

UF/IFAS CENTER FOR LAND USE EFFICIENCY



2024

Annual Report

Focusing on social, environmental and economic issues affecting urban landscapes and agriculture in Florida.

Mission

Promote the adoption of science-based policies and practices that measurably create an environmentally, economically, and socially vibrant life for Florida's citizens.

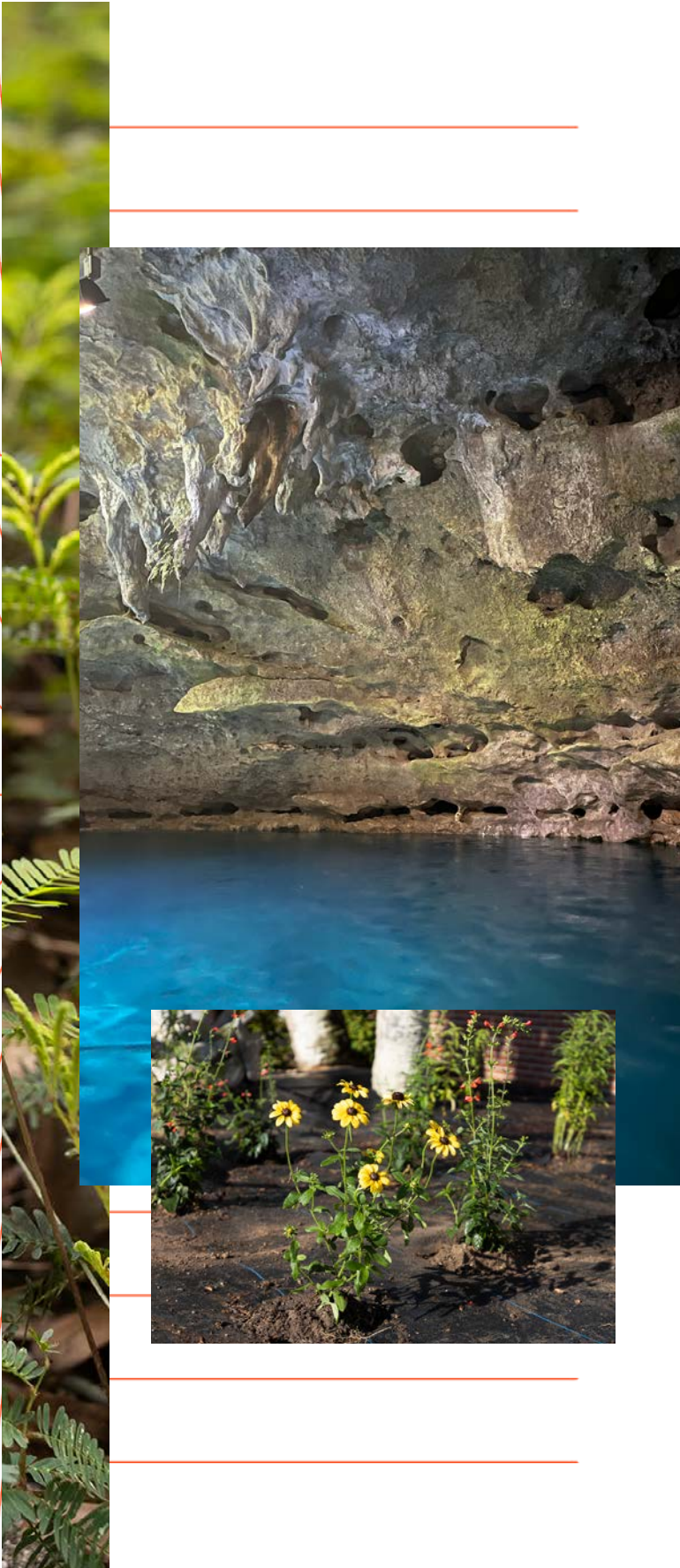
Our work is *focused* on three areas:

- Agriculture,
- Urban and suburban landscapes,
- Large-scale development,

And is largely related to water *quality* and *quantity* and various best management practices (BMPs).

Major Extension Programs

- Florida Master Gardener Volunteer Program,
- Florida-Friendly Landscaping™ Program,
- H₂OSAV,
- Sustainable FloridiansSM,
- Florida Energy Equity Coalition, Flood Resilient Communities, and
- Florida Agricultural Best Management Practices.



2024 By the Numbers

\$4,497,534

Total active external funding in 2024 resulting from CLUE seed funding.

\$245,105

Internal Funding

\$25,398,482

Active External Funding

25

Interdisciplinary Faculty

14

Affiliated Faculty

22

Staff

37

Chaired M.S.

26

Chaired Ph.D.

60

Refereed Pubs

42

Proceedings

373

EDIS

45

Non-refereed Pubs

433

Trainings & Workshops with 21,563 participants

9,584

E-newsletter subscribers

54

webinars with more than 30,000 live and recorded views

1.8 million

Website views with 2.4 million sessions

60,088

Facebook followers and 3.16 million reached

21,222

Instagram followers with 513,158 reached

YouTube Channels

CLUE

49,194

views, with 2,111 channel subscribers

FFL

75,337

views, with 1,625 channel subscribers

Behavior change brought about by UF/IFAS Extension programs in 2023 led to an estimated

375,503,045 gallons of

water saved annually in Florida, a direct

impact through the Center's major

Extension programs. This savings is

valued at **\$1,618,418** on

Floridians' utility bills and is enough

water to supply the annual indoor

water needs of 4,267 households.

The cost to remove a pound of nitrogen from Florida waters is estimated at \$500 or more per pound. In 2022, FFL efforts

prevented an estimated **128,714**

pounds of nitrogen from entering Florida

waters with an estimated statewide annual

savings of **\$64.4 million**.



Message from the Director



The 2024 calendar year has been a big year for CLUE. The year started with interviews for the new leader of the FFL program. After a competitive search, I am glad that we hired Claire Lewis as the new State Specialized Agent and Statewide FFL Program Coordinator. That is a long

title but Claire is up to the task of leading the FFL program given that she has been with the program for 14 years working with communities to utilize the FFL principles to protect create beautiful landscape that also protect Florida's water resources. She has taken leadership of the program and in a short time is building and expanding the program including conducting a strategic planning retreat, creating FFL Natural (a no input after establishment FFL option), and hiring additional staff with expanded grant funds from the Department of Environmental Protection.

This year also ushered in a host of changes to the Program for Resource Efficient Communities (PREC), with the retirement of its longtime leader, Dr. Pierce Jones. Pierce was with PREC for decades, leading this program that evolved from the Energy Extension Program in the 80's and 90's to PREC in the early 2000's. PREC focuses on efficient resource use in master planned developments. Within PREC there

are currently four programs Water Savings Analytics and Verification (H₂OSAV), Energy Efficiency Construction book sales, Coastal Flood Resilience, and Sustainable Floridians Benchmark and Monitoring Program (SF-BMP). As we move into 2025, we are seeking to strengthen these programs with expanded partnerships to make a tangible difference and benefit Floridians.

In the spring, CLUE hosted the 5th Landscape Summit. We had attendance from FNGLA leadership, local government representatives and private developers. I believe engagement of all parties involved in the impacts of rapid growth and development will be essential for the solution of associated problems. This is an effort we are leaning into for our next summit in 2026.

Also in the spring, the FFL team lead by Claire Lewis, designed a new FFL landscape for Malachowsky Hall. This was a great opportunity for the FFL program which accentuates our newest building on campus focusing on data science and information technology with the broad UF investment into Artificial Intelligence.

This summer I accepted the opportunity to lead the UF/IFAS Nutrient Management Program as the Interim Director. Much of the content of this agriculture focused project overlaps with the water quantity and quality work we do in CLUE.

I am excited for 2025 as we'll keep working on science-based solutions for Floridians.

A handwritten signature in blue ink, appearing to read "Michael D. Dukes". The signature is fluid and cursive, written on a white background.

Michael D. Dukes
Director

Message from the SVP



Leadership Matters

CLUE's work is more important than ever.

As senior vice president, I hear consistently from legislators, producers, association executives and state agency officials about the urgency of water quality for our state.

In response, I needed a leader for our statewide nutrient program – a massive and complex multiyear effort to update fertilizer recommendations for agriculture. Appointing Michael Dukes is one of the best hiring decisions I've made as leader of UF/IFAS.

To you in the CLUE community, don't worry, I did not remove him from CLUE. I appointed him *because of* CLUE. Michael's record of leadership in establishing and improving both agricultural and urban best management practices demonstrated to me that he's the leader I need for such an important role.

In fact, it's so important that in a year when I restructured the leadership of UF/IFAS so that

I would have dozens fewer direct reports, I added the nutrient program leader as a position reporting to me.

While an update of fertilizer rates for agriculture are among the most urgent of all issues UF/IFAS is working on, it is far from the only challenge for those who seek to protect Florida's water quality. Michael thinks strategically about all sources of nutrients that can impact water quality, whether that's a farmer's field, a residential lawn, a parking lot or a septic tank.

CLUE covers it all. While I single out Michael for his leadership, I also appreciate all faculty who affiliate with CLUE and carry out its important research and Extension. These faculty members are not only first-rate scientists, but they communicate with external partners to ensure that their work is relevant. Staff, too, work hard to support scientific progress.

