The New Hydrilla in The Northeast

APMS

The Aquatic Plant Management Society

The CAST HABs Paper Launch

65th Annual Conference   Providence, Rhode Island   July 14-17, 2025

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Committee Chairs

Awards	Ryan Wersal
Bylaws and Resolutions	Shaun Hyde
Education and Outreach	Christine Krebs
Exhibits	Dean Jones
Finance	Andy Fuhrman
Meeting Planning	Tom Warmuth
Membership	Matthew Johnson
Nominating	Jay Ferrell
Past President's Advisory	Jay Ferrell
Program	Lyn Gettys
Proposal Review	Jay Ferrell
Regional Chapters	Gray Turnage & Michael Greer
Strategic Planning	Mark Heilman
Student Affairs	Andrew Howell

Special Representatives

AERF	Carlton Layne
Science Policy	Lee Van Wychen
BASS	Jeremy Slade
CAST	Gray Turnage
NALMS	Terry McNabb
RISE	Matthew Johnson
Women of Aquatics	Amy Kay
WSSA	Andrew Howell

APMS Presidents and Meeting Sites

1961	T. Wayne Miller, Jr.	Fort Lauderdale, FL
1962	T. Wayne Miller, Jr.	Fort Lauderdale, FL
1963	William Dryden	Tampa, FL
1964	Herbert J. Friedman	Tallahassee, FL
1965	John W. Woods	Palm Beach, FL
1966	Zeb Grant	Lakeland, FL
1967	James D. Gorman	Fort Myers, FL
1968	Robert D. Blackburn	Winter Park, FL
1969	Frank L. Wilson	West Palm Beach, FL
1970	Paul R. Cohee	Huntsville, AL
1971	Stanley C. Abramson	Tampa, FL
1972	Robert J. Gates	Miami Springs, FL
1973	Brandt G. Watson	New Orleans, LA
1974	Alva P. Burkhalter	Winter Park, FL
1975	Luciano Val Guerra	San Antonio, TX
1976	Ray A. Spirnock	Fort Lauderdale, FL
1977	Robert W. Geiger	Minneapolis, MN
1978	Donald V. Lee	Jacksonville, FL
1979	Julian J. Raynes	Chattanooga, TN
1980	William N. Rushing	Sarasota, FL
1981	Nelson Virden	Jackson, MS
1982	Roy L. Clark	Las Vegas, NV
1983	Emory E. McKeithen	Lake Buena Vista, FL
1984	A. Leon Bates	Richmond, VA
1985	Max C. McCowen	Vancouver, BC
1986	Lars W. J. Anderson	Sarasota, FL
1987	Dean F. Martin	Savannah, GA
1988	Richard D. Comes	New Orleans, LA
1989	Richard Couch	Scottsdale, AZ
1990	David L. Sutton	Mobile, AL
1991	Joseph C. Joyce	Dearborn, MI
1992	Randall K. Stocker	Daytona Beach, FL
1993	Clarke Hudson	Charleston, SC
1994	S. Joseph Zolczynski	San Antonio, TX
1995	Steven J. de Kozlowski	Bellevue, WA
1996	Terence M. McNabb	Burlington, VT
1997	Kurt D. Getsinger	Fort Myers, FL
1998	Alison M. Fox	Memphis, TN
1999	David F. Spencer	Asheville, NC
2000	J. Lewis Decell	San Diego, CA
2001	Jim Schmidt	Minneapolis, MN
2002	David P. Tarver	Keystone, CO
2003	Richard M. Hinterman	Portland, ME
2004	Ken L. Manuel	Tampa, FL
2005	Eric P. Barkemeyer	San Antonio, TX
2006	Jeffrey D. Schardt	Portland, OR
2007	Donald W. Doggett	Nashville, TN
2008	Jim Petta	Charleston, SC
2009	Carlton Layne	Milwaukee, WI
2010	Greg MacDonald	Bonita Springs, FL
2011	Linda S. Nelson	Baltimore, MD
2012	Tyler Koschnick	Salt Lake City, UT
2013	Terry Goldsby	San Antonio, TX
2014	Michael D. Netherland	Savannah, GA
2015	Cody Gray	Myrtle Beach, SC
2016	Rob Richardson	Grand Rapids, MI
2017	John D. Madsen	Daytona Beach, FL
2018	John H. Rodgers, Jr.	Buffalo, NY
2019	Craig Aguillard	San Diego, CA
2020	Mark Heilman	*Canceled*
2021	Ryan Wersal	New Orleans, LA
2022	Ryan Thum	Greenville, SC
2023	Brett Hartis	Indianapolis, IN
2024	Jason Ferrell	St. Petersburg, FL
2025	Jeremy Slade	Providence, RI

APMS Award Recipients

Honorary Members

Awarded to persons who have been voting members of the Society for no less than ten years, have contributed significantly to the field of aquatic vegetation management, and must have actively promoted the Society and its affairs during their membership.

William E. Wunderlich	1967
F. L. Timmons	1970
Walter A. Dun	1976
Frank S. Stafford	1981
Robert J. Gates	1984
Herbert J. Friedman	1987
John E. Gallagher, Luciano “Lou” Guerra	1988
Max C. McCowen	1989
James D. Gorman, T. Wayne Miller, Jr.	1995
A. Leon Bates, Richard Couch	1997
N. Rushing	1997
Alva P. Burkhalter	2002
J. Lewis Decell	2004
Paul C. Myers	2005
David L. Sutton	2006
Dean F. Martin	2007
Robert C. Gunkel, Jr.	2008
Allison M. Fox, Randall K. Stocker, Steven J. de Kozlowski	2010
Carole Lembi	2011
Lars W.J. Anderson, David Tarver	2012
Don Doggett, Richard Hinterman	2013
David Spencer	2015
Jim Schmidt	2016
Joseph C. Joyce, Jeff Schardt	2017
David A. Issacs, Vernon V. Vandiver	2018
Eric P. Barkemeyer	2019
Linda Nelson, Ken Manuel, Steve Brewer	2020
Kurt Getsinger, John Rogers, Jr., Terry Goldsby	2021
William Culpepper, Joe Bondra	2022
John Gardner, John Madsen	2023
Scott Nissen	2024

President’s Award

An individual, designated by the current President, who has displayed "*Many Years of Dedication and Contributions to the Society and the Field of Aquatic Plant Management*".

T. O. “Dale” Robson	1984
Gloria Rushing	1991
William T. Haller	1999
David Mitchell	1999
Jeffrey D. Schardt	2002
Jim Schmidt	2003
Robert C. Gunkel, Jr.	2004
Victor A. Ramey	2006
William H. Culpepper	2007
Kurt Getsinger	2008
Richard Hinterman	2009
Steve D. Cockreham	2010
Donald W. Doggett	2012
Carlton Layne	2013
Ken Langeland, Jeff Schardt, Dan Thayer, Bill Zattau	2014
Greg MacDonald	2015
Linda Nelson	2015
John Madsen, Mike Netherland	2016
Jason Ferrell	2017
Robert Blackburn	2018
Sherry Whittaker	2018
Eric P. Barkemeyer	2019
Dave Petty, Bill Torres, Rob Richardson	2020
Mark Heilman	2021
Ryan Wersal	2022
JJ Ferris	2023
Amy Giannotti, Andy Fuhrman, Justin Nawrocki	2024

Max McCowen Friendship Award

A special recognition given to an APMS member whose demeanor and actions display sincerity and friendship in the spirit of being an ambassador for the APMS. Criteria include warmth and outgoing friendship, sincerity and genuine concern, gracious hospitality, positive attitude and smile.

Judy McCowen	1995
John E. Gallagher	1997
Paul C. Myers	2000
William T. Haller	2002
Bill Moore	2006
Vernon V. Vandiver, Jr.	2012
Tommy Bowen	2014
Steve Hoyle	2015
Ken Manuel	2016
David Isaacs	2017
John Gardner	2018
William A. Ratajczyk	2019
Tom Warmuth	2020
Todd Olson	2021
Dean Jones	2022
Amy Kay	2023
Matt Johnson	2024

T. Wayne Miller Distinguished Service Award

An individual recognized for *"Service to the Society and the Profession"*. Considerations include completion of a relatively short-term project taking considerable effort resulting in advancement of aquatic plant management; performance beyond the call of duty as an APMS officer, chair, or representative; or non-member achievement leading to the advancement of APMS goals and objectives.

Gerald Adrian	2005
Linda Nelson	2007
Surrey Jacobs	2009
Amy Richard	2010
Michael Netherland	2011
John H. Rodgers, Jr.	2012
John Madsen	2013
Jim Schmidt	2014
Jeffrey D. Schardt	2015
Craig Aguillard	2016
Tommy Bowen	2017
Tyler Koschnick	2018
Robert J. Richardson	2019
Jeremy Slade	2020
Jason Ferrell	2021
Mark Heilman	2022
Ryan Thum	2023
Brett Hartis	2024

Outstanding Graduate Student Award

A student recognized for outstanding achievement during graduate studies in the field of aquatic plant management.

Ryan Wersal	Mississippi State University	2010
Joe Vassios	Colorado State University	2011
Sarah True-Meadows	North Carolina State University	2013
Justin Nawrocki	North Carolina State University	2014
Erika Haug	North Carolina State University	2015
Kyla Iwinski	Clemson University	2016
Alyssa Calomeni	Clemson University	2017
Andrew Howell	North Carolina State University	2018
Tyler Geer	Clemson University	2019
Gray Turnage	Mississippi State University	2020
Mirella Ortiz	Colorado State University	2021
Jens Beets	NC State University	2022
Conrad Oberweger	University of Florida	2023
Alyssa Anderson	Minnesota State University	2024

Outstanding International Contribution Award

An individual or group recognized for completion of research or outreach activities that is international in nature.

Deborah Hofstra	National Institute of Water & Atmospheric Research	2013
Paul Champion	National Institute of Water & Atmospheric Research	2016
John Clayton	National Institute of Water & Atmospheric Research	2017
Tony Dugdale	Agriculture Victoria	2018
Tobias Bickel	Queensland Department of Agriculture and Fisheries	2023
Daniel Clements	National Institute of Water & Atmospheric Research	2024

Outstanding Journal of Aquatic Plant Management Article Award

An award voted by the Editor and Associate Editors for research published in the JAPM during the previous year.

James Johnson, Ray Newman	University of Minnesota	2012
Michael D. Netherland and LeeAnn Glomski	U.S. Army Corps of Engineers	2014
Greg Bugbee, M. Gibbons, and M.J. Wells	Connecticut Agricultural Experiment Station	2016
Justin Nawrocki, Robert Richardson and Steve Hoyle	North Carolina State University	2017
Ryan A. Thum, Syndell Parks, James N. Mcnair, Pam Tyning, Paul Hausler, Lindsay Chadderton, Andrew Tucker, and Anna Monfils	Montana State University	2018
Alyssa J. Calomeni, Ciera M. Kinley, Tyler D. Geer, Maas Hendrikse, and John H. Rodgers Jr	Clemson University	2019
Melaney Dunne and Raymond Newman	University of Minnesota	2020
John Madsen and Kurt Getsinger	USDA and USACE	2022
Kathryn A. Gannon, Raymond M. Newman, Ryan A. Thum	Montana State University	2023
Alyssa J. Calomeni, Andrew D. McQueen, Ciera M. Kinley-Baird, Gerard A. Clyde Jr.	USACE and Aquatic Control, Inc.	2024

Outstanding Research/Technical Contributor Award

An individual or group recognized for completion of a research project or technical contribution related to aquatic plant management that constitutes a significant advancement to the field.

Michael Netherland, Dean Jones, and Jeremy Slade	University of Florida	2010
Kurt Getsinger	U.S. Army Corps of Engineers	2011
Mark Heilman	SePRO Corporation	2013
John Rodgers	Clemson University	2015
Rob Richardson	North Carolina State University	2016
Ryan Thum	Montana State University	2017
Scott Nissen	Colorado State University	2018
John D. Madsen	United States Department of Agriculture	2019
Patrick Moran and the DRAAWP	United States Department of Agriculture	2020
Tera Guetter	Pelican River Watershed Dist.	2021
Stephen Enloe	University of Florida	2022
Michael Greer	U.S. Army Corps of Engineers	2023
Ryan Wersal	University of Minnesota, Mankato	2023
Deborah Hofstra	National Institute of Water & Atmospheric Research	2024

Michael D. Netherland Graduate Student Research Grant

Student initiatives are among the most important core values of the Aquatic Plant Management Society. High on the list of student support programs is the Michael D. Netherland Graduate Student Research Grant. This $40,000 academic grant, co-sponsored by APMS and the seven regional APMS chapters, provides funding for a full-time graduate student to conduct research in an area involving aquatic plant management techniques (used alone or integrated with other management approaches) or in aquatic ecology related to the biology or management of regionally or nationally recognized nuisance aquatic vegetation.

