# MidSouth Aquatic Plant Management Society
# 43rd Annual Meeting

MIDSOUTH AQUATIC PLANT

MANAGEMENT SOCIETY

est. 1982

# PROGRAM

**October 29th-31st, 2024**
**Tennessee Aquarium**
**Chattanooga, Tennessee**

# Board of Directors

Daniel Hill
**President**
Louisiana Department of Wildlife & Fisheries

Dr. Gray Turnage
**President Elect**
Mississippi State University

Dr. John Madsen
**Secretary**
JD Madsen, LLC

Derek Smith
**Treasurer**
Jones Fish

Carl Della Torre
**Past President**
Orion, LLC

Adam Charlton
**Editor**
Aquatic Control

Steven Turner
**Director** (2 of 2 yrs.)
Tennessee Valley Authority

Dean Jones
**Director** (2 of 2 yrs.)
United Phosphorus Limited

Matt Horton
**Director** (1 of 2 yrs.)
Arkansas Game & Fish Commission

Matt Townson
**Director** (1 of 2 yrs.)
Jones Fish

# Past Award Recipients

## President's Award

Terry Goldsby (2007)
Bob Gunkel (2008)
Gerald Adrian (2009)
Carlton Layne (2010)
Dr. John Madsen (2011)
Sherry Whitaker (2012)
Aqua Services, Inc. (2013)
Craig Aguillard (2014)
Jeremy Slade (2016)
Friends & Families of MSAPMS Members (2017)
Dr. Ryan Wersal (2018)
Dr. Brett Hartis (2019)
JJ Ferris (2020)
Scott Jackson (2021)
Carl Della Torre (2022)
Daniel Hill (2023)

## Honorary Members

Angus Gholson, Jr. (1983)
John Lawrence (1989)
A. Leon Bates (1996)
J. Lewis Decell (1996)
Joe Kight (1997)
David Bayne (2006)
Scott Lankford (2007)
Bob Gunkel (2008)
Tom Broadwell (2014)
Dr. David Webb (2015)
Carlton Layne (2018)
Terry Goldsby (2020)
Mark Tow (2021)
Sherry Whitaker (2022)
Dr. John Madsen (2023)

## Sustaining Members

Airmax
Alabama Power Company
Alligare, LLC
Aqua Services, Inc.
Aquatic Control, Inc.
Brandt
Cygnet Enterprises, Inc.
Tennessee Valley Authority
Orion Solutions
Outdoor Water Solutions, Inc.
SePRO
Solitude
Syngenta
UPL
Helena Agri-Enterprises, LLC

## Exhibitors

The MidSouth Aquatic Plant Management Society appreciates the following companies for exhibiting their products and services.

Airmax
AquaMaster Fountains
Aquatic Control, Inc.
Earth Science Labs
Helena Agri Enterprises
Orion Solutions
Syngenta
Alligare, LLC
Aqua Services, Inc.
Brandt
Cygnet Enterprises, Inc
Aquatic Ecosystem Restoration Foundation
Outdoor Water Solutions
SePRO
UPL

# Sponsors

The MidSouth Aquatic Plant Management Society appreciates the generous support of the following meeting sponsors. Through the kindness of their support and contributions, we are able to conduct a successful and enjoyable meeting.

## Platinum

Airmax
Alligare, LLC
Aquatic Control, Inc
Brandt
Cygnet Enterprises, Inc.
Orion Solutions
Outdoor Water Solutions
SePRO Corporation
Syngenta
Tennessee Valley Authority
UPL

## Silver

AquaServices, Inc.
Earth Science Labs

## Contributors

AquaMaster Fountains and Aeration

# MidSouth APMS Meeting Agenda

Tennessee Aquarium
Chattanooga, TN
October 29th - 31sr, 2024

## Monday, October 28th

5:00 pm - 7:00 pm Board of Directors Meeting (*Courtyard Downtown Chattanooga*)

***Dinner on your own***

## Tuesday, October 29th

**Tuesday's Agenda-at-a-Glance**

| | |
|---|---|
| 8:00 am - 12:00 pm | Exhibits Setup (*Ocean Journey Lupton Room*) |
| 11:00 am - 5:00 pm | Meeting Registration (*Ocean Journey Atrium*) |
| 12:00 pm - 1:00 pm | Lunch (*On Your Own*) |
| 12:00 pm - 5:00 pm | Exhibits Open (*Ocean Journey Lupton Room*) |
| 1:00 pm - 3:20 pm | General Session I (*Ocean Journey Auditorium*) |
| 3:20 pm - 3:40 pm | Refreshment Break (*Ocean Journey Lupton Room*) |
| 3:40 pm - 5:00 pm | Special Session I: Invasive *Vallisneria* (*Ocean Journey Auditorium*) |
| 5:30 pm - 7:00 pm | President's Reception (*Puckett's Restaurant*) |

12:00 pm **Lunch on your own**

**General Session I** (*Ocean Journey Auditorium*)
**Moderator:** **Dr. Gray Turnage**, *Mississippi State University, Starkville, MS*

1:00 pm **Opening Remarks and Announcements**
**Gray Turnage**
*Starkville, MS*

1:05 pm **Presidential Address**
**Daniel Hill**
*LDWF, Lafayette, LA*

1:10 pm **Keynote Address – Endangered Species Act 101: Navigating the Workplans**
**Kylie Gregory**
*RISE*

2:10 pm **Alabama Power Aquatic Plant Management Program Update**
**Tim McLean**
*AL Power, Calera, AL*

2:30 pm **AIS Management in Coastal Mississippi**
**Mike Pursley**
*Mississippi DMR, Biloxi, MS*

2:50 pm **Pearl River Valley Water Supply District Management Update**
**Rick Hollis**
*Pearl River Valley Water Supply District, Jackson, MS*

3:10 pm **Aerial mapping of aquatic nuisance plants using deep learning AI**
**Sathishkumar Samiappan,** Ruchitha Prakesh, Daniel McCraine, Gray Turnage

*Mississippi State University, Starkville, MS*

3:30 pm **Refreshment Break** (*Ocean Journey Lupton Room*)

**Special Session I: Invasive *Vallisneria*** *(Ocean Journey Auditorium*)
**Moderator:** **Sam Schmid**, *Mississippi State University, Starkville, MS*

3:40 pm **A General Review of the Biology, Phylogeny, and Invasions of the genus Vallisneria**
**Maxwell G. Gebhart** and Gray Turnage
*Mississippi State University, Starkville, MS*

4:00 pm **Response of Vallisneria taxa to combination herbicide treatment**
**Delaney Davenport,** Kara Foley, Jens Beets, Rob Richardson
*North Carolina State University, Raleigh, NC*

4:20 pm **Short Term Efficacy of Contact Herbicides on the invasive *Vallisneria, V. spiralis*× *V. denseserrulata* and *V. spiralis***
**Maxwell G. Gebhart** and Gray Turnage
*Mississippi State University, Starkville, MS*

4:40 pm **TVA Eelgrass Update in the Tennessee River System**
**Stephen Turner**
*Tennessee Valley Authority, Guntersville, AL*