CLUE continues to make a unique contribution to expanding the body of knowledge that can inform efforts to protect our valuable natural resources.

A handwritten signature in black ink that reads "J. Scott Angle". The signature is written in a cursive, flowing style.

J. Scott Angle
Senior Vice President of Agriculture and Natural Resources

CLUE Faculty, Affiliates, and Staff

Interdisciplinary, Collaborative, and Innovative

CLUE Faculty

Michael **DUKES**

Associate Dean for Extension, CLUE Director,
Department of Agricultural and Biological Engineering,
Water Conservation & Irrigation

Andrea **ALBERTIN**

Water Resources Regional Specialized Agent

Eban **BEAN**

Department of Agricultural and Biological Engineering,
Urban Water Resources Engineer

Catherine **CAMPBELL**

Department of Family, Youth and Community Sciences,
Community Food Systems

Jay **CAPASSO**

Water Resources Regional Specialized Agent

Gail **HANSEN**

Department of Environmental Horticulture, Sustainable
Landscape Design

Basil **IANNONE**

School of Forest, Fisheries and Geomatic Sciences,
Urban Ecology

Hayk **KHACHATRYAN**

Department of Food and Resource Economics,
Horticultural Economics

Ryan **KLEIN**

Department of Environmental Horticulture, Arboriculture

Andrew **KOESER**

Department of Environmental Horticulture,
Landscape Management

Lisa **KRIMSKY**

Water Resources Regional Specialized Agent

Claire **LEWIS**

State Specialized Agent, and Statewide Florida-Friendly
Landscaping™ Coordinator

AJ **LINDSEY**

Department of Environmental Horticulture, Urban Turfgrass
Management

Mary **LUSK**

Department of Soil, Water, and Ecosystem Sciences,
Urban Water Quality

Chris **MARBLE**

Department of Environmental Horticulture, Invasive
Weed Management

Paul **MONAGHAN**

Department of Agricultural Education and Communication,
Community Based Social Marketing

Jerry **MURPHY**

State Specialized Program Agent, Flood Resilient Communities

Nasser **NAJIBI**

Department of Agricultural and Biological Engineering, Climate
Resilience Engineer

Don **RAINEY**

Water Resources Regional Specialized Agent

AJ **REISINGER**

Department of Soil, Water, and Ecosystem Sciences, Urban
Soil & Water Quality

Lakesh **SHARMA**

Department of Soil, Water, and Ecosystem Sciences,
Agricultural BMP Program

Nick **TAYLOR**

H₂O SAV State Specialized Agent

Laura **WARNER**

Department of Agricultural Education and Communication,
Social Marketing & Program Evaluation

Wendy **WILBER**

State Specialized Agent and Statewide Master Gardener
Coordinator

Yilin **ZHUANG**

Water Resources Regional Specialized Agent

Affiliated Faculty

Michelle **ATKINSON**

Manatee County, Urban Horticulture

Lynn **BARBER**

Hillsborough County, Urban Horticulture

Haimanote **BAYABIL**

Department of Agricultural and Biological
Engineering, Hydrology

Taylor **CLEM**

Nassau County, Landscape Design

Adam **DALE**

Department of Entomology and Nematology,
Landscape Entomology

Zhanao **DENG**

Department of Environmental Horticulture, Plant Breeding

Erin **HARLOW**

Columbia County, Department of Environmental Horticulture

Mark **HOSTETLER**

Department of Wildlife Ecology and Conservation, Biodiversity

Kevin **KENWORTHY**

Department of Agronomy, Turfgrass Breeding

Jason **KRUSE**

Department of Environmental Horticulture, Sports Turf
Management

Tina **MCINTYRE**

Seminole County, Florida-Friendly Landscaping™

Vivek **SHARMA**

Department of Agricultural and Biological Engineering, Precision
Water Management

Bryan **UNRUH**

Department of Environmental Horticulture, Urban Turfgrass
Management

Sandy **WILSON**

Department of Environmental Horticulture, Ornamental &
Invasive Plants

CLUE Staff

Rebecca **CLAPP**

Communications Manager

Melissa **FRIEDMAN**

Research Coordinator II

Brenna **STURGIS**

CLUE Communications Intern

Jennifer **SYKES**

Communications Web Designer II

Kirstin **THOMPSON**

Science Communicator

Florida-Friendly Landscaping™ Staff

CJ **BAIN**

FFL Website & Information Tech Coordinator

Marc **CELESTIN**

FFL Statewide Training Coordinator

Paula **DAVO**

FFL Student Intern

Keighly **GRAVES**

FFL Horticulture Specialist

Angela **GREGORY**

FFL Social Media Specialist

Carol **KAVALAN**

FFL IT Architect

Jen **MARVIN**

FFL Education Coordinator

Claire **MITCHELL**

FFL Statewide Education Coordinator

Cesar **PERALTA**

FFL Regional Coordinator

Barry **SAWICKI**

FFL Training Specialist

Lyn **WARD**

FFL Program Assistant

Tom **WICHMAN**

FFL Assistant Director

Program for Resource Efficient Communities Staff

David **BEARL**

Chef, Local Food Systems and Culinary Educator

Xiongxiang **FAN**

Data Management Analyst I

Lesly **JEROME**

Energy Programs Research Assistant

Kaitlin **ROBB PRICE**

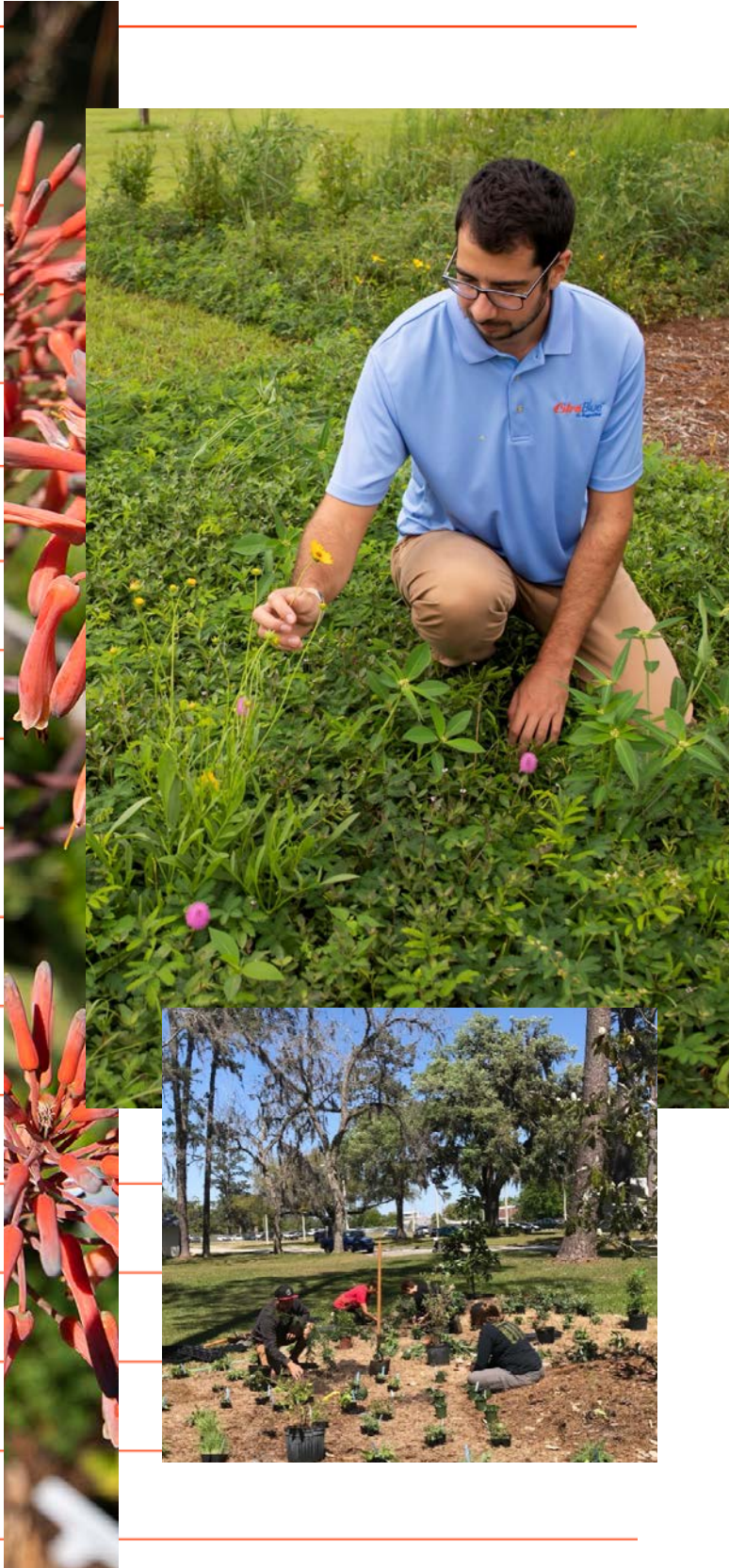
H₂OSAV Project Manager

Bradley **SPATZ**

H₂OSAV Computer Scientist

Graduate Students

Working on CLUE Research



2 M.S. **7** Ph.D.

Agricultural and Biological Engineering



3 M.S. **6** Ph.D.

Agricultural Education and Communication



2 M.S.

Agronomy



3 M.S. **2** Ph.D.

Entomology and Nematology



1 M.S.

Environmental Engineering,
University of South Florida



9 M.S. **12** Ph.D.

Environmental Horticulture



2 Ph.D.

Food and Resource Economics



5 M.S. **4** Ph.D.
Forest, Fisheries and Geomatics Sciences

1 M.S. **1** Ph.D.
Interdisciplinary Ecology

2 M.S.
Landscape Architecture

10 Ph.D.
Natural Resources and Environment

15 M.S. **11** Ph.D.
Soil, Water, and Ecosystem Sciences

1 Ph.D.
Wildlife, Ecology, and Conservation

43 M.S. **56** Ph.D.
TOTAL Graduate Students



UF creates new Florida-Friendly Landscaping™ installation at Malachowsky Hall

The University of Florida has begun construction on a new Florida-Friendly Landscaping™ (FFL) demonstration garden at Malachowsky Hall. The area will serve as an example of how to create an environmentally friendly landscape, with a goal to inspire students and visitors about what's possible in their own yards.