Recipient	Affiliation	Year	Amount
Mary Bremigan	**Michigan State University**	**1999**	**$34,000**
The Indirect Effects of Sonar Application on Lake Food Webs			
Katia Englehardt	**University of Maryland**	**2001**	**$40,000**
Controlling Non-native Submersed Aquatic Macrophyte Species in Maryland Reservoirs: Plant Competition Mediated by Selective Control			
Susan Wilde	**University of South Carolina**	**2005**	**$40,000**
Investigating the Role of Invasive Aquatic Plants and Epiphytic Cyanobacteria on Expression of Avian Vacuolar Myelinopathy (AVM)			
John Madsen and Ryan Wersal	**Mississippi State University**	**2007**	**$60,000**
The Seasonal Phenology, Ecology and Management of Parrotfeather [Myriophyllum aquaticum (Vellozo) Verdecourt]			
Rob Richardson, Sarah True, Steve Hoyle	**North Carolina State University**	**2010**	**$40,000**
Monoecious Hydrilla: Phenology and Competition			
Ryan Thum	**Grand Valley State University**	**2012**	**$40,000**
A Quantitative Genetics Approach to Identifying the Genetic Architecture of Herbicide Susceptibility, Tolerance, and Resistance in Hybrid Watermilfoils (Myriophyllum spicatum x sibiricum)			
Scott Nissen	**Colorado State University**	**2014**	**$40,000**
Exploring the Physiological Basis of 2,4-D Tolerance in Northern Watermilfoil x Eurasian Watermilfoil Hybrids			
Rob Richardson	**North Carolina State University**	**2015**	**$40,000**
Aspects of Monoecious Hydrilla Physiology and Response to Herbicide Combination Treatments			
Christopher R. Mudge and Bradley T. Sartain	**Louisiana State University**	**2016**	**$40,000**
Exploring Alternative Giant Salvinia (Salvinia molesta D.S. Mitchell) Management Strategies			
John Rodgers and Tyler Geer	**Clemson University**	**2017**	**$60,000**
Evaluation of Management Options for Nitellopsis obtusa (Desvaux in Loiseleur) J. Groves, (1919) (Starry Stonewort) in the United States			
Ryan A. Thum and Greg M. Chorak	**Montana State University**	**2018**	**$40,000**
Identifying Eurasian and Hybrid Watermilfoil Gene Expression Differences in Response to Frequently Used Herbicides for Improved Adaptive Management			
Rob Richardson and Jens Beets	**North Carolina State University**	**2020**	**$40,000**
Evaluation of Effect of Biotype on Biology and Response to Herbicides of Aquatic Macrophyte Species			
Alyssa Anderson and Ryan Wersal	**Minnesota State University – Mankato**	**2022**	**$40,000**
The Photosynthetic Ecology of Parrotfeather (Myriophyllum aquaticum) and Implications for Future Spread			
Del Hannay and Ryan Thum	**Montana State University**	**2024**	**$40,000**
Resolving Species Boundaries of Closely Related Myriophyllum Species for Improved Native Identification			

Sustaining Members

AgroShield has been serving the Agriculture and Aquatic industries since 2015. Our Vodaguard product was developed to cure infections in the upper water column. Vodaguard's unique follow the bloom technology concentrates the cure where it is needed the most. Vodaguard C is a copper sulphate pentahydrate product. Vodaguard O is a sodium percarbonate that becomes hydrogen peroxide when introduced to water. Both products have a patented formulation that allows them to be buoyant for 24 to 36 hours. Reduces manpower, machinery, and un-necessary product which reduces cost. Please visit us at: https://www.agro-shield.com/our-products/algaecides.

AquaTechnex, LLC is a lake and aquatic plant management firm that operates in the Western United States. The company is expert in the use of aerial and boat GIS/GPS technologies to assess aquatic environments. The firm is also expert in the management of invasive aquatic weed species and phosphorous mitigation to suppress toxic cyanobacteria blooms. Our web site is www.aquatechnex.com; please drop by regularly to get news updates as we have moved our blog onto the site.

Aquatic Control, Inc. has been managing aquatic resources since 1966. As a distributor of lake management supplies, floating fountain aerators, and diffused aeration systems, Aquatic Control represents all of the major brands of quality supplies and equipment. Aquatic Control offers aquatic resource services including vegetation mapping, vegetation management services, phosphorus mitigation, fish management, fountain and aeration system installation, equipment maintenance, and factory-trained service and warranty repair throughout the Midwest. Harmful Algae Bloom monitoring programs with our in-house laboratory allow us to customize treatment plan design through control of the algae causing taste and odor or toxin production issues. Learn more at www.aquaticcontrol.com.

Aquatic Vegetation Control, Inc. (AVC) is a Florida corporation founded in 1986 offering vegetation management and general environmental consulting services throughout the southeast. Since its establishment as an exotic/nuisance vegetation management company specializing in the control of invasive wetland, aquatic and upland species, AVC has broadened its scope of capabilities to include; certified lake management, fish stocking, re-vegetation, mitigation and restoration services, mitigation monitoring services, aquatic, roadside, forestry and utility vegetation management, and environmental/ecological consulting.

Brewer International is a reputable manufacturer of aquatic and land management adjuvants that has been providing distribution services nationwide for over 40 years, with its headquarters located in Vero Beach, Florida. The company specializes in producing surfactants designed to improve pesticide penetration, wetting, bonding, and drift control. Our products are widely utilized by aquatic and land managers across the country to enhance pesticide uptake, thereby increasing efficiency while reducing the chemical footprint in natural environments. As a family-owned business, Brewer International is committed to producing only the highest-quality products and has consistently invested in product development and manufacturing innovation to provide its distribution partners with the best possible value. We take great pride in our reputation as a reliable partner, providing superior quality products that meet and exceed industry standards.

Chem One is a national leader of Organic Copper Sulfate for aquatic management. With eight standard EPA label grades; Fine 20, 25, 30, 100, 200, Small, Medium and Large. Chem One has a grade to meet every customer's needs. With our corporate offices and 78,000+ square foot warehouse in Houston, Texas, Chem One is a national wholesale company that is certified to ISO 9001, ISO 14001, OHSAS 18001.

Compliance Services International (CSI) is a leading regulatory consultancy providing innovative solutions for organizations faced with regulatory and environmental challenges. CSI's experienced scientists and regulatory specialists in the USA and the EU provide innovative approaches to solving regulatory and environmental challenges – combining traditional sciences with developing technologies to deliver economically sensible and scientifically sound results.

Cygnet Enterprises, Inc. is the largest, single source distributor of aquatic management products in the United States. With strategically placed offices and warehouses in Michigan, Indiana, Pennsylvania, North Carolina, California, and Idaho we provide quick access to any product you may need for your lake, pond, reservoir, or irrigation district. Our dedicated and experienced staff assures aquatic managers receive outstanding service to manage our valuable water resources.

Duke Energy "Building a smarter energy future". **Duke Energy** (NYSE: DUK), a Fortune 150 company headquartered in Charlotte, N.C., is one of the largest energy-holding companies in the U.S. It employs 30,000 people and has an electric generating capacity of 51,000 megawatts through its regulated utilities, and 3,000 megawatts through its nonregulated Duke Energy Renewables unit. Duke Energy is transforming its customers' experience, modernizing the energy grid, generating cleaner energy, and expanding natural gas infrastructure to create a smarter energy future for the people and communities it serves. More information about the company is available at duke-energy.com. Follow Duke Energy on Twitter, LinkedIn, Instagram and Facebook.

Since 1973, **Diversified Waterscapes, Inc**. has offered lake management services and ecological products to professional applicators. Our proven field experience in pond and lake cleaning enabled us to develop an eco-friendly line of products that show dramatic results in any aquatic environment. With more than 45 years of experience, we have been providing aquatic treatment products and maintenance service for some of the world's best water features, including the famous Bellagio Fountain in Las Vegas – delivering clearly better results without harming the environment. Our mission is to combine extensive industry experience, mechanical aptitude and scientific knowledge to bring clarity, cleanliness and beauty to water features across the country.

Lake Restoration, located in MN, has specialized in controlling pond weeds, lake weeds, and nuisance algae since 1977. Lake Restoration's product line-up includes: Mizzen, a copper based algaecide, Spritflo and Dibrox herbicides, a variety of pond dyes and nutrient reducers. Lake Restoration also manufactures the TORMADA product application boat, Vitaflume floating fountains, and the retractable Goose D-Fence system. For more information, visit www.lakerestoration.com.

The Lee County Hyacinth Control District was formed by the Florida Legislature in June 1961 to curtail excessive growths of water hyacinth. That same year, water managers from across the state convened in Lee County and formed the Hyacinth Control Society, now APMS, to share control strategies and develop a comprehensive management approach to Florida's most prolific aquatic plant. T. Wayne Miller, Jr. of Lee County served as the Society's President for the first two years and Lee County has been a supporting member of APMS since its inception.

Nutrien Ag Solutions is a full-service vegetation management company, providing innovative solutions and quality products for the aquatic plant management industry. The cornerstone of our success is our highly educated and trained field staff. With strong commitments to environmental stewardship, innovation, and technology, Nutrien Ag Solutions provides customized programs tailored to specific locations throughout the U.S. We are the country's leading vegetation management provider, and we're excited to introduce you to everything Nutrien Ag Solutions has to offer. Visit: NutrienAgSolutions.com/Specialty.

Oase (Oh-ah-suh) Professional, with US headquarters in Aurora, Ohio, is a global leader in fountain and water technology. We supply award-winning, innovative products, that are holistic and environmentally friendly, to lake and pond management companies, golf courses, municipalities and zoos. We offer the most effective solutions to your toughest lake and pond problems, whether it's too much organic sludge, too many nutrients or too little oxygen. Our proprietary formulations are developed and engineered in Germany to the highest quality standards in the industry and are now made and distributed in North America after decades of success in Europe. We use nature to our advantage, leaving nothing behind but beautiful, healthy water. And you receive the most value for your dollar with quick and sustainable results when following our suggested treatment plans. Be prepared to improve results, save time, reduce site visits, and exceed all of your lake and pond management goals with Lake Therapy by Oase Professional.

SOLitude Lake Management is a nationwide environmental firm committed to providing sustainable solutions that improve water quality, enhance beauty and preserve natural resources. SOLitude's team of aquatic scientists specializes in the development and execution of customized lake, stormwater pond, wetland and fisheries management programs. Services include water quality testing and restoration, algae and aquatic weed control, installation and maintenance of fountains and aeration systems, shoreline erosion control, muck and sediment removal and invasive species management. SOLitude partners with homeowners associations, golf courses, private landowners, businesses and municipalities. For more information, visit SOLitude Lake Management at solitudelakemanagement.com.

Invasive weeds can devastate both natural and commercial habitats. **Syngenta** provides high performance products to control destructive weeds while helping to restore the habitat of aquatic environments. Syngenta offers proven aquatic herbicides like Reward® and Tribune™ that provide fast burn-down, work well in cool weather and are rainfast in as little as 30 minutes. The active ingredient, diquat dibromide, has been used successfully in sensitive aquatic areas for over 25 years.

TIGRIS is revolutionizing surface water management. Formed in 2022, we operate as a platform company, bringing together the industry's most talented and respected veterans alongside top-performing providers across the nation. We are an organization dedicated to ensuring our waters and people thrive. Our goal is to forge a unique organization with a new approach to water management. Instead of relying on one-size-fits-all solutions or a limited service spectrum necessitating multiple vendors, TIGRIS provides comprehensive solutions from a single source. Our team of local specialists tailors these solutions to the specific needs of our clients' environments. Combined with the support and resources of a large national organization, TIGRIS introduces a transformative approach to surface water management. "One call covers it all," when it comes to your lake, pond, and wetland management and stormwater solutions.

