

Driving Engagement across Segments: Overcoming Barriers in Water Conservation through Irrigation Restriction Compliance¹

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Introduction

The growing global water crisis poses a significant threat to an essential resource, impacting human needs, environmental sustainability, and economic growth (Gleick, 2014; Pltonykova et al., 2020). In Florida, residents use an average of 100 to 150 gallons of water per person daily (Marella, 2020). Many Florida households use about 60% to 70% of their water for irrigation (Taylor et al., 2023). Low public awareness and compliance with year-round residential irrigation restrictions (i.e., adhering to these policies) remain a significant concern, despite the importance of these policies for water resources (Morkel & Nemati, 2024; Warner et al., 2023; Warner et al., 2024). This publication shares the results of recent research that explored how Florida residents adhered to residential irrigation restrictions by identifying groups of individuals who shared similar compliance behaviors further distinguished by demographic, geographic, psychographic, and behavioral factors such as age, income, education, regional water availability, environmental attitudes, social norms, and convenience or skepticism tendencies (Warner et al., 2025). This publication was developed for conservation coordinators, Extension professionals, and other educational practitioners who work in outreach related to irrigation restriction policies. Adherence to irrigation restrictions, particularly watering schedules, varies widely among residents (Gilbertson et al., 2011). Some consistently follow the rules, while others may follow them inconsistently, or not at all (Warner et al., 2023; Warner et al., 2025). Groups of residents who share similar behaviors, motivations, and barriers related to irrigation restriction compliance are referred to as compliance clusters in the research described here. Recognizing behavioral clusters, which are groups with similar attitudes and behaviors toward irrigation rules that reveal what drives compliance and help agents target local audiences, enables conservation coordinators, Extension professionals, and others to identify meaningful differences in how residents use water (Kitunen et al., 2019).

Understanding these clusters can help conservation coordinators, Extension professionals, water conservation experts, policymakers, agricultural communicators, environmental educators, and water management district personnel design outreach strategies that align with each group's needs. All of these professionals represent the intended audience for this publication (Pasula et al., 2024). This approach moves beyond one-size-fits-all interventions by tailoring efforts to individual attitudes, perceptions, and likelihood of compliance. Insights from the research summarized in this publication can also guide the development of programs and policies in other regions facing similar challenges with water scarcity and residential irrigation management.

Key Findings

- Four distinct resident clusters were identified based on irrigation restriction compliance behaviors, attitudes, and motivations.
- Compliance was strongly shaped by personal values such as caring for others, caring for nature, and looking out for oneself.
- Clusters differed in their levels of social support surrounding compliance, confidence in ability to comply, and perceived importance of following irrigation restrictions.
- Encouraged Eco-Adherents (37.5%) and Steady Supporters (24.6%) consistently followed restrictions, and can help to promote community-wide conservation.
- Moderate Self-Interested Compliers (20.7%) responded best to messages emphasizing personal benefits of compliance, such as cost savings, convenience, and rebates.
- Reserved Resisters (17.2%) had low confidence and limited support; clear guidance and landlord collaboration could boost participation.
- Extension professionals can improve overall compliance by tailoring outreach to each cluster's motivations and barriers instead of applying one-size-fits-all messaging.

- Audience segmentation enables programs to use resources more efficiently and achieve stronger water conservation outcomes across Florida communities.

Research Approach

The information collected through this study leveraged audience segmentation to investigate Floridians' compliance with irrigation restrictions. The approach was grounded in the theory of planned behavior (TPB) and value-belief-norm (VBN) theory (Batool, 2024), which together explain how attitudes, confidence in one's ability to engage in a behavior, social norms, and personal values (caring for others, caring for nature, looking out for oneself, and enjoying life) influence water conservation behaviors.

An online survey was distributed in October and November 2024 to Florida residents who use in-ground irrigation and are subject to irrigation restrictions. The sample was matched to state demographics for age, ethnicity, race, and gender, based on the 2020 U.S. Census. Institutional Review Board approval was obtained, and informed consent was required before participation. After

exclusions of respondents to whom irrigation restrictions did not apply, the final sample included 256 participants.

Descriptive statistics and cluster analysis were used to identify distinct clusters based on similarities in values, attitudes, and behavioral intentions. ANOVA and chi-square tests examined differences between clusters on demographics, compliance behaviors, and information sources. Additionally, effect sizes were interpreted to determine the practical significance of observed differences. Table 1 describes the four clusters identified in this research. This publication then goes on to provide additional information about the clusters along with recommendations for each.

Identified Segments and How to Engage Them

Figure 1 illustrates the clustering of participants into distinct groups based on their behavioral traits. It also shows engagement levels along with corresponding outreach strategies designed to effectively engage each cluster in sustainable initiatives.