This project will transform the area to create a welcoming, relaxing atmosphere for students, faculty and visitors alike, while also creating a space that showcases the nine FFL principles.

“We wanted to create a space where students could get outside, walk around, and feel relaxed,” said Claire Lewis, state specialized agent and FFL program coordinator.

By incorporating flowering plants, native species, and shade-providing trees, we've designed a beautiful space that also serves an educational purpose.

~ Claire Lewis

Malachowsky Hall, a seven-story, 263,000-square-foot building on UF's campus, is the center for data science and information technology at UF. Malachowsky Hall is across from the J. Wayne Reitz Union, the student union at UF, and features a large lawn along Museum Road, where the new FFL landscape area will be located.

The area will feature signs identifying various plants and explaining FFL principles, making it a living classroom for sustainable landscaping practices. Some of the plants that will be incorporated are palmettos, dune sunflowers, drift roses, plumbagos, agapanthus, white muhly grasses and thryallises. The design includes trellises, walking paths and benches.

“When using evergreen shrubs and groundcovers, you get good foundation planting that remains interesting even in the winter when the flowering perennials go dormant,” she explained.

The grass used will be a Zoysia grass cultivar called CitraZoy™, a UF-developed heat- and drought-tolerant grass variety that flourishes in Florida's environment. CitraZoy™ has a good tolerance to insects, weeds, shade and salt. It keeps its green color well throughout the year and is a hybrid between two types of Zoysia grasses.

“We are proud to use UF-developed cultivars in our projects,” said Lewis.

Installation of the landscape began in the fall of 2024 and should be completed by spring of 2025. As the designer of the landscape, Lewis hopes this area will become an iconic part of the UF campus that reminds alumni, students and visitors why they came to Florida.



“We like to make Gators aware of FFL and show people how to do landscaping in a Florida-friendly way,” added Lewis. “By using Florida-friendly plants and reclaimed water, we’ve addressed drought conditions while creating a stunning and educational landscape.”

As part of the design for this landscape, Lewis collaborated with Jules Bruck, chair of the UF Department of Landscape Design, and with undergraduate student Juan Perez from the UF College of Design, Construction and Planning. Together they turned the paper plans created by Lewis into a three-dimensional computer model that allows the viewer to fly through the

new landscape. Viewers get a birds-eye view of the landscape, complete with people walking on the sidewalks, flowers in full bloom and trees providing shade over the benches. This video is a perfect way to preview this beautiful new landscape before it is completed in real life.

Scan here for a sneak peek at the finished design for the Malachowsky Hall landscape: youtu.be/cuBoiZMFBBY



*Parts of this article were provided courtesy of Meredith Bauer, UF/IFAS Communications.

Years of UF research yields science-backed fertilization rates

After two years of work, researchers have new fertilizer recommendations for several agriculture commodities in Florida. These results are the first of many recommendations that will result over the next two years from research projects being conducted across the state. The goal is to create nutrient management recommendations based on science and specific to the crop, climate, and soil.

In 2022, state funding made it possible for the UF/IFAS Nutrient Management Program (NMP) to begin scrutinizing long-established fertilization rates for 14 crops to determine whether updates are needed. The goal was to pinpoint the appropriate amount of fertilizer to achieve optimum yield for each crop while minimizing environmental impact. To that end, more than 60 scientists commenced 19 research projects across the state.

But it takes years of crop growth trials with calibrated adjustments for different variables to validate results and identify appropriate nutrient rates, said Michael Dukes, interim director of the program.

“We’ve been consumed with ramping things up, establishing relationships with growers, buying equipment and conducting the research,” Dukes said. “Now, we’re at a point where we’re seeing results.”

NMP scientists are honing application rates for nitrogen, phosphorus and potassium. Past recommendations for those key macronutrients needed updating to represent current production systems as well as to account for Florida’s varied environmental conditions,

including diverse soil types ranging from sand to muck, or its hardiness zones, which range from 8b to 11b.

Growers have long known changes were needed to accommodate these realities, and the work of the NMP is welcome, said Bob Hochmuth, an NMP project leader and the assistant director of the UF/IFAS North Florida Research and Education Center–Suwannee Valley, where 15 of the scientists work.

The new rates are based on research that considers a farm’s location, as well as modern farming methods regarding row spacing, irrigation practices and seed varieties. They are derived from research that incorporates the use of technology to increase efficiency and decrease fertilizer leaching, including controlled-release fertilizers and precision application machinery that places nutrients directly at plant root systems rather than widely broadcasting across the entire field. They also consider that growers may be increasing the number of plants grown on their land to boost crop yield.

“It’s important that the new nutrient rates reflect changing cultural practices on farms,” Hochmuth said.

The UF/IFAS Plant Nutrient Oversight Committee (PNOC) reviews all nutrient rate research results for consistency and scientific integrity. The members are composed of administration and researchers with a background in crop nutrient management. They evaluate nutrient recommendation proposals for changes and vote to approve, deny or return them for revisions.

To promote transparency and ensure stakeholders understand and support the new rates, UF/IFAS is conducting outreach to growers, state agencies and advocacy groups. Stakeholders are learning about the research through a seminar series and by attending field days at locations where trials are underway. Advisory committees for specific crops allow growers to share input.

UF/IFAS also conducts research on private farms with private machinery, ensuring real-world conditions. In addition to engaging growers and making it possible to share new practices, this approach supplements research conducted under highly controlled conditions at UF/IFAS research and education centers.

“Whether it’s the farmers or the non-farm community, we’re trying to make sure that everybody is aware of what we’re doing,” Hochmuth said.

Researchers have already made changes to the recommendations for corn, potatoes, sugarcane, strawberries, turfgrass and carrots. (See infographic for specific nutrient management recommendation changes) In 2025, additional changes to recommendations are expected for potatoes, corn and sod as well as new recommendations for tomatoes and snapbean.

Although the state legislature has funded the NMP through fiscal year 2024-2025, ever-changing environmental conditions and production systems mean the scientists’ work will never truly end, Dukes said. Their research helps ensure Florida crops worth millions of dollars continue to thrive and support a key component of Florida’s economy.

“There is a huge economic benefit to society for us to do this research, so growers can continue to feed the world using fertilizer rate guidance they can trust while we are mindful about limiting nutrient loss to the environment,” he said.

*Parts of this article were provided courtesy of Megan Winslow, UF/IFAS Communications.



Nutrient Management



January 2022 | Grain corn

The N recommendation was increased up to 240 lb N/ac for high plant populations above 28,000 seeds/ac.



October 2022 | Potato

A provisional P rate recommendation was implemented for 120 lb P2O5/ac regardless of soil test results.



February 2023 | Sugarcane

The recommended rates of N, P, Si were updated based on specific soil types.



February 2023 | Strawberry

The N rate was increased 150 to 175 lb N/ac.



February 2023 | Turfgrass

The rate recommendation was updated for no P unless M-3 <= 20mg/kg across turfgrasses and the bahiagrass N rate recommendation was updated to 1-2 lb N/1000 sf/yr.



August 2023 | Carrot

The carrot N recommendation was updated 175 to 200 lb N/ac.

CLUE Joins \$9.8 Million Ag Grant for Nursery Automation Research

Researchers with the UF/IFAS Center for Land Use Efficiency (CLUE) have been awarded part of a nearly \$10 million grant from the U.S. Department of Agriculture to study ways to use automation and robotics to address the critical labor shortage in the nursery crops industry.

Along with partner universities and the USDA, UF scientists will develop sustainable solutions for labor, efficiency, automation and production (LEAP). The LEAP project has been awarded a five-year \$9.8 million grant from the USDA National Institute of Food and Agriculture's Specialty Crops Research Initiative, and \$1

million of that is designated for UF/IFAS research and Extension.

Representing the University of Florida on this project are Chris Marble, associate professor in ornamental and landscape weed management, and Laura Warner, professor and Extension specialist in behavioral theory. Marble will lead the project's outreach team and evaluate herbicide application technologies, and Warner will lead the behavioral adoption team, exploring factors that influence adoption of automated nursery technologies.