UPL NA, Inc. is a premier supplier of crop protection products and technologies designed for the agricultural, specialty, fumigation and aquatic markets. The Aquatics Division is part of the Environmental Solutions group which has manufactured aquatic herbicides and algaecides for the management of lakes, ponds, rivers and irrigation canals for more than 40 years. These products are marketed as Aquathol®, Hydrothol®, AquaStrike®, Current®, Symmetry®, Cascade®, Teton®, and Top Deck™. Most recently the development and commercialization of the ADAPT aquatic drone boat for improved application accuracy and efficiency was launched. With a customer-centric focus, UPL is committed to providing product stewardship and technical support to ensure your plant management operations are successful. Visit us at: https://uplaquatics.com/

Exhibitors

The Aquatic Plant Management Society thanks the following companies for exhibiting their products and services. This list was current when the Program was submitted for printing. Please visit the exhibit hall in the Gallery for all Exhibitors, including not-for-profit organizations*.

AERF*

Alligare

AquaMaster

Aquatic Control, Inc

Atticus

Biosafe Systems

BlueGreen Water Technologies

Brandt

Brewer International

Cygnet Enterprises, Inc

FAPMS*

Kasco

Keycolour

Nutrien Solutions

Oase Professional

RISE*

SePRO

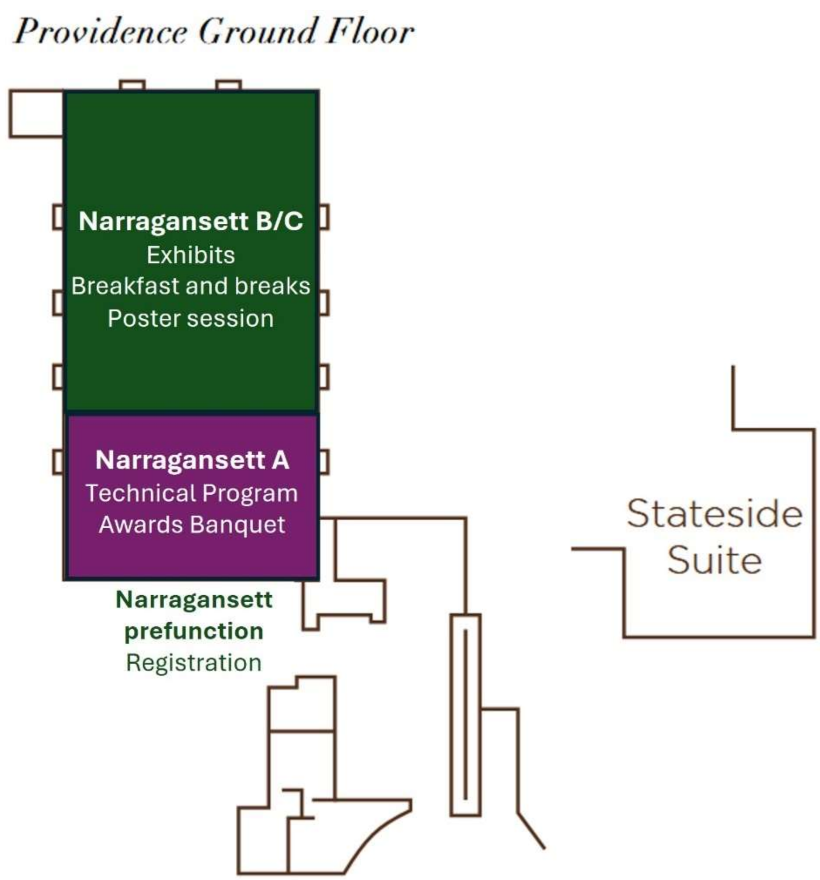
Sox Erosion Solutions

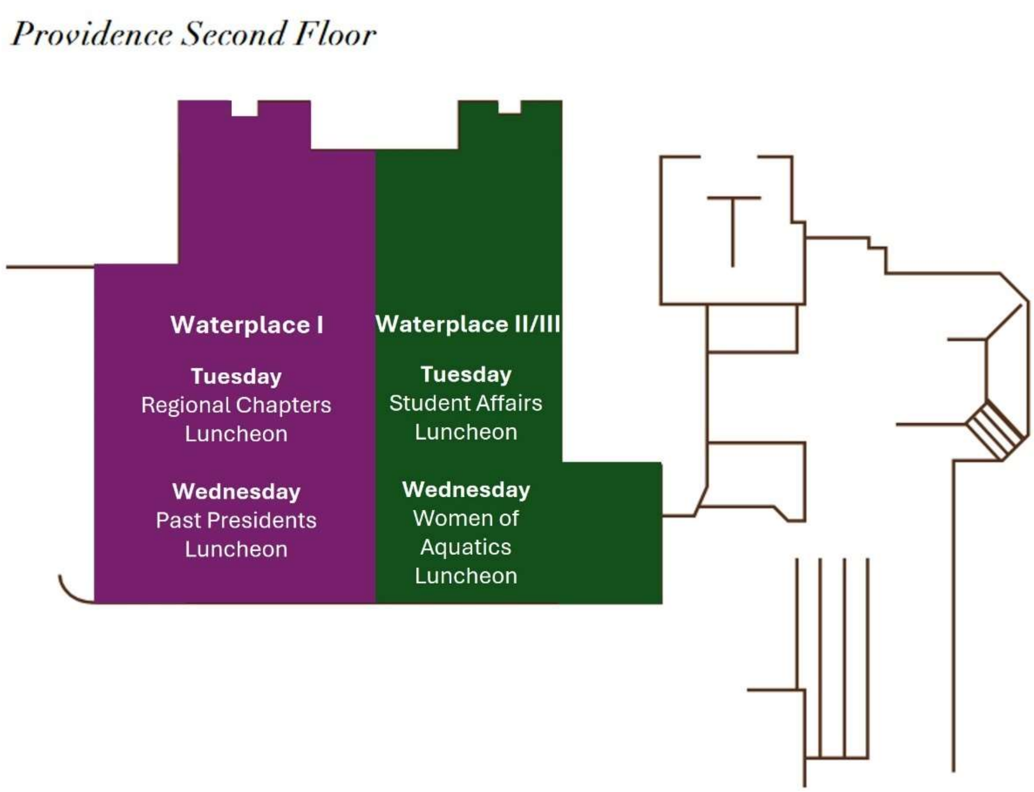
Syngenta

UPL Environmental Solutions

Vertex Aquatic Solutions

Conference and Event Rooms Floor Maps





General Information and Events

Program Organization
The agenda is organized by day and time. For more event information, please see the Agenda at a Glance pages for each day in this Program. Messages will be posted at the meeting registration desk. Most events will take place in the Narragansett A and B/C. See the hotel site map on previous pages for event locations.

Name Badges
Your name badge is your ticket for all events at the meeting. Wear it to all activities during the meeting. All individuals participating in meeting events or activities must be registered and have a name badge. Non-registered guests may purchase tickets for the President's Reception, Poster Session Reception, and Awards Banquet at the meeting registration desk.

Meeting Registration Desk
The meeting registration desk will be in Narragansett Prefunction. Operating hours are noon until 4:30 pm on Monday July 14, 7:00 am until 4:30 pm on Tuesday and Wednesday July 15 and 16, and 8:00 am until 10:40 am on Thursday July 17.

Exhibits
Exhibits will be open from 7:00 am Tuesday July 15 through 5:00 pm Wednesday July 16 in Narragansett B/C.

Continental Breakfasts / Networking Breaks
Continental breakfasts and mid-morning and afternoon networking breaks will be served each day in Narragansett B/C. Please see the Agenda at a Glance for specific times. Also, take time to visit with Exhibitors while enjoying your breakfast or break.

Spur of the Moment Meeting Room
We have a room set up for breakout discussion and conference needs. Check at the meeting registration desk with Mr. Bill Torres to reserve.

Student Meet-and-Greet (Offsite):
Monday, July 14, 6:00 pm to 7:00 pm, ***Trinity Brewhouse, 186 Fountain St, Providence, RI 02903***
All students registered for the meeting are invited to gather at Trinity Brewhouse to get to know other students prior to the Presidents' Reception. Beverages and light snacks will be provided. This students-only event is open to all students who are registered for the meeting.

President's Reception (Offsite):
Monday, July 14, 7:00 pm to 9:00 pm, ***Trinity Brewhouse, 186 Fountain St, Providence, RI 02903***
Join your APMS friends and colleagues at the President's Reception to "kick off" our annual meeting while enjoying a game atmosphere with food and beverages. The President's Reception is open to all registered delegates, guests, and students. Non-registered guests may purchase tickets at the meeting registration desk.

Regional Chapters Luncheon:
Tuesday, July 15, 12:10 pm to 1:20 pm, Waterplace I
Two representatives from each APMS regional chapter are invited to attend the Regional Chapter Discussion, provided by APMS sponsors. Regional Chapters Co-Committee Chairs Gray Turnage and Michael Greer will be the moderators for discussions on aquatic plant management activities in each region. Please contact Gray to confirm your attendance.

Student Affairs Luncheon:
Tuesday, July 15, 12:10 pm to 1:20 pm, Waterplace II/III
All students registered for the meeting are invited to attend. This luncheon, provided by our sponsors, is a great opportunity to meet other students, interact with guest speakers and APMS leadership, and learn how to become more involved in the Society. Andrew Howell, Student Affairs Committee Chair, will be the moderator. Please contact Andrew to confirm your attendance.

Poster Session Reception:
Tuesday, July 15, 6:00 pm to 7:30 pm, Narragansett B/C
Posters will be available for viewing from 7:00 am Tuesday to 5:00 pm Wednesday in Narragansett B/C. Poster presenters will be on hand during the Evening Poster Reception on Tuesday, July 15, 6:00 pm to 7:30 pm in Narragansett B/C.

Past Presidents Luncheon:
Wednesday, July 16, 12:10 pm to 1:20 pm, Waterplace I
All APMS Past Presidents are invited to attend the Past Presidents' Luncheon to provide insight into matters facing APMS and aquatic plant managers. Jay Ferrell, Immediate Past President, will be the moderator. Please contact Jay to confirm your attendance.

Women of Aquatics Luncheon:
Wednesday, July 16, 12:10 pm to 1:20 pm, Waterplace II/III
Amy Kay will host the Women of Aquatics Luncheon to discuss opportunities for women in the field of aquatic plant management. Please contact Amy to confirm your attendance.

Awards Reception/Banquet:
Wednesday, July 16, 6:00 pm to 7:00 pm, Reception (Narragansett Prefunction)
Wednesday, July 16, 7:00 pm to 10:00 pm Banquet (Waterplace I/II/III)
Registered delegates, guests and students are invited to the Awards Banquet to be held in the hotel. After dinner, we will recognize those who have served APMS, welcome new officers and directors. Our evening will conclude with a fund-raising raffle to support APMS students and other education initiatives.

APMS Post-Conference Board of Directors Meetings:
Newly elected officers, directors, and committee members will attend the post-conference board of directors meeting. Members will be provided with a web link for the meeting which will be held virtually following the conference.

