Florida Lake Management Society

Florida Lake Management Society
36th Annual Technical Symposium

August 26th – August 29th, 2025
Hawks Cay Resort, Duck Key Florida

Program Theme:
From Data to Action: Bridging Ecosystem Monitoring with Conservation and Restoration

SYMPOSIUM PROGRAM

TABLE OF CONTENTS

TUESDAY – AUGUST 26, 2025 -- WORKSHOPS

7:30 AM – 5:00 PM **Check-In and Registration** (Overseas Foyer)

8:15 – 4:45 pm **Workshop 1 (Overseas 1): Lake (and Fish) Mapping with Consumer Sonar and Biobase: Survey Design, Analysis Tips and Tentative Field Demo.** Presented by Ryan Sullivan, Biobase LLC (Engineering PDHs 3.0)

8:15 – 12:00 pm **Workshop 2 (Overseas 3): General Aquatic Weed Control, Herbicide Resistance, Introduction Pathways, IPM and Biocontrol Insects.** Presented by Lyn Gettys, Ph.D, University of Florida, IFAS (DACS Aquatic Pest Control CEUs 3.0 & Engineering PDHs 3.0)

8:15 – 4:45 pm **Workshop 3 (Overseas2)**: **From API Data Access to Multivariate EDA and Modeling in R.** Presented by Dan Schmutz, Greenman Pederson, Inc. & Alex Mano, Pinellas County (Engineering PDHs 3.0)

All workshop food breaks are located in the Overseas Foyer
10:00 – 10:15 am **Morning Break**
12:00 – 12:45 pm **LUNCH** *(provided with full-day Workshop registration)*
2:30 – 2:45 pm **AFTERNOON BREAK**

12:45 – 4:45 pm **Workshop 4 (Overseas 3): Aquatic Plant ID Including Telling Apart Lookalikes and Propagation Tips for Natives.** Presented by Lyn Gettys, Ph.D, University of Florida, IFAS (Does not require Workshop 2) (DACS Aquatic Pest Control CEUs 3.0 & Engineering PDHs 3.0)

WEDNESDAY – AUGUST 27, 2025 MORNING – SYMPOSIUM

(* - Denotes student paper)

7:30 AM – 5:00 PM	**Check-In and Registration** (Overseas Foyer)
7:00 AM – 8:30 AM	**Breakfast** (Dolphin Ballroom)

Opening Program (Overseas Ballroom 2-3)

8:30-8:45 AM **Welcome & Opening Remarks: Dan Schmutz, FLMS President**

8:45-9:45AM **Morning Keynote Address**

Kate Hubbard, Ph.D, Research Scientist with FWC's Ecosystem Assessment & Restoration Section

9:45-10:30 AM **MORNING BREAK** (Exhibit Hall – Dolphin Ballroom)

Session A1: Lake Restoration (Overseas Ballroom)

Moderator: Ernesto Lasso De La Vega

DACS Aquatic Pest Control CEUs or Engineering PDH 1.0

10:30 – 10:35 AM	*Session Introduction*
10:35 – 10:50 AM	Restoring Howell Creek: A Collaborative Effort for Ecological and Community Resilience – *Alex Darr*
10:50 – 11:05 AM	Restoration Options for Lake Carlton – *James Preston*
11:05 – 11:20 AM	Lake Jesup: The Latest Modeling and Restoration Efforts – *Shannon Salvatori*
11:20 – 11:35 AM	A 20 Year Cost-Benefit Analysis of the Lake Apopka Marsh Flow-Way Treatment Wetland – *Jennifer Mitchell*
11:35 – 11:50 AM	The Foundational Data Supporting the Black and Crane Creek Projects – *Erich Marzolf, Ph.D.*
11:50 – 12:00 PM	*Session Q&A*

12:00 – 1:00 PM	**Lunch** (Exhibit Hall – Dolphin Ballroom)
1:00 – 2:00 PM	**Keynote Address** – Jason Dotson, FWC Section Leader, Freshwater Fisheries Research (Overseas Ballroom)

Wednesday – AUGUST 27, 2025 AFTERNOON

Session A2: Data Management and Trends (Overseas Ballroom)

Moderator: Dan Schmutz

DACS Aquatic Pest Control 0.5 CEU; Engineering PDH 1.0

2:00 – 2:05 PM	*Session Introduction*
2:05 – 2:20 PM	The Save Our Indian River Lagoon Program: From Data to Action to More Data to Adaptive Management – *Virginia Barker*
2:20 – 2:35 PM	Field Validation of a Phone-Based Turbidimeter and Determining Next Steps for Mobile-App Integration – **Lindsey Pegram*
2:35 – 2:50 PM	Unique Long-Term Monitoring of the 2023 Full Lake Hydrilla Treatment on Lake Mary Jess, Orange County – *Marissa Heron*
2:50 – 3:05 PM	Trends in Extreme Rainfall in North Carolina and Florida – *Dan Schmutz*
3:05 – 3:15 PM	*Session Q&A*
3:15 – 3:45 PM	**AFTERNOON BREAK** (Exhibit Hall – Dolphin Ballroom)

Session A3: Lake Management

Moderator: Harvy Harper, Ph.D

DACS Aquatic Pest Control CEU or Engineering PDH 1.0

3:45 – 3:50 PM	*Session Introduction*
3:50 – 4:05 PM	In-Season and Overwintering Cyanobacteria Monitoring and Treatment Methods Using Liquid and Granular Paa/Hydrogen Peroxide – *Tom Warmuth*
4:05 – 4:20 PM	Changes in Nutrient Cycling in a Deep Stratified Central Florida Lake – *Harvey Harper, Ph.D*
4:20 – 4:35 PM	Tracking Lead Contamination in Central Florida Impaired Lakes – *Emily Hartdegen, PWS and Jesse Wineberg, PE*
4:35 – 4:50 PM	Lake Conway: Where Stormwater Evaluations, Feasibility Studies, and a Citizen Board Lead to Stormwater Improvements – *Tara Urbanik*
4:50 – 5:05 PM	From Lab to Action: Enhancing Community Resilience with Affordable Flood Monitoring and Hyperlocal Predictions – *Brian Glazer, Ph.D*
5:05 – 5:15 PM	Session Q &A

WEDNESDAY AUGUST 27, 2025 EVENING

5:30 – 7:00 PM	**EXHIBITORS' SOCIAL** (Exhibit Hall – Dolphin Ballroom)

5:30 – 7:00 PM **Poster Session** (Exhibit Hall – Dolphin Ballroom)
*Denotes Student Poster

1. Ecological succession of epibenthic communities on different faces of an artificial reef on the Southwest Florida Shelf - *Rodolfo Arambulo

2. Quantifying the Nutrient-Pollution Impacts of Aquatic Plant Management in Florida - *Anthony Dues, Jr., James Douglass, Serge Thomas

3. Investigating seasonal patterns of vegetation indices for a southwest Florida cypress dome: a case study at the Naples botanical garden - *Kelton Maystrick, Chad Washburn, Brian Bovard

4. Understanding Nutrient and Chlorophyll Concentrations in the Caloosahatchee River Using Spatial Interpolation Tools - Caroline Hoel

5. A decadal sediment accumulation in the Carlton Lakes, southwest Florida – Dr. Serge Thomas, *Nevaeh Greco, *Mackenzy Binion, Taylor Rowe, and Rachel Smith

6. A case for rewilding: Unmowed dry detention ponds have floristic characteristics more like natural wetland areas – *Michael Bruder, Dr. James Douglass

7. The role of Florida's unique pond clusters along conservation corridors: a call for monitoring and protection - *Isabelle Rytlewski, Thomas Whitmore

8. Common Nursey Study on native *Vallisneria neotropicalis* - *Jennifer Bishop

9. *Vallisneria americana* restoration in the Caloosahatchee river estuary: Opportunities, progress, and challenges - *Devin Quigley and James Douglass

Wednesday AUGUST 27, 2025 EVENING

POSTER SESSION CON'T

10. Investigating the effectiveness of Lake Guard® Oxy (Algaecide) during the 2024 cyanobacterial bloom season at S-77 - Haruka Urakawa, Anna Wachnicka, Dr. Serge Thomas, Jose Lopez, Levente Pap, Bethany Ryder, Alvio Barbaretta and Hidetoshi Urakawa

11. Gambusia farming in an urban environment – Paul Mosteller and Eduardo Morales

12. Nitrogen uptake from an urban stormwater pond with biochar-amended floating treatment wetlands – Mary Lusk, Ph.D.

13. Citizen science as an education tool for adult and youth audiences – Michael D'Imperio

14. With Rigero's Bio-generation system, a "plug and play" solution to reduce nutrients, reduce algae blooms, and consumes pond muck – Michael Bateman and Dan Danforth

15. Conservation paleoecology and lake management in Florida: using lake sediments to guide management, restoration, and conservation initiatives – Melanie Riedinger, Thomas Whitmore, Cody Letts and Shayna Dimmer.

16. Integrating high-resolution satellite and in-situ sensor data for enhanced monitoring of cyanobacterial blooms in Doctors Lake, Florida – Todd Lundell

17. Cyanobacterial harmful algae bloom treatment using Lake Guard Oxy in Doctors Lake, Florida – Jessica Frost

THURSDAY – AUGUST 28, 2025 MORNING

(* - Denotes Student Paper)

7:30 AM – 5:00 PM **Check-In and Registration** (Overseas Foyer)
7:00 AM – 8:30 AM **Breakfast** (Dolphin Ballroom)

Opening Program (Overseas Ballroom 2-3)

8:30-8:45 AM **Welcome & Opening Remarks: Gloria Eby, FLMS Incoming President**

8:45-9:45AM **Morning Keynote Address**

Rehabilitating Oligotrophic Ecosystems and the Long Tail/Tale of Nutrient Enrichment Legacies.
Evelyn Gaiser Ph.D, FIU Distinguished University Professor of Biological Sciences

9:45-10:20 AM **MORNING BREAK** (Exhibit Hall – Dolphin Ballroom)

Session A4: Nutrient Reduction (Overseas Ballroom)

DACS Aquatic Pest Control CEU or Engineering PDH 1.5

Moderator: Gloria Eby

10:20-10:25 AM	*Session Introduction*
10:25-10:40 AM	The Growth of USDA Nationally Certified Biobased/Biopreferred Erosion Products – *Joseph Greco*
10:40-10:55 AM	Full-scale phosphorus mitigation projects to improve water quality in Florida – *Pamela Dugan Ph.D*
10:55-11:10 AM	Get the Most BAM for Your Buck with Recirculating Biosorption Activated Media Filters! A Unique Solution for Addressing External and Internal Nutrient Loads to Lakes. – *Andrew Hood*
11:10-11:25 AM	Stormwater Management – It's All About the Concentration! – *Harvey Harper, Ph.D*
11:25-11:40 AM	Enhanced Nitrogen Reducing (ENR) Systems Updates – R*oxanne Groover*
11:40-11:50 AM	*Session Q&A*