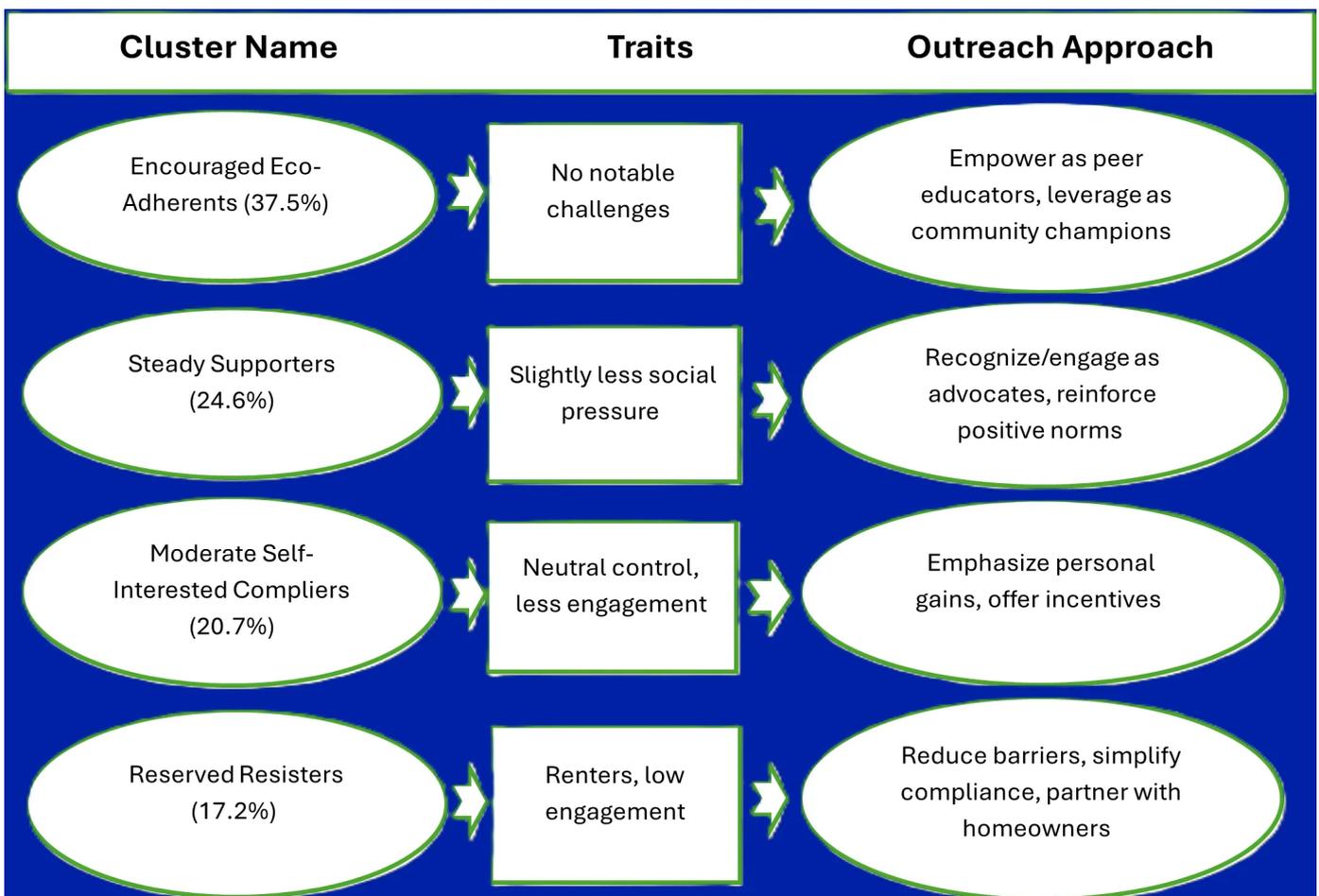


Figure 1. Cluster segmentation of participants based on their traits and recommended outreach strategies.

Note: Figure developed by the authors using survey data collected in 2024.

Credit: Adeyinka T. Ayodele, Dipendra Aryal, Oluwatosin A. Asemokhai, and Laura A. Warner, UF/IFAS.

Respondents were classified according to their compliance with irrigation restrictions, with each cluster representing a distinct level of adherence.