Agenda at a Glance

Monday – July 14:

8:00 am - 4:00 pm	APMS Board of Directors Meeting (Bristol – third floor)
7:00 am - 5:00 pm	Student Tour (Field sites)
12:00 pm - 5:00 pm	Exhibits and Poster Setup (Narragansett B/C)
12:00 pm - 4:30 pm	Registration (Narragansett Prefunction)
6:00 pm - 7:00 pm	Student Meet & Greet (Trinity Brewhouse; offsite)
7:00 pm - 9:00 pm	President's Reception (Trinity Brewhouse; offsite)

Tuesday – July 15:

7:00 am - 5:00 pm	Exhibits (Narragansett B/C)
7:00 am - 7:50 am	Continental Breakfast (Narragansett B/C)
7:00 am - 4:30 pm	Registration (Narragansett Prefunction)
8:00 am - 5:30 pm	General Session (Narragansett A)
12:10 pm - 1:20 pm	Regional Chapters Luncheon (Waterplace I)
12:10 pm - 1:20 pm	Student Affairs Luncheon (Waterplace II/III)
6:00 pm - 7:30 pm	Poster Session Reception (Narragansett B/C)

Wednesday – July 16:

7:00 am - 5:00 pm	Exhibits (Narragansett B/C)
7:00 am - 8:00 am	Continental Breakfast (Narragansett B/C)
7:00 am - 4:30 pm	Registration (Narragansett Prefunction)
8:00 am - 5:00 pm	General Session (Narragansett A)
12:10 pm - 1:20 pm	Past Presidents Luncheon (Waterplace I)
12:10 pm - 1:20 pm	Women of Aquatics Luncheon (Waterplace II/III)
6:00 pm - 7:00 pm	APMS Awards Banquet Reception (Narragansett Prefunction)
7:00 pm - 10:00 pm	APMS Awards Banquet (Waterplace I/II/III)

Thursday – July 17:

7:00 am - 8:00 am	Continental Breakfast (Narragansett B/C)
8:00 am - 10:40 am	Registration (Narragansett Prefunction)
9:00 am - 11:00 am	General Session (Narragansett A)

PROGRAM

TUESDAY MORNING - JULY 15, 2025

7:00 AM Continental Breakfast (Narragansett B/C)

Tuesday Plenary Session – The Novel Hydrilla in the Northeast

LOCATION: Narragansett A
TIME: 8:00 AM - 10:30 AM
MODERATOR: Lyn Gettys
University of Florida IFAS FLREC
Davie, FL

BOLD = PRESENTER

08:00 AM Presidential Address – Jeremy Slade

08:20 AM Connecticut: The Epicenter of the New Hydrilla Invasion (*recorded*)
Senator Richard Blumenthal
U.S. Senate, Hartford, CT

08:40 AM Novel Strain of Connecticut River Hydrilla Spreads to Lakes and Ponds, Interstate Movement Likely
Greg Bugbee
The Connecticut Agricultural Experiment Station, New Haven, CT

09:00 AM The Potential for Classical Biological Control of Connecticut River Hydrilla
Jeremiah Foley
The Connecticut Agricultural Experiment Station, New Haven, CT

09:20 AM "New Hydrilla" Connecticut River Hydrilla Research and Demonstration Program – Interagency Collaboration and Management Structure
Keith Hannon (*recorded*)
U.S. Army Corps of Engineers, New England District (NAE), Concord, MA

09:40 AM Development of Management Strategies for a New Hydrilla Invasion on the Connecticut River
Benjamin P. Sperry (*recorded*)
U.S. Army Corps of Engineers, Gainesville, FL

10:00 AM Networking Break (Narragansett B/C)

Student Oral Competition: Session 1

LOCATION: Narragansett A
TIME: 10:20 AM - 12:00 PM Eastern Time
MODERATOR: TBA

BOLD = PRESENTER; ALL ARE PARTICIPATING IN THE STUDENT CONTEST

10:20 AM 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[4], Christopher Mudge[5], Gray Turnage[6]
[1]Department of Agronomy, UF/IFAS Center for Aquatic & Invasive Plants, Gainesville, FL
[2]Department of Agricultural Education and Communication, University of Florida, Plant City, FL

[3]School of Forest, Fisheries, and Geomatics Sciences, Florida LAKEWATCH, University of Florida, Gainesville, FL
[4]US Army Engineer Research and Development Center, Gainesville, FL
[5]US Army Engineer Research and Development Center, Baton Rouge, LA
[6]Geosystems Research Institute, Mississippi State University, Starkville, MS

10:40 AM **The Influence of Triclopyr on *Lygodium microphyllum* (Old World Climbing Fern) and Native Fern Gametophytes**
Minjin Choi, Stephen Enloe
University of Florida, Gainesville, FL

11:00 AM **Mississippi Macrophyte Monitoring: Surveys for Detecting Aquatic Invasive Plants**
Samuel Schmid, Gray Turnage
Mississippi State University, Starkville, MS

11:20 AM **Water Chestnut, Code and Robots: A Long Island's Tale on Mathematical Modeling for Invasive Species Management**
Carlos Morantes Ariza[1], Catherine McGlynn[2], Steven Pearson[2]
[1]New York State Department of Environmental Conservation, Stonybrook, NY
[2]New York State Department of Environmental Conservation, Albany, NY

11:40 AM **A Comparative Analysis of the Ecophysiology Between the Invasive Macroalgae Starry Stonewort (*Nitellopsis obtusa*) and the Native Macroalgae Chara (*Chara* sp.) to Predict Invasion Potential**
Thomas Zellmer[1], Ryan Wersal[1], Michael Greer[2], Christopher Ruhland[1]
[1]Minnesota State University, Mankato, Mankato, MN
[2]US Army Corps of Engineers, Buffalo, NY

12:00 PM **Lunch on Your Own**

12:10 PM **APMS Regional Chapters Luncheon (Waterplace I)**

12:10 PM **APMS Student Affairs Luncheon (Waterplace II/III)**

TUESDAY AFTERNOON - JULY 15, 2025

Student Oral Competition: Sessions 2 and 3

LOCATION: Narragansett A
TIME: 1:30 PM - 5:30 PM
MODERATOR: TBA

01:30 PM **Aquatic Use and Select Non-Aquatic Use Herbicide Efficacy on *Vallisneria* × *pseudorosulata***
Maxwell G. Gebhart, Gray Turnage
Mississippi State University, Starkville, MS

01:50 PM **Comparing the Competitive Ability of Three *Vallisneria* Taxa Grown with Dioecious *Hydrilla verticillata* and *Potamogeton nodosus***
Delaney Davenport[1], Kara Foley[1], Jens Beets[2], Rob Richardson[1]
[1]North Carolina State University, Raleigh, NC
[2]United States Department of Agriculture, Davis, CA

02:10 PM **Resolving Species Boundaries of Closely Related *Myriophyllum* Species for Improved Native Identification**
Del Hannay, Ryan Thum
Montana State University, Bozeman, MT

02:30 PM **Characterization of the Genetic Diversity of Curlyleaf Pondweed (*Potamogeton crispus*) in the Contiguous United States and Canada**
Mallory Kaiser[1], Ryan Wersal[1], Ryan Thum[2]
[1]Minnesota State University, Department of Biological Sciences, Mankato, MN
[2]Montana State University, Bozeman, MT

02:50 PM **Small Plot Rate Response of Flumioxazin on Curlyleaf Pondweed and Native Plant Selectivity**
Pearl Jensen, Ryan Wersal
Minnesota State University, Department of Biological Sciences, Mankato, MN

03:10 PM **Humic Acid: A Novel Broadscale Tool for Phosphorus and Harmful Algal Bloom Management**
Brittany Chesser, Todd Sink
Texas A&M University, College Station, TX

03:30 PM **Networking Break (Narragansett B/C)**

03:50 PM **Evaluating Impacts of Water Conditions on Herbicide Efficacy to Control *Myriophyllum spicatum* in Bear Lake, UT**
Tia Lawrence, Francielli Santos de Oliveira, Mirella Ortiz
Utah State University, Logan, UT

04:10 PM **Reducing Carrier Volume for Crested Floating Heart (*Nymphoides cristata*) Control**
Corrina Vuillequez[1], Benjamin P. Sperry[2]
[1]University of Florida, Gainesville, FL
[2]US Army Corps of Engineers Engineer Research and Development Center, Gainesville, FL

04:30 PM **Comparative Efficacy of 2,4-D, Glyphosate, and Endothall Against Submerged and Emergent *Myriophyllum aquaticum***
Francielli Santos de Oliveira[1], Tia Lawrence[1], Pedro Antonio Vougoudo Salmazo[2], Eric Westra[1], Mirella Ortiz[1]
[1]Utah State University, Logan, UT
[2]Federal University of Grande Dourados, Dourados Mato Grosso do Sul, Brazil

04:50 PM **Demonstration of Novel Small Plot Treatments for Controlling Hydrilla on Lake Seminole**
Amber Riner[1], Jonathan Glueckert[2], Michael Durham[3], Ian Markovich[4], Benjamin Sperry[3]
[1]ORISE, United States Army Corps of Engineers, Environmental Laboratory, Gainesville, FL
[2]Center for Aquatic and Invasive Plants, University of Florida, Gainesville, FL
[3]United States Army Corps of Engineers, Environmental Laboratory, Gainesville, FL
[4]United States Army Corps of Engineers, Jacksonville District, Jacksonville. FL

05:10 PM **Evaluation and Field Demonstration of Herbicides for Water Violet (*Hottonia palustris*) Control**
Kara Foley[1], Erika Haug[2], Amy Smagula[3], Rob Richardson[1]
[1]North Carolina State University, Raleigh, NC
[2]North Carolina Department of Environmental Quality, Raleigh, NC
[3]New Hampshire Department of Environmental Services, Concord, NH

TUESDAY EVENING - JULY 15, 2025

Poster Session

LOCATION: Narragansett B/C
TIME: 6:00 PM - 7:30 PM

BOLD = PRESENTER † = STUDENT CONTEST

† Herbicide Efficacy and Degradation Patterns in Managing Eurasian Watermilfoil (*Myriophyllum spicatum*) in Bear Lake
Olanrewaju Adeyemi, Tia Lawrence, Francielli Santos de Oliveira, Eric Westra, Corey Ransom, Mirella Ortiz
Utah State University, Logan UT

† Do Fragments of *Hydrilla verticillata* Remain Viable After Treatment with Florpyrauxifen-Benzyl?
Anna Agi[1], Kara Foley[1], Jens Beets[2], Erika Haug[3], Rob Richardson[1]
[1]North Carolina State University, Raleigh, NC
[2]United States Department of Agriculture, Davis, CA
[3]North Carolina Department of Environmental Quality, Raleigh, NC

† Influence of Sediment and Water Nutrient Concentrations on the Growth of Three *Hydrilla verticillata* Biotypes
Maria Grazia Corrales-Jimenez, Kara Foley, Ramon Leon, Rob Richardson
North Carolina State University, Raleigh, NC

† Response of Selected Aquatic Plants to Combination Treatments including Florpyrauxifen-benzyl
Delaney Davenport, Kara Foley, Rob Richardson
North Carolina State University, Raleigh, NC

† Chemical Management of *Azolla caroliniana* as Foliar and Submersed Treatments
Maxwell Gebhart[1], Garrett Ervin[2], Gary Ervin[1], Gray Turnage[1]
[1]Mississippi State University, Starkville, MS
[2]Coleman & Associates, Austin, TX

Vegetation Assessment After an Operational-Scale Herbicide Treatment to Hydrilla (*Hydrilla verticillata*) in the Connecticut River
Jonathan Glueckert[1], Corrina Vuillequez[1], Michael Durham[2], Benjamin Sperry[2]
[1]UF/IFAS Center for Aquatic & Invasive Plants, Gainesville, FL
[2]USACE ERDC, Gainesville, FL

Establishing Aquatic Herbicide Degradation and *Hydrilla verticillata* Research Projects as Part of a First Year BAA Grant
Timothy Grey[1], Kayla Eason[2], Benjamin Sperry[3], Samantha Bowen[1]
[1]University of Georgia, Tifton, GA
[2]USDA/ARS, Tifton, GA
[3]USACE ERDC, Gainesville, FL

Evaluation of Flumioxazin Tank Mixes with Select Herbicides for Cuban Bulrush Control
Christopher Mudge[1], Gray Turnage[2], Samuel Schmid[2], Samantha Prinsloo[3]
[1]U.S. Army Engineer Research and Development Center, Baton Rouge, LA
[2]Mississippi State University, Starkville, MS
[3]Louisiana State University, Baton Rouge, LA

Using Rhodamine WT Dye as an Aquatic Herbicide Tracer to Quantify Site-Specific Water Exchange Rates in Hydrilla-Infested Tidal Areas of the Connecticut River
Amber Riner[1], Michael Durham[2], Jonathan Glueckert[3], Andrew Howell[4], Benjamin Sperry[2]
[1]ORISE, United States Army Corps of Engineers, Environmental Laboratory, Gainesville, FL
[2]United States Army Corps of Engineers, Environmental Laboratory, Gainesville, FL
[3]Center for Aquatic and Invasive Plants, University of Florida, Gainesville, FL
[4]Soil and Crop Sciences, North Caroline State University, Raleigh, NS

Effect of Chilling Duration on Sprouting of Connecticut River Hydrilla Turions
Amber Riner[1], Madeline Watts[2], Jeremiah Foley[2], Benjamin Sperry[3]
[1]ORISE, United States Army Corps of Engineers, Environmental Laboratory, Gainesville, FL
[2]Connecticut Agricultural Experiment Station, Department of Environmental Sciences and Forestry, Office of Aquatic Invasive Species, New Haven, CT
[3]United States Army Corps of Engineers, Environmental Laboratory, Gainesville, FL