Chris Marble



Laura Warner



Labor, Efficiency, Automation, and Production: LEAP Nursery Crops Toward Sustainability

Under a previous USDA-SCRI grant led by the University of Tennessee, LEAP researchers found that a lack of workers is the most critical sustainability challenge facing nursery crops producers. Nursery crop production is a labor-intensive industry that includes potting, pruning, staking, scouting, weeding, taking inventory, harvesting, and loading orders. The industry relies heavily on full-time workers augmented by seasonal employees. But both kinds of workers are increasingly hard to find. The team previously reported that compatibility with existing infrastructure, values, and goals is among the most important factors informing decisions to adopt these technologies.

Despite the acknowledged advantages, overall adoption of innovations in nurseries, like automating repetitive tasks, is low. Producers say currently available technologies aren't designed specifically for nursery crops, and they're not sure if these mechanisms are even financially feasible.

The researchers' goal is to develop new automation technologies along with ways to stimulate the use of current technologies. They'll also study other factors, including consumer preferences and the effect of labor retention and re-allocation as a buffer against ongoing labor scarcity. Part of the team's innovation is the emphasis on social

sciences to ensure new technologies meet nursery growers' needs and improve adoption of the emerging innovations.

"The big goal is to effect change," says Marble. "We want growers to adopt these different automation practices, but mostly, we want to give them information to even consider these changes in the first place. We want them to take incremental steps so they become more profitable and more sustainable, and it helps the industry as a whole."

Just how to effect that change is what Warner's team will be focusing on. They will be investigating the perceptions and barriers to adopting specific automation technologies. Working with researchers across the country, her team will map growers' information-sharing networks that accelerate adoption.

"Understanding the concerns nursery owners and their employees have with adopting new technologies, as well as what drives their adoption is crucial for developing impactful technologies as well as outreach strategies that will help facilitate successful transitions to sustainable automation," Warner says.

The LEAP team will collaborate across states with producers, scientists, local Extension staff, and allied industries to encourage and accelerate the adoption of these technologies. Marble will lead national outreach efforts, organizing events such field days to demonstrate the benefits of automation. Such events will provide hands-on experiences and showcase successful cases.

"The goal is a sustainable US nursery industry that is more resilient to labor shortage with growers engaged in satisfying work supported by emerging innovations," says Warner, "and to remain a major player in the economic growth of agricultural communities."

The grant team will be led by North Carolina State's Anthony LeBude, and includes scientists from the University of Tennessee, Oregon State University, Texas A&M University, and UF, as well as the USDA.



H₂OSAV Receives AWWA Best Article Award for Water Conservation Division

In June 2024, H₂OSAV received the Best Article Award in the Water Conservation Division for the Journal American Water Works Association (JAWWA) feature article “The Conservation Potential of Smart Irrigation Controllers for Over-Irrigators.” Nick Taylor, UF/IFAS Extension state specialized agent for water and energy resources, was presented with this national award at the AWWA ACE conference in Anaheim, California. The article, published in the April 2023 edition of JAWWA, was authored by Taylor, Connor Atkinson, Kaitlin Robb Price, Parker Johnson, and Bradley Spatz. Atkinson, who was mentored by Taylor, began the work as a student project in Fall 2022. This work was then expanded by H₂OSAV and written for the journal audience, which is primarily those working in utilities, water management districts, and others in the water industry.

The article described the importance of strategically designed and targeted conservation programs for reducing overall water use. With landscape irrigation expected to drive a substantial increase in Florida’s water use, it is critical to focus conservation efforts and ensure a practical cost per gallon of water saved. The article’s primary audience, utilities and water management districts, have significant responsibility in deciding where to invest resources. JAWWA has a monthly circulation of 35,000 copies in the U.S., with more than 72% of readers being defined as decision makers. H₂OSAV aimed to support these decision makers in their efforts by providing a better understanding of the highest water users and their conservation potential.

For homes with in-ground irrigation systems, outdoor water use often accounts for more than half of the total water use. Smart irrigation technology can reduce overwatering by controlling for factors such as soil moisture or weather conditions. This study evaluated the potential water savings from smart controllers and examined the financial benefits for homeowners and service providers. This research used the Tampa Bay area as a case study and relied on H₂OSAV data, including metered monthly water use data provided by Tampa Bay Water, and property appraisal data from Hillsborough, Pinellas, and Pasco County.

This study utilized existing research about net irrigation requirements in Florida that was conducted by Consuelo Romero, Bernard Cardenas, and Michael Dukes. Using net irrigation requirements and average irrigable area for the study area, it was determined the average net irrigation requirements for homes in the Tampa Bay area is 9,982 gallons of water per month. Using metered water data for 449,764 single-family, detached homes, 39,451 homes were identified as using water beyond the theoretical net requirement for their property, with an estimated 16,234 gallons a month used for irrigation. This is 63% above the expected water use if they were irrigating to the net irrigation requirement. If a smart controller was to reduce irrigation to the net irrigation requirement of 9,982 gallons per month, that would be a savings of 6,252 gallons per month. On a larger scale, it is unrealistic to assume that 100% of over-irrigators would upgrade to a smart controller. If just 20% of over-irrigators in

the study reduced their water use to expected amounts, it would save 592 million gallons of water per year (1.62 million gallons per day).

If the utility issued a \$250 rebate for smart controller installation that 20% of homeowners in the study area took advantage of, it would cost the utility \$1.97 million in rebates to reduce demand by 1.62 million gallons per day, which is a cost of \$0.33/1,000 gallons of water saved. This is a lower cost than many existing conservation programs and alternative water supplies, including reclaimed water.

The research also included homeowner impacts, using the current water rate for the study area of \$5.70/kilogallon of water (not including wastewater charges, making the savings more conservation). If the homeowners saw a reduction in water use of 6,250 gallons of water a month, they would save \$427/year. On a larger scale, that would save \$32 million over 10 years (the standard product lifetime) if just 20% of over-irrigators reduced their water use to the net irrigation requirement.

Of critical importance, however, is that of the homes in this study, 39,451 (8.8%) were classified as over-irrigators. This means that more than 90% of homeowners wouldn't see a meaningful reduction in their water use if they installed a smart controller and could even see an increase in their water use after installation.

In summary, the authors found that smart controllers can save a significant amount of water, and a utility rebate could be a cost-effective conservation program. However, there is a critical need to design conservation programs with over-irrigators as the target audience. Ultimately, the article gives a framework of how to think about program design and savings potential. While this study was focused on the Tampa Bay area, it is applicable across Florida and beyond.

To read the full text, including more detailed findings and methodology, scan this code: awwa.onlinelibrary.wiley.com/doi/10.1002/awwa.2073



Potential savings

reduce water demand by

1.62 million gallons

per day and save Floridians

\$32 million over 10 years

CLUE 2024 Landscape Summit Largest in History of the Event

In April, CLUE hosted the 2024 Urban Landscape Summit. This year's summit was noteworthy for a number of reasons. The attendance for the summit was the largest in the history of this event with more than 130 people spending two days to address the issue of building water resiliency with Florida landscapes.

For the first time at this summit, the event brought together UF/IFAS research and Extension faculty with industry professionals, water management professionals, developers, builders, and city managers from across the state.

UF/IFAS researchers and Extension faculty presented the latest information on a variety of topics including water conservation through alternative groundcovers, landscape design, soil amendments, data to target high water users and public perceptions of water restrictions. Expert panelists provided insights on the struggle for cities, counties, and communities to meet current and future water demands. The open forum format of the summit allowed for interaction between all groups that continued during meals and breaks.

Feedback provided by attendees through a post-event survey found that the summit was a success. One attendee said she was "really impressed with the variety of industry, nonprofit, government, and university representatives in attendance." Another attendee commented that "engaging with builders and developers makes sense" as a way to move the needle on the issue of strategies to reduce excessive irrigation demand from landscapes, particularly with alternative



landscapes. He added that if the demand is strong and sustainable then it will be possible to "motivate the nursery and landscape industry to align their practices, product and services" to meet this new demand. A researcher said he was able to identify the lack of understanding of water policy at a local government level as a barrier to progress in water conservation.

The summit is an example of UF/IFAS Extension at its best. The summit brought together the groups on all sides of an issue and used science-based information to find solutions. The summit proved what Extension already knows- that more information, more viewpoints, more ideas, and more voices generate the best answers. It also shows that by working together, people can make an impact on large scale issues like protecting Florida's water resources.

Scan here to watch the UF/IFAS Presentations from the 2024 Landscape Summit:
tinyurl.com/2nzyhuwr



CLUE Working Group Standardizing Irrigation Evaluation Process



Outdoor water use is a driver of high water bills for many homes in Florida. Identifying ways to reduce residential irrigation will help protect Florida's valuable resources and save Floridians money. Irrigation evaluations are a way to

identify common issues with an irrigation system and stop water-wasting issues, such as leaks or irrigating too frequently. While a few county Extension offices have developed irrigation evaluation programs, there is currently no UF/IFAS standardized process for conducting irrigation evaluations. This has made it difficult to train Extension agents who wish to start similar programs in their own county. The Irrigation Evaluation Working Group is a collaborative effort to solve this problem.