THURSDAY – AUGUST 28, 2025 AFTERNOON

11:50 – 1:20 PM **FLMS ANNUAL AWARD LUNCHEON** (Exhibit Hall-Dolphin Ballroom)

Session A5: Citizen Science (Overseas Ballroom)

Moderator: Dana Stephens, Ph.D

DACS Aquatic Pest Control CEU or Engineering PDH 1.0

1:20-1:25 PM	*Session Introduction*
1:25-1:40 PM	Citizen's Pond Survey Tool – *Ernesto Lasso de la Vega*
1:40-1:55 PM	How Volunteer Data Collection Supported the Restoration of Crescent Lake, St. Petersburg – *James Bays*
1:55-2:10 PM	Translating Community Scientist Data to Intentional Action in Northwest Florida – *Dana Stephens, Ph.D*
2:10-2:20 PM	*Session Q&A*

2:20-3:00 PM **AFTERNOON BREAK** (Exhibit Hall – Dolphin Ballroom)

Session A6: Vegetation Monitoring (Overseas Ballroom)

Moderator: Rob Burnes

DACS Aquatic Pest Control & DACS Core 0.5 CEU; Engineering PDH 1.0

3:00-3:05 PM	*Session Introduction*
3:05-3:20 PM	Assessing the State of Cuban Bulrush (Cyperus blepharoleptos) Management across the Southeastern United States – **Patrick Belk*
3:20-3:35 PM	Assessing the risk factors for hurricane-induced tree failure in the Naples Urban Forest – **Coralie Paschal*
3:35-3:50 PM	Pixels and Plants: Monitoring Dune Vegetation Restoration Using Remote Sensing Technologies - **Nathan Hewitt*
3:50-4:05 PM	Examining Recovery and Resilience of Coastal Dune Vegetation Following Repeated Hurricanes – **Mary Moody*
4:05-4:15 PM	*Session Q&A*

5:00 – 11:00 PM Scholarship Fundraiser – Conch Crawl Bus to Key West

FRIDAY – AUGUST 29, 2025 MORNING

(* - Denotes Student Paper)

7:00AM – 8:30AM **Breakfast** (Exhibit Hall – Dolphin Ballroom)

8:50 – 9:00 AM Announcements: Gloria Eby, FLMS President

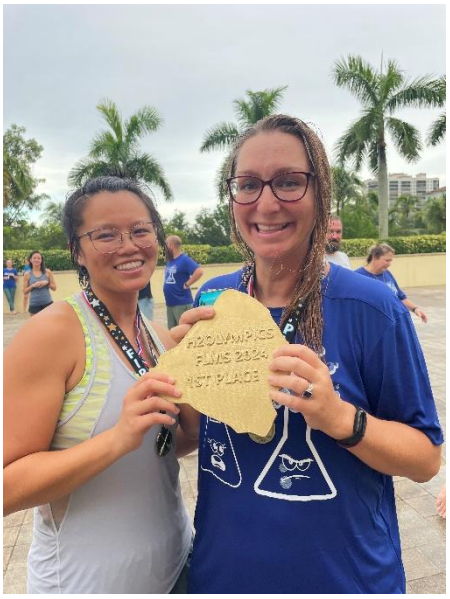
Session A7: Nutrient Reduction & Lake Management 2 (Overseas Ballroom)

Moderator: Leesa Souto, Ph.D

DACS Core CEU or Engineering PDH 1.0

9:00-9:05 AM	*Session Introduction*
9:05-9:20 AM	Science to Support Groundwater Adaptive Management – *Leesa Souto, Ph.D*
9:20-9:35 AM	Automated In-Situ Nutrient Monitoring to Inform Assessment, Prescription, and Implementation of Water Quality Management – *Scott Shuler*
9:35-9:50 AM	Boats, Birds, and Balance: A Regulatory Approach to Managing Recreation and Conservation at Egret Island – *Tim Hull*
9:50-10:05 AM	The Karst Lakes of the Wakulla Spring Shed and their effects on one of the largest springs in the world, Wakulla Springs – *Sean McGlynn*
10:05-10:20 AM	Evaluation of Rangia cuneata (Bivalve) as a Biological Control for Algae in Stormwater Pond in Southwest Florida – *Ernesto Lasso De La Vega*
10:20-10:30 AM	*Session Q&A*

10:30-11:00 AM Student Awards and Closing Remarks - Gloria Eby, FLMS President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Wednesday Morning Keynote Speaker
Kate Hubbard, Ph.D.

Dr. Kate Hubbard leads FWC-FWRI's harmful algal bloom (HAB) monitoring and research program and since 2020, directs FWC's Center for Red Tide Research. Recent enhancements to Florida's HAB monitoring network under her direction have focused on new, enhanced, and/or sustained biological, chemical, and physical observation capabilities for Karenia brevis that can be more broadly applied to other regional HABs as well. Her specific expertise in genomics and ecology has helped evaluate drivers of HABs and other species using environmental DNA (eDNA), handheld detection technology, or submersible in situ detection tools such as the Imaging Flow CytoBot. Through Woods Hole Oceanographic Center, Kate is involved in HAB detection and forecasting projects across the US to better understand and predict blooms and their impacts. She has served on the National HAB Committee since 2017.

Wednesday Afternoon Keynote Speaker
Jason Dotson, M.S.

Since 2012, ***Jason Dotson*** has been the Section Leader of the Freshwater Fisheries Research section within FWC's Fish and Wildlife Research Institute (FWRI) based in Gainesville, FL. He has a B.S. in Fish and Wildlife Science from Virginia Tech (2003) and an M.S. in Fisheries Management from University of Florida (2007). Jason's research on Largemouth Bass includes evaluating the efficacy of stock enhancement strategies, the utility of restrictive harvest regulations, effects of habitat enhancement and restoration efforts on largemouth bass fisheries, among others. He participated on the team that developed the Florida Black Bass Management Plan and was instrumental in the development of the Florida TrophyCatch program. He has published in North American Journal of Fisheries Management, Lake and Reservoir Management, Florida Scientist, American Fisheries Society Symposium "Black Bass Diversity: Multidisciplinary Science for Conservation" and co-authored a chapter in the book "Florida's Climate: Changes, Variations, and Impacts".

Thursday Morning Keynote Speaker
Evelyn E. Gaiser, Ph.D.

Dr. Evelyn Gaiser, Distinguished University Professor of Biological Sciences, holds the George M. Barley, Jr., Eminent Scholars Chair at Florida International University (FIU). She is an aquatic ecologist who studies algal responses to climate and land-use change and has published over 130 peer-reviewed papers informing the protection of waterways. For 15 years, Gaiser led the Florida Coastal Everglades Long-Term Ecological Research program (FCE LTER, http://fcelter.fiu.edu/), one of 27 such programs funded by the National Science Foundation, and now chairs the Executive Board of LTER Network. As former Executive Director of FIU's School of Environment, Arts & Society (2014-2018), Gaiser united faculty and students across disciplines to foster sustainability through inspirational teaching, creative works, and research. She advances science-based policy change through public-private partnerships and engagement of the fine arts. She is a member of the State of Florida Blue Green Algae Task Force and the Academy of Science, Engineering, and Medicine of Florida. She received her B.S. from Kent State University, M.S. from Iowa State University, and Ph.D. at University of Georgia.

2025 SYMPOSIUM COMMITTEE

Planning and implementing the symposium is a year-round team effort!

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FLMS 2025 AWARDS OF EXCELLENCE

The Board of Directors is pleased to announce this year's award recipients!

THE MARJORIE CARR AWARD

presented to

Dave Tomasko

The Marjorie Carr Award *is the Society's highest award and is given for lifetime work on behalf of Florida's aquatic resources. This award is named in honor of Marjorie Carr who, among other things, organized citizens and brought to an end the proposed Cross Florida Barge Canal.*

THE ERNESTO LASSO DE LA VEGA AWARD

presented to

Rachel Silverstein

The Ernesto Lasso de la Vega Award *is given to a professional who has worked to restore, protect and/or advance our understanding of Florida's aquatic resources. This award is named in honor of a long-time FLMS Board Member whose tireless enthusiasm and generosity have been the backbone of FLMS.*

THE DR. DANIEL E. CANFIELD, JR. VOLUNTEERISM AWARD

presented to

Joe Dunn

The Dr. Daniel E. Canfield, Jr. Volunteerism Award *is given to a volunteer organization or outstanding volunteer for significant contributions to the research, restoration and/or preservation of our water resources. The award is named after Dr. Daniel Canfield, founder of Florida LAKEWATCH, the pioneering citizen-volunteer water quality monitoring program involving over 1,200 lakes statewide and now being emulated across the United States.*

THE BOB GRAHAM AWARD
presented to

George Neugent

The Bob Graham Award *is given to persons elected to office who demonstrate a commitment to lake and aquatic resource conservation. Bob Graham is remembered for his support of many environmental initiatives including the purchase for preservation of thousands of acres of Gulf Coast wetlands.*

THE MARJORY STONEMAN DOUGLAS AWARD
presented to

Tim O'Hara

The Marjory Stoneman Douglas Award *is given to individuals who report on aquatic resource issues. This award is named in honor of Marjory Stoneman Douglas who authored the book "Everglades: River of Grass", founded the Friends of the Everglades and who has been environmentally active in south Florida.*

THE SCOTT DRIVER AWARD
presented to

Ralf Brooks

The Scott Driver Award *is given to an environmental advocate who has promoted the restoration, protection and/or appreciation of Florida's aquatic resources. Scott was a well know activist on behalf of Lake Okeechobee and a member of the steering committee that founded the FLMS.*

THE MARISSA L. WILLIAMS YOUNG PROFESSIONAL AWARD
presented to

Daniel Barber

The Young Professional Award *is presented to a young lake management professional who exhibits exemplary professional accomplishments and a commitment to water resource protection and management of our lakes and watersheds. The award is named after Marissa Williams who devoted her life to promoting an understanding of, and active involvement in, Florida's aquatic resources.*

SESSION ABSTRACTS

Session A1: Lake Restoration

Moderator: Ernesto Lasso De La Vega

Wednesday August 27, 2025, 10:30 am to 12:00 pm

RESTORING HOWELL CREEK: A COLLABORATIVE EFFORT FOR ECOLOGICAL AND COMMUNITY RESILIENCE

Alex Darr, CEPSC, CERP and Madison Wichmann, PE, Pond & Company, Atlanta, GA

The City of Winter Park experienced unprecedented rainfall, flooding, and infrastructure failures due to Hurricane Ian, particularly along Howell Creek and its associated lake system. This event, along with similar storms, has heightened concerns about the instability of stream banks along private and public properties. Historically, Howell Creek's streambanks between Lake Sue and Lake Virginia have been modified with structures such as seawalls, sheet piling, and other artificial embankments made from materials like concrete bags/blocks, crushed concrete, commercial riprap, recycled wooden crossties, plastic, and composite sheeting. These modifications, combined with extreme weather events, have led to structural damage, streambank erosion, and increased risk of property loss.