† Range Expansion Predicted for Cuban Bulrush (*Cyperus blepharoleptos*)
Samuel Schmid, Maxwell Gebhart, Gray Turnage
Mississippi State University, Starkville, MS

Knotgrass (*Paspalum distichum*) Control in Seasonally Drained Wetlands of Mississippi to Improve Waterfowl Habitat
Gray Turnage
Mississippi State University, Starkville, MS

† The Impact of Representative Management Interventions on Crested Floating Heart (*Nymphoides cristata*) Reproduction

Corrina Vuillequez[1], Benjamin Sperry[2]
[1]University of Florida, Gainesville, FL
[2]US Army Engineer Research and Development Center, Gainesville, FL

† Field-based Monitoring of *Hydrilla verticillata* subsp. *lithuanica* Removal Impacts on Carbon Dynamics in the Lower Connecticut River

Madeline Watts[1], Kelly Aho[2], Jeremiah Foley[3]
[1]Connecticut Agricultural Experiment Station, Department of Environmental Science and Forestry, Office of Aquatic Invasive Species, New Haven, CT
[2]Department of Earth and Environmental Science, Department of Integrative Biology, Michigan State University, East Lansing, MI
[3]Connecticut Agricultural Experiment Station, Department of Environmental Science and Forestry, Office of Aquatic Invasive Species, New Haven, CT

† Detecting Northern Hydrilla (*Hydrilla verticillata* subsp. *lithuanica*) in the Connecticut River with Satellite Imagery

Summer Weidman[1], Jeremiah Foley[1], Chandi Witharana[2]
[1]Connecticut Agricultural Experiment Station, New Haven, CT
[2]University of Connecticut, Storrs, CT

WEDNESDAY MORNING - JULY 16, 2025

7:00 AM Continental Breakfast (Narragansett B/C)

Wednesday Plenary Session – Launch of the APMS-Led CAST HABs Paper

LOCATION: Narragansett A
TIME: 8:00 AM - 10:00 AM
MODERATOR: Gray Turnage
Mississippi State University
Starkville, MS

BOLD = PRESENTER

08:00 AM **History of the APMS-Led CAST HABs paper**
Gray Turnage
Mississippi State University, Starkville, MS

08:15 AM **CAST's Role: What We Do for You**
Chris Boomsma
CAST: Center for Agricultural Science and Technology, Ames, IA

08:30 AM **Herding Cats: Leading the Contributors to the CAST HABs paper**
Dail Laughinghouse
University of Florida IFAS FLREC, Davie, FL

08:45 AM **Details about the HABs paper**
Heather Raymond
The Ohio State University, Columbus, OH

09:00 AM **Decoding HABs: Revealing Chemical Diversity through Mass Spectrometry - based Aquatic Metabolomics (*recorded*)**
Triantafyllos Kaloudis
EYDAP SA and NCSR Demokritos

09:15 AM **And More Details about the HABs paper**
West Bishop
SePRO Corporation Research and Technology Campus, Whitakers, NC

09:30 AM **Panel Discussion with HABs Contributors**

10:00 AM **Networking Break (Narragansett B/C)**

Northeast Session

10:20 AM **Benefits of Standardized Surveys and Data Centralization: A Case Study using New York's Watercraft Inspection Steward Program Application (WISPA)**
Anna Haws[1], John Marino[2], Mitchell O'Neill[2], Jennifer Dean[2], Steven Pearson[3], Catherine McGlynn[3]
[1]New York State Water Resources Institute, Cornell University, Ithaca, NY
[2]New York Natural Heritage Program, Albany, NY
[3]New York State Department of Environmental Conservation, Albany, NY

10:40 AM **Aquatic Invasive Plant Response and Restoration in the Peconic River System of Long Island, NY**
Catherine McGlynn[1], Steven Pearson[1], Carlos Morantes Ariza[2], Ashley Morris[3], Nicole White[4], Abby Bezrutczyk Marino[5], Alan Duckworth[6], Heidi O'Riordan[2]
[1]New York State Department of Environmental Conservation, Albany, NY
[2]New York State Department of Environmental Conservation - Region 1, Stony Brook, NY
[3]New York State Department of Environmental Conservation - Region 3, New Paltz, NY
[4]Little Bear Environmental, LLC, Scarsdale, NY
[5]Long Island Invasive Species Management Area, Brentwood, NY
[6]Town of Brookhaven, Brookhaven, NY

11:00 AM **Comparing Detection of Aquatic Invasive Species in the Adirondacks Using Traditional Tool Based Monitoring and eDNA Monitoring Methodologies**
Brian Greene
The Nature Conservancy, Keene Valley, NY

11:20 AM **Control of Monoecious Hydrilla in a Lotic System Using Automated Treatment Technology**
Nicole White[1], Catherine McGlynn[2], Jon Gosselin[3], JT Gravelie[3], Willow Eyers[4]
[1]Little Bear Environmental Consulting, LLC, Scarsdale, NY
[2]New York State Department of Environmental Conservation, Albany, NY
[3]SePRO Corporation, Carmel, IN
[4]The Nature Conservancy, Albany, NY

11:40 AM **Genetic Diversity and Geographic Origin of Water Soldier (*Stratiotes aloides*) in Canada**
Gregory Chorak[1], Ian Knight[2], Philip Weyl[3], Patrick Häfliger[3], Lauréline Humair[3], Ryan Thum[1]
[1]Montana State University, Bozeman, MT
[2]U.S. Army Engineer Research and Development Center (ERDC), Vicksburg, MS
[3]Centre for Agriculture and Bioscience International, Delémont Jura, Switzerland

12:00 PM **Lunch on Your Own**

12:10 PM **Past Presidents Luncheon (Waterplace I)**

12:10 PM **Women of Aquatics Luncheon (Waterplace II/III)**

WEDNESDAY AFTERNOON - JULY 16, 2025

LOCATION: Narragansett A
TIME: 1:30 PM - 4:45 PM
MODERATOR: TBA

BOLD = PRESENTER

01:30 PM **Rethinking Lake Turnover**
Cory Richmond, Trent Shelton, Chad Imig
Kasco Marine, Prescott, WI

01:50 PM **Evaluating Ecosystem Health in Waterbodies Treated With and Without Copper-based Herbicides with the Floristic Quality Index**
Steven Pearson, Daniel Woltmann
SUNY Albany, Albany, NY

02:10 PM **Using Adaptive Management to Restore Lakes Impacted by Cyanobacteria**
Terry McNabb
Aquatechnex, LLC, Bellingham, WA

02:30 PM **Evaluation of *Rangia cuneata* (Bivalve) as a Biological Control for Algae in Stormwater Pond in Southwest Florida**
Ernesto Lasso de la Vega[1], Madeline Aadnes[2], Carly Centnarowicz[2], Laine Howard[2]
[1]Lee County Hyacinth Control District, Lehigh Acres, FL
[2]Florida Gulf Coast University, Fort Myers, FL

02:50 PM **Networking Break (Narragansett B/C)**

03:10 PM **Genetic Identification and Diversity of Native and Introduced Eelgrass (*Vallisneria*)**
Ryan Thum, **Gregory Chorak**, Ashley Wolfe
Montana State University, Bozeman, MT

03:30 PM **Platinum Sponsor Update**
SePRO Corporation

03:40 PM **Field Demonstration of a Metered Drip Application of Endothall for Controlling Hydrilla in a Flowing Spring Run**
Jonathan Glueckert[1], Michael Durham[2], Benjamin Sperry[2], Ian Markovich[3]
[1]UF/IFAS Center for Aquatic & Invasive Plants, Gainesville, FL
[2]USACE ERDC, Gainesville, FL
[3]USACE Jacksonville District, Jacksonville, FL

04:00 PM **Gold Sponsor Update**
Syngenta

04:05 PM **Gold Sponsor Update**
UPL

04:10 PM **Maintenance Control of Hydrilla (*Hydrilla verticillata*) and Associated Sedimentation Rates (*recorded*)**
Michael Durham[1], Benjamin Sperry[1], Corrina Vuillequez[2], **Jonathan Glueckert[2]**, Amber Riner[2]
[1]US Army Corps of Engineers - Engineer Research and Development Center, Gainesville, FL
[2]University of Florida - Center for Aquatic and Invasive Plants, Gainesville, FL

04:30 PM **AERF Update**

04:40 PM APMS Annual Business Meeting (Narragansett A)

06:00 PM APMS Awards Banquet Reception (Narragansett Prefunction)

07:00 PM APMS Awards Banquet (Waterplace I/II/III)

THURSDAY MORNING - JULY 17, 2025

7:00 AM Continental Breakfast (Narragansett B/C)

LOCATION: Narragansett A
TIME: 9:00 AM - 11:00 AM
MODERATOR: Lyn A. Gettys
University of Florida
Davie, FL

BOLD = PRESENTER

09:00 AM RISE Update
Megan Provost
RISE (Responsible Industry for a Sound Environment, Arlington, VA

09:20 AM Troublesome Issues: Aquatic Weed Survey Results and Federal Funding
Lee Van Wychen
Weed Science Society of America, Alexandria, VA

09:40 AM Building a New Aquatic Training Manual
Brett Bultemeier
UF/IFAS Pesticide Information Office, Gainesville, FL

10:00 AM Growth and Survival of *Azolla caroliniana* (Carolina mosquitofern) after Exposure to Different Temperatures
Jaslyn Johnson, Anna Faust, **La Toya Kissoon-Charles**
Missouri State University, Springfield, MO

10:20 AM *Vallisneria spiralis* Control When Grown in Mesocosms
Gray Turnage, Maxwell Gebhart
Mississippi State University, Starkville, MS

10:40 AM Growth of Florida Eelgrass (*Vallisneria neotropicalis*) Ecotypes under Common Nursery Conditions
Lyn Gettys, Jennifer Bishop, Madison Self, Megan Reid, Chad Keates
University of Florida IFAS FLREC, Davie, FL

11:00 AM Meeting Concludes

Save the date! 66th Annual APMS Meeting: July 13-16, 2026
Renaissance Phoenix Downtown, Phoenix, Arizona

Notes:

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APMS

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BONUS: WATCH OUR INSTAGRAM AND FACEBOOK STORIES during the conference for daily clues to find hidden raffle tickets

Thank you!

APMS

The Aquatic Plant Management Society

The **Aquatic Plant Management Society, Inc.** is an international organization of scientists, educators, students, commercial pesticide applicators, administrators, and concerned individuals interested in the management and study of aquatic plants. The membership reflects a diversity of federal, state, and local agencies, universities and colleges around the world, corporations, and small businesses. Membership applications are available at the meeting registration desk and online at www.apms.org.

The **Vision** of the Aquatic Plant Management Society is to be the leading international organization for scientific information on aquatic plant and algae management.

The **Mission** of the Aquatic Plant Management Society is to provide a forum for the discovery and dissemination of scientific information that advances aquatic plant and algae management policy and practice.

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ABSTRACTS

Abstracts are listed in alphabetical order by presenter's last name

Assessing the State of Cuban Bulrush (*Cyperus blepharoleptos*) Management across the Southeastern United States

P. Belk[1], S. Enloe[1], J. Diaz[2], G. Lescord[3], B. Sperry[4], C. Mudge[5], G. Turnage[6]
[1]Department of Agronomy, UF/IFAS Center for Aquatic & Invasive Plants, Gainesville, FL
[2]Department of Agricultural Education and Communication, University of Florida, Plant City, FL
[3]School of Forest, Fisheries, and Geomatics Sciences, Florida LAKEWATCH, University of Florida, Gainesville, FL
[4]US Army Engineer Research and Development Center, Gainesville, FL
[5]US Army Engineer Research and Development Center, Baton Rouge, LA
[6]Geosystems Research Institute, 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. 132 surveys were completed before the expiration date on April 30, 2025. Results were analyzed using Qualtrics Stats iQ and R Studio. We evaluated the relationship between control effectiveness on a Likert scale and 14 other variables in the survey. We also assessed how specific chemical and physical control techniques relate to variables, including Cuban bulrush biotype, total acreage, and habitat. At the end of the survey, participants were asked to include additional comments, which were pooled into a word map and discussed. Findings from the survey will inform ongoing and future management research and highlight the importance of engagement with management professionals.