The catalyst for creating this group was the H₂OSAV Water Conservation Mini Award. The mini award was created to support county agents with measurable water-saving efforts, and the first two years have focused on county agents conducting irrigation evaluations of HOA common areas. Agents were excited to work on these projects, but their experiences, skills, and confidence with conducting irrigation evaluations have varied. H₂OSAV arranged an Extension In-Service Training in September 2023 to train agents on how to

conduct irrigation evaluations but received numerous requests for resources, such as an irrigation evaluation form. It became apparent that these resources were not available, and further, that a standardized process did not exist to be the basis for more resources.

As a result, H₂OSAV developed a needs assessment that was distributed in September 2024. Respondents confirmed the gap in resources provided by UF/IFAS on this topic; 89% of respondents said current irrigation evaluation resources do not meet their needs or only somewhat meet their needs. Further, 95% of respondents indicated that more resources would definitely or probably improve their water conservation programming.

The working group consists of 19 members, including Extension agents from 12 counties representing all 5 UF/IFAS Florida districts, as well as leaders of the Master Gardener Volunteer Program, Florida-Friendly Landscaping™ program, and H₂OSAV. These working group members have dedicated themselves to monthly meetings and bring a range of knowledge and experiences that has allowed for productive conversations on conducting effective irrigation evaluations. This collaborative effort is possible due to the Center for Land Use Efficiency, which houses these experts in irrigation and landscaping.

After a standardized process and form for conducting irrigation evaluations is completed by this group in 2025, next steps can begin on expanding a library of resources and training opportunities for agents.

2024 CLUE Funded Grant Projects



Updating and Expanding the UF/IFAS Southeast Landscape Pests Web Application

Principle Investigator: Adam Dale

Collaborators: Amanda Hodges, Jaret Daniels, Claire Lewis, and Tom Wichman

- Update and expand content, and reformat web applications to align with FFL applications so they provide consistent information to the public and industry professionals on new and emerging plant pests
- Support programmatic efforts on biodiversity conservation and Integrated Pest and Pollinator Management (IPPM) in lawn and ornamental systems
- Host statewide workshop for county Extension faculty on integrating IPM with biodiversity conservation



A Statewide Extension Program for Promoting Foodscaping as a Key Urban Agriculture Component for Sustainable and Resilient Communities

Principle Investigator: Gail Hansen

Collaborators: Amanda Marek, Mark Bailey, Claire Lewis, Jen Marvin, and Shannon Bly

- Develop and administer educational and marketing outreach materials and trainings that make Foodscaping accessible to Florida homeowners
- Design foodscaping landscapes for 10-12 residential sites in North, Central and South Florida that meet aesthetic preferences and common HOA criteria
- Document the development process as a blueprint to be used by other Extension and outreach programs



Developing Frogfruit for Widespread Use in Florida Landscapes

Principle Investigator: Kevin Kenworthy

Collaborators: A.J. Lindsey, Bryan Unruh, Esteban Rios, and Basil Iannone

- Characterize performance, flowering, and morphology from assembled collection of Florida frogfruit germplasm to identify most fertile lines for production
- Develop breeding population and evaluate for sod suitability
- Assess genetic diversity to identify core Florida frogfruit species
- Evaluate alternative lawn covers for sod suitability



Enhancing Research and Extension Outputs on the Benefits of Native Plants in Two Types of Urban Designed Ecosystems

Principle Investigator: Basil Iannone

Collaborators: Michelle Atkinson, Eban Bean, Patrick Bohlen, Adam Dale, Michael D'Impero, Gail Hansen, Mark Hostetler, Pierce Jones, Jennison Kipp, Mary Lusk, Brooke Moffis, Paul Monaghan, AJ Reisinger, Nick Taylor, and Wendy Wilber

- Observe plants in native-dominated yards, traditional yards, and natural areas for indicators of resource/food availability known to support higher trophic levels
- Analyze data to detect differences among the locations in overall resources
- Use findings to guide entrepreneurial leaders in pursuing sustainable landscaping



Evaluating the Impacts of Climate Change on Urban Tree Performance & Survival

Principle Investigator: Ryan Klein

Collaborators: Gail Hansen, Sandra Wilson, and Laura Warner

- Identify underutilized tree species that might perform well in future climates Analyze effect of common irrigation technologies on tree establishment
- Determine effects of increased temperatures on commonly planted trees in Florida
- Develop a tool to assess parking lot plantings and evaluate impact of municipal codes on tree performance



The Impact of Lawn Age on Soil Carbon Sequestration, Respiration, and Nitrogen Mineralization

Principle Investigator: A.J. Lindsey

Collaborators: Bryan Unruh and Marco Schiavon

- Select lawns of various ages throughout Florida and collect multiple soil samples from representative locations
- Analyze soil characteristics for correlations between lawn age and location

Expanding Our Water Supply Portfolio Part 2: Research on the Effects of Reclaimed Water Irrigation on Soil Microorganisms in an Agricultural System

Principle Investigator: Mary Lusk

Collaborators: Davie Kadyampakeni and Justina Odogwu

- Investigate the effects of reclaimed water (RW) irrigation on soil microbial ecology
- Evaluate soil N and P cycles when RW is used to irrigate a major commodity
- Develop extension materials on best practices for RW use and blueberry production



Greening Development II: Working with Communities to Identify Incentives for Development Projects and Low-Income Neighborhoods

Principle Investigator: Andrew Koeser

Collaborators: Mysha Clarke, Gail Hansen, Mary Lusk, Lara Roman, Laura Warner, and Aline Teodoro Kuzma

- Conduct comprehensive review of existing local ordinances to identify incentive programs to enhance urban greening
- Survey/interview low-income residents in Florida's 5 largest cities
- Survey urban foresters and municipal planners to gauge willingness to participate in incentive schemes outlined by developers



Exploring the Impacts of Urban Greenery on Hypertension: An Analysis of the 3-30-300 Rule

Principle Investigator: Andrew Koeser

Collaborators: Ryan Klein, Laura Warner, and Christy "Suzie" Suhendy

- Conduct statewide survey targeting residents likely to suffer from hypertension
- Develop logistic regression model to determine if greening criteria is associated with reduced or increased odds of hypertension
- Compare costs of greening to monetary benefits of hypertension prevention
- Document findings in peer-reviewed article and present to green industry managers



Field to Fork Office's Florida-Friendly Landscape™ (FFL) Demonstration Garden

Principle Investigator: Wendy Wilber

Collaborators: Jen Marvin

- Create a garden that will educate and demonstrate 6 of the 9 FFL principles
- Use 90% native plants in the garden to showcase beauty of natives in a landscape
- Report knowledge gain of attendees through post tour surveys
- Increase Master Gardener Volunteer knowledge of FFL design and plant choices



Evaluating the Need for a Statewide Collaboration for Septic System Education: Navigating the Impact of SB 1379

Principle Investigator: Yilin Zhuang

Collaborators: Andrea Albertin, Lisa Krinsky, Don Rainey, Mary Lusk, and Ricky Telg

- Conduct literature review to identify relevant regulations, technological advancement, and public perception
- Host in-person focus groups with state/regional entities and industry professionals to gather insights on challenges, perspectives, and expectations for statewide implementations
- Analyze data and prepare report summarizing findings and recommend next steps
- Create working group with representatives from state agencies, county and municipal governments, environmental organizations, and other relevant stakeholders



Native Landscape Plants Make Their Debut at Field & Fork Farm and Gardens

Following the introduction of native landscape plants in May, Field & Fork Farm and Gardens have welcomed numerous groups, with visitors ranging from Master Gardener Volunteers, community members, and UF faculty. These groups have explored the garden's diversity and learned about the importance of native plants in supporting biodiversity.

The goal of the project is to showcase Florida-Friendly Landscaping™ (FFL) practices using native plants. Native pollinator plants have previously been added to the area, however, natives, such as Muhly Grass and BeautyBerry, are a step in a new direction. Other shrubs included in the addition are Dwarf Walters Viburnum, Firebush, and Myrsine.

The visionaries behind the project are Florida's Statewide Master Gardener Volunteer Program Coordinator, Wendy Wilber, and Program Director and Campus Food Systems Coordinator, Anna Prizzia. These two experts selected the native plants, carefully mapped out the location of the installation, and even got in on the action by digging in the soil with volunteers.

A dozen students from the UF's College of Agricultural and Life Sciences worked with Field & Fork Farm and Gardens student interns to bring the new native area to life. They hauled wagonloads of recycled tree mulch, cut nursery ground cover, pulled weeds, and planted the natives in the soil.

"The office at Field & Fork looks similar to a residential home, showcasing an example of how residents can incorporate native landscape plants into their yards, while also using Florida-Friendly Landscaping™ principles," Prizzia said.

Sponsored by the FFL program, this addition of the native landscape plants has become a focal point of Field & Fork and serves as a learning opportunity for guests. Groups such as the Jacksonville Master Gardener Volunteers, Clay County Master Gardener Volunteers, and the University of Florida Foundation Board members have toured the Farm and Gardens to learn how to use the FFL techniques in their gardens. Field & Fork welcomed visitors to a fall festival featuring the newest educational aspect in November.

Jen Marvin, FFL Extension Program Manager, was responsible for creating the design portion of the garden. Her inspiration behind the design was based on maintenance, location, and the overall feel of the natives. "It's all about right plant, right place, meaning matching the needs of the plant to the site conditions", Marvin said. She accompanied this concept with a selection of plants that were dwarf varieties, drought-tolerant, sturdy, and perennials to ensure their beauty would be long-lasting.

