water beliefs.

For more information on this study, see "The Water Science Communication Problem: Water Knowledge and the Acceptance or Rejection of Water Science" at <https://doi.org/10.1016/j.jhydrol.2021.127230> (Hundemer et al., 2022).

Acknowledgements

This material is based upon work supported by the National Science Foundation under Grant No. 2021590. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. This project is also supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 2017-68007-26319.

References

- Campbell, T. H., & Kay, A. C. (2014). Solution aversion: On the relation between ideology and motivated disbelief. *Journal of Personality and Social Psychology*, 107(5), 809–824. <https://doi.org/10.1037/a0037963>
- Douglas, M., & Wildavsky, A. (1982). *Risk and culture: An essay on the selection of technical and environmental dangers*. University of California Press. <https://doi.org/10.1525/9780520907393>
- Feinberg, M., & Willer, R. (2013). The moral roots of environmental attitudes. *Psychological Science*, 24(1), 56–62. <https://doi.org/10.1177/0956797612449177>

Haidt, J. (2012). *The righteous mind: Why good people are divided by politics and religion*. Random House, Inc.

Hundemer, S., Monroe, M. C., & Kaplan, D. (2022). The water science communication problem: water knowledge and the acceptance or rejection of water science. *Journal of Hydrology*, 604, 127230. <https://doi.org/10.1016/j.jhydrol.2021.127230>

McCright, A. M., & Dunlap, R. E. (2011). The politicization of climate change and polarization in the American public's views of global warming, 2001–2010. *The Sociological Quarterly*, 52(2), 155–194. <https://doi.org/10.1111/j.1533-8525.2011.01198.x>

Wolsko, C., Ariceaga, H., & Seiden, J. (2016). Red, white, and blue enough to be green: Effects of moral framing on climate change attitudes and conservation behaviors. *Journal of Experimental Social Psychology*, 65, 7–19. <https://doi.org/10.1016/j.jesp.2016.02.005>

Wong-Parodi, G., & Feygina, I. (2020). Understanding and countering the motivated roots of climate change denial. *Current Opinion in Environmental Sustainability*, 42, 60–64. <https://doi.org/10.1016/j.cosust.2019.11.008>