Novel Strain of Connecticut River Hydrilla Spreads to Lakes and Ponds. Interstate Movement Likely

G. Bugbee
The Connecticut Agricultural Experiment Station - Office of Aquatic Invasive Species, New Haven, CT

In 2016, a new strain of hydrilla called Clade C was found in the Connecticut River with subsequent surveys documenting nearly 1000 acres from southern Massachusetts to Long Island Sound. Known as northern hydrilla, this Clade is more robust than monecious hydrilla which was formerly the predominate strain in the northeast. It has engulfed entire coves, marinas, and river systems. Clade C hydrilla was thought to be limited to the Connecticut River and its tributaries until 2023 when it was detected near a boat launch in East Twin Lake near the New York/Massachusetts border. This was the start of detections in other Connecticut lakes with a total of ten water bodies containing the plant by the end of 2024. We are beginning to get information on routes of entry, rapidity of spread, depth limitation, and water chemistry preferences. Efforts to manage northern hydrilla include increased public awareness, herbicide trials spearheaded by the USACE, boat inspections, investigations into boat wash stations, and increased surveillance. Funding for both public and private management activities is provided by State of Connecticut Aquatic Invasive Species grants and potentially USACE cost share funds that are in the planning phase. Although the known range of northern hydrilla is currently limited to Massachusetts and

Connecticut, the likelihood it has or will move to neighboring states is acute and preemptive strategies should be taken.

Building a New Aquatic Training Manual

B. Bultemeier
UF/IFAS Pesticide Information Office, Gainseville, FL

The United States EPA recently update the rules and requirements for certifiying users of pesticides. This has prompted states to redevelop their certification plans and most states to radically update their training manuals. In an effort to reduce duplicative efforts a proposal was developed to create a national training manual for the Aquatic Pest category, while also having it be regionally distinct. Dr. Bultemeier is the lead for this project and will be the first of it's kind manual in the country. This presentation will give an overview of the logic, the materials that will be in the manual, and how this process will work.

Humic Acid: A Novel Broadscale Tool for Phosphorus and Harmful Algal Bloom Management

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Harmful algal blooms (HABs), including those caused by *Microcystis aeruginosa* K. (cyanobacteria) and *Prymnesium parvum* C. (golden algae), pose significant ecological, economic, and public health threats across the United States. These blooms can result in fish, livestock, and companion animal deaths, degrade water quality, and disrupt aquaculture and agricultural operations. Increased reports of HABs over the last 20 years are attributed to improved monitoring efforts and changing environmental factors such as prolonged drought, high temperatures, and nutrient enrichment.

Traditional management strategies, such as nutrient buffers, nutrient binders, algaecide application, dilution, and toxin oxidation, are often costly, impractical, or harmful to non-target organisms. Consequently, there is a growing interest in alternative, sustainable solutions such as humic acid. Humic acid, an organic compound derived from natural decomposition, has demonstrated potential as a cost-effective management tool by providing a carbon source for beneficial phosphorus cycling bacteria and as a direct nutrient (phosphorus) binder.

This research evaluated the use of humic acid to prevent and mitigate HABs in replicated outdoor mesocosms simulating pond environments. Trials were conducted on both *M. aeruginosa* and *P. parvum* blooms using varying dosages of humic acid (prophylactic, low, and high), with and without pond sediment (soil) presence. Results demonstrated significant phosphorus binding within six hours of treatment, particularly in systems containing soil. Prophylactic treatments effectively limited algal cell counts and bloom magnitude, maintaining concentrations below bloom thresholds, with cell counts significantly suppressed by week 4 for *M. aeruginosa* and *P. parvum*.

These findings suggest that humic acid may offer a practical, sustainable alternative to traditional HAB management approaches by enhancing natural nutrient cycling and reducing algal proliferation. This research supports the broader application of humic acid in aquaculture, natural aquatic systems, and pond management efforts.

The Influence of Triclopyr on *Lygodium microphyllum* (Old World Climbing Fern) and Native Fern Gametophytes

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Lygodium microphyllum, also known as the Old World climbing fern (OWCF), has aggressively changed native plant communities in South and Central Florida wetland ecosystems by forming dense rachis mats that cover the understory and tree canopy. Chemical control is the primary tool for managing OWCF, and triclopyr has recently been shown to provide effective sporophyte control with reduced nontarget damage to many native ferns. However, the impact of triclopyr on OWCF and native fern gametophytes is still unclear. To address this, we conducted growth chamber studies to evaluate the effects of triclopyr on OWCF and *Woodwardia virginica* gametophytes, a native fern in South Florida. Gametophytes grown on agar were treated with various triclopyr treatments (0.002, 0.008, 0.033, 0.132, 0.310, and 0.619 g a.e. L^{-1}) and two controls (water without and with nonionic surfactant) with five replicates per treatment. All plates were placed in the growth chamber, which was set to be 25°C with a 16h day/8h night photoperiod and 50 umol s^{-1} m^{-2} of light intensity. Twenty five days after treatment (DAT), three gametophytes were randomly selected from each plate, and using ImageJ, each gametophyte's prothallus width was measured to evaluate triclopyr effects on OWCF and *W. virginica* gametophyte growth. Using the Kruskal-Wallis followed by Dunn's test, the data was tested to confirm significance and all the tests were run on R. Triclopyr and nonionic surfactant-treated OWCF gametophytes showed lower growth rates than the water control. However, *W. virginica* gametophytes treated with two controls showed similar growth rates and the ones treated with 0.002 and 0.310 g a.e. L^{-1} had significantly lower growth rates. These results indicate that triclopyr performance delays fern gametophyte development without mortality.

Genetic Diversity and Geographic Origin of Water Soldier (*Stratiotes aloides*) in Canada

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Efficient management strategies are needed to mitigate the costly impacts of invasive aquatic plants in North America. Water soldier (*Stratoites aloides*) is an emerging species of concern in the US and Canada. The only known populations in North America occur in and near the Trent-Severn waterway of Ontario, Canada; however, there is concern that water soldier will spread into the Great Lakes and US. Understanding the genetic diversity and geographic origin(s) of water soldier will provide managers information on the potential roles of clonal versus sexual reproduction in establishment and spread, and possible different management responses or ecologies. Additionally, genetic information from introduced and native ranges can be used to inform foreign exploration for potential biological control agents. Here, we use population genomic data from the native and introduced range of water soldier to 1) determine genetic diversity in the introduced range in Canada, and 2) identify potential source populations from the native range. We found that introduced samples from Canada are dominated by a single clonal lineage, likely indicating introduction of a single genotype that has propagated and spread asexually. Inference regarding clonal diversity across the native range varies depending on how the genomic data are filtered and corrected for sequencing errors. However, it is clear that genetic diversity of water soldier in the native range is also low, which may reflect the long history of cultivation for water gardening and frequent escape. Interestingly, the common clone in Canada is identical to samples from the Swiss Botanical Garden, potentially the introduction source of water soldier to Canada.

Comparing the Competitive Ability of Three *Vallisneria* Taxa Grown with Dioecious *Hydrilla verticillata* and *Potamogeton nodosus*

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Vallisneria is a genus of submersed aquatic macrophytes that have been historically prioritized for revegetation projects across the Eastern United States due to the wide variety of ecosystem services it can provide. Previously, all populations within the United States were classified as *Vallisneria americana*, however, recent genetic evaluations have revealed that there are two native species (*V. americana* and *V. neotropicalis*) and more concerningly, three non-native populations (*V. australis*, *V. spiralis*, and *V. x pseudorosulata*). The establishment of these non-native taxa presents challenges for management due to a lack of knowledge surrounding their ecology and competitive abilities. The main objective of this work is to compare the competitive potential of one native and two non-native *Vallisneria* taxa (*V. neotropicalis, V. spiralis,* and *V. x pseudorosulata)*. This comparison was investigated by placing each *Vallisneria* taxa in direct competition against dioecious *Hydrilla verticillata* and *Potamogeton nodosus* in an outdoor mesocosm setting. The study was organized as a randomized complete block design, with five treatments for each species of *Vallisneria* and competitor species it was placed against. Treatments followed a replacement series design that contained *Vallisneria*:competitor species-proportions of 100:0, 75:25. 50:50, 25:75, 0:100. All treatments were replicated three times. After 16 weeks, above- and belowground biomass was destructively harvested and was dried and weighed. Without competitive pressure, all tested *Vallisneria* taxa had comparable mean leaf lengths, ranging from 39.81 to 40.43cm. In the presence of competition, leaf length was statistically different amongst treatments, and amongst *Vallisneria* taxa. Competitive pressure also appeared to influence both ramet and biomass production for all tested taxa. *V. spiralis* demonstrated the most aggressive ramet production when grown in a monoculture, producing an average of 74 ± 12 ramets over the course of 16 weeks.

Evaluation of *Rangia cuneata* (Bivalve) as a Biological Control for Algae in Stormwater Pond in Southwest Florida

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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. Five 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.

Maintenance Control of Hydrilla (*Hydrilla verticilatta*) and Associated Sedimentation Rates

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Research demonstrates that maintenance control of invasive aquatic plants (i.e., maintaining plant populations at the lowest feasible level) is the most effective strategy for reducing both management costs and invasive plant impacts. However, a common concern is that herbicide use exacerbates organic matter deposition within waterbodies due to decaying plant material, contributing to algal blooms and reductions in water clarity. Both chemical control and mechanical harvesting techniques are used for management of hydrilla (*Hydrilla verticillate* (L.f.) Royle). The objective of this study was to evaluate the effects of chemical control and mechanical harvesting on water quality parameters, sedimentation rates and turion production associated with treating hydrilla when plant stands were at 50 or 100 percent volume inhabited (PVI) of the water column. Hydrilla sprigs were planted in 900 L concrete mesocosms and evaluated every 2 weeks until meeting the 50 or 100 PVI threshold. Once the threshold was met, the tank was treated with endothall at 3 ppm for 48 hours, or clipped at the hydrosoil surface. This cycle was allowed to continue for two years before the tanks were drained and the sediments were analyzed and the axillary and subterranean turions densities quantified. This presentation will discuss results from this study.

The Potential for Classical Biological Control of Connecticut River Hydrilla

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The invasive aquatic plant *Hydrilla verticillata* subsp. *lithuanica* (commonly known as Connecticut River hydrilla) poses a significant ecological and economic threat to the waterbodies it invades. Traditional management methods, such as mechanical removal and herbicide applications, are just a few of the tools available to aquatic plant managers. Biological control - particularly through the use of classical biological control agents - offers another potentially valuable option. A commonly hypothesized reason for the success of invasive species is the lack of top-down predators or herbivores in their introduced range. Classical biological control aims to address this by reintroducing natural enemies to their host in areas of new invasion. In the 1980s, the Asian leaf-mining fly (*Hydrellia pakistanae*) was released to control *Hydrilla verticillata* subsp. *verticillata* (commonly known as dioecious hydrilla). From 2000 to 2008, a mass-rearing program led to the release of millions of flies and their subsequent establishment in six states. Results have demonstrated the fly's ability to reduce biomass, as well as tuber and turion production. With the recent introduction of a new hydrilla biotype in the United States, questions have arisen regarding the fly's ability to establish and effectively impact Connecticut River hydrilla. This presentation explores the potential use of the Asian leaf-mining fly (*Hydrellia pakistanae*) as a biological control agent for this newly introduced biotype.

Evaluation and Field Demonstration of Herbicides for Water Violet (*Hottonia palustris*) Control

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A new non-native aquatic plant species, *Hottonia palustris* L. ("featherfoil", "water violet"), was recently documented in Lake Winnipesaukee, which is New Hampshire's largest lake and has significant economic value. This species is popular within the water garden and aquarium trade in the United States

but has not been documented in any other major natural system the US. Due to the growth habit and reproductive capacity of *H. palustris*, it has the potential for rapid spread within New Hampshire's waterbodies and could negatively impact ecosystem services and economic values. Management options for *H. palustris* are not well documented, therefore we conducted research trials to determine potential chemical control methods. Our studies were initiated with a small-scale greenhouse-based efficacy screening at North Carolina State University to determine potential herbicide options that could be effective for *H. palustris* control. Treatments included flumioxazin, diquat, florpyrauxifen-benzyl, 2,4-D, triclopyr, penoxulam, imazamox, fluridone, and endothall at maximum and half-maximum label rates. Flumioxazin at 200 ppb and endothall at 2.5 ppm reduced *H. palustris* biomass by 98% or greater at 6 weeks after treatment (WAT). Based upon greenhouse results, a field demonstration project was conducted in Lake Winnipesaukee, NH in the summer of 2024. Flumioxazin (300 ppb) was applied to 5 – 18 ac. plots of established *H. palustris* in three geographically-distinct regions of the lake. All study plots were assessed at pre-treatment and 4 WAT through the collection of species presence and relative abundance. By 4 WAT, the percent occurrence of *H. palustris* was reduced from 44% to 4% in treatment plots. Short-term impacts to non-target species varied. These results confirm mesocosm findings and suggest that flumioxazin can be a useful tool for *H. palustris* management in the US.

