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People and Ponds: How Can Homeowners Better Understand and Manage Stormwater Ponds?[1]

Samiul Haque, Hayk Khachatryan, and Michelle K. Atkinson[2]

Introduction

Stormwater ponds have become an integral part of Florida's landscape, with thousands of these engineered systems dotting our residential communities (Sinclair et al. 2020). Although these ponds are designed to manage flooding and improve water quality (Asanzi et al. 2024), they face increasing challenges:

- Many ponds are struggling with excess nutrients, leading to algal blooms and water quality issues.
- Urbanization has increased the amount of runoff these systems must handle.
- Shoreline erosion threatens pond stability and effectiveness.
- Insufficient maintenance can reduce both function and aesthetic value.
- Increased frequency and intensity of precipitation (rainfall) due to climate change are putting additional stress on these systems.

Despite these challenges, stormwater ponds remain crucial infrastructure for communities. While these ponds are initially engineered to meet regulatory standards, their ongoing management typically falls to the residential communities where they are located. In homeowner association (HOA) communities, pond management decisions become the responsibility of homeowners and elected board members. Therefore, the proper functioning of ponds partly depends on the informed management decisions of homeowners, including those serving on HOA boards. Key stakeholders, therefore, must understand how these systems work, and what stormwater ponds need to function effectively. It is vitally important that Extension professionals discover gaps in homeowners' and HOA community understanding about stormwater systems to better educate and assist this important group.

This publication is one of a multi-part series on Florida stormwater pond management. The target audience for this publication is Extension educators who are interested in identifying knowledge gaps among homeowners regarding sustainable stormwater pond management and pond landscaping. We explored what homeowners in HOA communities know about stormwater pond management and pond landscaping, examining their understanding of major pond functions, low-maintenance buffer zone requirements, and appropriate plant selection. We also investigated whether serving on an HOA board influences knowledge levels.

Methods

To evaluate homeowners' knowledge of stormwater pond functions, buffer zones requirements, and appropriate plant selections for ponds, we administered a survey with specific questions targeting those three knowledge domains. Participants were pre-screened to ensure that responses were collected from relevant audiences (being a Florida resident for at least one year, living in owner-occupied housing in an HOA community with at least one stormwater pond, aged 20–80 years, and being the primary decision-maker of the family). In total, 2499 homeowners responded to the survey. The survey was conducted via Qualtrics using their panel of opt-in respondents. Most respondents (70%) never served on an HOA board (Figure 1), while a relatively small portion held board roles ranging from treasurers (8.56%) to other roles (1.2%).

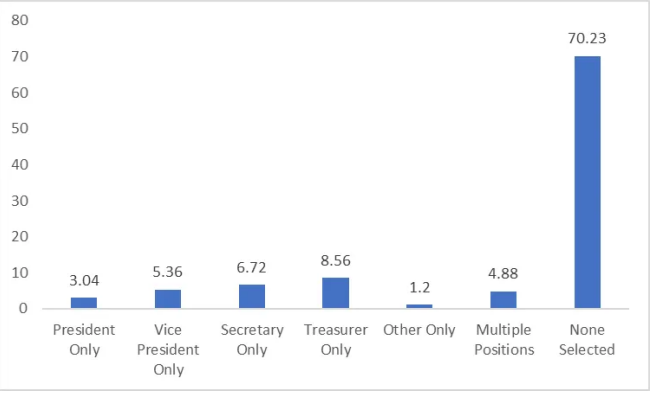

Figure 1. Percentage of survey respondents by HOA board membership roles.
Credit: UF/IFAS; all charts in this publication were created by the authors.

Understanding Stormwater Pond Functions

Stormwater ponds are engineered systems that serve multiple functions in Florida communities. While they may look like natural lakes, these ponds are carefully designed to protect our neighborhoods and the environment. The two primary functions of stormwater ponds are flood control and pollutant removal (Asanzi et al. 2024).

1. Flood control: During heavy rainfall, these ponds capture and temporarily store excess water, preventing flooding in the surrounding areas. This function is particularly crucial in Florida's climate where intense storms are common.
2. Pollutant removal: As water flows into these ponds, they act as natural filters. Sediments settle to the bottom, while nutrients and other pollutants are partially removed through various physical and biological processes, helping protect our waterways.

Our survey of Florida HOA residents revealed how homeowners understood these pond functions. When asked about the two main purposes of stormwater ponds, respondents could select from seven options. Figures 2 and 3 show how homeowners understand pond functions. A substantial majority (70%) of respondents recognized flood control as a purpose, while 37% identified pollutant removal. However, only 28% of the surveyed homeowners correctly identified both primary functions together. Some homeowners attributed other purposes, such as aesthetics (29%) and irrigation (36%), to these ponds.