Funded by a Natural Resource Conservation Service (NRCS) emergency relief grant, the City of Winter Park partnered with Pond & Company to facilitate repair and recovery measures, including debris removal and bank stabilization along Howell Creek from Lake Sue to Lake Virginia. The initial phases of the project involved site reconnaissance and preliminary field data collection to assess the conditions of all streambanks and seawall structures. The Pond team established a ranking system to prioritize and direct funding efforts towards critical repair needs. Following initial assessments, conceptual design, permitting, and final implementation were carried out.

The restoration of Howell Creek is characterized by a balanced approach that leverages stakeholder and community member input while emphasizing ecological functionality throughout the design process. Pond utilized a combination of structural repair measures, bio-engineering design, and vegetative restoration methods tailored to each repair area, incorporating feedback from stakeholders and residents. Adaptive design approaches are crucial for reestablishing and maintaining ecosystem balance in highly urbanized and vulnerable settings.

RESTORATION OPTIONS FOR LAKE CARLTON

James Preston, PE and Lance Lumbard, WSP USA Inc, Altamonte Springs, FL

Lake Carlton is a 397-acre lake north of Lake Apopka in the Upper Ocklawaha River Basin (UORB). The western half of the lake is within Lake County while the eastern half is located

within Orange County. Lake Carlton is part of the Lake Harris Chain of Lakes and discharges west into Lake Beauclair which is the first lake downstream of Lake Apopka. The Florida Department of Environmental Protection (FDEP) assigned Lake Carlton and Lake Beauclair a concentration-based Total Maximum Daily Load (TMDL) goal of 32 ppb for total phosphorus (TP) in 2003 and 2004, respectively. Based on the TMDL, this would necessitate a TP reduction of 281 lb/yr from non-point pollutant sources within the watershed.

The FDEP's 2014 Basin Management Action Plan (BMAP) indicated Lake Carlton was not expected to meet its TP TMDL based on a traditional watershed management approach. Surface runoff to the lake is limited because the surrounding watershed is largely agricultural with sandy soils and low-density development around the lake edge. Untreated direct stormwater discharge to the lake is limited to a few small outfalls contributing less than 30 lb/yr. Orange and Lake County collaborated on a 2018 hydrologic and nutrient budget study by WSP which estimated a total external TP load of 419 lb/yr to the lake and evaluated traditional watershed treatment options and a range of additional water quality management methods including addressing internal loading sources. The study also directly measured seiche between Lake Beauclair and Lake Carlton and concluded that the two lakes were relatively well mixed. Several large-scale water quality improvement projects have been completed over the past two decades which have resulted in significant water quality benefits to both Lake Beauclair and Lake Carlton

Traditional watershed management projects do not appear to be feasible for Lake Carlton given their limited ability to achieve the TMDL. While the TMDL for Lake Carlton does not include internal loading, addressing internal loading appears to be critical for near-term water quality improvements and is likely the most cost-effective solution for Orange County's water quality management needs. Internal loading from phosphorus flux was estimated by WSP in 2023 to be 921 lb/yr or more than twice the total external TP load.

WSP conducted a pilot-scale demonstration project in 2024 to evaluate dredging and the use of sediment nutrient inactivation products including liquid aluminum sulfate (alum) and EutroSORBÂ® G to improve water quality in Lake Carlton. Eight limnocorrals were deployed for six months in Lake Carlton near Trimble Park to assess the effectiveness of each treatment. Results suggest that both alum and EutroSORBÂ® G were effective at reducing TP concentration in the water column while dredging did not result in a significant reduction in TP concentration. While dredging did not reduce TP concentration within the area evaluated by the limnocorrals, it may still be effective in deeper portions of the lake where highly unconsolidated flocculent sediments are likely to be resuspended resulting in light limitation to submerged aquatic vegetation. A multi-pronged approach to water quality management in Lake Carlton is recommended.

LAKE JESUP: THE LATEST MODELING AND EFFORTS

Shannon Salvatori, Joseph Stewart, P.E., Andy Canion, Ph.D., and Joshua Papacek, Ph.D.
St. Johns River Water Management District, Palatka, FL

Building on a long history of restoration, numerous efforts by the St. Johns River Water Management District (District) and its state and local partners are currently underway to study and

restore the water quality of Lake Jesup. Among these efforts, District staff are utilizing Weighted Regressions on Time, Discharge, and Season (WRTDS) to assess long term trends in tributary nutrient loads. The simulated water quality constituent time series produced by WRTDS will also be tested for their utility as boundary conditions inputs to a Jesup EFDC-WASP model. This hydrodynamic and water quality model was originally calibrated by Tetra-Tech in 2017 and was used to establish internal load reduction requirements in FDEP's 2019 Lake Jesup BMAP amendment. District staff are currently working to update the model's inputs and parameters and recalibrate it to evaluate the latest restoration scenarios. The restoration efforts that will be evaluated using the District's EFDC-WASP model include chemical sediment treatments to reduce internal phosphorus recycling and a proposed nutrient removal facility that would treat lake water using media-based technology.

A 20 YEAR COST-BENEFIT ANALYSIS OF THE LAKE APOPKA MARSH FLOW-WAY TREATMENT WETLAND

Jennifer Mitchell, St. Johns River Water Management District, Palatka, FL

Constructed treatment wetlands have become a common method for improving water quality, but they are relatively new and long-term data are just becoming available. The Marsh Flow-Way, a 308-hectare constructed recirculating wetland system at Lake Apopka began operation in 2003. At the time of its construction, it served as a model treatment wetland and is composed of four independent continuous flow through cells which cumulatively treat 30% of the lake's volume annually. The Marsh Flow-Way is operated with a target mean hydraulic loading rate (HLR) of 29 m/yr, which allows total suspended solids and the associated nutrients to settle out of suspension while minimizing the release of the legacy soluble soil P. Over the past 20 years of operation, it has removed 36.7 tons of TP, over 75,400 tons of TSS and over 1,400 tons of TN. Weekly water quality sampling provides status information for operational changes to water levels and HLR and indicates when larger maintenance activities are needed. The total average annual operation and maintenance cost was $482,900 over the 20-year period. Fractional costs included 38% operational activities (including levee and cell maintenance, pump repair and replacement, and water quality analysis), 30% personnel, 25% pumping electrical costs, and alum usage contributed 7%. Capital projects had an annual average cost of $551,700. Although the incoming lake water quality has improved, which decreases the total potential nutrient removal, the removal of suspended sediments and nutrients are still helping to improve the water clarity and overall health of Lake Apopka.

THE FOUNDATIONAL DATA SUPPORTING THE BLACK AND CRANE CREEKS PROJECTS

Erich Marzolf, Ph.D. St. Johns River Water Management District, Palatka, FL

In 2025, the St. Johns River Water Management District will begin operation of two new projects

that support the District's water supply and quality missions, the Black Creek and Crane Creek projects.

The Black Creek project will recharge the Upper Floridan aquifer in Clay County. This ~$100M water supply project will harvest up to 10 mgd of flow from Black Creek and pump the water 17 miles to an area of high aquifer recharge potential, near the headwaters of the Etoniah chain of lakes. The water will be treated to remove nutrients and color and then discharged to Alligator Creek. Increased Floridan aquifer water levels will also increase water levels in lakes Brooklyn and Geneva enough to meet existing minimum flows and levels.

The Crane Creek / M-1 Canal Flow Restoration project is a $23M project in Brevard County to reroute runoff from 5,300 acres of development back towards the St. Johns River and away from the Indian River Lagoon, where it was diverted by construction of the M-1 canal. The Project's components include an operable weir at the eastern end of the M-1 Canal, two pump stations, two force mains and a stormwater treatment area, and finally a discharge site into the St. Johns River's floodplain wetlands. During heavy rainfall events, the weir will be lowered, allowing the high flows to pass to the Indian River Lagoon, with no reduction in flood protection provided to the basin. Based upon anticipated flows, the Project is expected to reduce annual loads of fresh water, sediment, and nutrients to the impaired Indian River Lagoon by 24,000 pounds of nitrogen and 3,100 pounds of phosphorus, respectively. In addition, approximately seven mgd of alternative water supply will be restored to the St. Johns River.

Session A2: Data Management and Trends

Moderator: Dan Schmutz

Wednesday August 27, 2025 2:00 pm to 3:15 pm

The Save Our Indian River Lagoon Program: From Data to Action to More Data to Adaptive Management

Virginia Barker, Terri Breeden, and Anthony Gubler, Brevard County Natural Resources, Melbourne, FL

The Indian River Lagoon (IRL), one of 28 estuaries of National Significance, hosts one of the most biodiverse ecosystems in the United States. Nearly 71% of its area lies within Brevard County, which has faced mounting environmental challenges despite decades of pollution reduction efforts. Recurring brown tides, fish kills, seagrass loss and unusual mortalities of dolphins, manatees, and shorebirds underscore the continued human impact.

In response, Brevard County voters approved a 10-year, half-cent sales tax in 2016, generating over $500 million in dedicated funding to implement the Save Our Indian River Lagoon Project

Plan. This plan prioritizes projects aimed at improving water quality and estuarine habitats, guided by scientific and economic data collection to assess effectiveness and cost-efficiency.

Ten million dollars of the tax revenue supports monitoring, evaluation, and adaptive management. These efforts include measuring changes in public behavior; monitoring pre- and post-project groundwater quality for wastewater treatment upgrades, septic system improvements, and conversions to sewer; tracking dissolved oxygen, turbidity and algal bloom severity response to muck dredging projects; assessing stormwater runoff improvements; analyzing shellfish recruitment, density and growth in restoration areas; and utilizing satellite imagery for early detection of harmful algal blooms. Brevard County also partners in regional efforts to monitor water quality and guide seagrass restoration.

Findings from our monitoring efforts are synthesized to evaluate the effectiveness of pollution reduction strategies and to quantify pollutant loading from various sources and pathways into the Indian River Lagoon. Results are disseminated to stakeholders and policymakers to support informed decision-making on stormwater, wastewater, septic systems, and estuarine habitat restoration. As Florida's population continues to grow, data-driven policy reform is essential to prevent further water quality degradation and to reverse damage caused by historically inadequate regulations.