- **Encouraged Eco-Adherents:** These individuals account for 37.5% of respondents. They show strong enthusiasm for water conservation and have high confidence in their ability to comply with irrigation restrictions. They perceive strong social support for following irrigation rules and policies, achieving the highest level of compliance. Their attitudes toward irrigation restrictions are overwhelmingly positive. They often serve as informal role models who influence neighbors through their feasible water-saving actions. Furthermore, Encouraged Eco-Adherents are driven by strong caring-for-others and caring-for-nature values, reflecting deep concern for both community well-being and environmental stewardship. They are the most engaged in water conservation and represent the group most ready to partner with Extension and community programs. Because they already value conservation and respond positively to community norms, the most effective strategy is to position them as visible examples of success.
Conservation coordinators, Extension professionals, and others can apply the community champion model, which empowers trusted local early adopters to lead by example, share practical tips, and mobilize neighbors through peer influence (Woodley & Pratt, 2020). Agents can invite these residents to share testimonials, demonstrate efficient irrigation practices, or lead neighborhood “water-wise” activities. Doing so reinforces positive social norms, builds peer-to-peer trust, and expands community-level commitment to irrigation compliance.
- **Steady Supporters:** These individuals are 24.6% of the sample. They demonstrate a balanced approach to water conservation, with strong positive attitudes and high confidence in their ability regarding irrigation restriction compliance. Although they have a more moderate perception of social support than the Encouraged Eco-Adherents, their commitment to conservation is consistent. Steady Supporters are motivated by a mix of caring for others, caring for nature, and personal well-being values, and they engage in a variety of landscape water conservation practices beyond irrigation restrictions, such as using rain barrels and seeking information from local Extension offices. This group is highly compliant with current restrictions and is likely to continue supporting water conservation efforts in the future. To engage this segment who exhibits balanced motivations and consistent compliance, conservation coordinators, Extension professionals, and others reinforce their positive behaviors through recognition and opportunities to act as ambassadors and

advocates. Individuals’ perceptions of social norms can be strengthened by highlighting high neighborhood compliance rates or sharing testimonials from respected community members who have implemented irrigation schedules and other water conservation practices to encourage engagement. Workshops, advancement of training, and technologies that aid in compliance can also help to increase their continuous commitment to water conservation.

- **Moderate Self-Interested Compliers:** This cluster is 20.7% of the sample. Individuals in this segment exhibit a slightly positive attitude toward irrigation restriction compliance, but their confidence in their ability to comply is neutral, and they perceive social norms as being only moderately supportive. They are characterized by a strong focus on self-interest, as reflected in their higher enjoying life and looking out for oneself values, but they also maintain significant care for others and care for nature motivations. They have a positive attitude towards irrigation restrictions, but their engagement in following these policies is lower than that of Encouraged Eco-Adherents and Steady Supporters. This cluster may benefit from targeted education and messaging that emphasizes the personal benefits of compliance, such as reduced maintenance effort, improved lawn appearance, and potential cost savings. While this cluster is generally supportive of water conservation, its members are more motivated by personal benefits that they can derive from complying, such as reduced maintenance, improved lawn appearance, and potential cost savings. Therefore, outreach to this group should emphasize the concrete personal advantages of compliance, such as financial incentives, rebates for efficient irrigation equipment, and public recognition for water conservation achievements. Highlighting these individual benefits can help shift perceptions and increase engagement among those who might otherwise remain less committed.
- **Reserved Resisters:** This is the smallest cluster, representing 17.2% of the sample. This group displays low positive attitudes, lower confidence in ability, and a lack of perceived social support for irrigation restriction compliance. Their values are more neutral across the board, and they are less engaged in other landscape water conservation practices. Notably, Reserved Resisters are more likely to be renters and less likely to own their homes, which may contribute to their lower engagement. Their current compliance with irrigation restrictions is lower than that of other groups, and they show neutral intent for future compliance. Interventions for this group should focus on reducing barriers to compliance, such as providing user-friendly irrigation technologies and step-by-step

guides, and highlighting concrete benefits such as utility bill savings, avoidance of conflict with landlords, or simplified maintenance and workshops that explain the process of adhering to restrictions. Messaging should emphasize tangible benefits such as simplified irrigation management, rather than relying solely on environmental appeals. Partnerships with landlords or property managers can help ensure that

renters receive clear information and support, while reminder notifications or assistance in installing automated systems can further prompt action. Addressing the unique needs of this group is critical because it presents a significant opportunity to increase overall water conservation compliance among the public.

Table 1. Clusters identified in a study designed to understand subgroups that exist among the broader public pertaining to irrigation restriction compliance.