5:00 pm **Day 1 Sessions Conclude**

5:30 pm **Puckett's Restaurant**

***Dinner on your Own***

## Wednesday, October 30th

**Wednesday's Agenda-at-a-Glance**

| | |
|---|---|
| 6:00 am - 8:00 am | Continental Breakfast (*Courtyard Downtown Chattanooga, Chestnut Room*) |
| 7:00 am - 5:00 pm | Meeting Registration (*Ocean Journey Lupton Room*) |
| 7:00 am - 5:00 pm | Exhibits Open (*Ocean Journey Lupton Room*) |
| 8:00 am - 10:00 am | Special Session II: New Research and Student Presentations (*Ocean Journey Auditorium*) |
| 10:00 am - 10:20 am | Refreshment Break (*Ocean Journey Lupton Room*) |
| 10:20 am - 12:00 pm | Special Session III: Regulatory, Extension, and Safety (*Ocean Journey Auditorium*) |
| 12:00 pm - 1:30 pm | Catered Lunch (*Ocean Journey Lupton Room*) |
| 1:30 pm - 3:10 pm | General Session II (*Ocean Journey Auditorium*) |
| 3:10 pm - 3:30 pm | Refreshment Break (*Ocean Journey Lupton Room*) |
| 3:30 pm - 4:25 pm | General Session III (*Ocean Journey Auditorium*) |
| 4:25 pm. - 5:20 pm | Special Session IV: Resource Management (*Ocean Journey Auditorium*) |
| 5:20 pm - 5:50 pm | Business Meeting (*Ocean Journey Auditorium*) |
| 6:00 pm - 9:00 pm | Conference Social and Awards Banquet (*River/Ocean Journey*) |

**Dinner Provided at Reception**

**Special Session II: New Research and Student Presentations (***Ocean Journey Auditorium)*
**Moderator:** **Dean Jones**, *UPL, Auburndale, FL*

8:00 am **Effects of Herbicide on Estuarine Eurasian Watermilfoil (*Myriophyllum spicatum*)**
**Anna Reimer** and Charles Martin
*University of South Alabama, Mobile, AL*

8:20 am **Automating Water Hyacinth Detection Using Deep Learning on RGB UAS Imagery**
**Amber Riner,** Jonathan Glueckert, Nathan Pals, James Leary, Amr Abd-Elrahman, Gregory MacDonald

*University of Florida, Gainesville, FL*

8:40 am **Desiccation Tolerance of Giant Salvinia in Boat Trailer Bunks**
**Corrina J. Vuillequez,** Jonathan S. Glueckert, Michael W. Durham, Benjamin P. Sperry
*University of Florida, Gainesville, FL*

9:00 am **Advancing Invasive Aquatic Plant Classification through Deep Learning and Cost-Effective Hardware.**
**Swarup Bhattarai**, Sathishkumar Samiappan, Ashutosh Shah, Daniel McCraine, Maxwell Gebhart, Gray Turnage
*Mississippi State University, Starkville, MS*

9:20 am **Assessing the State of Cuban Bulrush Management across Florida and the Southeastern United States**
**Patrick Belk,** Stephen F. Enloe, Gray Turnage, and Chris Mudge
*University of Florida, Gainesville, FL*

9:40 am **Evaluation of giant salvinia and salvinia weevil tolerance to salinity under mesocosm conditions**
**Samantha L. Prinsloo** and Christopher R. Mudge
*Louisiana State University, Baton Rouge, LA*

10:00 am **Refreshment Break (***Ocean Journey Lupton Room***)**

**Special Session III: Regulatory, Extension, and Safety - (***Ocean Journey Auditorium***)**
**Moderator:** **Maxwell Gebhart**, *Mississippi State University, Starkville, MS*

10:20 am **Unintended Consequences: A Search for Alternatives to Rotenone**
**Carlton Layne** and John D. Madsen
*Aquatic Ecosystem Restoration Foundation, Marietta, GA*

10:40 am **Water Weeds: A New Resource for Aquatic Plant Management**
**Wes Neal,** Dennis Riecke, and Gray Turnage
*Mississippi State University, Starkville, MS*

11:00 am **Strategies that Foster Better Safety Culture for Applicators**
**Chris Taylor,** Derek Smith, and Mark Whitney
*AquaServices (Jones Fish), Guntersville, AL*

11:20 am **Using machine learning techniques to predict the spread of invasive species: Cuban bulrush (*Cyperus blepharoleptos*) as a case study.**
**Samuel A. Schmid**, Maxwell G. Gebhart, and Gray Turnage
*Mississippi State University, Starkville, MS*

11:40 am **Surface Aeration in a Shallow Pond: A Case Study**
**Cory Richmond**
*Kasko Marine, Prescott, WI*

12:00 pm **Catered Lunch** (*Ocean Journey Lupton Room*)

**General Session II -** (*Ocean Journey Auditorium*)
**Moderator:** **Matt Horton**, *Arkansas Game and Fish Commission, Camden, AR*

1:30 pm **AERF Update**
**John Madsen**
*Aquatic Ecosystem Restoration Foundation, Marietta, Georgia*

1:40 pm **APMS Update**
**Jeremy Slade**
*Sepro, Alachua, Florida*

1:50 pm **Industry Discussions from All Angles**
**Adam Charlton,** Stephen Turner, Gray Turnage, Carl Della Torre, Matt Townson
*Aquatic Control, Elizabethtown, KY*

2:20 pm **Industry Updates - Platinum and Gold Sponsors**

3:10 pm **Refreshment Break** (*Ocean Journey Lupton Room*)

**General Session III (***Ocean Journey Auditorium*)
**Moderator:** **Adam Charlton**, *Aquatic Control, Elizabethtown, KY*

3:30 pm **Aquatics Management: The value you bring**
**Michael McCall**
*Tennessee Valley Authority, Chattanooga, TN*

3:50 pm **Mississippi macrophyte monitoring: Routine surveys of aquatic plant communities to support EDRR initiatives**
**Samuel A. Schmid** and Gray Turnage
*Mississippi State University, Starkville, MS*

4:00 pm **Why Mapping is Managing**
**Troy Goldsby**
*AquaServices (Jones Fish), Guntersville, AL*

**Special Session IV: Resource Management** (*Ocean Journey Auditorium*)
**Moderator:** **Carl Della Torre,** *Orion, La Grange, GA*

4:20 pm **Mississippi Department of Wildlife, Fisheries, and Parks Aquatic Plant Management Update**
**Buford Lessley**
*Mississippi Department of Wildlife, Fisheries, and Parks, Jackson, MS*

4:40 pm **Early Season Control of American Lotus with ProcellaCOR**
**Cody Bragg**
*Aquatic Control, Memphis, TN*

5:00 pm **So an engineer, biologist, and a sociologist walk into….**
**Will Stevenson**
*Solitude Lake Management, Burlington, VT*

5:20 pm **MSAPMS Business Meeting**

5:50 pm **General Sessions Conclude**

6:00 pm **Conference Social and Awards Banquet (***River/Ocean Journey***)**

***NOTE:** Social will begin in River Journey building and progress through the Ocean Journey building back to the Lupton Room. For those wanting to eat a little earlier, dinner will be ready at 7 PM but the formal awards ceremony will begin at 7:30 PM. Exhibits will need to be removed from the aquarium after the awards banquet.

## Thursday, October 31st – Aquatic Plant Workshop Field Day

**Thursday's Agenda-at-a-Glance**

6:00 am - 8:00 am Breakfast (*Courtyard Downtown Chattanooga, Chestnut Room*)
8:00 am - 11:45 am Aquatic Plant Workshop Field Day (*Courtyard Downtown Chattanooga [Chestnut Room] and Nickajack Reservoir*)
11:45 am - 12:00 pm Closing Remarks and Adjourn

**Closing Session** (***Courtyard Downtown Chattanooga –*** *200 Chestnut St., Chattanooga, TN 37402*)
**Moderator:** **Matt Townson**, *Chattanooga, TN*

8:00 am **Interactive Aquatic Plant Workshop**
**Gray Turnage[1], John D. Madsen[2], and Stephen Turner[3]**
[1]*Mississippi State University, Starkville, Mississippi*
[2]*JD Madsen, LLC*
[3]*TVA*

*Classroom; Chestnut Rm. Courtyard Marriott (8:00 – 8:50 am)*

- *8:00 am - Intro to Workshop – Gray Turnage*
- *8:05 am - Plants vs. Fish – John D. Madsen*
- *8:25 am – Herbicides for Use in Aquatic Habitats – Gray Turnage*