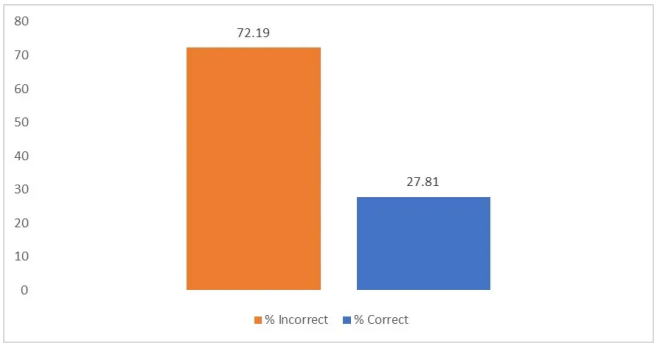

Figure 2. Percentage of correct answers to the survey question about the two main functions of stormwater ponds.
Credit: UF/IFAS

We also explored whether serving on an HOA board was associated with different levels of understanding of pond functions. Figure 4 shows considerable variation in understanding across different HOA roles. Board secretaries demonstrated the highest awareness at 45%, followed by treasurers at 42%, and vice presidents at 31%. Regular member homeowners who did not serve on HOA boards identified both functions approximately 25% of the time. Interestingly, some board positions showed lower levels of awareness than regular homeowners, with presidents at 20%, those serving multiple positions at 18%, and other board roles at 17%.

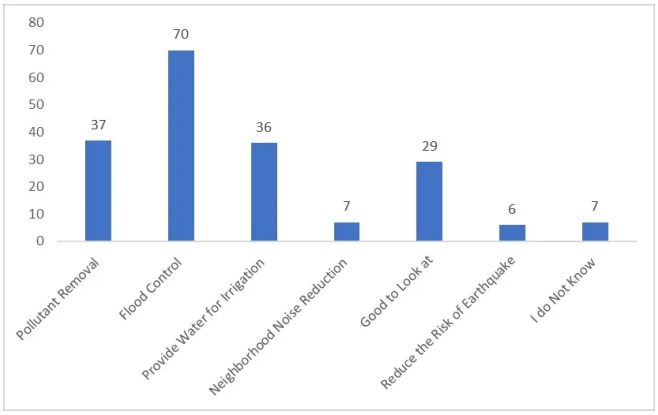

Figure 3. Percentage of answers to the survey question about the two main functions of stormwater ponds.
Credit: UF/IFAS

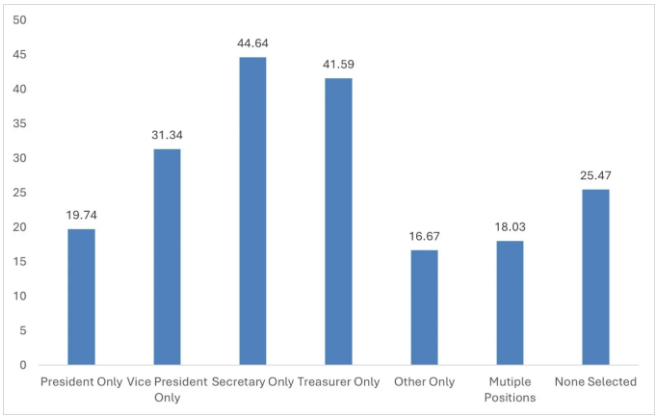

Figure 4. Percentage of correct answers to the questions about the two main functions of stormwater ponds by HOA board membership status.
Credit: UF/IFAS

These findings highlight several important learning opportunities:

1. There is a significant knowledge gap regarding the dual purposes of stormwater ponds. While many recognize the flood control function, few residents understand the critical role these ponds play in pollutant removal and water quality improvement.
2. Some misconceptions exist about pond purposes, with a notable proportion of homeowners viewing them primarily as aesthetic features or irrigation sources. This suggests a need to better communicate the engineered nature of these systems.
3. The variation in understanding across HOA roles indicates that board position alone does not guarantee a better awareness of pond functions. This suggests a need for consistent education across all HOA members, regardless of their roles.

Understanding Stormwater Pond Low-Maintenance Buffer Zones

A buffer zone is a strip of land that surrounds a stormwater pond, serving as a critical transition area between the water and developed land. To prevent potential nutrient and pesticide runoff into water bodies, the Florida-Friendly Landscaping™ Program (FFL) recommends maintaining a minimum 10-foot low-maintenance zone (Momol et al. 2020) around ponds. No chemical applications or mowing should occur within this low-maintenance zone. These low-maintenance zones play several vital roles:

- They help filter pollutants from runoff before it enters the pond;
- They stabilize the shoreline and prevent erosion; and
- They provide habitat for beneficial wildlife.