Cluster Name	% of Sample	Attitude towards Compliance	Key Values	Social Norms Perception	Compliance Level	Main Motivations	Cluster Traits That May Prevent Engagement
Encouraged Eco-Adherents	37.5%	Very positive	Caring for others; caring for nature	Strong support	Highest (always)	Environmental concern; community	No notable challenges
Steady Supporters	24.6%	Positive, consistent	Caring for others; caring for nature; personal well-being	Moderate	High	Mix of community and personal benefit	Slightly less social pressure
Moderate Self-Interested Compliers	20.7%	Slightly positive	Enjoying life; looking out for myself; (some) caring for others/caring for nature	Moderate support	Moderate	Personal benefits (cost, convenience)	Neutral control, less engagement
Reserved Resisters	17.2%	Low/neutral	Neutral/mixed	Weak/none	Lowest	Minimal; property value; convenience	Renters; low engagement

How to Apply This Information

These audience segmentation findings offer valuable information for conservation coordinators, Extension professionals, agricultural communicators, water conservation experts, and policymakers aiming to improve irrigation restriction compliance. Rather than treating the public as a single, homogeneous group, it is crucial to acknowledge the diversity among residents and develop targeted interventions accordingly (Gibson et al., 2021). When resources allow, different messages can be created for each cluster; however, programs may choose to focus on one or two key clusters, such as the Moderate Self-Interested Compliers, who represent the greatest potential for improvement.

Tips for practical application include the following.

- **Encouraged Eco-Adherents:** Engage them as peer educators and highlight community success stories to amplify their influence (Bollinger et al., 2018; Marsh et al., 2023).
- **Steady Supporters:** Reinforce good practices through neighborhood recognition or “water-wise” certification programs (Heflebower et al., 2005).
- **Moderate Self-Interested Compliers:** Emphasize personal benefits such as cost savings, convenience, and rebates (Borisova et al., 2024).
- **Reserved Resisters:** Simplify irrigation requirements, partner with landlords, and provide easy-to-use reminder tools (Warner & Lamm, 2017).

Across all clusters, communication should emphasize positive outcomes such as water savings and improved freshwater availability, address common concerns about lawn health, and include community goal-setting activities such as tracking local water savings to build shared

responsibility and motivation for behavioral change (Hodges et al., 2020; Yue et al., 2022).

Conclusion

By tailoring messages and interventions to the unique needs and motivations of the clusters identified by this research, conservation coordinators, Extension professionals, agricultural communicators, water conservation experts, water policymakers, environmental educators, and water management district personnel can significantly enhance the effectiveness of their outreach and ultimately promote more sustainable water use practices across Florida. This analysis provides valuable insights for tailoring water conservation outreach and policy interventions by identifying four distinct compliance clusters. The Encouraged Eco-Adherents and Steady Supporters show a strong positive attitude, perceived control, and care for others as well as care for nature values. It is important to leverage these groups as community champions and reinforce their positive social norms to maintain and amplify their high compliance level. Moderate Self-Interested Compliers and Reserved Resisters need support that addresses their concerns and motivations via effective communication strategies. Communication strategies should emphasize tangible personal benefits such as cost saving, convenience, and property value enhancement. Applying these insights helps policymakers, Extension professionals, agricultural communicators, environmental educators, water management district personnel, and experts/managers design more effective evidence-based outreach programs. Strengthening confidence in ability and public awareness ultimately increases adherence to irrigation restrictions.