Aquatic Use and Select Non-Aquatic Use Herbicide Efficacy on *Vallisneria* × *pseudorosulata*

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Submersed macrophytes such as *Vallisneria* fulfill critical roles in their native ecosystems and provide important forage and shelter for a variety of organisms. However, *Vallisneria* × *pseudorosulata* is a recent, aggressive invader of waterbodies in the southeast U.S., with little known about the management of this eelgrass hybrid. Therefore, mesocosm studies were conducted to assess the herbicide efficacy of 13 herbicides labelled for aquatic use and 14 herbicides not labelled for aquatic use. Plant biomass and ramet density were collected at 6 and 12 weeks after treatment (WAT). Data were analyzed using a generalized linear model with a post-hoc Fisher's least sum of differences test at the $\alpha = 0.05$ significance level. Of the 27 tested herbicides, PPO, STPP, and ALS inhibiting herbicides effectively reduced above and belowground biomass and ramet density at 12 WAT. These results suggest several effective chemistries for use in *V.* × *pseudorosulata* management and their efficacy will be studied further in long-term concentration exposure time trials; however, some will require 24c labelling prior to availability for operational use.

Growth of Florida Eelgrass (*Vallisneria neotropicalis*) Ecotypes under Common Nursery Conditions

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Florida's native eelgrass (*Vallisneria neotropicalis*) in an important part of the aquatic ecosystem as it provides structure, substrate stabilization, a food source, and numerous other environmental benefits. This presentation will describe common nursery experiments conducted on six ecotypes of *V. neotropicalis* and how the results may be useful for resource managers that are planning aquatic habitat restoration and enhancement projects.

Field Demonstration of a Metered Drip Application of Endothall for Controlling Hydrilla in a Flowing Spring Run

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Merritt's Mill Pond is an impounded spring run in Jackson County, FL, formed by first magnitude spring, Jackson Blue Spring, which contributes to 70% of the flow in the waterbody. Topped out infestations of *Hydrilla verticillata* covers nearly 100 surface acres of the pond. Treatments with fluridone were relatively unsuccessful due to high water exchange in the pond which causes low residency time of herbicide and insufficient exposure times. More recent treatments have consisted of endothall, applied by boats using trailing hoses. Previous small-scale research on endothall has detailed lower concentration and exposure times required to kill hydrilla. However, field treatments in the flowing water of the Mill Pond have yielded inadequate results. Here, we detail field demonstrations of a whole pond treatment, using a metered drip application from a single injection point at Jackson Blue Spring. Site specific hydrology was examined prior to the application of endothall with rhodamine water tracer dye. The dye, applied at 10 parts per billion (ppb), was used to simulate an herbicide application to track movement and dissipation through the waterbody. Endothall treatments at 5 parts per million (ppm) were initiated on June 14 and 15 2023 and applied for 11 hours each day. A second treatment was applied on September 18 and 19 for 2023 for 10 hours each day. Point intercept and hydroacoustic surveys were conducted to quantify SAV throughout the system pre and post treatment. Relative abundance of hydrilla after the drip application was dependent on distance from the injection site.

Comparing Detection of Aquatic Invasive Species in the Adirondacks using Traditional Tool Based Monitoring and eDNA Monitoring Methodologies

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The first step in managing invasive species is detecting them and measuring their abundance. Finding aquatic invasive species at low populations is a critical part of the early detection and rapid response framework. But what are the best methods to detect species? With new techniques like environmental DNA (eDNA) monitoring, we need to know which techniques are best for detecting which species. To help provide insights and data into this the Adirondack Park Invasive Plant Program studied 10 lakes in 2024 using a paired monitoring approach. One team went out to each lake and collected four water samples from a lake once in July and then again in September. These eight samples were analyzed for the genetic presence of over 30 different animal and plant invasive species using a multiplex assay. A separate team surveyed the same lakes in July using traditional visual and tool-based methodologies including aquatic rakes, plankton tows, and sediment sieves. This allows for comparison of which species were discovered using the different methodologies. This presentation will compare and contrast the differences between methods, highlight the difficultly of detecting plants using eDNA, and provide suggestions for how best to search your local lake for aquatic invasive species.

Resolving Species Boundaries of Closely Related *Myriophyllum* Species for Improved Native Identification

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Accurate species identification is paramount for aquatic plant management, especially when introduced and invasive species are difficult to distinguish from native and desirable species. Closely related aquatic

plant species are notoriously difficult to distinguish because physical traits to differentiate species are frequently related to flowers and fruits, which are not always present (Sculthorpe 1967; Moody & Les, 2010). In addition, hybridization between closely related species can make their identification even more challenging. One group of aquatic plants where identification of native versus invasive species is particularly challenging and important is the genus *Myriophyllum* (watermilfoil). Specifically, one North American species, variable-leaf watermilfoil (*Myriophyllum heterophyllum* Michx.), poses identification problems for aquatic plant managers in the western and northeastern US. Because of the difficulties with morphological identification of these closely related species, their identification has largely come to rely on DNA barcoding approaches. Although DNA barcoding is a promising method for identifying morphologically similar species, this approach can lead to inaccurate identifications for recently diverged species because of a phenomenon called incomplete lineage sorting. Therefore, DNA barcoding approaches should be validated with additional, independent data before their widespread application, especially when distinguishing invasive species that should be targeted for control from native species that should be protected. The overall goal of this project is to compare species identifications determined by the ITS barcode and species boundaries found through hundreds to thousands of DNA sites across the genome. This dataset will be the first genomic survey of these species and will shed light on the native status of variable-leaf populations in areas of management and conservation concern, notably the Pacific Northwest.

"New Hydrilla" Connecticut River Hydrilla Research and Demonstration Program – Interagency Collaboration and Management Structure

Keith Hannon
USACE New England District, Plan Formulation Branch

In support of the U.S. Army Corps of Engineers' Connecticut River hydrilla research and demonstration program the New England District leads the NEPA and local permitting needs in Connecticut, assists with field work, and leads public outreach efforts to educate and inform the public and local stakeholders about the goals and objectives of the project. To facilitate interagency coordination and stakeholder involvement, we created several working groups that meet on a recurring basis to resolve issues and synchronize communication with the public and other interested stakeholders. A number of educational resources including a project website and online StoryMap were developed to help communicate the importance of stopping the spread of hydrilla, the goals and objectives of the project, options for management, and the current status of field demonstrations. Although this is an informal management structure, we found that it has been extremely useful in minimizing delays and gaining public trust. This presentation focuses on the management structure, roles of the various working groups, and some of the challenges the team worked to solve.

Benefits of Standardized Surveys and Data Centralization: A Case Study using New York's Watercraft Inspection Steward Program Application (WISPA)

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Minimizing overland transport of aquatic invasive species (AIS) via recreational watercraft is an essential component of invasive species spread prevention. Watercraft inspections at launch sites are a widely applied strategy to reduce human-mediated transport of AIS to protect priority waterbodies and offer public education and training of preventative cleaning procedures. Watercraft inspections also represent an opportunity to collect useful information for ecosystem managers on watercraft movement patterns and species occurrences that can be applied to risk assessments and early detection rapid response programs. New York State (NYS) in the Northeastern USA implemented use of a Watercraft Inspection Steward Program Application (WISPA) in 2018, which is a form-based survey that populates a centralized database with several data fields that include spatially explicit location, watercraft type, origin waterbody, and species observations. Coordinated and standardized collection of this data equips AIS managers with substantial information to make data-driven decisions. Here, we summarize the information collected in the WISPA database during the first six years of use and highlight two key management uses for this information using a set of eight popular destination lakes. Boater connectivity maps of origin-destination links are valuable to acknowledge the breadth of origins travelling to NYS destinations, and to identify the highest-magnitude connections that likely represent increased-risk pathways for species transport. 'Hits' analysis is an applied mechanism to relate species interceptions to a confirmed presence database to identify previously undocumented species occurrences and direct early detection rapid response survey priorities. WISPA has been effective to establish the data infrastructure needed to support systematized data collection during watercraft inspection surveys and increase managers' ability to make informed decisions about AIS management.

Small Plot Rate Response of Flumioxazin on Curlyleaf Pondweed and Native Plant Selectivity
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Curlyleaf pondweed (*Potamogeton crispus* L.) is a submersed aquatic plant that creates thick, monospecific beds that can impede recreation and water flow. Before senescing in mid-summer, curlyleaf pondweed forms a large number of turions that can lay dormant in the sediment for several years. Typical herbicide management of this species occurs in early spring to target the plant before turion production occurs and native plants are dormant. Flumioxazin has shown potential in curlyleaf pondweed management in small scale studies, but its effects have not been assessed in operational management. Using rates of 75, 100, 125, and 150 μg L^{-1} of flumioxazin alongside two non-treated plots on Minnesota lakes, the effect of the treatments is being assessed on curlyleaf pondweed and native plant presence, as well as turion densities in the sediment, for a period of two years. Plant surveys were conducted prior to treatment, 3 weeks after treatment, and 6 weeks after treatment. Turion sampling occurs monthly between May and October. First year results showed no significant decreases in overall species richness at any of the treated sites. Both non-treated plots maintained a species richness of 1.22 or less, while most treated plots had a species richness more than 2.09. Turion densities across treated plots on the ranged between 0 to 235 turions/meter^2, while the two non-treated sites reached 212.5 and 667.5 turions/meter^2. The treatment rate of 75 μg L^{-1} was not effective at reducing curlyleaf pondweed presence, while the highest treatment rate of 150 μg L^{-1} showed the most promising results, with curlyleaf completely absent after treatment at one of the plots.

Growth and Survival of *Azolla caroliniana* (Carolina mosquitofern) after Exposure to Different Temperatures
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Azolla, a small floating aquatic fern, exhibits varying growth rates and physiological responses to temperature. In winter, *Azolla* enters dormancy and sinks to the bottom of the water. In spring, plant fragments rise to the surface and resume growth asexually as temperatures increase. Previous studies reported that *Azolla* growth rates are lower in colder months and growth typically peaks in warmer months. Variations in winter temperatures might influence these patterns of growth and survival. We conducted two experiments in the laboratory to determine how varying temperatures impact *Azolla* *caroliniana* growth and survival. In experiment one, we placed *Azolla* in the dark at -5, 5, 0 and 20 °C for seven days. We then placed all plants under LED light at 20 °C for 14 days. In experiment two, we placed *Azolla* in the dark at -5, 5, 0 and 20 °C for 14 days. We then placed all plants under LED light at 20 °C for 21 days. We hypothesized that *Azolla* exposed to freezing temperatures will produce lower biomass than those exposed to warmer temperatures. In experiment one, plants below 5 °C experienced 2-7 times decrease in biomass, while plants at 5 °C and 20 °C experienced 3-5 times increase. In experiment two, plants at 0 and 5 °C experienced 3-4 times increase in biomass. Longer exposure to cold and dark conditions appeared to induce dormancy and allowed for increased growth and survival. Exposure to freezing temperatures in the dark should be implemented in field experiments to determine if this is an effective strategy for control of *Azolla*.

Characterization of the Genetic Diversity of Curlyleaf Pondweed (*Potamogeton crispus*) in the Contiguous United States and Canada

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Curlyleaf pondweed (*Potamogeton crispus* L.) is a prolific invasive species that has spread across the United States and into parts of Canada since its introduction to North America in the 1840s. It causes extensive economic and environmental damage across its invasive range, and its control and eradication are of utmost importance to agricultural, ecological, recreational, and transportational stakeholders. Developments in molecular ecology and invasive management have found that genetic diversity and hybridization of aquatic macrophytes may affect their susceptibility to herbicide treatments, but little research has been conducted on the widespread genetic diversity of *P. crispus*. This species has, however, been observed to hybridize with other species in the *Potamogetonaceae* family and, therefore, has some propensity for sexual reproduction, which was previously thought to be rare in its invasive range as asexual reproduction through turions is more common. Because hybridization and genetic diversity in aquatic macrophytes is known to pose a risk to efficacious management, further and broader analysis of *P. crispus* genetic diversity must be undertaken in its North American range. An initial sequencing pilot study of 7 geographically separated *P. crispus* samples revealed high clonality, but still yielded a deviation in two individuals, collected in Arizona and Utah, from the remaining 5 samples which were highly clonal. The pilot study also enabled the selection of the most suited restriction enzymes and read coverage/ depth for a species that has not been previously sequenced at this scale or using RAD-seq methodology. Future work will aim to sequence all 543 subsampled *P. crispus* individuals from 15 states and collect samples from Ontario to identify SNP variation across the Contiguous United States and parts of Canada.