*Break (8:50 -9:05 am)*
*Outdoor (9:05 – 11:55 am)*

- *9:05 am – Load Bus and travel to field site (20 min)*
- *9:35 am – Arrive at Nickajack Reservoir and load boats*
- *9:45 am – Tour field sites – Stephen Turner*
- *11:35 am – Load bus and return to hotel*

11:55 am **Closing Remarks**
**Gray Turnage**
*Mississippi State University, Starkville, MS*

12:00 pm **Adjourn**

***Lunch on your own***

# MidSouth APMS Meeting Abstracts and Speaker Biographies

Tennessee Aquarium
Chattanooga, TN
October 29th - 31sr, 2024

**PRESENTATION ABSTRACTS** *(In presentation Order)*

**Endangered Species Act 101: Navigating the Workplans**
**Kylie Gregory**
**RISE**
This presentation will provide an overview of the Environmental Protection Agency's (EPA) latest work to comply with the Endangered Species Act (ESA) and address common misconceptions. We will explore how the EPA's workplans for pesticides are designed to protect vulnerable species and their habitats while balancing environmental and economic interests. The presentation will also highlight recent EPA initiatives aimed at enhancing species protection through collaborative strategies and science-based decision-making.

**Alabama Power Aquatic Plant Management Program Update**
**Tim McLean**
**Alabama Power Company (APC)**
This will be a general update of what APC's aquatic plant management has been up to for the 2024 season. We will talk about the ongoing battle we are having with invasive plants on our system. We will highlight some new tools that we have implemented onto our GIS systems to help better manage our program. We will give an update on the granular application system that our team developed last year.

**AIS Management in Coastal Mississippi**
**Mike Pursley**
This presentation will be an overview of AIS management projects underway in Coastal Mississippi as well as plans for future endeavors. The logistics necessary and costs incurred to treat a large Phragmites infestation on a Coastal Preserve Island will be highlighted. Species managed include giant salvinia, common salvinia, water hyacinth, alligatorweed, Eurasian watermilfoil, phragmites, beach vitex, torpedograss, and others.

**Pearl River Valley Water Supply District Management Update**
**Rick Hollis**
This presentation will be an overview of PRVWSD management projects underway and in the future along the Pearl River located within the five counties, (Leake, Scott, Rankin, Madison, and Hinds), that our district manages. Timber along with aquatic vegetation management is a huge portion of the PRVWSD resources. PRVWSD is blessed with a variety of interests that can be considered a gift and a curse. Timber management, dealing with natural resource maintenance, inventory and financial gain. Aquatic management, dealing with invasive species, Cuban Bullrush, Alligator weed, Hyacinth, and Giant Salvinia. Public perception and communication are a vital part of our role.

**Aerial mapping of aquatic nuisance plants using deep learning AI**
**Sathishkumar Samiappan, Ruchitha Yadav, Daniel McCraine, and Gray Turnage**
High-resolution imaging, particularly when integrated with Unmanned Aerial Systems (UAS), has become a pivotal tool in environmental monitoring and the management of invasive aquatic species. This technology enables detailed vegetation mapping, land cover classification, and the monitoring of

ecological changes, offering unprecedented spatial resolution and insight. In this study, multispectral and visible spectrum imagery were captured using a UAS with visible imagery at a spatial resolution of 1 cm (about 0.39 in) and multispectral imagery at 4 cm (about 1.57 in). Deep learning AI models, particularly Convolutional Neural Networks (CNNs) and advanced segmentation models, were employed to analyze this high-resolution imagery. In the classification of RGB imagery, models such as VGG-16, DenseNet, Alexnet, Resnet18 and standard CNNs demonstrated exceptional performance, with accuracy rates ranging 95% - 98%. These models proved highly effective in identifying and categorizing invasive species, highlighting their potential for precise ecological monitoring. Segmentation models, including FCN, U-Net, Segnet, DeepLabV3+, and mask RCNN provided detailed pixel-level analysis, which is critical for accurate vegetation mapping, although their accuracy was slightly lower compared to classification tasks, ranging between 64% and 73%. Multispectral imagery analysis also yielded strong results, with models achieving accuracy levels above 96%. This demonstrates these models' capability to effectively process and analyze complex spectral data, essential for differentiating between plant species.

**A General Review of the Biology, Phylogeny, and Invasions of the genus Vallisneria**
**Maxwell G. Gebhart and Gray Turnage**
*Vallisneria* has recently become a genus of plants under the spotlight as several species and hybrids have become rapidly invasive throughout many areas of the U.S. This slew of new invaders coupled with general information about *Vallisneria* being hazy at best, prompts a needed synthesis of the currently known information. *Vallisneria*, more commonly referred to as eelgrass or tape grass, is a genus of submersed monocot plants that play a critical role in aquatic ecosystems. It was previously thought that *Vallisneria* contained only 2 species, *V. americana* and *V. spiralis*, however, recent evidence has suggested there are closer to 16 species in the genus. Among the 16 species that have been identified over the past two decades, there is evidence to suggest there is another *Vallisneria* species native to North America, *V. neotropicalis*. Alongside numerous taxonomic changes, the biology of *Vallisneria* is rather complex with numerous studies arguing different tolerances to factors, such as salinity and nutrient loading. Several sources have reported salinity tolerances of *V. americana* between 2 to 18 ppt, suggesting that not only is *Vallisneria* complex evolutionarily but biologically. Previous studies may have oversimplified this genus of plants that have become problematic not only in the U.S. but throughout the world.

**Response of Vallisneria taxa to combination herbicide treatment**
**Delaney Davenport, Kara Foley, Jens Beets, and Rob Richardson**
*Vallisneria* is a genus of submersed aquatic macrophytes that have been historically prioritized for revegetation projects across the United States. Previously, all populations within the United States were classified as *Vallisneria americana*, which is valued for its many ecosystem services. In recent years, genetic evaluations have revealed that there are two native species (*V. americana and V. neotropicalis*) and more concerningly, two non-native populations (*V. australis and V. denseserrulata x spiralis*) within the United States. The establishment of these non-native taxa presents challenges for management due to a lack of knowledge surrounding their ecology and response to chemical control regimes. The primary objective of this work aims to evaluate the efficacy of herbicide combinations containing endothal, copper, diquat, and bispyribac on three *Vallisneria* taxa. All products listed were used alone, and in combination with one another. Each experimental unit containing two mature plants sustained a 72 hour exposure time, being moved into untreated water to end the exposure. Visual percent control ratings occurred at 1, 3, 7, 14, 28, 56, 84 and 112 days after treatment. Destructive harvests occurred at 56 and 112 DAT in order for dry weight data to be analyzed. Preliminary results indicate that *V. neotropicalis* was often the most sensitive of the species tested, with only

two treatments providing less than 50% biomass reduction. All endothall treatments provided at least 83% visual control ratings, and at least 54% aboveground biomass reduction.

**Short Term Efficacy of Contact Herbicides on the invasive *Vallisneria, V. spiralis* × *denseserrulata* and *V. spiralis***
**Maxwell Gebhart and Gray Turnage**
In recent years, *Vallisneria* is a genus of submersed monocots that has rapidly invaded water bodies throughout the southeastern U.S. Particularly of interest are the Eurasian Vallisneria, a hybrid of *V. spiralis* and *V. denseserrulata* that are native to the Eurasian continent, and Channel eelgrass, *V. spiralis* native to freshwaters around the Mediterranean Sea. Both species have been anecdotally recorded to rapidly infest reservoir waterbodies and form large floating mats of biomass and reproductive propagules prompting a major need for control strategies. Contact herbicides can act as a rapid control strategy for infestations of invasive species and those herbicides labelled for aquatic use were tested for their efficacy on the mentioned *Vallisneria* species. Diquat, flumioxazin, carfentrazone-ethyl, and copper-ethylenediamine were applied as static, submersed injections at the maximum label rate to *Vallisneria* growing in mesocosms. After herbicide applications were administered, plants from both eelgrass taxa were harvested at 6 and 12 weeks after treatment (WAT), ramet density was recorded, and biomass was separated into aboveground and belowground tissues, dried in a forced air oven, then measured and recorded. Differences in biomass and ramet density were determined using a mixed model ANOVA followed by a Fisher's LSD for pairwise comparisons. Aboveground biomass was reduced 60 to 86% 6 WAT ($p = <0.01$) by all treatments, however, belowground biomass and ramet density were not reduced. These data suggest multiple contact herbicide applications may be necessary to reduce belowground tissue and ramet density; both of which are important for long term population persistence and reproduction. Further research regarding systemic herbicide efficacy and concentration exposure time relationships should be investigated as potential management strategies for eelgrass reduction.