Our survey revealed a varied understanding of homeowners about the width of low-maintenance zone requirements. Figures 5 and 6 present the findings on participants' knowledge of FFL. Only 18% of the homeowners surveyed identified the recommended 10-foot minimum width. Interestingly, many respondents believed that wider low-maintenance stormwater pond buffer zones were required: 13% suggested 20 feet, 14% chose 30 feet, 10% selected 40 feet, and 9% indicated 50 feet. About one-third of the respondents (33%) acknowledged that they were unsure about the recommended minimum width.

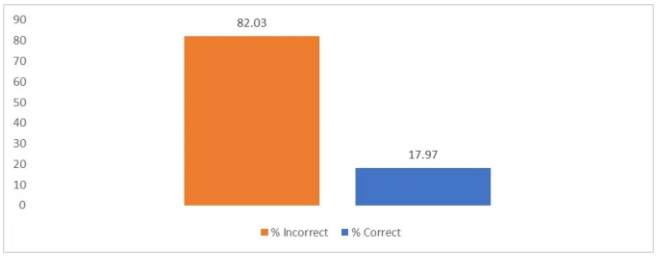

Figure 5. Percentage of correct responses to the survey question about the Florida-Friendly Landscaping™ Program recommendation on the minimum width of stormwater pond low-maintenance buffer zones.
Credit: UF/IFAS

When examining responses by HOA board role (Figure 7), treasurers showed the highest awareness (36%), followed by secretaries (29%). Regular member homeowners identified the recommended width approximately 16% of the time.

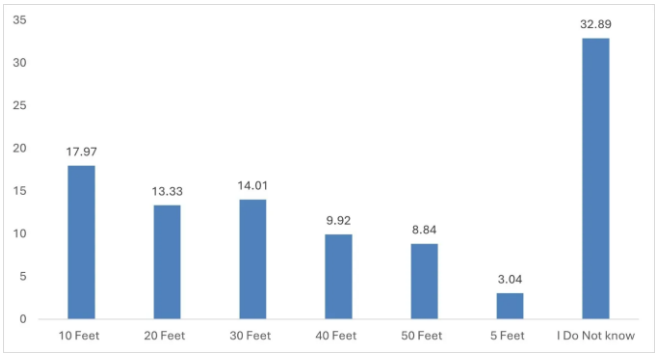

Figure 6. Percentage of responses to options in the question about the Florida-Friendly Landscaping™ recommendation on the minimum width of stormwater pond low-maintenance buffer zones.
Credit: UF/IFAS

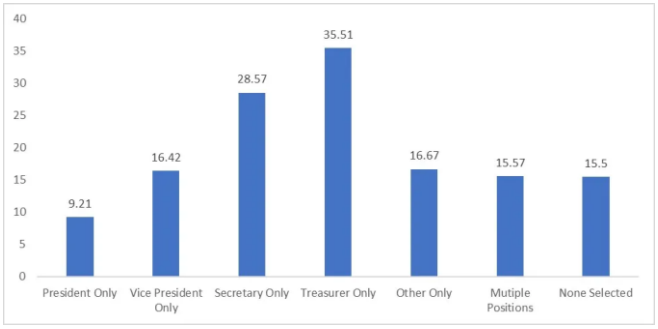

Figure 7. Percentage of correct responses to the survey question about the Florida-Friendly Landscaping™ Program's recommendation on the minimum width of stormwater pond low-maintenance buffer zones by HOA board membership role status.
Credit: UF/IFAS

Based on these findings regarding low-maintenance buffer zone knowledge, the key learning opportunities are as follows:

1. There is a widespread lack of awareness regarding the FFL-recommended minimum low-maintenance buffer width.
2. The survey responses showed variation in buffer zone width estimates, with understanding the minimum requirement being important for practical implementation, especially in communities with space constraints.
3. The high percentage (33%) of "don't know" responses suggests an opportunity for direct, clear communication about low-maintenance buffer zone guidelines. This honesty about the lack of knowledge also indicates that homeowners may be receptive to education on this topic.
4. The variation in understanding across HOA roles again emphasizes the need for consistent education across all community members, regardless of their HOA involvement.

Selecting Plants for Stormwater Ponds

Plant selection plays a crucial role in the health and functionality of stormwater ponds. The FFL program provided guidance on appropriate plant choices for pond areas. While both native and non-invasive non-native plants can be suitable choices (Hansen and Hu 2022), some key considerations include

- the plant's ability to filter pollutants;
- root systems that can stabilize shorelines;
- adaptation to local water conditions;
- maintenance requirements;
- ability to provide wildlife habitat; and
- resistance to common pests and diseases.

Our survey assessed homeowners' knowledge of the FFL program guidelines for pond plants. Figures 8 and 9 present the findings on participants' knowledge of FFL-recommended plant types for pond areas. Approximately 34% of homeowners knew that the FFL program supports the use of both native and non-invasive non-native plants around ponds. A considerable proportion (31%) believed that the FFL program recommended only native Florida plants. Approximately 16% indicated that they were not familiar with the FFL program's plant recommendations.