Together, these initiatives ensure that restoration efforts are data-driven and adaptive, maximizing ecological and economic returns.

FIELD VALIDATION OF A PHONE-BASED TURBIDIMETER AND DETERMINING NEXT STEPS FOR MOBILE-APP INTEGRATION

*Lindsey Pegram, Michael Fisher, and Amanda Northcross, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, NC

Safe water quality is essential to human and aquatic health. In lakes, factors such as nutrient runoff, algal blooms, and sedimentation can significantly impact water clarity and overall quality. Monitoring these parameters is essential for effective lake management and ensuring the safety of recreational activities, drinking water sources, and aquatic life. Turbidity measures the opacity of water and can indicate potential microbial contamination in both surface and well water. Current turbidity measurement methods are costly, cumbersome, and/or complex to use. A low-cost, user-friendly turbidity sensor could provide a useful option for individuals interested in timely and cost-effective data about potential microbial contamination in drinking and surface waters. We developed and piloted a low-cost (<$5) turbidimeter comprised of a graduated cylinder and waterproof, high-contrast sticker, used in conjunction with a mobile phone camera and ImageJ to approximate turbidity. Mean-gray and circularity values were quantified, and a standard curve produced including seven points from 0.10 to 100NTU. In the field, gray value difference provided more reliable estimates at higher turbidity levels and circularity for low turbidity. Currently, neither approach replicates the accuracy of standard equipment, therefore, future efforts should seek to advance reliability and usability. The ultimate goal of this project is to empower individuals

and communities interested in improving drinking water access and sustainable lake management to monitor and assess water quality in a timely and affordable manner. By providing accessible tools for turbidity measurement, we aim to enhance the ability to detect and respond to changes in water quality, supporting healthier lakes and safer water for all.

UNIQUE LONG-TERM MONITORING OF THE 2023 FULL LAKE HYDRILLA TREATMENT ON LAKE MARY JESS, ORANGE COUNTY

Marissa Herron, Orange County Lake Management, Orlando, FL

Lake Mary Jess is a private 46-acre lake located in Unincorporated Orange County and the City of Edgewood and outflows to Lake Jessamine. A Municipal Service Taxing Unit (MSTU) was established by the Lake Mary Jess residents in 1974 for general lake maintenance and aquatic plant management services. Over the last couple of decades, the MSTU has funded numerous hydrilla (Hydrilla verticillata) treatments with the most recent occurring in 2023. To practice a rotational use of herbicide for resistance management, the herbicide Tradewind (active ingredient Bispyribac-sodium) was selected for this treatment. Surrounding the 2023 treatment, Orange County Lake Management staff performed long-term monitoring which involved coordinating with the University of Florida Center for Aquatic and Invasive Plants, Orange County's Water Sciences program, and the Florida Fish and Wildlife Conservation Commission. This unique collaboration resulted in data and observations from several types of field monitoring, including aerial imagery captured with Unmanned Aerial Systems (drones), point intercept surveys (PIS), Biobase vegetation density surveys, lake vegetation index (LVI) sampling, and an observational electrofishing assessment. The intense monitoring not only provided supportive data that the full lake herbicide treatment was effective but also comprised of productive insight into the status of the lake following the treatment.

The abundance of information was essential for educating and responding to the Lake Mary Jess Advisory Board and other MSTU residents. This extraordinary occurrence of collaboration demonstrates the benefits of multi-agency participation in natural resource management and engagement with stakeholders. No formal conclusions will be made from the effects of the full lake hydrilla treatment on the aquatic vegetation and fisheries population in Lake Mary Jess, however the observations obtained support an optimistic outlook for the lake ecosystem.

TRENDS IN EXTREME RAINFALL IN NORTH CAROLINA AND FLORIDA

Dan Schmutz, GPI, Orlando FL

Accurate characterization of the probability of extreme rainfall events, such as major hurricanes, is critical for appropriate engineering design of drainage systems, dams, and other infrastructure. We modeled extreme rainfall for case study locations in North Carolina and Florida using the Generalized Extreme Value distribution statistical framework to assess the return interval for specific extreme storm events. Increasing temporal trends in the statistical location parameters were observed in some cases, consistent with the effects of increasing atmospheric temperatures, implying that the future extreme rainfall in those locations will be even more extreme than expected based on the past data (and typical assumptions of stationarity).

Session A3: Lake Management

Moderator: Harvey Harper

Wednesday August 27, 2025 3:45 pm to 5:05 pm

IN-SEASON AND OVERWINTERING CYANOBACTERIA MONITORING AND TREATMENT METHODS USING LIQUID AND GRANULAR PAA/HYDROGEN PEROXIDE

Tom Warmuth, Biosafe Systems

Peroxide based algaecides have been shown to be effective in mitigation and control of cyanobacteria in various methods of application. Lab scale trails of liquid Peroxyacetic acid (PAA)/hydrogen peroxide and solid SCP (sodium carbonate peroxyhydrate) on cyanobacteria give direction on developing effective dosing in field applications for cyanobacterial harmful algal blooms (cHAB) in-season as well as early season/overwintering benthic populations from which planktonic blooms develop later in the spring and summer. More recently, extensive research through private and federal (ACOE) researchers have shown that overwintering treatments appear to be potentially effective options to minimize the impacts, severity, or frequency of cyanobacterial blooms.

CHANGES IN NUTRIENT CYCLING IN A DEEP STRATIFIED CENTRAL FLORIDA LAKE

Harvey Harper, Ph.D, ERD, Orlando, FL

Lake Gem Mary is a 14.1-ac, deep (>10 m), polymictic, hypereutrophic lake located in central Florida with elevated concentrations of total N, total P, and chlorophyll-a. Sediment inactivation

was conducted during 2020-21 using alum with lime as a pH buffer and an average aerial application rate of 105 g Al/m2. Over a 4-year post application period, sediment inactivation reduced water column concentrations of ammonia (-88%), total N (-60%), total P (-84%), chlorophyll-a (-92%), and total Fe (-81%). Secchi disk depths improved from 1.09 m (pre) to 2.98 m (post).

TRACKING LEAD CONTAMINATION IN CENTRAL FLORIDA'S IMPAIRED LAKES

Emily Hartdegen, PWS and Drummond Carpenter, PLLC, Stuart, FL
Jesse Wineberg, PE, Orange County Environmental Protection Division, Orlando, FL

Most lakes in Florida are impaired due to nutrients; however, some lakes are impaired due to the presence of heavy metals. Drummond Carpenter (DC) has worked with Orange County's Environmental Protection Division on several lakes impaired for lead (Pb), including Lake Mary Jane, Lake Hart, and Big Sand Lake, to evaluate the presence and distribution of Pb, potential sources of contamination, impacts on water quality and aquatic species, and mitigation options. Assessment of these lakes included thorough field sampling, analysis of historical water quality data, and a review of potential Pb sources. DC's evaluation of these lakes indicates that while the source may be similar, impacts on water quality and aquatic species differ. Big Sand Lake exhibits higher Pb concentrations in water and has sediment Pb levels that could potentially impact aquatic species, while Lake Mary Jane and Lake Hart exhibit relatively low Pb concentrations and sediment Pb levels indicate minimal potential impact on aquatic species. An evaluation of water quality data through time suggests that Pb concentrations are decreasing in these lakes, but each experiences sporadic exceedances of the water quality criterion. DC has developed and continues to develop path forward options for Orange County to manage these Pb-impaired lakes with a focus on removing each lake's Pb-impairment status. These include both passive (continuation of existing monitoring, monitored natural recovery) and active (capping, dredging) options.

LAKE CONWAY: WHERE STORMWATER EVALUATIONS, FEASIBILITY STUDIES AND A CITIZEN BOARD LEAD TO STORMWATER IMPROVEMENTS

Tara Urbanik, Orange County Environmental Protection Division, Orlando, FL
Mike Hardin, PhD, PE, CFM, Geosyntec Consultants, Inc, Winter Springs, FL

The Lake Conway Water and Navigation Control District (District) was originally created in 1957 by Special Acts of Legislation. This unique taxing district is located within a highly urbanized watershed in Central Florida that spans several jurisdictions including Unincorporated Orange County, the City of Belle Isle, the City of Edgewood, and encompasses a 1,278-acre chain of lakes. Taxes are collected annually and maintained in an exclusive fund that is used for aquatic plant

management, and to fund water quality improvement projects at the recommendation of a citizen-lead volunteer advisory board.

In 2020 Geosyntec was hired by the District and completed the Lake Conway Stormwater Quality Management Master Plan evaluation with a focus on hydrologic budgeting and nutrient monitoring tasks such as surface water, stormwater, seepage, and sediment assessments. Findings indicate that Lake Conway is phosphorus-limited, varying from oligotrophic to mid-eutrophic conditions. Stormwater samples showed lower nutrient levels in areas with existing BMPs but revealed bacterial concerns in basins near public parks, possibly linked to pet and animal waste. Sediment analysis suggested nutrient-rich deposits in deeper lake regions, with iron-bound phosphorus presenting a potential release risk under anoxic conditions, internal recycling of phosphorus appeared to have minimal impact. Seepage assessments found elevated nitrogen levels, possibly influenced by septic systems and fertilizers, as confirmed by isotope and sucralose analysis. Prioritized stormwater improvement recommendations were provided.

This hydrologic and nutrient loading assessment quantified pollutant sources within the watershed but did not evaluate BMP implementation. Feasibility studies help to proactively determine whether BMPs can be built and function as intended, identify emerging unknowns, examine flooding potentials, right-of-way constraints, and infrastructure impacts while refining pollution reduction estimates, construction costs, and permitting considerations. Three feasibility studies, their resulting outcomes, and funding challenges will be presented.

From Lab to Action: Enhancing Community Resilience with Affordable Flood Monitoring and Hyperlocal Predictions

Brain Glazer, Ph.D, Hohoun Inc, Honolulu, HI

Tidal flooding, king tide events, intensifying storm surge, coastal erosion, and atmospheric pertubations are combining with increased frequency and intensity to have significant impacts on coastal infrastructure and changing shorelines. In recent years, flooding has become more frequent along the U.S. coastline as documented at 33 long-term measurement sites; every site measured has experienced an increase in coastal flooding since the 1950s. Until recently, tracking flooding events and monitoring water levels were left to government experts and academic scientists who had insight into changing conditions over local, regional, and global scales. However, coastal changes are becoming more widespread and there is a growing need for new data in different locations to fill large gaps in monitoring. Community managers, municipalities, and residents now have the ability to empower communities and help fill these gaps to quantify, inform, and prevent further loss in the face of accelerating climate change impacts. Technology has shifted in the past several years making widespread ocean and watershed observations accessible, accurate, and easy to understand. Continuous, unattended coastal observations are critical for improving predictive models and disaster preparedness. This means open data can bring municipalities, federal government, and community-led initiatives together so that they can redirect preparedness, action and information, and place power with the people that are impacted most. One way to do this is with affordable and durable sensors that provide real-time water-level monitoring using solar

power and cell phone data networks. The growth in these platforms has allowed for improved coverage of information at the local level, embedded within the broader national sensor network of federally-maintained gauges. Here, we report on how emerging technologies can be successfully transferred from academic research laboratories to operational service-based partnerships, using examples from how Hohonu has successfully engaged and empowered communities around the U.S. to scale ocean observing and prediction technologies, data availability, and science-based decision-making strategies.