**TVA Eelgrass Update in the Tennessee River System**
**Stephen Turner**
From a few colonies of Vallisneria americana scattered throughout the lower end of the Tennessee River system to a highpoint of near 40,000 acres of the Eurasian hybrid in less than 20 years. In the early 2000's the Eurasian hybrid (V. spiralis X V. denseserrulata) was introduced into the Tennessee River. This introduction, believed to have occurred in Guntersville Reservoir or Nickajack Reservoir, quickly expanded to cover large swaths of Kentucky, Pickwick, Wilson, Wheeler, Guntersville and Nickajack Reservoirs. But with its minimal winter drawdown and plentiful shallow flats Guntersville reservoir quickly became its primary residence, at its pinnacle covering almost 20,000 acres of the 68,000-acre reservoir in 2022. How the TVA Aquatic Plant Management Program has managed and continues to manage the recent eelgrass explosion in the Tennessee Valley through herbicide treatments and multiple harvester and collection efforts.

**Effects of Herbicide on Estuarine Eurasian Watermilfoil (*Myriophyllum spicatum*)**
**Anna Reimer and Charles Martin**
*Myriophyllum spicatum*, commonly known as Eurasian watermilfoil, is among the most prolific invasive aquatic plants in North America, with positive reporting in 48 U.S. states and parts of Canada. Watermilfoil is easily transported through waterways by fragmentation and can effectively dominate new bodies of water, outcompeting native species within the ecosystem. This has led to an abundant population in the local estuary, the Mobile Tensaw Delta, Alabama (USA) and surrounding waterways. Watermilfoil, like many aquatic plants, produce chemical defenses and secondary metabolites such as polyphenols to increase an individual's chance of survival by providing protection against herbivory,

pathogens, parasites, and ultraviolet radiation. The production of these metabolites facilitates competition among individuals and species by inducing more favorable characteristics, potentially furthering the establishment and expansion of invasive species such as Eurasian watermilfoil. Active management of watermilfoil frequently involves the application of the systemic herbicide 2,4-Dichlrophenoxyacetic acid (hereafter 2,4-D) which stimulates the meristematic tissue of a broadleaf plant inducing uncontrolled growth ultimately causing plant death. Thus, under a regulated application of the 2,4-D, resources and energy will be directed towards the stimulation of tissue growth of the affected population. However, the effect this herbicide has on Eurasian watermilfoil under varying salinity conditions typical in estuaries remains unknown. Here, I report on a laboratory experiment testing the effect of 2, 4-D on watermilfoil plant metrics (e.g., growth, biomass, polyphenol production) across common estuarine salinities (0, 5, and 15 ppt) found in the Mobile-Tensaw Delta. In this experiment, I applied herbicides at various concentrations (0 mL/L, 0.03 mL/L, 0.06 mL/L) under laboratory conditions and monitored plant metrics such as survival, growth, biomass, and branching as well as chemical defenses (polyphenols) across representative salinities (0, 5, and 15 ppt). This work provides key information on the management and ecology of Eurasian watermilfoil in estuaries, thus filling a critical gap in our understanding of the effectiveness of herbicide application under estuarine conditions and how it may influence food web metrics such as palatability.

**Automating Water Hyacinth Detection Using Deep Learning on RGB UAS Imagery**
**Amber Riner, Jonathan Glueckert, Nathan Pals, James Leary, Amr Abd-Elrahman, Gregory MacDonald**
Water hyacinth (*Eichhornia crassipes*), an invasive aquatic plant, poses significant ecological and navigational challenges in Florida's freshwater systems. Effective management relies on early detection and targeted herbicide application. This study aims to enhance water hyacinth surveillance by integrating small unoccupied aerial systems (sUAS) equipped with RGB cameras with deep learning neural networks (DNN) to automate the detection process. Aerial surveys were conducted over Lake Lochloosa and Lake Tohopekaliga in various seasons during 2022 using high-resolution optical sensors. Images from the fall, summer, and winter on Lake Lochloosa were processed and analyzed to train a DNN model for detecting water hyacinth. Remaining surveys were used to evaluate the performance of the model across different spatial and temporal environments.

Two deep learning models, Deeplabv3 and UPerNet, were evaluated. Deeplabv3 demonstrated superior accuracy (79%) in detecting water hyacinth within the same lake and season it was trained. Accuracy and recall decreased across both models with the size of the water hyacinth patch. Additionally, there was a decrease in recall, but not precision, when the model was applied to a different lake than it was trained on, indicating variability in detection efficiency across different environments. Our approach highlights the benefits and limitations of sUAS and DNN integration in creating a systematic, high-resolution surveillance method for managing invasive species. By automating the image analysis process, we can provide timely, actionable intelligence to field operators, enhancing resource allocation and treatment efficacy. This study supports the adoption of advanced aerial and machine learning technologies in environmental management, contributing to more efficient and sustainable control of water hyacinth in Florida's lakes. The practical outcome is an accessible technology support system that optimizes management decisions, thereby improving maintenance control efforts overall.

**Desiccation Tolerance of Giant Salvinia in Boat Trailer Bunks**
**Corrina J. Vuillequez, Jonathan S. Glueckert, Michael W. Durham, Benjamin P. Sperry**
The continued spread of giant salvinia (Salvinia molesta) threatens the ecology and utility of water bodies worldwide. Boat traffic has been shown to be a major vector of aquatic invasive species. However, the potential for giant salvinia survival under boat trailer conditions is currently unknown.

Therefore, experiments were conducted to evaluate the viability of giant salvinia following desiccation events under simulated boat trailer conditions. Giant salvinia was subjected to four environments: open-air, plastic boat bunks, wood boat bunks, and carpeted boat bunks for exposure times that ranged from 12 hours to 16 days. After exposure times were met, plants were placed into recovery mesocosms, and moisture loss and survival were recorded. Data were subject to ANOVA to test for main effects and interactions. Subsequently, data from separate experimental runs were fitted to a log-logistic model and regressed over exposure time. Effective times (ET) to result in 50% (ET50) and 90% (ET90) mortality were estimated from regression models. In open-air conditions, plants did not survive following 12 hours of desiccation. Based on ET50 values in run 1, plants on plastic boat bunks survived 1.5 to 1.9 times longer than on wood or carpet boat bunks, respectively. However, no differences in ET50 values between boat bunk types were observed in run 2. In run 1, ET90 values for carpet, wood, and plastic boat bunks were 2.7, 3.2, and 5.4 days, respectively. Likewise in run 2, ET90 values for carpet, wood, and plastic boat bunks were 4.6, 5.1, and 5.4 days, respectively. Regardless of run or environment, 100% mortality was observed after eight days of exposure. Consequently, these results indicate that giant salvinia may require at least eight days of desiccation within boat bunks to prevent spread to new systems. No significant differences between survival on plastic, wood, or carpet boat-bunks were observed. Additionally, lack of survival in open-air exposure suggests that giant salvinia may not be tolerant of desiccation in unenclosed environments, such as on fishing nets or inside boats.