The garden includes flowering native landscape plants like Black-Eyed Susan, Starry Rosinweed, Blue-Eyed Grass, Swamp Sunflower, Horsemint, and Twin Flower. During different parts of the year, each of these plants will bloom, showing off their unique colors for the farm and gardens visitors to enjoy. They each have a certain appeal and aroma that attracts butterflies, hummingbirds, and bees.

The next steps for the native landscape garden are already underway. Currently, a panel sign is being developed that will be displayed in the garden, identifying and explaining the nine principles of Florida-Friendly Landscaping™ and Florida Friendly Natural Landscape certification. This new level of recognition is an alternative to the Silver



and Gold tiers of the landscaping program's current recognitions and focuses on plants and gardening methods that can thrive with minimal intervention. The goal of the recognition is to reward people who go above and beyond to create environmentally friendly landscapes that will protect water resources and create an ecological haven for pollinators and wildlife. The required practices for the Florida-Friendly Landscaping™ Natural recognition and focus on minimal inputs to the plants and 75% of the plants used must be native to Florida. Irrigation is used only if the plant shows signs of severe drought stress and no fertilizer is applied to the landscape after establishment.

In 2025, the garden will participate in the Great Southeast Pollinator Census, counting the number of bees that visit the natives in 15 minutes. Finally,

a handout is in progress, with information on Florida-Friendly Landscaping™ and the native plants highlighted in the garden. The garden's future looks bright, and this installation's impact will extend beyond.

"The native landscape garden has really enhanced the office landscape and created another educational aspect that draws visitors to expand their knowledge on FFL and sustainable agriculture," Prizzia said.

*Article written by Brenna Sturgis, UF/IFAS CLUE Communications Intern and AEC Student.

For more information on Florida-Friendly Natural certification, scan here: ffl.ifas.ufl.edu/about-ffl/landscape-recognition



A Year of Growth for the Florida-Friendly Landscaping™ Program

Florida's population currently exceeds 22 million, which is expected in 2025 to drive daily water demand to 9.1 billion gallons—a 26.4% increase from current levels. In regions where water supply already exceeds capacity, the conservation of existing resources and the development of sustainable practices are essential to meet future needs. UF/IFAS Extension addresses these challenges through programs like the Florida-Friendly Landscaping™ (FFL) initiative. Designed to promote sustainable landscaping practices, FFL educates residents and professionals on water conservation, soil health, and low-input landscape management, helping ensure Florida's water resources are protected amid rapid population growth.

The Florida-Friendly Landscaping™ (FFL) Program has been consistently funded by the Florida Department of Environmental Protection (DEP) since 1993 and is implemented statewide through UF/IFAS Extension, with active programs in 50 of Florida's 67 counties. The program received increased support from DEP, which has provided additional funding to strengthen the FFL Program's efforts in meeting these critical needs. This expanded budget has enabled the program to grow the team and enhance its

capacity to advance sustainable landscaping practices across Florida.

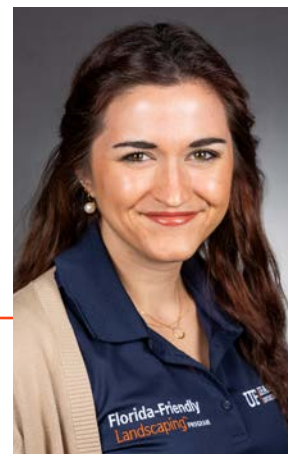
This year the program added several key team members and promoted others from within. Marc Celestin, now Training Coordinator, brings a wealth of expertise with a Master of Science in Education Leadership and will spearhead our Green Industries Best Management Practices (GI-BMP) program and professional training initiatives. Joining Marc is Claire Mitchell, the new Education Coordinator. Mitchell holds a Master's degree in Family, Youth, and Community Sciences from the University of Florida, with over a decade of experience focusing on developing and evaluating urban education programs. Additionally, Keighly Graves, Horticultural Specialist, joins FFL with interdisciplinary expertise from the University of Florida's Plant Science program. Graves will bolster efforts in public outreach and education. FFL is also actively seeking candidates for the positions of FFL Youth Education Coordinator and North Regional GI-BMP Training Coordinator. These additions position the FFL Program to expand its training, education, and outreach efforts statewide.



**Marc
Celestin**



**Claire
Mitchell**



**Keighly
Graves**

FFL Program Strategic Planning and Needs Assessment Report

In July, the Florida-Friendly Landscaping™ (FFL) Program embarked on a comprehensive strategy development process by conducting a Listening and Planning Session. This two-day meeting brought together 51 participants, including UF/IFAS faculty, FFL educators, staff, and key industry partners. Attendees engaged in dynamic discussions that allowed for reflection on the program's successes, identification of challenges, and exploration of future opportunities. The primary objective of the meeting was to gather feedback on the program's strengths, weaknesses, and areas for growth, as well as to identify strategic priorities for the next five years.

The listening session was paired with an online needs assessment survey conducted to capture input from those who were unable to attend. The survey aimed to identify challenges faced by educators in teaching FFL and GI-BMP classes, assess the needs of students, and evaluate the overall effectiveness of the program. It also sought input on potential new topics, preferred formats and resources for instructor training, and suggestions for improving communication and collaboration among educators, industry partners, and stakeholders. This inclusive approach allowed the program to gather a wide range of perspectives and will help inform the development of a more effective and responsive strategy moving forward.

Key findings from these two evaluations will guide the development of a comprehensive strategic plan focused on addressing the identified challenges and opportunities. The goal is to ensure that the FFL

Program continues to evolve in response to both stakeholder needs and Florida's changing environmental landscape and to empower educators and stakeholders to promote sustainable landscaping practices that foster environmental stewardship across the state.

Flip My Florida Yard: Expanding Statewide Impact

The Emmy Award-winning television series *Flip My Florida Yard* has been renewed for an exciting fourth season. This highly acclaimed program airs weekly across Florida, showcasing the transformative power of Florida-Friendly Landscaping™. Season four will spotlight smaller-scale, practical landscape design changes that homeowners can implement themselves, making FFL principles even more accessible to a broader audience. With its reach extending to all major viewing markets in Florida, *Flip My Florida Yard* has become a cornerstone of public outreach for promoting Florida-Friendly Landscaping™ and UF/IFAS Extension. Its widespread popularity, reaching almost ten million viewers annually, continues to enhance the program's visibility and reinforce its reputation as a trusted resource for sustainable landscaping education.

FFL Awards Program and Photo Contest

The third FFL Awards Program and Photo Contest were launched to recognize exemplary projects, Master Gardeners, FFL educators, UF/IFAS Extension Agents, and other individuals who make significant contributions to creating attractive and sustainable landscapes across Florida. This initiative not only gathers success stories and encourages broader adoption of FFL practices, but it also boosts the program's brand recognition. Winning submissions were celebrated at the Florida Master Gardener Volunteer Conference on October 20th, 2024, in Kissimmee, where they received enthusiastic appreciation from attendees. Additionally, winning entries were featured on social media, amplifying their reach and showcasing these contributions to a wider audience.



Florida Master Gardener Volunteer Program: 2024 Highlights

This year was another successful one for the Florida Master Gardener Volunteers as the program saw a 60% increase in the number of contacts made by volunteers through plant clinics, events and community gardens. In 2024, the MGV program donated 348,709 volunteer hours valued at more than \$31 per hour which totals out to more than \$11 million dollars.

In 2024 Wendy Wilber, the Statewide Coordinator of the Florida Master Gardeners, served in the vice chair role of the Extension Master Gardener National Committee. This committee provides a national focus and contact point for the nationwide Extension Master Gardener program and the various state efforts in Extension consumer horticulture. She will provide leadership as the national chair of EMGNC in 2025.

These 2024 initiatives underscore the Florida Master Gardener Volunteer Program's commitment to providing exceptional

educational opportunities and fostering collaboration both within and beyond state lines. These UF/IFAS Extension volunteers continue to play an invaluable role in advancing horticultural knowledge and practices in their communities.

Florida Master Gardener Volunteer Conference

The 39th annual Florida Master Gardener Volunteer (MGV) advanced training conference took place in Kissimmee, Florida, bringing together over 300 dedicated volunteers. The event offered the latest, most relevant, and engaging horticultural information tailored to Florida's unique environment.

Keynote speakers included UF's Dr. Jaret Daniels and Dr. Adam Dale, who delivered an insightful talk on pollinator conservation. Marc Frank discussed the concept of nativeness, while Disney's Debbie Mola shared innovative strategies for container gardening. Renowned Southern horticultural experts Jenks Farmer and Carol Reese explored the themes of Southern garden aesthetics and "Native Plants: Facts and Foibles." Additionally, UF's Dr. Nick Taylor and Dr. Yilin Zhuang presented an engaging session on the past, present, and future of Florida's water resources.

Pre-conference tours offered attendees a unique experience at Ever Oak Farm, where they explored the Orlando local food system. Participant feedback highlighted the conference's exceptional educational value, with many reporting that the three days of classes and workshops significantly enhanced their knowledge and ability to serve their horticultural communities.

In 2024...