Session A4: Nutrient Reduction

Moderator: Gloria Eby

Thursday August 28, 2025 10:20 am to 11:50 am

THE GROWTH OF USDA NATIONALLY CERTIFIED BIOBASED/BIOPREFERRED EROSION PRODUCTS

Joe Greco, BEG Group LLC, Shelocta, PA

The BEG Group presentation honors the 20 years of progress the USDA BioPreferred Program has achieved in replacing petroleum based products with biobased products.

As we look to the future, all communities are at the forefront of addressing climate change by using biobased innovations to convert agricultural commodities into a multitude of erosion/filtration products that will create sustainability, promote job growth while protecting and revitalizing our economies.

The audience will be made aware of the USDA Biobased Program efforts at accomplishing the above.

FULL-SCALE PHOSPHORUS MITIGATION PROJECTS TO IMPROVE WATER QUALITY IN FLORIDA

Pamela Dugan, Ph.D, Scott Shuler and Greg Knoethe, Eutrophix

"Urban stream syndrome" refers to the consistent ecological degradation of streams draining urban areas and generally characterized by symptoms like elevated nutrient levels and flashier hydrographs. High levels of nutrients such as phosphorus can lead to poor water quality, oxygen depletion, eutrophication, and harmful algal blooms. As a result, significant demand exists for operationally and technically efficient stream restoration approaches for effective, sustainable, and scalable water resource management. This paper describes the performance of a full-scale inline automated injection approach using a liquid phosphorus binder, EutroSORB® WC, to mitigate

phosphorus from an urban stream located in the Bone Valley of Central Florida. The stream is a storm water conveyance system with maximum phosphorus concentrations of 35 mg/L. To measure phosphorus reduction, a combined approach of grab samples and automated in situ monitoring samples collected upstream and downstream of the injection system was implemented. The stream also exhibits "flashy" flow which results in rapid increases and decreases in water levels after rain events, therefore; phosphorus removal with the automated inline dosing system was evaluated during periods of low flow and high flow conditions. After one month of operation an estimated 344 pounds of phosphorus was mitigated during low flow conditions with additional data to follow. A cost analysis demonstrates that this is a cost-effective approach to address the effects of eutrophication in impaired urban waters relative to other watershed best management practices. This approach can be scaled to many other moving water systems throughout the United States.

The authors of this abstract have a financial interest in implementing water quality restoration projects through commercial entities of EutroPHIX, a division of SePRO Corporation, EutroSORB® products, and water quality and sediment analysis methods.

GET THE MOST BAM FOR YOUR BUCK WITH RECIRCULATING BIOSORPTION ACTIVATED MEDIA FILTERS! A UNIQUE SOLUTION FOR ADDRESSING EXTERNAL AND INTERNAL NUTRIENT LOADS TO LAKES

Andrew Hood P.E., WSP, Altamonte Springs, FL

Achieving required nutrient removals for BMAPs can be a daunting task, especially given the multiple load sources. Common challenges with stormwater treatment include the distributed nature of stormwater systems, limited available footprint for BMPs, and limited funding. To further complicate matters, upstream lakes within the watershed also have internal nutrient loadings that are comparable to, or even greater than, that of stormwater. A unique solution is installing a Recirculating Biosorption Activated Media (RBAM) filter to treat an impaired lake that is upstream in the basin. A RBAM filter was designed and modeled for Lake Concord, as part of the Lake Jesup BMAP total nitrogen reduction effort.

STORMWATER MANAGEMENT – IT'S ALL ABOUT THE CONCENTRATION!

Harvey Harper Ph.D, ERD, Orlando, FL

Dissolved runoff nutrients are present as both inorganic and organic species, and removal processes vary substantially between the two forms. Concentration impacts and potential limitations on BMPs such as denitrification, baffle boxes, floating wetlands, natural wetlands,

stormwater treatment areas, wet detention, wet retention, and filter media will be discussed, and recommendations provided to maximize soluble nutrient removal.

ENHANCED NITROGEN REDUCING (ENR) SYSTEMS UPDATES

Roxanne Groover, Florida Onsite Wastewater Association, Lake Alfred, FL

This presentation will discuss where ENR programs have been implemented over the last few years in Florida. We will share the reduction in nitrogen loading to the environment when utilizing advanced onsite wastewater treatment from the various grant initiatives. We will conclude by sharing information regarding the types of treatment available and their treatment capacity.

Session A5: Citizen Science

Moderator: Dana Stephens, Ph.D.
Thursday August 28, 2025 1:20 pm to 2:20 pm

CITIZEN'S POND SURVEY TOOL

*Madeline Aadnes, Florida Gulf Coast University, Ft. Myers, FL

This is a tool for Pond Watch volunteers to evaluate and collect data of storm water ponds. The tool is free and accessible via cell phones. It provides opportunities for citizens participation in monitoring and data collection for their communities.

HOW VOLUNTEER DATA COLLECTION SUPPORTED THE RESTORATION OF CRESCENT LAKE, ST. PETERSBURG

James Bays, Stewards of Our Urban Lakes, St. Petersburg, FL
Michael Perry, City of St. Petersburg, St. Petersburg, FL

Crescent Lake is a 20-acre lake in the heart of St. Petersburg, Florida. Although natural in origin, the lake has been highly modified by dredging and stormwater management, and is atypically deep for Florida, reaching a maximum depth of 35 feet. Since 2007, local volunteers with the Friends of Crescent Lake have conducted water quality monitoring, with samples analyzed through the University of Florida's LAKEWATCH program. In 2021, Stewards of Our Urban Lakes (SoUL) assumed leadership of this ongoing sampling effort.

Long-term data collected monthly revealed that Crescent Lake is strongly stratified, with seasonal turnover typically occurring in October or November. This turnover had historically triggered

intense algal blooms, periodic fish kills, and noticeable air quality issues for surrounding residents during winter months. Analysis of the volunteer-collected data in 2018 led to a recommendation for artificial aeration to reduce thermal stratification and internal nutrient loading.

Following this recommendation, a lake-bottom aeration system was installed in January 2021. Volunteers continued monthly monitoring before and after implementation, generating a robust data set that has been critical for evaluating system performance. Post-installation analyses show a significant reduction in winter algal blooms and fish kill events, demonstrating the effectiveness of the aeration strategy in mitigating the lakes most severe seasonal impacts.

Volunteer monitoring has also revealed that nutrient-related trophic indicators tend to increase in spring and summer, which can occasionally support cyanobacterial blooms and floating macrophytes such as Pistia (water lettuce). These observations provide valuable insight into remaining management challenges.

This long-term volunteer effort reflects a substantial economic contribution in terms of labor, expertise, and lab costs, while exemplifying how citizen science can support data-driven, cost-effective restoration in urban lake systems.

TRANSLATING COMMUNITY SCIENTIST DATA TO INTENTIONAL ACTION IN NORTHWEST FLORIDA

Dana Stephens, Ph.D. UF/IFAS Okaloosa County Extension

Community science is vital in promoting localized environmental action, particularly in regions like Northwest Florida, where ecological and socioeconomic factors are intertwined. Synchronous and asynchronous activities were explored to advance community scientists' environmental commitment and refocus actional frameworks. Analyses of post-activity surveys demonstrated the importance of accessibility, social cohesion, and ownership at the local level in building the sustained vitality of community scientists. For example, community scientists (92%) relayed an interactive PDF volunteer resource increased their engagement and commitment to a volunteer program. Community scientists (100%), supporting a local invasive species event, indicated a developed sense of ownership by taking a community leadership role. The experience changed perspectives on coastal ecosystems (43%) and empowered individuals (71%) to increase the number of volunteer hours dedicated to environmental-focused activities. Overall, broadly accessible, resource-driven, shared-community leadership opportunities successfully inspired environmental commitment and propelled the implementation of an environmental-focused, adaptive community system in Northwest Florida.

Session A6: Vegetation Monitoring
Moderator: Rob Burnes
Thursday August 28, 2025 3:00 pm to 4:15 pm

ASSESSING THE STATE OF CUBAN BULRUSH (CYPERUS BLEPHAROLEPTOS) MANAGEMENT ACROSS THE SOUTHEASTERN UNITED STATES

*Patrick Belk[1], Stephen Enloe[1], John Diaz[2], Gretchen Lescord[3], Benjamin Sperry[1], Christopher Mudge[4], and Gray Turnage[5]

[1]UF/IFAS Center for Aquatic & Invasive Plants, Gainesville, FL
[2] University of Florida, Plant City, FL
[3] Florida LAKEWATCH, University of Florida, Gainesville, FL,
[4]LSU AgCenter, Baton Rouge, LA,
[5]Mississippi State University, Starkville, MS,

Cuban bulrush (Cyperus blepharoleptos) is an invasive aquatic epiphyte that poses an increasing threat to freshwater systems in the Southeastern United States. Very little research has been conducted on this species, resulting in limited and inconsistent management practices. A survey was conducted to assess current Cuban bulrush management practices and collect information on the plant's biology and impacts from the perspective of aquatic management professionals. A 20-question Qualtrics survey was written and organized into sections covering Cuban bulrush information, management, monitoring, and success. Before the final draft was published, cognitive interviews were conducted with four reviewers, and valid suggestions were integrated into the survey. The survey link was distributed after November 6, 2024, across professional management networks and government agencies. A total of 132 surveys were completed before the expiration date of April 30, 2025. Results were analyzed using Qualtrics Stats iQ and R Studio. Some key discoveries include evidence of a general lack of awareness regarding the different biotypes, physical control methods are used more frequently than previously thought, and satisfaction among managers is not at the highest level. Other findings reveal a strong association between Cuban bulrush and water hyacinth, among other floating plants, and there is no consensus among managers regarding the seasonality of treatment. These and other findings will inform ongoing and future management research, highlighting the importance of engagement with management professionals.