**Advancing Invasive Aquatic Plant Classification through Deep Learning and Cost-Effective Hardware**

**Swarup Bhattarai, Sathishkumar Samiappan, Ashutosh Shah, Gray Turnage**

Non-indigenous aquatic plants, introduced through various pathways, pose a significant threat to U.S. aquatic ecosystems. These species, including water hyacinth, alligator weed, and primrose, disrupt native biodiversity, degrade water quality, and hinder economic activities such as boating and fishing. Water hyacinth, for instance, forms dense mats that block sunlight and deplete oxygen, impacting aquatic life and water flow. According to the US national invasive species information center, the economic burden of management of non-indigenous species is over $137 billion annually. To address this challenge, we developed a low cost computer vision system that can be applied on various autonomous platforms to map these problematic aquatic plants. For this research, we collected a comprehensive dataset of 1,963 high-resolution images, capturing eight distinct invasive aquatic plant classes. This dataset includes the following species: Alligator Weed, Cuban Bulrush, Giant Salvinia, Primrose, Torpedo Grass, Water Hyacinth, Water Lettuce, and Water Lily. Leveraging this dataset, we developed a deep learning model using MobileNetV2 architecture, achieving an impressive 98% accuracy in classifying invasive plant species. To enhance accessibility and affordability, we further implemented the model on a cost-effective Raspberry Pi Camera Module V2 and NVIDIA Jetson Nano system, maintaining a respectable 84% accuracy despite the lower resolution. This research demonstrates the potential of integrating deep learning techniques with cost-effective hardware solutions to significantly improve the classification and management of invasive aquatic plants. The high accuracy achieved, even with affordable technology, offers a scalable solution for various environmental monitoring contexts, aiding in the protection of aquatic ecosystems and the mitigation of economic losses.

**Assessing the State of Cuban Bulrush Management across Florida and the Southeastern United States**

**Patrick Belk, Stephen F. Enloe, Gray Turnage, and Christopher R. Mudge**

Cuban bulrush (*Cyperus blepharoleptos*) is a floating, aquatic sedge native to South America that poses a rising threat to freshwater ecosystems in Florida and the Southeastern United States. It establishes epiphytically on native and nonnative floating plants and forms dense mats that fill the water column,

displace wildlife, and obstruct transportation. Within the last decade, Cuban bulrush has risen to a high management priority. Little research has been conducted on this plant, resulting in limited or inconsistent management practices. New research aims to develop consistent, reliable approaches to control Cuban bulrush while conserving aquatic resources. This objective will be accomplished by engaging aquatic managers through a management network, establishing in-field monitoring of current control efforts, assessing new control strategies in mesocosm studies, and expanding successful mesocosm methods at field scale. A survey was created to obtain current control techniques and monitoring data from aquatic managers. New monitoring protocols will be written and refined following the survey results. Chemical, mechanical, and IPM control strategies will be assessed in mesocosms at three sites: Baton Rouge LA, Starkville MS, and Gainesville FL. Field validation and confirmation of successful mesocosm trials will be conducted on lakes of diverse environments in the Southeast. The conclusions of this research will enhance the effective treatment of Cuban bulrush invasions and protect native ecosystems in the Southeast by providing managers with the best knowledge of control techniques.

**Evaluation of giant salvinia and salvinia weevil tolerance to salinity under mesocosm conditions**
**Samantha L. Prinsloo and Christopher R. Mudge**

*Salvinia molesta* commonly known as giant salvinia or Kariba Weed, is a floating aquatic fern that forms dense mats on the surface of fresh waterbodies that impedes water use. Giant salvinia originates from Brazil but has since escaped its native range due to anthropogenic activities making it one of the world's worst aquatic invasive species. The salvinia weevil, *Cyrtobagous salviniae,* is a subaquatic beetle used to control giant salvinia. Both the larvae and adult life stages cause significant damage to the rhizomes, root mass and fronds (leaves). The weevil life cycle is solely dependent on the plant and weevils can also be found underwater feeding on submerged plant material. Environmental conditions known to impact giant salvinia and weevils include nitrogen availability, pH, shade, temperature, dissolved oxygen, and eutrophication. Although giant salvinia is primarily found in freshwater systems, the floating species is tolerant to saline conditions up to 7 parts per thousand (ppt). Salinity is of particular importance to waterbodies susceptible to saltwater intrusion in southeastern states because hurricanes and rising sea levels can increase salinity levels. Limited efforts have been made to assess salvinia weevil tolerance to salinity and should be investigated. If salvinia weevils are intolerant to saline conditions, management practices in areas with low to moderate salt levels and giant salvinia tolerances to these conditions will be negatively impacted. A mesocosm study assessed weevil survival at salinity concentrations of 0, 0.25, 0.5, 1, 2, 4, 6, and 8 ppt and each treatment was replicated five times. Within each treatment mesocosm, five smaller containers possessed giant salvinia with twenty adult weevils per container (n = 100 weevils per treatment). Weevils were exposed to these conditions for five weeks. Each week plant injury scores were recorded, and a single cup was destructively harvested to assess weevil survival. Weevils absent after the extraction process were recorded as dead. The results from this experiment are ongoing and will be presented at the annual conference. These results will offer important insight into biological control programs as giant salvinia continues to spread throughout the southeastern states.

**Unintended Consequences: A Search for Alternatives to Rotenone**
**Carlton R. Layne and John D. Madsen**

The presentation will cover a brief regulatory history of the pesticide rotenone, how recent mandatory label changes have affected fisheries management, and how managers are trying to adapt to the more stringent and costly restrictions. Potential alternative chemicals will be explored and likely outcomes.

**Water Weeds: A New Resource for Aquatic Plant Management**
**J. Wesley Neal, Gray Turnage, and Dennis Riecke**

Plants fulfill many natural functions and are vital in aquatic and wetland environments. They provide food, shelter, and reproductive habitat for fish and other aquatic and terrestrial species and help regulate water quality and produce oxygen. However, they can become overabundant and cause water quality issues and interfere with human use, ecosystem dynamics, and fish management. The Extension Service of Mississippi State University, with support and funding from the Aquatic Nuisance Species Program of the U.S. Fish and Wildlife Service and the Mississippi Department of Environmental Quality, has produced a new aquatic plant management platform that differs from similar platforms. First, it does not label all plants as inherently bad and in need of control. In addition to control options, the new resources indicate which species can be used for habitat and aesthetic enhancements with proper management. Also, the resources only recommend herbicides that have demonstrated the best control in peer-reviewed literature, real-world applications, and agency and third-party studies. Finally, herbicide recommendations have been simplified and scaled down for small-volume application. In most cases, the recommended quantity of herbicide is presented in a per gallon of water mixture (for foliar applications) or per acre-foot of water (for injection) basis. The resources include waterproof field guides and a new website (www.extension.msstate.edu/water-weeds) with individual printable factsheets for each plant species or group. These resources were designed for Mississippi application, but will be useful to managers anywhere these plant species are found.

**Strategies that Foster Better Safety Culture for Applicators**
**Chris Taylor, Derek Smith, and Mark Whitney**
Teams specializing in field work frequently encounter hazardous situations and environments. Mitigating the risk of accidents requires the development of sound protocols and a vigilant workforce. There is an ever-increasing body of research suggesting that psychological factors that emerge from company and team culture impact performance and employee safety. Occurrences of accidents and injuries are decreased by improving the physical and cultural environment of the employee. The rate of these improvements is impacted by leadership, communication, training, and employee engagement. Here we present a brief review of strategies from the organizational to individual level that promote better safety culture in the workplace.