348,709

Volunteer Hours Contributed
at a Value of more than

\$11 million

Florida Master Gardener Leadership School

Since 2012, the Florida MGV Program has hosted an advanced training program for volunteers who serve as leaders in their county initiatives. This year's Leadership School took place in Ocala, drawing 75 attendees from across the state.

The curriculum focused on topics such as evaluation techniques, building community partnerships, teaching youth in 4-H programs, social media best practices, and volunteer wellness. Participants praised the two-day event for its practical insights and reported that the knowledge gained would directly improve their leadership skills and enhance their county programs.

Florida-Friendly Landscaping™ (FFL) New Checklist Training for MGVs

In spring 2024, the Florida Master Gardener Volunteer Program partnered with Florida-Friendly Landscaping™ program to deliver training on the updated landscape recognition checklist. As MGVs play a pivotal role in conducting FFL recognitions at the county level, this training ensured they were well-prepared to educate homeowners effectively.

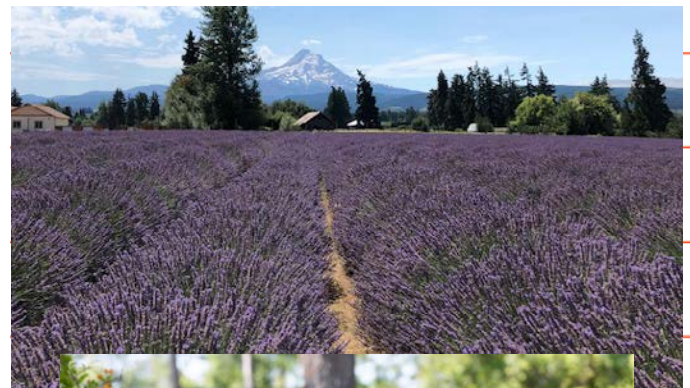
The revised checklist now incorporates a mobile app, enabling volunteers to conduct recognitions online during site visits. Training was delivered through a combination of online modules and in-person workshops. Wendy Wilber, alongside FFL's Jen Marvin, conducted hands-on training sessions in Duval, Alachua, Leon, Volusia, and Lee counties. This initiative equipped volunteers with the tools and confidence to seamlessly integrate the updated process into their work.

Florida Master Gardener Volunteers Travel to Oregon

In August 2024, 42 Florida MGVs embarked on a study tour to Portland, Oregon, and the surrounding agricultural regions. The trip aimed

to explore innovative urban landscaping techniques, examine the local food systems of the Willamette and Hood River Valleys, and foster collaboration with Oregon State University Extension Master Gardeners.

Participants toured urban edible community gardens, horticultural therapy gardens, and a variety of farms and nurseries. A highlight of the trip was the exchange of ideas with Oregon Master Gardeners, who shared insights into their community projects and organizational practices. Florida volunteers, in turn, shared their expertise on gardening in the Sunshine State's unique conditions. Attendees rated the study tour highly, citing the cross-state exchange of knowledge as the most enriching aspect of the experience.



REACH for New Energy Savings

Energy programming has a long history at UF/IFAS and has been integral in shaping building code best practices in Florida through the *Energy Efficient Building Construction in Florida* (EEBCF) book since 1999. The EEBCF serves as a resource to promote energy efficiency in new home construction, providing professionals with essential guidance for energy-saving building practices. It's a critical reference guide for contractors, architects, and builders working to meet Florida's energy and construction standards. Based on the *Florida Building Code, 8th Edition*, the EEBCF supports the adoption of energy-efficient building construction practices and serves as a key resource for contractors to obtain state licensure. It's widely used both as a reference for testing and as a practical guide in the field.

The 11th edition, released in March 2024, includes updates to reflect new testing standards and aligns with the latest building code requirements. EEBCF achieved a milestone with approximately 6,500 copies sold in 2024, generating \$350,000 in annual revenue. This achievement highlights its role as an essential tool within Florida's construction sector, providing the guidance needed to promote energy efficiency and meet professional requirements. While EEBCF continues to serve as a critical resource for the construction of homes across Florida, there has been a lack of UF/IFAS programming in recent years to support energy-saving efforts in existing homes. Florida's Resource for Efficiency, Affordability, and Community Health Program, or REACH, was recently launched to expand energy-saving impacts across the state.

Florida's REACH Program

The REACH Program is designed to empower communities with knowledge and resources by supporting energy efficiency, water savings, and economic development across Florida.

Aligned with UF/IFAS Extension's goals and the broader objectives of the IFAS Pathways and Initiative 4, the program aims to equip county Extension agents with the tools and expertise to foster energy-efficient practices, reduce costs, and enhance community well-being. The REACH Program was developed by the Florida Energy Extension Coalition (FEEC), a partnership between the University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) Extension Services, Florida Agricultural and Mechanical University (FAMU) Cooperative Extension, and the Community Weatherization Coalition (CWC). FEEC currently operates as the steering committee for the Florida REACH Program, exemplifying a collaborative approach to achieving statewide energy goals.

2024 REACH Highlights

In 2024, the REACH Program focused on community education and resource distribution through four key programs designed to improve energy literacy, promote energy-efficient practices, and address residential energy needs. The four energy saving opportunities include the In-Home Tune-Up Program, Do-It-Yourself (DIY) Energy & Water Efficiency Kits, HomeFlow Program, and Home Energy Efficiency Backpack Program. These were tailored to maximize local engagement and deliver measurable results, including energy and water savings and long-term community benefits.

The first round of REACH awardees represented 15 counties across all five IFAS districts. Participants, selected through a competitive process, received specialized energy training that equipped them to act as local leaders in promoting energy-smart practices. The REACH program conducted specialized training sessions for Extension agents in April and October that provided technical knowledge, best practices, and strategies for

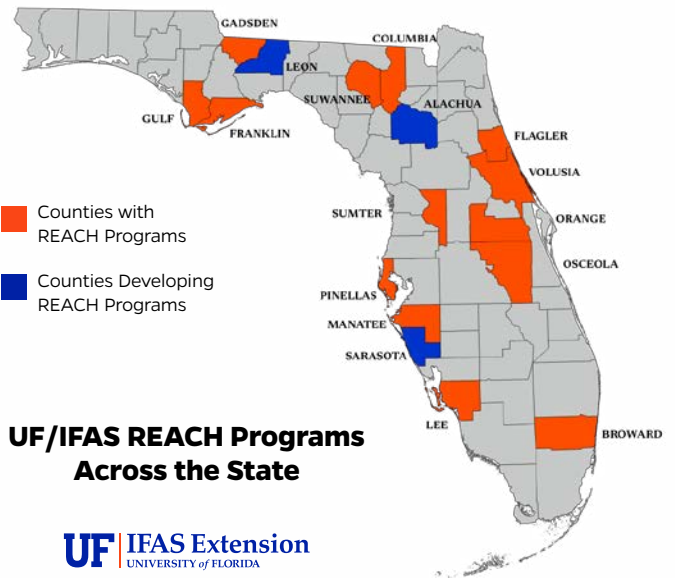
community engagement. Feedback from these sessions highlighted their practicality and value, with agents reporting increased confidence in implementing and expanding energy initiatives.

A standout achievement of 2024 was the Energy Tune-Up Event held in Volusia County in June. This community-focused event engaged over 200 residents in hands-on demonstrations of energy-saving practices. Participants reported an increased understanding of actionable techniques, with early evaluations indicating measurable reductions in household energy consumption.

REACH's Future Trajectory

Building on the successes of 2024, the REACH Program is set to expand its presence in additional county Extension offices across Florida. This strategic growth will allow more communities to benefit from its resources, empowering residents to adopt energy-saving practices and reducing costs through local outreach and education. A key initiative for 2025 involves the rollout of kits tailored to various energy programs. These kits will support county Extension agents in helping residents assess and save energy in practical ways. Designed for flexibility, the kits will enable agents to offer both hands-on, energy coach-led interventions and self-driven energy improvement options. Through these resources, residents will gain access to tools and guidance to reduce energy use, improve efficiency, and lower utility costs. As part of its development, the REACH Program aims to raise its public profile by increasing community awareness and strengthening relationships with local partners. The program will also refine its educational methods to ensure they remain engaging, accessible, and impactful. By leveraging participant feedback, integrating innovative tools, and adapting to emerging trends, REACH will continue to meet the evolving needs of Florida's residents.

Through these initiatives, the REACH Program is committed to expanding its impact, equipping county Extension agents and Florida communities with the tools and knowledge needed to address residential energy challenges effectively.



Flood Resilient Communities

CLUE's Flood Resilient Communities (FRC) program collaborates with local governments to improve their communities' resilience by reducing its vulnerability to flooding. The FRC program evaluates Comprehensive Plan compliance, assesses community vulnerability to flooding and evaluates the impact of other climate change effects. It also assists with community education and outreach, while also providing guidance on policy language and regulations.

In 2024, the program continued to work with the East Central Florida Regional Planning Council to develop a Low-Impact Design/Development and Green Stormwater Infrastructure Ordinance and Guidebook for Volusia County. FRC assisted with Vulnerability Assessments for the cities of Cape Canaveral, Palm Bay and Satellite Beach. These assessments combined with audits of planning documents can help these cities create ordinances and development regulations to prevent and protect from flooding events. This work was presented by program leader

Jerry Murphy at the biennial Water Institute Symposium in Gainesville and at the APA Florida chapter annual state conference in Tampa. As a UF/IFAS Extension State Specialized Program agent, Murphy serves on the Education Committee and as Region 2 Director for the Florida Floodplain Managers Association. He also co-chairs the Higher Education Committee and serves as Academia Regent on the Certification Board of Regents of the national Association of State Floodplain Managers (ASFPM).