ASSESSING THE RISK FACTORS FOR HURRICANE-INDUCED TREE FAILURE IN THE NAPLES URBAN FOREST

*Coraline Paschal[1], Dr. Edwin Everham III[1], Jill Schmid[2], Heather Shields[3] and Dr. Brian Bovard[1]

[1]Florida Gulf Coast University, Fort Myers, FL
[2]Rookery Bay National Estuarine Research Reserve, Naples, FL
[3]Parks, Recreation and Facilities, City of Naples, FL

While the coastal ecosystems of the Greater Everglades have long been impacted by hurricanes, recovery may be reduced by their heightened intensity under climate change. There is thus an urgent need to further research on storm damage and recovery, especially in urban forests, which are understudied despite the risk posed by tree hazards. The research objective was to determine whether the probability of hurricane-induced tree failure is impacted by tree, environment, and management factors. A binary logistic regression model was created using tree height, species, utility lines, and their two-way interactions as explanatory variables of tree failure. The results from this study suggest that the probability of hurricane-induced tree failure is impacted by these risk factors. There was an interaction effect of species and utility lines, tree height and utility lines, and tree height and species on the probability of tree failure, indicating the direction and magnitude of the effect varies. Given these findings, urban forest managers should consider species-specific responses to hurricanes. It may be advisable to replace less hurricane-resistant species with those demonstrating greater hurricane resistance, while still maintaining species diversity and ecosystem services. By improving urban forest management practices in the Greater Everglades in line with these insights, counties and municipalities may decrease public expenditure, increase public safety, and ultimately enhance coastal resilience in the context of climate change, creating more sustainable communities.

PIXELS AND PLANTS: MONITORING DUNE VEGETATION RESTORATION USING REMOTE SENSING TECHNOLOGIES.

*Nathan Hewitt, Jeannine Richards, Dhruvkumar Bhatt and Ahmed Elshall, Florida Gulf Coast University, Ft Myers, FL

Coastal sand dunes play a critical role in protecting shorelines from storm surge, sea level rise, and erosion, largely due to the stabilizing effects of their vegetation. However, these ecosystems are increasingly at risk from climate change and human disturbance. As a result, restoration initiatives have become more common—but tracking vegetation recovery through traditional fieldwork can be time- and labor-intensive. This study explores the use of remote sensing technologies, paired with minimal field validation, to monitor vegetation health and regrowth at two dune restoration sites in Collier County, Florida. One site was revegetated in January 2025, while the other was revegetated in May 2025. Imagery from 2018 to the present, captured by satellite (Landsat,

Sentinel-2, PlanetScope) and UAV-based multispectral sensors, were analyzed using vegetation indices, such as NDVI and MSAVI, to observe vegetation health and coverage over time. These results were validated against field-collected data to evaluate the accuracy and reliability of each platform. The objective was to identify the most effective and accessible remote sensing tools for long-term ecosystem monitoring and rapid post-storm assessment. Findings from this research aim to inform coastal restoration strategies and support more resilient shoreline management in the face of climate-driven impacts.

RECOVERY AND RESILIENCE OF SOUTHWEST FLORIDA BEACHES FOLLOWING MULTIPLE HURRICANES

*Mary Moody, Tristan Dumas and Jeannine Richards, Florida Gulf Coast University, Fort Myers, FL

In recent years multiple high intensity hurricanes have impacted Southwest Florida and devastated our beaches. Erosion and damage to coastal ecosystems from Hurricane Ian was further compounded by Hurricanes Debbie, Helene, and Milton two years later. There is little information about the recovery of Southwest Florida's coastal dune systems, our study looking at the recovery of multiple beaches following these storms gives us the opportunity to assess resilience and increase regional knowledge. Repeated transect analyses were used to measure vegetation recovery across select developed and undeveloped beaches. Stakes were installed in the sand to observe certain common dune species recovery as well as to quantify the relationship between plants and sediment accretion/erosion. We have found that species richness and plant cover declined with each storm. Many species have been completely lost since Hurricane Milton, while some species have taken the opportunity of the bare beaches to expand and become more relatively abundant. Recovery has been impeded by the dry season and by disturbance from beach renourishments. Recovery from large impact storm events is a long process and with the recent influx of storms our coastal systems may not be able to recover on their own quickly enough. Through this research we have learned about individual species resilience and how they responded to recent storms. Providing us with information that can be used to guide restoration efforts for Southwest Florida. Restoration can be used as a tool to help the recovery process and will be necessary if events continue at the current pace.

Session A7: Nutrient Reduction 2

Moderator: Leesa Souto, Ph.D.

Friday August 29, 2025 8:50 am to 10:15 am

SCIENCE TO SUPPORT GROUNDWATER ADAPTIVE MANAGEMENT

Leesa Souto[1], Ph.D, Claudia Listopad1, Ph.D, and Virgina Barker[2]

[1]Applied Ecology, Inc
[2]Brevard County Natural Resources Management Division, Melbourne, FL

Since 2016, Applied Ecology has been working with Brevard County on groundwater research to characterize and prioritize the major sources of groundwater nutrients that reach the Indian River Lagoon and evaluate adaptive management strategies implemented to mitigate them. The goal was to prioritize areas for groundwater remediation as part of the citizen supported, Save our Indian River Lagoon Project Plan. As part of the research, Applied Ecology completed monthly sampling of more than 40 groundwater monitoring wells in communities with septic systems, those on sewer, and communities on sewer that receive reclaimed water for irrigation. The project research design was presented at the FLMS 2019 conference with initial findings that indicated septic and reclaimed communities had similarly high groundwater TN concentrations and that septic communities had the highest groundwater TP concentrations of all. The current presentation will share results of the monitoring used to evaluate groundwater BMPs including septic-to-sewer conversions and a WWTF upgrade to answer important management questions such as: What is their effectiveness at reducing groundwater nutrients and how fast can changes in the groundwater quality be detected (if at all)? This ongoing monitoring project was designed to estimate the timing and extent of water quality benefits resulting from various groundwater BMPs to guide future priority planning efforts. The project demonstrates an application of groundwater adaptive management.

AUTOMATED IN-SITU NUTRIENT MONITORING TO INFORM ASSESSMENT, PRESCRIPTION, AND IMPLEMENTATION OF WATER QUALITY MANAGEMENT

Scott Shuler[1], Vince Kelley[2], and Shannon Junior[3]

[1]EutroPHIX, A division of SEPRO, Carmel, IN
[2]Green Eyes Environmental Monitoring Systems, A Division of SEPRO, Easton, MD
[3]EutroPHIX, A division of SEPRO, Madison, VA

The United States faces a large and growing number of challenges managing waterbodies that are impaired with excess nutrients. A key challenge in deploying effective management actions is accurately quantifying the dynamic relationship between external watershed nutrient loading and internal loading in a waterbody. Collecting accurate watershed loading data has historically been

labor-intensive due to the broad geographic extent of the sampling sites and the need for frequent measurements under variable flow conditions. Advances in the development and operation of autonomous, in-situ nutrient monitoring instrumentation enable the continuous monitoring of nutrients at high temporal scales in aquatic environments. Such systems are commercially available that provide wet chemical discrete analysis methods to precisely measure nitrate plus nitrite, nitrite, phosphate, ammonia, total nitrogen, total phosphorus, and silicate. These systems can be deployed with flow or water elevation sensors to accurately quantify nutrient budgets, and in feedback loops with phosphorus mitigation injection systems to maximize efficiency. This data-driven water quality management approach is illustrated with case studies in Virginia, Florida, and Washington State, and can be further applied to water bodies throughout the United States.

A CASE STUDY: HARMFUL ALGAE BLOOM RESTORATION AT MEMORIAL PARK, STUART FL

Patrick M. Goodwin, Natural Lake Biosciences, Madison, WI
Conrad A. Oberweger, Aquatic Vegetation Control, Riviera Beach, FL

Memorial Park within Stuart, FL, is a tranquil park offering grassy areas, footpaths, a pond, and U.S. war memorials. The small pond (~0.5 acres), however, has observed a decline in water quality over the past five years despite best management efforts. Initial environmental assessments conducted at Memorial Park (0.5 ac) uncovered alarming levels of Total Nitrogen (5.8-6.1 ppm) and Total Phosphorus (2.18-2.22 ppm), indicating a hypereutrophic state conducive to ongoing algae proliferation. The resulting decline in water clarity, measured at < 10 inches, underscored the significant loss in water quality due to the combined effects of excessive nutrients and dense algae populations. A collaborative research case study with AVC, Natural Lake Biosciences, and the City of Stuart was undertaken at the beginning of 2024 to address water quality concerns. This effort started with identifying source loading of nutrients, from which long-term treatment programs could then be designed. A detailed water quality monitoring program was set in place as restoration efforts began. Over the course of thirty days, the lake reverted to a mesotrophic state and continued to hold for years after the initial treatments. This talk will discuss details of the restoration efforts, including lessons learned from the various products used, in conjunction with weekly water quality data.

Session A8: Lake Management 2

Moderator: Ernesto Lasso De La Vega, Ed.D.

Friday August 29, 2025 10:35 am to 11:35 am

BOATS, BIRDS, AND BALANCE: A REGULATORY APPROACH TO MANAGING RECREATION AND CONSERVATION AT EGRET ISLAND

Tim Hull, Orange County Environmental Protection Division, Orlando, FL

In response to growing concerns about public safety, environmental degradation, and wildlife disturbance at Egret Island in Lake Butler, Orange County recently adopted an ordinance creating a designated swimming area and vessel exclusion (SAVE) zone. Egret Island, a 23-acre wildlife sanctuary jointly owned by the State of Florida and the Florida Audubon Society, had become a hotspot for recreational activity, leading to conflicts between human use and the ecological function of the island and surrounding waters. The ordinance, developed through a comprehensive process of interagency coordination and public stakeholder engagement, marks the first step in a two-phase update to the County's Chapter 8, Boats and Water Safety Ordinance.

This presentation will outline the development and implementation of the SAVE zone, including the legal, environmental, and logistical considerations involved. Key participants included the Florida Fish and Wildlife Conservation Commission, Florida Audubon Society, Orange County Sheriff's Office, Town of Windermere, local advisory boards and residents. The designated SAVE zone, spanning a shallow sandy area on the northwest side of the island, was strategically chosen to minimize the potential for occurrence of dangerous boat-swimmer interactions, reduce habitat disruption, and support wildlife conservation; particularly for nesting birds such as brown pelicans and ospreys.

Precedents from other Florida jurisdictions informed the ordinances development, reinforcing the potential effectiveness of exclusion zones in managing high-use water environments. While most stakeholders supported the ordinance, concerns were raised about enforcement and the potential for unintended boating conflicts. These have been acknowledged in the County's phased approach, with Phase II focusing on broader updates to boating safety zones and enforceability.

This case study provides valuable insights for lake managers across Florida, highlighting how regulatory frameworks can be adapted to protect sensitive lake ecosystems while accommodating safe, sustainable public recreation.