**Using machine learning techniques to predict the spread of invasive species: Cuban bulrush (*Cyperus blepharoleptos*) as a case study**
**Samuel A. Schmid, Maxwell G. Gebhart, and Gray Turnage**
The biogeography of invasive species is integral to the study of invasion ecology and one of the most important research questions in this respect asks where invasive species are expected to spread. In the past few decades, many statistical tools have been developed that use machine learning to predict the ecological niches of target species. One such tool is MaxEnt which can make use of small datasets of presence-only data to develop ecological niche models (ENMs) with environmental predictors. The objective of this study is to use a MaxEnt ENM to predict the distribution of suitable habitat of the poorly studied Cuban bulrush (*Cyperus blepharoleptos*) in present-day and future climate scenarios. Publicly available records of Cuban bulrush and BioClim rasters (BIO1, BIO7, BIO12, BIO14, and BIO15) were used in this modeling effort as the response variable and predictors, respectively. MaxEnt models were iteratively tuned using combinations of four different feature classes and three different regularization multipliers to build 12 different candidate models. The best-fit model was selected using three criteria: omission rate < 0.05, corrected Akaike information criterion (AIC), and model parsimony. We used the 'jackknife' function in MaxEnt to determine the relative importance of BioClim variables through stepwise inclusion/exclusion. The best-fit model was used to predict the geography of suitable habitat in North and South America in five climate scenarios: present-day, SSP1-2.6 in 2040, SSP1-2.6 in 2060, SSP5-8.5 in 2040, and SSP5-8.5 in 2060. Model predictions show the expansion of suitable habitat in all future climate scenarios, with the greatest expansion occurring in SSP5 by 2060. We

compare and contrast our findings with a study that used a different niche modeling approach to highlight the strengths and weaknesses of either approach as well as how these different approaches can complement each other. Add a sentence or 2 regarding the importance of these findings to resource managers (aka, how will this affect decision making for resource managers).

**An Update on the Aquatic Ecosystem Restoration Foundation**
**John Madsen**
*Aquatic Ecosystem Restoration Foundation, Marietta, Georgia*
The Aquatic Ecosystem Restoration Foundation is committed to sustainable water resources through the science of aquatic ecosystem management in collaboration with industry, academia, government and other stakeholders. The Aquatic Ecosystem Restoration Foundation accomplishes this mission through support of research and development of aquatic ecosystem management strategies, advocating for environmentally sound conservation and restoration of aquatic ecosystems, providing information to the public regarding aquatic plant management, and serving as an unbiased voice for ecosystem management activities.

**APMS Update**
**Jeremy Slade**
*Sepro Corporation, Alachua, Florida*
An overview of 2023-24 activities, including 2024 annual conference, from the national chapter of The Aquatic Plant Management Society will be presented.

**Industry Updates**
**Platinum Sponsors**
New products and technology for management of aquatic plants and resources will be previewed from various industry experts.

**Industry Discussions from All Angles**
**Adam Charlton, Stephen Turner, Gray Turnage, Carl Della Torre, Matt Townson**
Round table discussion and audience Q&A session regarding contemporary and innovative tools, technology, and future hurdles for aquatic plant management purposes. This discussion incorporates information from industry and academic perspectives. Topics will range from pesticide supply forecasts to incorporation of autonomous systems in aquatic plant management programs.

**Mississippi macrophyte monitoring: Routine surveys of aquatic plant communities to support EDRR initiatives**
**Samuel A. Schmid, and Gray Turnage**
Small lakes account for a major portion of Earth's surface water. One of the major threats to surface freshwater resources is the infestation by aquatic invasive species, and small lakes are a critical component of these resources. One of the most effective strategies to combat invasive species is the implementation of early detection and rapid response (EDRR) strategies. We present an operational implementation of an early detection strategy conducted by Mississippi State University (MSU) and Funded by the Mississippi Department of Environmental Quality and the US Fish and Wildlife Service since 2017. Statewide, aquatic plant surveys of Mississippi waterbodies are conducted annually with the objectives of surveying vegetation in high traffic lakes and rivers for the early detection of aquatic invasive plants. Boats are used to conduct point surveys of the littoral zone and all species observed during the surveys are recorded and compiled. Survey methods are designed to generate adequate data to describe the aquatic plant communities, while allowing for several aquatic systems to be surveyed during a season. Results from these surveys have been used to predict the patterns of invasion for

prominent invasive species in Mississippi waters. Some of the most common aquatic invasive plants in Mississippi are alligatorweed (*Alternathera philoxeroides*), Cuban bulrush (Cyperus blepharoleptos), torpedograss (*Panicum repens*), and Chinese tallowtree (*Triadica sebifera*). We also present several cases of early detection of invasive species that resulted from these surveys allowing resource managers to implement needed management strategies.

**Surface Aeration in a Shallow Pond: A Case Study**
**Cory Richmond**
The lake and pond management industry standard has long been to aerate shallow ponds with surface aeration and aerate deep basins with bottom diffused aeration. This presentation will explore types of surface aeration, zone of influence of surface aerators, optimal applications for surface aerators over bottom diffused aeration, and a case study highlighting the relationship between surface aeration and fluctuations in dissolved oxygen in a shallow pond.

**Why Mapping is Managing**
**Troy Goldsby**
Managing aquatic plants has never, and never should be, a guessing game. Understanding species, species density, area, and water volume are all crucial in proper diagnosis, prescription, and following Best Management Practices (BMP's). Whether you are working on a 5 acre private impoundment, or a 70,000 acre public reservoir, mapping can provide you with the most up to date information necessary for proper product rates and placement. Don't get left behind, lose contracts, or go to jail because you decided to guess. Mapping is Managing.

**Mississippi Department of Wildlife, Fisheries, and Parks Aquatic Plant Management Update**
**Buford Lessley**
The Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) fisheries bureau is responsible for aquatic vegetation management on public waters and state-owned properties which consist of approximately 225,000 freshwater acres throughout the state. Primary management focuses on public waters and includes controlling exotics, maintaining recreational/navigational access, and promoting native vegetation. Problematic species managed include alligatorweed, hydrilla, giant salvinia, common salvinia, and water hyacinth. Additionally, regional fisheries staff provide technical guidance related to aquatic vegetation management to private landowners and local governments.

**Early Season Control of American Lotus with ProcellaCOR**
**Cody Bragg**
Private lake and pond managers are challenged to meet our customers' unique goals and expectations. With a limited number of active ingredients available in the aquatic pesticide market, it's imperative to explore new application methods and technologies when available. American Lotus (Nelumbo lutea) is commonly treated with a foliar application of an aquatic approved glyphosate or 2,4-D product. This is typically done after the plant is mature and has flowered. ProcellaCOR was introduced to the aquatic pesticide world in 2018 adding a new tool for aquatic pesticide applicators. Aquatic Control applied ProcellaCOR as a direct injection/foliar spray combination in the late spring. This allowed for a quicker turnaround time on treatment, less time spent in the field, less visible decomposition for the customer, and has proven to be long lasting.

**So, an engineer, biologist, and a sociologist walk into….**
**Will Stevenson**
This presentation will explore the varying uses of water and how they shape perspectives of water use and how these then affect management strategies and goals.

**Interactive Aquatic Plant Workshop**
**Gray Turnage, John D. Madsen, and Stephen Turner**
Hands on opportunity for participants to learn plant ID, biology, and management techniques for invasive species common in the southeastern U.S.

**SPEAKER BIOGRAPHIES** *(In Presentation Order)*

**Gray Turnage, PhD**
Gray has over a decade of research experience with invasive aquatic and wetland plants. He has been involved with several projects nationwide establishing control efforts and protocols for invasive aquatic and wetland plants as well as monitoring those efforts to analyze success of the protocols he has helped to develop (www.gri.msstate.edu). His projects range in size from entire watersheds to private ponds. This work regularly includes consulting with resource managers and landowners, developing management plans for public and private entities, and monitoring temporal changes in plant community dynamics. He is an active member of the MidSouth and National Aquatic Plant Management Societies (APMS) and engages other APMS chapters on a regular basis.