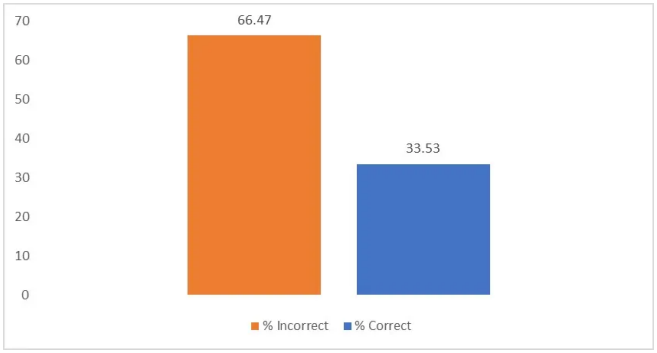

Figure 8. Percentage of correct responses to the survey question about the Florida-Friendly Landscaping™ Program's recommended plant types for use around stormwater ponds.
Credit: UF/IFAS

When examining this knowledge across HOA roles (Figure 10), 45% of presidents identified the FFL program's plant guidelines, followed by vice presidents and those serving multiple positions at approximately 39%. Among the regular homeowners who were not board members, 32% identified the FFL program's recommendations for plant choices.

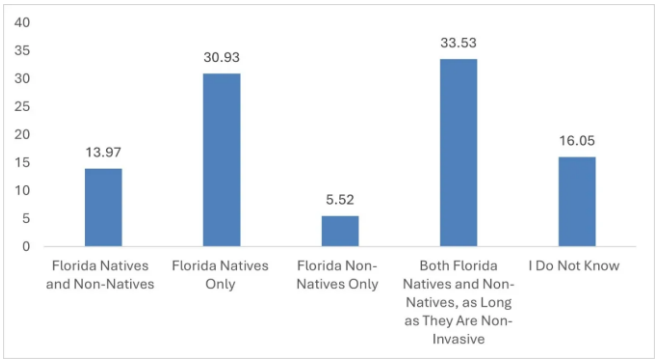

Figure 9. Percentage of responses to the various options in the survey question about the Florida-Friendly Landscaping™ Program's recommended plant types for use around stormwater ponds.
Credit: UF/IFAS

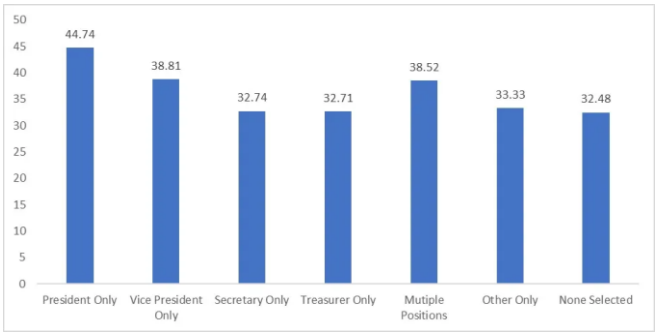

Figure 10. Percentage of correct responses to the survey question about the Florida-Friendly Landscaping™ Program's recommended plant types for use around stormwater ponds by HOA board membership status.
Credit: UF/IFAS

Given these findings about homeowners' knowledge of FFL plant recommendations, here are the key learning opportunities:

1. There is a need to clarify the FFL plant guidelines. While native plants are excellent choices, homeowners should understand that the program also accepts appropriate non-invasive non-native plants, providing more flexibility in plant selection.
2. The substantial percentage of homeowners who believed only native plants were recommended suggests an opportunity to explain the scientific basis behind the FFL program's inclusive approach to plant selection.
3. With 16% of homeowners indicating unfamiliarity with the plant guidelines, there is an opportunity to increase the overall awareness of the FFL recommendations for pond landscaping.
4. The variation in knowledge across HOA roles again points to the need for consistent education on FFL guidelines across all community members.

Moving Forward with Stormwater Pond Management

Stormwater pond management continues to evolve as researchers and practitioners develop new understandings of these complex systems. Our survey findings reveal several important knowledge gaps, suggesting opportunities for education and research in areas such as

- Pond function and performance under changing climate conditions;
- Effective buffer zone establishment and maintenance;
- Plant selection strategies that balance ecological functions with community needs; and
- Best practices for long-term pond sustainability.

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[2] Samiul Haque, postdoctoral associate, Department of Food and Resource Economics, UF/IFAS Mid-Florida Research and Education Center, Apopka, FL; Hayk Khachatryan, professor and Extension economist, Department of Food and Resource Economics, UF/IFAS Mid-Florida Research and Education Center, Apopka, FL; Michelle K. Atkinson, Extension agent III, M.S., environmental horticulture, UF/IFAS Extension Manatee County, Palmetto, FL; UF/IFAS Extension, Gainesville, FL 32611.