References

- Batool, N., Wani, M. D., Shah, S. A., & Dada, Z. A. (2024). Theory of planned behavior and value-belief norm theory as antecedents of pro-environmental behaviour: Evidence from the local community. *Journal of Human Behavior in the Social Environment, 34*(5), 693–709. <https://doi.org/10.1080/10911359.2023.2205912>
- Bollinger, B., Burkhardt, J., & Gillingham, K. (2018). *Peer effects in water conservation: Evidence from consumer migration* (No. w24812). National Bureau of Economic Research. https://www.nber.org/system/files/working_papers/w24812/w24812.pdf
- Borisova, T., Warner, L. A., Weng, W., Searcy, J., Chaudhary, A. K., & Dukes, M. (2024). Estimating benefits of residential outdoor water conservation: A step-by-step guide: FE1009/FE1009, rev. 10/2024. *EDIS, 2024*(5). <https://doi.org/10.32473/edis-fe1009-2017>
- Gibson, K. E., Fortner, A. R., Lamm, A. J., & Warner, L. A. (2021). Managing demand-side water conservation in the United States: An audience segmentation approach. *Water, 13*(21), 2992. <https://doi.org/10.3390/w13212992>
- Gilbertson, M., Hurlimann, A., & Dolnicar, S. (2011). Does water context influence behaviour and attitudes to water conservation? *Australasian Journal of Environmental Management, 18*(1), 47–60. <https://doi.org/10.1080/14486563.2011.566160>
- Gleick, P. H. (2014). Water, drought, climate change, and conflict in Syria. *Weather, Climate, and Society, 6*(3), 331–340. <https://doi.org/10.1175/WCAS-D-13-00059.1>
- Heflebower, R., Cerny-Koenig, T., Waters, M., & Ward, R. (2005). Water-Wise Plant Recognition Program. *Journal of Extension, 43*(1), 22. <https://open.clemson.edu/joe/vol43/iss1/22>
- Hodges, H., Kuehl, C., Anderson, S. E., Ehret, P. J., & Brick, C. (2020). How managers can reduce household water use through communication: A field experiment. *Journal of Policy Analysis and Management, 39*(4), 1076–1099. <https://doi.org/10.1002/pam.22246>
- Kitunen, A., Rundle-Thiele, S., Kadir, M., Badejo, A., Zdanowicz, G., & Price, M. (2019). Learning what our target audiences think and do: Extending segmentation to all four bases. *BMC Public Health, 19*, Article 382. <https://doi.org/10.1186/s12889-019-6696-2>
- Marella, R. L. (2020). *Water withdrawals, uses, and trends in Florida, 2015* (Scientific Investigations Report 2019-5147). U.S. Geological Survey. <https://doi.org/10.3133/sir20195147>
- Marsh, C. L., Gold, A. U., & Rongstad Strong, B. (2023). Elevating community voices through inclusive science communication: A case study of the We are Water program in the Southwestern United States. *Frontiers in Communication, 8*, 1214105. <https://doi.org/10.3389/fcomm.2023.1214105>

- Morkel, S., & Nemati, M. (2024). Residential irrigation restrictions and water conservation: A review of studies from 1978 to 2022. *Journal of Contemporary Water Research & Education*, 179(1), 53–63. <https://doi.org/10.1111/j.1936-704X.2024.3402.x>
- Pasula, S., Kalauni, D., Warner, L., Diaz, J., Asanzi, A., Harmon, J., Irwin, D., & Grantham, R. L. (2024). Understanding Florida residents' perceptions of and experiences with landscape irrigation restrictions: Insights for water conservation experts as well as Extension educators: AEC797/WC458, 5/2024. *EDIS*, 2024(4). <https://doi.org/10.32473/edis-wc458-2024>
- Pltonykova, H., Koeppel, S., Bernardini, F., Tiefenauer-Linardon, S., de Strasser, L., & Connor, R. (2020). *The United Nations World Water Development Report 2020: Water and climate change*. United Nations Educational, Scientific and Cultural Organization. <https://www.unwater.org/publications/un-world-water-development-report-2020/>
- Taylor, N., Price, K. R., & Spatz, B. (2023). How much water am I using for my yard? AE585, 3/2023. *EDIS*, 2023(2). <https://doi.org/10.32473/edis-ae585-2023>
- Warner, L., Pasula, S., Kalauni, D., Loizzo, J., & Hundemer, S. (2024). Residents' perceived outcomes of irrigation restriction compliance: A guide for Florida's water conservation professionals: AEC806/WC467, 8/2024. *EDIS*, 2024(4). <https://doi.org/10.32473/edis-wc467-2024>
- Warner, L. A., Cardenas-Lailhacar, B., Dukes, M. D., Taylor, N., Irwin, D., Harmon, J., Yazdanpanah, M., & Diaz, J. M. (2023). Insights from residents under year-round irrigation restrictions to improve water conservation impacts. *AWWA Water Science*, 5(4), e1348. <https://doi.org/10.1002/aws2.1348>
- Warner, L. A., Kalauni, D., Hundemer, S., & Diaz, J. M. (2025). Drivers of planned compliance with irrigation restrictions among residents in a rapidly urbanizing region. *Urban Water Journal*. <https://dx.doi.org/10.1080/1573062X.2025.2476554>
- Warner, L. A., & Lamm, A. J. (2017). Understanding residential irrigation users to target water conservation Extension programs. *Journal of Extension*, 55(3), 11. <https://doi.org/10.34068/joe.55.03.11>
- Woodley, L., & Pratt, K. (2020). *The CSCCE Community Participation Model: A framework to describe member engagement and information flow in STEM communities*. Center for Scientific Collaboration and Community Engagement. <https://doi.org/10.5281/zenodo.3997802>
- Yue, C., Cui, M., Kong, X., Watkins, E., & Barnes, M. (2022). Landscape irrigation and water conservation in urban areas: An analysis of information-based strategies. *HortTechnology*, 32(2), 213–225. <https://doi.org/10.21273/HORTTECH05001-21>

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