**Daniel Hill**
Daniel has worked in private industry and state agencies controlling the worst aquatic weeds in the U.S. The U.S. Fish and Wildlife Service as well as state agencies in Arizona, California, Mississippi, and Arkansas have engaged him as a consultant for establishing giant salvinia management plans.

**Kylie Gregory**
Kylie Gregory is the Manager of Government Affairs at RISE (Responsible Industry for a Sound Environment), the national trade association representing manufacturers, formulators, and distributors of specialty pesticides and fertilizers. Here, she drives federal legislative initiatives, focusing on aquatic issues. She leads a national grassroots network, mobilizing advocates for key priorities like the annual federal appropriations process. Prior to this role, Kylie managed CropLife America's Political Action Committee (CLPAC) and supported the Government Relations Team. A proud Texas A&M alumna, she holds a Master of Public Administration and a Bachelor of Science in Political Science, bringing together her passion for policy and connecting with others.

**Tim McLean**
Tim has been with Alabama Power's aquatic plant management team since 2017. He graduated from Auburn University in 2005 with a degree in fisheries science.

**Mike Pursley**
Mike works as the Invasive Species Program Manager for the Mississippi Department of Marine Resources and has been finding and treating AIS infestations for the agency since 2006. He also serves on the Gulf and South Atlantic Regional Panel on Aquatic Invasive Species and as Coordinator for the Mississippi Aquatic Invasive Species Council. Mike holds a B.S. degree in Environmental Science from the University of Arkansas and a M.S. degree in Fisheries Biology from Louisiana State University.

**Sathishkumar Samiappan, PhD**
Dr. Sathishkumar Samiappan is an Associate Research Professor at the Geosystems Research Institute at Mississippi State University. He holds a Ph.D. in Electrical and Computer Engineering. His research interests lie at the intersection of remote sensing, artificial intelligence, and environmental science. He has been principal investigator or co-principal investigator on numerous research projects, securing funding from organizations such as the USDA and the U.S. Army Engineer Research and Development Center. His work has resulted in over 30 publications in peer-reviewed journals and conference proceedings. He is also a dedicated educator, having taught a variety of courses at both the undergraduate and graduate levels.

**Rick Hollis**
Rick Hollis, a Mississippi transplant from Tuscaloosa, Alabama, I have had a variety of Forestry employment opportunities that allowed me a broad knowledge of experience. A great desire for maintaining diversity, sustainability, as well as multiple use for all, is the ultimate challenge. Knowledge and education are vital in today's world which is constantly evolving. We, as stewards of the land, need to evolve and change with the times to make rational and vital decisions to insure our natural resources for the future. Currently, Pearl River Valley Water Supply District Forestry Supervisor, Ridgeland MS. Mississippi Forestry Commission Forester IV, Franklin and Jefferson County, MS. North Carolina Forest Service, Area Forester, Southern Pine Beetle Forester, and Forest Inventory Analysis Forester. Timber Procurement Forester, Stone Container Corporation, Brandon, MS. Consulting Forester, Tuscaloosa, AL. Mississippi Registered Forester #1668.

**Maxwell G. Gebhart**
Maxwell G. Gebhart is currently a Ph. D. student and research associate at Mississippi State University Geosystems Research Institute. Maxwell's research focuses on understanding aquatic invasive plant biology, ecology, their impact on environmental quality, and developing management strategies. Basic research includes phenology, resource allocation patterns, and some spatial modelling which are all used to optimize current management practices on problematic species. Maxwell's current research is focused on the *Vallisneria* genus however, his previous graduate research focused on *Butomus umbellatus* L.

**Delaney Davenport**
Delaney is pursuing a master's degree in Crop Science and Fisheries, Wildlife, and Conservation Biology at North Carolina State University under the direction of Dr. Rob Richardson. She is entering her first year as a graduate student after working as a Research Specialist within the Richardson lab for the last year. Prior to this role, she was an intern for the lab from 2021 to 2022. Her current research focuses on taxa in the genus Vallisneria, and will investigate several different aspects of its ecology and response to chemical control.

**Stephen Turner**
Stephen is the Program Manager for the TVA Aquatic Plant Management Program and is based in Guntersville, AL. He received his B.S. in Environmental Biology from Jacksonville State University, then attended graduate school at Auburn University in Fisheries Biology. Stephen spent 20 years in the Pond and Lake Management industry prior to his working for TVA for the last 6 years. He oversees the management of aquatic plants throughout the entire TVA system, oversees treatment of around 2,500 acres of aquatic plants annually, harvesting about 1,000 acres of aquatic plants from TVA reservoirs annually and works in partnership with multiple state agencies, local governments, and stakeholder groups to provide management on multiple waterbodies throughout TVA's footprint.

**Anna Reimer**
Anna received her undergraduate degree in Biological Sciences from the University of South Alabama. After completing her Bachelors, she worked as an environmental management technician mitigating harmful algal blooms and invasive aquatic plants. Anna also gained experience managing life support systems and animal husbandry at the Gulfarium Marine Adventure Park in Ft. Walton Beach, FL and the Alabama Aquarium at Dauphin Island Sea Lab. Anna is now a Graduate Student in the Environmental Toxicology program pursuing her Master's degree at the University of South Alabama. Her research interests include chemical ecology, secondary metabolic functions, and food web dynamics.

**Amber Riner**
Amber Riner was a graduate research assistant at the Center for Aquatic and Invasive Plants at the University of Florida. Her research was focused on detecting water hyacinth and monitoring herbicide applications with unmanned aerial systems. In addition to her graduate research Amber also served as the president of the Agronomy Graduate Student Association and volunteered with LAKEWATCH during her master's program. Amber is a Florida native from Orlando. She received her bachelor's degree in environmental science with a minor in music and certificate in geospatial analysis from the University of Florida in 2022. She graduated in August 2024 with a master's in agronomy with a concentration in geographic information systems and certificates in weed science and AI in applied smart ag systems. In her free time Amber loves exploring the outdoors through traveling, cycling, and hiking. She is also an avid reader and enjoys music, painting, and ceramics.

**Corrina J. Vuillequez**
Corrina Vuillequez graduated from the University of Florida in 2021 with a bachelor's degree in plant science. She currently is a graduate student as well as a researcher at the Center for Aquatic and Invasive Plants for Dr. Ben Sperry at UF. Her master's research focuses on developing novel control methods for the invasive aquatic plant crested floating heart. Outside of her thesis, she conducts research on other aquatic species such as giant salvinia and *Vallisneria*.

**Swarup Bhattarai**
Swarup Bhattarai is a sophomore majoring in Electrical Engineering at Mississippi State University. He is also an undergraduate student researcher at Geosystems Research Institute. He is passionate about integrating technology with environmental science and is exploring innovative applications of deep learning to address various ecological and computational challenges.

**Patrick Belk**
Patrick is a first-year MS student at the University of Florida studying aquatic weeds and weeds of natural areas. He earned his BS in Plant & Environmental Science from Clemson University in his home state of South Carolina. In his free time, he likes to compete in pool tournaments and take hikes with his wife, Ariel.

**Samantha Prinsloo**
Samantha Prinsloo has been a PhD candidate and graduate research assistant in the weed science program at Louisiana State University (LSU) in Baton Rouge, LA since January 2023. Samantha is originally from South Africa where she completed her undergraduate and Masters' degrees specializing in entomology at Rhodes University in 2018 and 2021, respectively. Her PhD research focuses on the integration of chemical and biological control to improve the management of giant salvinia, an invasive floating aquatic plant that has been troublesome in Louisiana and neighboring states since the late 1990's.