THE KARST LAKES OF THE WAKULLA SPRING SHED AND THEIR EFFECTS ON ONE OF THE LARGEST SPRINGS IN THE WORLD, WAKULLA SPRINGS

Sean McGlynn, McGlynn Labs, Tallahassee FL

Florida has 13 Basin Management Action Plans (BMAPs) dedicated to the restoration of impaired Outstanding Florida Springs. These plans address 24 of the 30 identified Outstanding Florida Springs. These Outstanding Florida Springs are considered impaired, primarily due to excess nitrogen pollution.

Within the group of BMAP Springs, the Wakulla Springshed is unique in that its waters derive from flows of the Floridan Aquifer, sinkhole lakes, disappearing streams, marine springs (these have reversed flow due to sea level rise). This spring is considered the world's largest and deepest single vent spring. Even though karst is quite common and is found on twenty five percent of the Earth's surface, the Wakulla Springshed is unusual. It has the necessary physical processes of hydrology and geology that allow a great variety of karst features. The Wakulla Springshed is one of the few places that display all the manifestations of karst. In the Wakulla Springshed there are: sinkholes (dolines); caves; sinking streams; swallets; sinking lakes; dry valleys; tube structures; joints; grikes; deep water tables and karst springs. Other karstic environments do not have such a complete array of karst features.

It is important that our karst features are managed and conserved. Karst changes continually due to natural as well as anthropogenic processes. However, this is being totally ignored. Even though the BMAP for Wakulla Springs only limits nitrogen, the biological integrity of the spring must become satisfactory for the BMAP to be complete, and thus eventually the impacts of the karst waterbodies in the Wakulla Springshed will have to be dealt with if we are to save Wakulla Spring.

EVALUATION OF RANGIA CUNEATA (BIVALVE) AS A BIOLOGICAL CONTROL FOR ALGAE IN STORMWATER POND IN SOUTHWEST FLORIDA

Ernesto Lasso de la Vega Ed.D., Lee County Hyacinth Control, Ft Myers, FL
Madeline Aadnes, Carly Centnarowicz, Laine Howard, FL Gulf Coast University, Ft. Myers, FL

Southwest Florida has experienced multiple hurricanes which have carried, on many occasions, saltwater surges into costal stormwater ponds. These freshwater ponds have been impacted, leaving turbid waters with microalgae blooms. A bivalve, *Rangia cuneata*, has been evaluated as a biological control organism to filter the water, thus improving environmental conditions. The biological characteristics of *Rangia cuneata* include being a native of Florida, being accustomed to a range of fresh and saltwater conditions, having a filtration rate of 20 gallons per day, and being capable of reproducing. This makes this organism suitable for biological control of microalgae blooms. Four communities are participating in this study coordinated by the Lee County Hyacinth Control District's Pond Watch program. The study has tested the survival and growth of these clams in mesh bags for 3 months to determine suitability for the deployment of larger numbers to create clam sanctuaries. Water quality has been monitored before and after the clam deployments. We present our observations and practical applications for stormwater remediation under catastrophic conditions caused by hurricanes in coastal communities.

Poster Session

Wednesday, August 27, 2025, 6:00 pm to 8:00 pm
Exhibitor Hall
* - Denotes Student Poster

ECOLOGICAL SUCCESSION OF EPIBENTHIC COMMUNITIES ON DIFFERENCE FACES OF AN ARTIFICIAL REEF ON THE SOUTHWEST FLORIDA SHELF

*Rodolfo Arambulo
Florida Gulf Coast University, Ft. Myers, FL

Kimberly's Reef is an artificial reef that was placed offshore of Collier County, FL in early 2023. We monitored ecological succession on the reef for a year by taking 0.25 m2 quadrat photos of multiple faces of each of the reef's concrete modules and quantifying coverage of different biota in the quadrats. Epibenthic communities developed quickly but differed according to the orientation of reef surfaces. Shaded surfaces were especially different from light-exposed surfaces. Cognizance of reef face effects could assist in optimization of future artificial reef designs.

QUANTIFYING THE NUTRIENT-POLLUTION IMPACTS OF AQUATIC PLANT MANAGEMENT IN FLORIDA

*Anthony Dues, James Douglass and Dr. Serge Thomas
Florida Gulf Coast University, Ft. Myers, FL

The Florida Fish and Wildlife Conservation Commission (FWC) controls invasive and nuisance aquatic plants by applying hundreds of thousands of pounds of herbicides to Florida waters each year. The unintended harms of herbicides may include toxic effects on non-target plants and animals, as well as harms from decaying plant matter, including release of nutrients that stimulate harmful algal blooms which can in turn cause hypoxia and anoxia, reduce water clarity, cause health problems for people, and prevent recreational activities like fishing and swimming. FWC keeps detailed records of amounts of each type of herbicide applied to each plant species treated in each Florida water body it manages, as required by the US Environmental Protection Agency (EPA). Developing a way to convert these data to estimates of nutrient pollution released could help managers more effectively balance habitat management and water quality concerns.

INVESTIGATING SEASONAL PATTERNS OF VEGETATION INDICES FOR A SOUTHWEST FLORIDA CYPRESS DOME: A CASE STUDY AT THE NAPLES BOTANICAL GARDEN

*Kelton Maystrick[1], Chad Washburn[2] and Brain Bovard[1]
[1]Florida Gulf Coast University, Ft. Myers, FL
[2]Naples Botanical Garden, Naples, FL

Climate change is expected to increase the intensity and severity of tropical cyclones such as Hurricane Ian, a Category 4 storm that devastated Southwest Florida in September 2022. Cypress domes, which are freshwater forested wetlands dominated by cypress trees, are the most prevalent swamps in Florida. They provide critical ecosystem services vital to human health and well-being, but their response to extreme hurricane disturbance is poorly understood. The objective of this research was to investigate interannual and intra-annual cypress phenological patterns, which impact the delivery of services. This study investigated seasonal patterns of vegetation productivity in a cypress dome at the Naples Botanical Garden following Hurricane Ian. UAV-based multispectral remote sensing was used to monitor post-disturbance changes. Using ArcGIS Pro, the Normalized Difference Vegetation Index (NDVI) and red-edge NDVI (NDVIre), a metric sensitive to plant physiological stress, were monitored across eight sampling periods between October 2022 and March 2025. Results indicated a compensatory growth response immediately after hurricane disturbance, followed by a return to seasonal phenological patterns. NDVI values showed an initial increase after October 2022, declined during the winter months, and rose exponentially during the spring months in both observed years. Contrastingly, NDVIre values revealed persistent physiological stress despite the production of new foliage. Ground validation using an ASD FieldSpec 4 spectroradiometer identified significant differences between field and UAV measurements, highlighting methodological considerations in remote-sensing applications. These findings demonstrate the resilience of cypress ecosystems to hurricane disturbance while revealing subtle disruptions in phenological timing and physiological conditions. Cypress phenology is closely linked to hydrological dynamics, as water availability influences the timing of leaf emergence, growth, and reproduction in cypress trees. Understanding these relationships can inform water resource management strategies, such as wetland restoration and floodplain management. Additionally, this research provides valuable insights into the responses of wetlands to extreme weather events in the context of climate change, with implications for conservation management, urban ecosystem service provision, and climate adaptation planning.

UNDERSTANDING NUTRIENT AND CHLOROPHYLL CONCENTRATIONS IN THE CALOOSAHATCHEE RIVER USING SPATIAL INTERPOLATION TOOLS

*Caroline Hoel
Florida Gulf Coast University, Ft. Myers, FL

Given water quality data provided by Lee County Hyacinth Control District, ArcGIS Pro was used to interpolate the concentration of nitrogen, phosphorus, and chlorophyll-a in the Caloosahatchee using statistical predictive modeling. The model's trends show higher nutrient concentrations in the wet season, which aligns with stormwater runoff coming from agricultural fields and urban areas near the river. A possible point source of pollution into the Caloosahatchee was also found in data analysis.

A DECADAL SEDIMENT ACCUMULATION IN THE CARLTON LAKES, SOUTHWEST FLORIDA.

*Nevaeh Greco, *Mackenzy Binion, Dr. Serge Thomas, Taylor Rowe, and Rachel Smith
Florida Gulf Coast University, Ft. Myers, FL

Retention ponds are vital parts of Florida's urban infrastructure. They manage stormwater runoff, reduce flooding, and filter pollutants before these substances reach natural waterways. However, poor long-term maintenance and a lack of sediment monitoring can lower efficiency, harm the environment, and lead to expensive dredging operations. This research tackles the need for better management practices by studying sedimentation patterns in the retention ponds of the Carlton Lakes community. Our method uses sediment core sampling and sonar-based depth mapping to look at how sediment accumulates over time. Initial findings show a significant increase in sedimentation levels in several areas of the pond. This suggests we need to intervene sooner than expected. By examining these changes, we want to provide data-driven recommendations for proactive pond management. The implications of this study go beyond Carlton Lakes. It offers a model that other Florida communities can use to enhance the function and ecological health of their retention systems. Our aim is to help create realistic, long-term strategies for stormwater infrastructure across the region.

A CASE FOR REWILDING: UNMOWED DRY DETENTION PONDS HAVE FLORISTIC CHARACTERISTICS MORE LIKE NATURAL WETLAND AREAS

*Michael Bruder and Dr. James Douglass
Florida Gulf Coast University, Ft. Myers, FL

In Florida, it is common practice to mow dry detention ponds, though in theory their water quality function and habitat value would be improved if they were allowed to develop more natural plant communities. We conducted floristic surveys for dry detention ponds and natural wetlands on Florida Gulf Coast University. We found that naturally managed ponds had more biodiversity and shared more similar characteristics to the natural wetlands.

THE ROLE OF FLORIDA'S UNIQUE POND CLUSTERS ALONG CONSERVATION CORRIDORS: A CALL FOR MONITORING AND PROTECTION

*Isabelle G. Rytlewski and Thomas J. Whitmore
University of South Florida, St. Petersburg, FL

Among Florida's nearly 8,000 waterbodies, the greatest number are 1-10 acres in size. Dense clusters of ponds are unique landscape features that occur along portions of Florida's Central Ridge from the Ocala National Forest to the Everglades Headwaters. These pond clusters create a mosaic of biogeographical islands between north Florida and south Florida, and are important for connectivity in wildlife conservation, but they have received little to no study and tenuous protection. As highly variable and often ephemeral systems, small waterbodies support a range of biodiversity, but they're especially vulnerable to watershed disturbances and hydrological alteration from climate change and anthropogenic development. This presentation examines pond clusters that arose from regressive beach-dune and solution processes in central Florida's conservation corridors, and it advocates for efficient systematic environmental monitoring and protection of endemic species in these systems.