In March, Murphy joined an elite delegation of ASFPM national leadership for the Flood and Resilience Dialogue Expedition initiative to Puerto Rico to discuss the role for the No Adverse Impacts (NAI) approach to Floodplain Stewardship in higher education and practice in Puerto Rico. In the aftermath of Hurricane Maria, many of the Commonwealth's citizens were evacuated to Florida. Assisting Puerto Rico to become more flood resilient can help reduce the need for such evacuations and minimize evacuation impacts on the State and its citizens.



In 2023, Murphy helped to complete work on ASFPM's No Adverse Impacts (NAI) Legal Guide. This guide can assist all Florida local governments to better protect their citizens from flood hazards by adopting legally-defensible development standards exceeding the minimums required for participation in the National Flood Insurance Program.

In 2024, Murphy presented at eight major conferences across Florida and around the country, including the American Planning Association's annual National Planning Conference, the Federal Emergency Management Agency's (FEMA) 26th annual Emergency Management Higher Education Symposium, the Florida Floodplain Managers Association annual state conference, and the inaugural Flooding Adaptation Symposium organized by Florida Sea Grant. Through these presentations, he introduced and promoted the NAI Legal Guide to more than 6,000 people.

Murphy also continues to support efforts to develop a Graduate Certificate in Floodplain Stewardship in partnership with Historically Black Colleges and Universities (HBCUs) and other Minority-Serving Institutions by speaking on this topic to the Association of Natural Resources Extension Professionals (ANREP) and by participating in FEMA's Higher Education Program's HBCU Special Interest Group.

In 2025, the program will continue to be busy with plans to complete work

with Manatee County to update their Stormwater Design Manual and with the City of Neptune Beach to finish their statutorily compliant Vulnerability Assessment and Adaptation Action plan. The program will also continue to collaborate with CLUE faculty Eban Bean and with The Nature Conservancy to evaluate local government stormwater management regulations utilizing the Code Audit Spreadsheet Tool (CAST) for Brevard County and several cities in central Florida.

The FRC program is part of the national and state professional floodplain management and urban and regional planning associations. The program's participation in these groups has positioned it to be a change agent in the climate, floodplain stewardship, and flood risk management spaces.



Funding Best Management Projects to Help Florida Farmers

Partnering with the Florida Department of Agriculture and Consumer Services, UF/IFAS provided mini-grants to faculty working on projects related to agricultural



Best Management Practices (BMPs). These mini-grants support efforts throughout the state and provide essential information to specific crop industries.

2024 FDACS Best Management Practices Mini-Grants

Title	PI	Amount Recommended
Cover Crop Establishment using New Technologies	Bearden, Jennifer	\$5,600.00
Cover Crops as an Agricultural Best Management Practice and Soil Biology Enhancer	Capasso, Jay	\$14,992.00
Developing on farm Sap testing method to estimate in-season nitrogen content for fertilizer rate determination in corn.	Kumar, Shivendra	\$24,129.00
The potential of compost use in ornamental production and fertilizer/irrigation application strategies to reduce grower inputs and enhance plant performance	Liu, Qingchun	\$19,450.00

Continued on next page

Title	PI	Amount Recommended
Advanced Cotton Farming: Enhancing Yield and Sustainability with Drone Technology	Morata, Guilherme	\$22,500.00
Exploring Cover Crop Impacts on Cotton Yield and Agricultural Viability	Morata, Murilo	\$11,350.00
Nutrient Management for Vegetable Crops in the Northwest District	Payne, Abbey	\$3,500.00
Developing a Multi-Agency Regional Artificial Intelligence (AI) taskforce that will facilitate the adoption of AI-driven technologies in BMP adoption, implementation, and efficiency	Pittman, Tyler	\$6,750.00
Water Best Management Practices (BMP) for Small Vegetable Producers: Quality, Conservation, and Soil Nutrition	Rodriguez, Luis	\$8,489.00
Mapping Pastures and Hay Fields for Fertilization '24-'26	Tomlinson, Paulette	\$15,000.00
Field Demonstration of Cover Crop Practices to Enhance Best Management Practices for Vegetable Production in South Florida	Wang, Qingren	\$12,950.00
Improving Drip Irrigation Design and Management to Increase Water and Nutrient Efficiency	Warren, Mark	\$27,074.00

CLUE Lunch and Learn Series Provides Updates on Fertilizer Research

CLUE is a unique combination of researchers and Extension faculty from a variety of disciplines housed in different departments across UF and at various Extension offices and RECs around the state. Yet, it's the connection between these experts that plays a critical role in the success of the work being done throughout the center. To keep this community connected, CLUE administration decided to create a webinar series where faculty could share the latest results of their research and programs. This CLUE Lunch and Learn webinar series brings faculty together physically, and virtually, through online communication, for one Friday each month. Lunch is provided at the in-person event and a CLUE faculty member gives a presentation before taking questions from in-person and online audiences. These informal gatherings offer an opportunity for the CLUE community to stay up to date on the latest information coming out of the center, ask questions and discuss topics with broad impacts.

This year, the CLUE Fall Lunch and Learn series focused on fertilizer research projects funded by the state legislature in 2023. Presentations from Bryan Unruh and Yiling Zhuang showcased their partnership with UF Center for Public Issues Education (PIE) to survey residents across the state and specifically in Hernando County about

how they know about and how they use fertilizer. Aj Reisinger and his student Audrey Goeckner reported on their work assessing the impact of fertilizer on the discharge from stormwater ponds. Mary Lusk explained the impact of increased nutrients in reclaimed water can have on urban landscapes. And AJ Lindsey wrapped up the series by presenting his research on how the age of a lawn can impact soil properties.

This year's Lunch and Learns saw a significant increase in the number of in-person attendees while retraining a consistent online audience. The series also drew interest from UF/IFAS faculty outside of the center who wanted to attend. After joining for a Lunch and Learn event, some of these guest faculty asked to join CLUE.

Based on this success, the Lunch and Learn webinar series will be extended into spring 2025 and this series will be composed completely of faculty from across the

state who are interested in joining CLUE as new affiliated faculty. We are excited to welcome new collaborators and new points of view into CLUE and we look forward to introducing these new members of the CLUE community in the 2025 Annual Report.

To watch the featured presentations from the CLUE Lunch and Learn Fall Series, scan the following QR code.

bit.ly/CLUELearnWatch



The poster for the 2024 Lunch and Learn Fall Series is framed in blue. At the top, it features the logos for UF/IFAS University of Florida and CLUE Center for Land Use Efficiency. The main title "2024 LUNCH AND LEARN" is in large blue letters, with "Fall Series" written in a red script font below it. The event details are listed as "One Friday a Month" on "12:00-12:45 p.m.". A paragraph of text states: "The UF/IFAS Center for Land Use Efficiency is hosting this series to update attendees about the latest research on fertilizer impacts in Florida. Join us in person at UF East Campus or on Zoom for each monthly talk." Below this text are two images: one showing a person in blue gloves using a tool to sample soil in a tray, and another showing a stormwater pond. The "Featured Presenters" section lists four events: September 20 (Bryan Unruh & Yilin Zhuang), October 25 (Aj Reisinger & Audrey Goeckner), November 22 (Mary Lusk), and December 6 (A.J. Lindsey). At the bottom, a red box contains the registration link: "Register: https://ufl.zoom.us/webinar/register/WN_TpNCy3VvQuq57Lr9cl8tiA".

Communicating through Digital Platforms

In 2024, the Gardening Solutions website was updated to a new format, layout and design. These new updates provided users with a better overall experience and made the website easier to use on a mobile device. With more than 67% of traffic to the website coming from mobile devices, this upgrade was critical in order for the site to remain current and relevant for our audience.

There were 1.8 million users of the Gardening Solutions website with

2.4 million
sessions.

The Neighborhood Gardener newsletter has 9,584 subscribers and an open rate of

58%.

That's 18% better than the industry average according to Constant Contact. The newsletter "click" rate is 13% which is 11% better than the email newsletter industry average.

The Master Gardener Facebook page has 43,343 followers with a reach of

2.29 million
in 2024. That is a 101% increase over 2023.

The Master Gardener Instagram reached 490,362 accounts and had

14,400
followers.

Popular articles for 2024 included

Vegetable Gardening by Season

Native Plants

Master Gardener Volunteer Home page

The Florida-Friendly Landscaping™ program saw significant growth and engagement across all social media platforms in 2024. The FFL Facebook page has

16,745

followers with a reach of 871,071. That is an increase in followers of 134% and increase in reach of 281% in a single year.

The FFL Website Traffic increased by

433%

directly from organic social media and paid advertising referrals.



About the Center

The UF/IFAS Center for Land Use Efficiency promotes the adoption of science-based policies and practices that measurably create an environmentally and socially vibrant life for Florida's citizens. Research and Extension programs largely relate to water quality and quantity and various best management practices (BMPs) in the following areas:

- Agriculture
- Urban and suburban landscapes
- Large-scale development

Contact information

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