**Carlton Layne**
Carlton holds a B.S. degree (Biology)) from Clarion University and an M.S. degree (Criminal Justice) from Rollins College. He worked for USDA as a lab analyst and inspector (5 yrs) before transitioning to EPA. At EPA, he fulfilled multiple roles over a 30-year career including Inspector, Regional and National Training Officer, Chief of Pesticide Section EPA Region 4, and National Pesticide Expert and Chief Investigator. After retirement from EPA, Carlton has served as the Executive Director of the Aquatic Ecosystem Restoration Foundation for the last 20 years.

**J. Wesley Neal**
Dr. Wes Neal received his B.S from Virginia Tech and his M.S. and Ph.D. from North Carolina State University. He has served as the Extension Fisheries Specialist for the state of Mississippi for 16 years and is currently a Professor at Mississippi State University. Wes conducts research and outreach on an array of topics that range from pond and reservoir management, fish ecology, artisanal fisheries in underserved areas, and hosts his own fish-centric podcast, Fish University.

**Chris Taylor, PhD**
Chris Taylor has worked as an applicator and administrative biologist at Aqua Services in Guntersville Alabama since June 6, 2023. He has a bachelor's degree in biomedical sciences from Auburn University and a master's and PhD in biology from the University of Alabama at Birmingham. Before joining Aqua Services, his work focused on aquaculture, the behavior of aquatic vertebrates and invertebrates, and real-time location system technologies. He was a science educator for 10 years with classes ranging from Pre-K to collegiate level.

**Samuel A. Schmid**
Samuel is a Research Associate and PhD Candidate at Mississippi State University where his dissertation focuses on the ecology and management of alligatorweed. His other active projects include research on invasive eelgrass and Cuban bulrush. Areas of interest include plant ecology, invasion ecology, and wetland research.

**John D. Madsen, PhD**
John D. Madsen, PhD retired as a Research Biologist with the US Department of Agriculture, Agricultural Research Service, Invasive Species and Pollinator Health Research Unit in Davis, California, USA in December 2022. He has researched the biology, ecology and management of aquatic plants, particularly invasive species, since 1987. Dr. Madsen was with the USDA ARS in California from 2014 - 2022. Before that, he was on the faculty of Mississippi State University for eleven years, and with the US Army Engineer Research and Development Center for ten years.

**Jeremy Slade**
Jeremy Slade joined SePRO Corporation as Business Development Leader, Aquatics in November 2023. In this role, his responsibilities include developing new business with existing and new customers, development and implementation of strategy to grow sales of current and new products and formulations, and stewarding ProcellaCOR® FX commercial operations in Canada. Jeremy has nearly 20 years of experience in the aquatic industry, including roles with UPL, the University of Florida, the U.S. Army Engineer Research and Development Center, and Mississippi State University. Most recently, Jeremy has served as Commercial Business Lead, Aquatics for UPL. Jeremy holds a B.S. in Biology from the University of Mississippi and a M.S. in Wildlife and Fisheries Science from Mississippi State University. Jeremy is also a strong industry advocate being involved with several national and regional aquatic plant management industry affiliates including holding various Board of Directors' positions; The Aquatic Plant Management Society (APMS; 2024-25 President and BASS special representative), Midsouth & Florida APMS (Past President), active member of Responsible Industry for a Sound Environment (RISE) and other APMS regional chapters.

**Adam Charlton**
Adam received his bachelor's degree in Fisheries and Aquatic Sciences from Purdue University in May of 2006. After graduation, he began work with the Florida Fish and Wildlife Conservation Commission at the FWRI Lab in Eustis, FL as a biological scientist II. In 2008, Adam became the fisheries biologist II with the Division of Freshwater Fisheries Management's regional office in Ocala, FL. In 2009, Adam

moved back to Indiana and began work with Aquatic Control. In 2011, Adam started Aquatic Control's Kentucky office in Elizabethtown, KY. After ten years of managing that office, he was promoted to Director of Satellite Operations. Now Adam serves as the Vice President of Satellite Operations at Aquatic Control. He has been a board member of MSAPMS since 2017 and has been serving as Editor since 2020. In his spare time Adam enjoys fishing, hunting, and spending time with his wife and three children.

**Cory Richmond**
Cory Richmond is the Midwest Territory Manager for Kasco Marine. He is a director of the Midwest Aquatic Plant Management Society (MAPMS) and Friends of the Lower Olentangy Watershed (FLOW). Prior to Kasco, Cory worked for AQUA DOC Lake and Pond Management and the Ohio Environmental Protection Agency. He is a graduate of Ohio State University's School of Environment and Natural Resources. From the Appalachian foothills to the corn fields of the northwest, Cory has lived and worked in several locations but all within the state of Ohio.

**Michael McCall**
Michael McCall serves as TVA's Vice President of Environment and Sustainability, and TVA's Chief Sustainability Officer. With more than 22 years of experience at TVA, Michael has served in multiple leadership roles in environmental engineering, enterprise strategic planning, enterprise performance and continuous improvement. Michael previously led the Office of the CEO supporting the TVA Board of Directors, CEO Jeff Lyash and the Executive Leadership Team, where he strengthened enterprise collaboration and execution of numerous Board and CEO project initiatives. Michael is a life-long native of East Tennessee and lives in Chattanooga with his wife Betsey and two children, Karaline and Will. They enjoy spending time outdoors and traveling together.

**Troy Goldsby**
Collegiate course studies at University of North Alabama, University of South Alabama, and Oregon State University (wildlife/fisheries emphasis). Troy is an expert aquatic pesticide applicator. Executive and biological responsibilities include field management of aquatic vegetation and fisheries projects throughout the southeastern U.S. He has managed a fish elimination project for Duke Energy (Plant McGuire) in Huntersville, North Carolina, and has 25 years of experience in the aquatic plant management field. Troy has been on the board and president of the following societies: The Midsouth Aquatic Plant Management Society, The Society of Lake Management Professionals, The Tennessee Vegetation Management Association, and The Alabama Fisheries Association, The Aquatic Plant Management Society, The Aquatic Ecosystem Restoration Foundation, and The Tennessee Wildlife Federation.

**Buford Lessley**
Buford Lessley is a fisheries biologist for the Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP). He serves the Central Region that includes several oxbow lakes along the Mississippi and Yazoo Rivers, Ross Barnett Reservoir, and numerous state fishing and state park lakes. He received a bachelor's degree wildlife and fisheries from Mississippi State University in 2014 and a master's in biology from the University of Texas Rio Grande Valley in 2016. Prior to working for MDWFP, he worked in private lake management in Tennessee and Texas.

**Cody Bragg**
Cody received his bachelor's degree in Fisheries and Aquatic Sciences from Purdue University in 2015. Throughout college he worked with the Indiana DNR as a Fisheries Biologist Aide. Immediately after graduation, he began working with Aquatic Control in southern Indiana as an aquatic biologist. He then

managed Aquatic Control's West Tennessee office from 2017-2020, and has been managing the Kentucky branch office since January 2021. He will be transitioning into Aquatic Control's Southern Territory Manager in 2025. In his free time he enjoys hunting, fishing, and spending time with his wife and two young sons.

**Will Stevenson**
Will Stevenson works at SOLitude Lake Management as the Director of Integration / Mergers & Acquisitions. Previously, Will was the owner and President of Lycott Environmental based in Massachusetts.

Will received a BS Civil Engineering from Union College in Schenectady, NY. He went on to earn his Master of Environmental Management from the Yale School of Forestry & Environmental Studies in New Haven, CT, as well as his MBA from Babson College in Babson Park, MA. Prior to owning Lycott, Will held multiple senior management positions in marketing, operations and sales for companies focusing in the software and real estate markets.

Will currently serves as the treasurer of the Northeast Aquatic Plant Management Society. He is also Vice President of Timber Owners of New England and on the board of directors of Wildlife Conservation Trust, in New Hampshire. These organizations manage several thousand acres of forest and recreation lands in New Hampshire. When not focused on environmental activities, he can be found on the local ambulance where he is an EMT.