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*COMMON NURSERY OF *VALLISNERIA NEOTROPICALIS*

*Jennifer Bishop
University of Florida, Hollywood, FL

Eelgrass (*Vallisneria neotropicalis*) is a native submersed plant that is useful in restoration projects. Eelgrass plays an important role in the aquatic ecosystem by stabilizing sediments, preserving water quality, and providing habitat for wildlife.

VALLISNERIA AMERICANA RESTORATION IN THE CALOOSAHATCHEE RIVER ESTUARY: OPPORTUNITIES, PROGRESS, AND CHALLENGES

*Devin Quigley[1], James Douglass[1] and David Ceilley[2]
[1]Gulf Coast University, Ft. Myers, FL
[2]Ceilley Aquatic Science of Ecology, Ft. Myers, FL

The Caloosahatchee River Estuary (CRE) historically supported extensive beds of *Vallisneria americana* (tape grass), but high salinity events in the early 2000s decimated the thriving vegetation. Changes in hydrological management to maintain higher minimum flows to the CRE have since stabilized the salinity regime, but natural recovery of *V. americana* has been poor. It is hoped that active restoration efforts, ameliorating grazing pressure with plantings in protective cages, can help the system regain self-sustaining, high-density *V. americana* beds. We monitored *V. americana* in nine designated restoration sites and two control sites at the beginning of a 2024 restoration effort. A stratified random sampling scheme was employed to assess 15 quadrats, and intervening transects at each site. Parameters measured included depth, substrate type, and macrophyte percent cover and shoot height. The collected data were mapped and analyzed using MS Excel and ArcGIS Pro. Results indicated that *V. americana* occurred naturally in some shallow, sandy areas, but its growth was sparse and short, often eclipsed by abundant, filamentous macroalgae. The *V. americana* in restoration cages was taller than outside, suggesting cages could help it reach heights capable of producing flowers and seeds. However, the maximum depth of occurrence of *V. americana* was just 0.53 m below mean lower low water, suggesting that poor optical water quality may limit restoration success to the shallower parts of the target restoration areas. Continued monitoring of the project will help quantify its success and inform strategies for the future.

INVESTIGATING THE EFFECTIVENESS OF LAKE GUARD® OXY (ALGAECIDE) DURING THE 2024 CYANOBACTERIAL BLOOM SEASON AT S-77

Haruka Urakawa[1], Anna K. Wachnicka[2], Dr. Serge Thomas[1], Jose V. Lopez[3], Levente Pap1, Bethany C. Ryder[1], Alvio S. Barbaretta[1] and Hidetoshi Urakawa[1]
[1]Florida Gulf Coast University, Ft. Myers, FL
[2]South Florida Water Management District, West Palm Beach, FL
[3]Nova Southeastern University, Ft. Lauderdale, FL

Cyanobacterial blooms present ongoing ecological and public health concerns in Florida's freshwater systems. This study has been evaluating the effectiveness of Lake Guard® Oxy, a hydrogen peroxide-based algaecide, at the S-77 outflow structure from Lake Okeechobee during the 2024 bloom season. Our objectives included assessing hydrogen peroxide concentrations post-treatment, monitoring cyanotoxin dynamics, and evaluating the ecological responses of phytoplankton and zooplankton communities. Despite applying the maximum EPA-approved dosage, the maximum post-treatment hydrogen peroxide concentration was only 0.62 mg/L, substantially lower than the 2"100 mg/L range typically required for effective cyanobacteria

control. The 16S rRNA gene sequencing revealed that the phytoplankton community was dominated by cyanobacteria, especially by the group of picocyanobacteria (Cyanobium, Synechococcus), with no significant species succession between June and July. Shifts in cyanobacteria vs. eukaryotic algae appeared to reflect natural seasonal changes rather than treatment effects. Microcystin analysis showed no increase in extracellular toxin levels following treatment, and all concentrations remained below 1.63 µg/L, suggesting low toxicity among Microcystis populations. Zooplankton, primarily rotifers and nauplii, showed no significant population decline, indicating minimal non-target effects. Photosynthetic efficiency exhibited minor post-treatment decreases but no substantial long-term reduction, consistent with low peroxide exposure. In summary, the hydrogen peroxide concentration used in the treatments was insufficient for strong bloom control, but the study established a valuable ecological baseline in pre-bloomed conditions. These findings will inform improved application strategies for the 2025 season, emphasizing the importance of effective dosing and continuous monitoring to balance treatment efficacy with ecosystem protection.

GAMBUSIA FARMING IN AN URBAN ENVIRONMENT

Paul Mosteller and Edward Morales
Florida Waterways Inc, FL

Correlating with Florida's increased urbanization, many lake and pond management companies locate their facilities within heavily urbanized areas. Commercial/industrial locations lack the space needed for traditional wet pond fish farming. We are developing a small footprint, high-yield vertical gambusia farm.

NITROGEN UPTAKE FROM AN URBAN STORMWATER POND WITH BIOCHAR-AMENDED FLOATING TREATMENT WETLANDS

Mary Lusk Ph.D.
University of Florida, Wimauma, FL

This work presents results of a study to assess nitrogen dynamics in an urban stormwater pond, using floating treatment wetlands amended with biochar as part of the growing media. We discuss the role of plant uptake, biochar, and other processes for nitrogen removal from the pond.

CITIZEN SCIENCE AS AN EDUCATION TOOL FOR ADULT AND YOUTH AUDIENCES

Michael D'Imperio
University of Florida, IFAS, Sarasota, FL

UF/IFAS Extension Sarasota County incorporates citizen science through the iNaturalist app to engage the public in water quality education. The "Dipnets and Donuts" program teaches attendees about aquatic macroinvertebrates as bioindicators, enhancing participants' identification skills and contributing to local data sets. These programs have improved local biodiversity documentation and increased awareness of water quality and ecosystem health.

WITH RIGERO'S BIO-GENERATION SYSTEM, A "PLUG AND PLAY" SOLUTION TO REDUCE NUTRIENTS, REDUCE ALGAE BLOOMS, AND CONSUMES POND MUCK

Daniel Danforth and Michael Bateman
Project Hydrology Inc, Pensacola, FL

Rigero Bio-Health Pod System improves a water bodies ecosystem with technology that hosts, grows, and distributes billions of beneficial bacteria. These bacteria target nutrients feeding algae blooms leading to fewer and less severe occurrences. The chemical free process also reduces pond muck from 2" up to 11" per season helping to restore water quality, recreational us, and mitigates nutrients. Rigero's specialized system of aeration and bio-generation cleans water by adding a bacteria boost to combat excessive nutrient loading. The system continuously hosts, grows, and distributes billions of beneficial bacteria microbes that consume and digest nutrients and muck to improve water and pond health. This system is installed in over 700+ lakes in America and is all natural including private ponds, lakefronts, neighborhood ponds, golf course, campgrounds, and marinas.

CONSERVATION PALEOECOLOGY AND LAKE MANAGEMENT IN FLORIDA: USING LAKE SEDIMENTS TO GUIDE MANAGEMENT, RESTORATION, AND CONSERVATION INITIATIVES

Melanie Riedinger-Whitmore, Thomas Whitmore, Cody Letts and Shayna Dimmer
University of South Florida, St. Petersburg, FL

Conservation paleoecology is an emerging field that currently seeks to define its capabilities and roles in conservation and restoration programs. Paleolimnology in Florida, however, has served important roles in lake management for more than 40 years. We discuss how paleolimnological studies in Florida have been used effectively to document historical changes in hydrology, water

quality, algal and aquatic-plant biodiversity, natural variation in ecological character, the loss of fringing wetlands, and how they have helped to establish restoration targets. Historical studies enhance our understanding of both natural variation and anthropogenic impacts, and they help identify priorities that lead to better informed lake management and conservation. We advocate for greater future integration of historical and contemporary approaches to better understand ecosystem changes that occur over long timescales, and to more effectively anticipate future changes and appropriate adaptation strategies.

INTEGRATING HIGH-RESOLUTION SATELLITE AND IN-SITU SENSOR DATA FOR ENHANCED MONITORING OF CYANOBACTERIAL BLOOMS IN DOCTORS LAKE, FLORIDA

Todd Lundell
BlueGreen Water Technologies, Melbourne, FL

Effective management of harmful algal blooms (HABs) demands a monitoring approach that is both spatially comprehensive and temporally frequent. Here, we present an integrated methodology combining in-situ sensors and satellite-based tools to monitor cyanobacterial blooms in Doctors Lake (Florida, USA). Continuous field measurements of phycocyanin, chlorophyll-a, turbidity, and temperature, collected at minute intervals, provide real-time data on bloom dynamics. These observations are complemented by Lake Guard View (LGV), BlueGreen Water Technologies™ proprietary satellite tool, which leverages Planet™ high-resolution (3 m) multispectral imagery to detect and track surface algal accumulations. Unlike traditional remote sensing methods, LGV™ fine spatial scale allows for precise detection within complex water bodies. However, this integration presents challenges: satellite imagery captures only surface-level accumulations and can be impacted by cloud cover, while in-situ sensors measure water conditions at a fixed subsurface depth, potentially leading to point sampling limitations and sensor fouling. Despite these challenges, integrating localized, high-frequency monitoring with broad, high-resolution satellite coverage presents a robust framework to improve HAB detection, assessment, and mitigation strategies.

CYANOBACTERIAL HARMFUL ALGAE BLOOM TREATMENT USING LAKE GUARD OXY IN DOCTORS LAKE, FLORIDA.

Jessica Frost, Ph.D and Todd Lundell
BlueGreen Water Technologies, Gainesville FL

Effective management of harmful algal blooms (HABs) demands a monitoring approach that is both spatially comprehensive and temporally frequent. Here, we present an integrated methodology combining in-situ sensors and satellite-based tools to monitor cyanobacterial blooms

in Doctors Lake (Florida, USA). Continuous field measurements of phycocyanin, chlorophyll-a, turbidity, and temperature, collected at minute intervals, provide real-time data on bloom dynamics. These observations are complemented by Lake Guard View (LGV), BlueGreen Water Technologies™ proprietary satellite tool, which leverages Planet™ high-resolution (3 m) multispectral imagery to detect and track surface algal accumulations. Unlike traditional remote sensing methods, LGV™ fine spatial scale allows for precise detection within complex water bodies. However, this integration presents challenges: satellite imagery captures only surface-level accumulations and can be impacted by cloud cover, while in-situ sensors measure water conditions at a fixed subsurface depth, potentially leading to point sampling limitations and sensor fouling. Despite these challenges, integrating localized, high-frequency monitoring with broad, high-resolution satellite coverage presents a robust framework to improve HAB detection, assessment, and mitigation strategies.

See you next year!
September 1 – 4, 2026
Hyatt Regency Coconut Point
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