Evaluating Impacts of Water Conditions on Herbicide Efficacy to Control *Myriophyllum spicatum* in Bear Lake, UT

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Eurasian watermilfoil (*Myriophyllum spicatum*, EWM) is an invasive aquatic plant that reduces biodiversity, impedes recreation and reduces economic outputs of infested waterbodies. First detected in Bear Lake, UT, in 2019, EWM has persisted despite repeated chemical management efforts with no significant reduction in EWM infestations. The presence of Northern watermilfoil (*M. sibiricum*, NWM) has raised concerns over potential hybridization, which could further complicate control strategies. In 2024, twenty-one milfoil samples were collected across the lake and genotyped using a KASP assay to assess species composition. All sampling sites contained mixed populations of EWM and NWM, but no hybrids were detected. To investigate the reduced herbicide efficacy in Bear Lake, absorption, translocation, and metabolism studies were conducted to evaluate the influence of water chemistry. Apical meristems (10 cm) of EWM were grown for three weeks in either tap water or Bear Lake water, then transplanted into 15 mL plastic tubes containing washed sea sand and sealed at the top with a low melting point eicosane wax. Plants were treated with radiolabeled 2,4-D in the respective water types and harvested at 6, 12, 24, 48, 96, and 192 hours after treatment. Samples were analyzed via biological oxidation or herbicide extraction followed by HPLC injection. This study will support improved herbicide use strategies for EWM control in Bear Lake.

Aquatic Invasive Plant Response and Restoration in the Peconic River System of Long Island, NY

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New York State Department of Environmental Conservation (NYSDEC) initiated herbicide treatment of *Ludwigia peploides* in the Peconic River after nearly two decades of unsuccessful hand pulling by stakeholders. Baseline aquatic plant surveys revealed six aquatic invasive plant species. By the third and final season NYSDEC was treating two additional aquatic invasive plants: European frogbit (*Hydrocharis morsus-ranae*) and parrot feather (*Myriophyllum aquaticum*). Each season's pre- and post-treatment surveys of aquatic plants and macroinvertebrates were conducted along with dissolved oxygen monitoring. We will talk about outcomes of the project and future plans for monitoring and restoration.

Using Adaptive Management to Restore Lakes Impacted by Cyanobacteria

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There are over 50,000 lakes in the US on the 303D list for phosphorus impairment. High phosphorus provides a competitive advantage for cyanobacteria species and a significant number of these lakes are closed each year because of toxin production. This impacts animal and human health, recreational commerce and property values. Recent studies have shown that these toxins can aerosolize and create exposure well beyond the lake shore.

Often the first step in the restoration process has been to conduct long and expensive studies. In many cases these studies develop programs that are not financially feasible. For example, in Washington State, the last few years, four cyanobacteria management plans consumed two years of study, and the plans are not implemented because they are not financially viable.

Adaptive management is a process that collects the necessary data to build a prescription, obtain stakeholder buy in, perform initial treatments, study the results and redo the next year. This process starts the lake toward recovery, spreads costs in a more manageable fashion and can show improvement rapidly.

This paper will provide case studies for several Washington Lakes that utilized adaptive management and started the process of restoration. It will discuss the financial benefits and data documenting recovery.

Water Chestnut, Code and Robots: A Long Island's Tale on Mathematical Modeling for Invasive Species Management

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Managing aquatic invasive species is a complex challenge influenced by life history of the invading species, infestation intensity, waterbody size, and resources available for control of the invasion. Effective management requires adaptable tools to help agencies prioritize control strategies. To address this need, we developed a discrete-time population dynamics model to predict the spread of Water chestnut (*Trapa natans*) in two Long Island water systems. Given the region's unique geographic and ecological conditions, the model assumes negligible immigration and interspecific competition. Carrying capacity was estimated as a function of depth-profiled area and average rosette size at seed maturity. Population growth rate was based on the mean number of seeds per rosette, adjusted upward to account for the poorly characterized seed bank. We modeled three management approaches: manual harvesting, mechanical harvesting, and benthic barriers. Manual removal followed an exponential decay model based on the maximum pulling rate per person-hour.

Using 2024 early-summer field data, the model indicated that traditional manual removal methods are ineffective at realistic removal rates. Consequently, we designed a new squad-based manual harvesting strategy (SMH), increasing removal rates tenfold. The model accurately predicted SMH's effectiveness in reducing the infestation in Massapequa Creek during 2024.

We further used the model to estimate the minimum mechanical harvesting hours needed to achieve control within 3–5 years. Critically, results showed that neither manual nor mechanical methods alone are sufficient for long-term success. Instead, the model identifies optimal integrated approaches for combined efforts.

An additional outcome of this research is the development of a small-scale, fully automated mechanical harvester to supplement management efforts. It will refine the model with new data and explore more efficient strategy combinations. Designed as a living model, it will continue evolving to improve prediction accuracy and support cost-effective invasive species management.

Evaluating Ecosystem Health in Waterbodies Treated With and Without Copper-based Herbicides with the Floristic Quality Index

S. Pearson, D. Woltmann
SUNY Albany, Albany, NY

Herbicide applications can have long term impacts on the treated habitats. We evaluated the impacts of copper-based herbicidal treatment within freshwater ecosystems of New York State (NYS) using the Floristic Quality Assessment (FQA) Method. Greater FQA metric values correlate with higher quality vegetation and an associated increase in ecosystem health. We analyzed the health of 19 freshwater lakes separated into two groups that included lakes with copper-based herbicidal treatment(n=8), and lakes with no historical record of treatment (n=11). We compared the plant community results with results from a related study comparing copper concentrations in littoral sediment of. Additionally, we compared the FQA results from statewide C values with alternative ecoregion level C values. Overall, greater FQA values were found to correlate with lower copper concentrations in littoral sediment of lakes, suggesting that the FQA Method could be a good indicator of habitat degradation and an asset in the management and monitoring of freshwater ecosystems. The Native Mean C metric was found to be particularly sensitive to ecological change through comparison of FQA Method results between datasets, as Native Mean C was the only FQA metric found to have a significant difference in results based on statewide and ecoregion C values.

RISE Update

M. Provost
RISE (Responsible Industry for a Sound Environment, Arlington, VA

This presentation will provide an overview of RISE's legislative and regulatory priorities, including funding for the Office of Pesticide Programs, state legislative bills, and the Endangered Species Act. It will highlight the challenges and opportunities for the specialty pesticide and fertilizer industry in the current political landscape. Attendees will gain insights into how RISE is engaging with lawmakers and agencies to advance science-based policy along with a call to action to join the RISE Grassroots Network.

Rethinking Lake Turnover

C. Richmond, T. Shelton, C. Imig
Kasco Marine, Prescott, WI

Case study that investigates the dynamics of water movement and aeration efficiency in lakes using diffusers. Key parameters include the upward velocity of water from the diffuser, the volume of water cresting at the surface, and the near-field and far-field distances of water pulled into the upward draft. The zone of influence of the diffuser and the industry standard for pond aeration, which recommends turning a pond once per day, are critically evaluated.

Demonstration of Novel Small Plot Treatments for Controlling Hydrilla on Lake Seminole

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Lake Seminole, a 37,500-acre reservoir spanning Florida, Georgia, and Alabama, was created in 1958 after the construction of the Jim Woodruff Dam, where the Flint, Chattahoochee, and Apalachicola rivers converge. Similar to many other lakes across the southeastern United States, Lake Seminole is infested with *hydrilla verticillata*, an aggressively growing submerged aquatic invasive plant from Asia. Hydrilla has caused serious water resource issues on the lake such as impeding navigation, water quality degradation, outcompeting native wildlife, and obstructing hydropower production. Currently in the southeast, rotation of herbicides for hydrilla management is minimal, and management goals often do not match concentration exposure time requirements and selectivity profiles of single active ingredients. Therefore, the aim of this study was to evaluate novel herbicide combinations for hydrilla control in small plots scenarios. Four treatment sites along the Florida and Georgia border of Lake Seminole ranging from 8 to 64 acres each were treated with either endothall (2ppm) plus florpyrauxifen-benzyl (19ppb), endothall (2ppm) plus penoxsulam (25ppb), florpyrauxifen-benzyl (19 ppb) plus imazamox (200 ppb), and three sequential treatments of florpyrauxifen-benzyl (19ppb) in the spring. Point intercept aquatic plant surveys were conducted for nine months after treatment (MAT). Sites treated with combinations of endothall plus florpyrauxifen-benzyl or endothall plus penoxsulam exhibited an initial reduction of hydrilla followed by an increase beyond pre-treatment levels 4 MAT. The sites treated with the florpyrauxifen-benzyl plus imazamox or sequential florpyrauxifen-benzyl treatments exhibited decreasing hydrilla abundance until nine months after treatment.

Comparative Efficacy of 2,4-D, Glyphosate, and Endothall Against Submerged and Emergent *Myriophyllum aquaticum* F. Santos de Oliveira[1], T. Lawrence[1], P. A. Vougoudo Salmazo[2], E. Westra[1], M. Ortiz[1]
[1]Utah State University, Logan, UT
[2]Federal University of Grande Dourados, Dourados, Brazil

Parrotfeather (*Myriophyllum aquaticum*) is a recently listed noxious aquatic weed in Utah that exhibits heterophylly, with submerged leaves lacking cuticles and stomata and emergent leaves possessing both. In September 2024, A population in Cache County, UT, was treated via drone application with a premix of 2,4-D (3,116 g ae ha^{-1}) and triclopyr (1,199 g ae ha^{-1}). Biomass samples were collected from five sites pre-treatment and at 14, 21, and 28 days after treatment (DAT), dried at 60 °C for seven days, and analyzed for biomass reduction. Pre-treatment biomass averaged 5,044 g m^{-2}, with a 36% reduction observed by 14 DAT and by visible necrosis and epinasty. However, regrowth was evident at 21 and 28 DAT. To evaluate more effective control options, additional trials assessed in-water applications of glyphosate, 2,4-D, and endothall at 2 mg ai L^{-1} to fully submerged plants, and foliar application to emergent foliage using glyphosate (3,360 g ae ha^{-1}), 2,4-D (2,100 g ae ha^{-1}), and endothall (870 g ae ha^{-1}). By 24 hours after treatment, foliar-applied 2,4-D caused epinasty, while glyphosate and endothall symptoms appeared between 5 and 10 DAT. At 42 DAT, in-water 2,4-D treatment reduced shoot and root biomass by 61% and 34%, respectively, relative to untreated controls, while glyphosate reduced shoot biomass by 20%. These findings suggest that targeted in-water herbicide applications, particularly with 2,4-D, offer effective control of submerged parrotfeather populations and inform strategies to manage its spread when early detected in Utah's aquatic ecosystems.

Mississippi Macrophyte Monitoring: Surveys for Detecting Aquatic Invasive Plants
S. Schmid, G. Turnage
Mississippi State University, Starkville, MS

A large fraction of the Earth's freshwater is stored in small lakes and a major threat to these ecosystems is the introduction of invasive aquatic plants. Despite their importance, small lakes are often neglected in research and management. To address the issue of invasive aquatic plants, the most effective method is the implementation of early detection and rapid response (EDRR) strategies. This talk introduces an ongoing early detection effort conducted by Mississippi State University, funded by the Mississippi Department of Environmental Quality. This strategy entails surveys of aquatic plant communities across the state of Mississippi with an objective of detecting new incursions of invasive plants and a focus on small lakes and rivers. Point surveys of the littoral zone were conducted by boat and all species observed at sample points were reported. Data from these surveys identified several new incursions of invasive species and these early detections were presented to appropriate management bodies for rapid response. These data were also used to predict the patterns of invasion of four prominent invasive species: *Alternathera philoxeroides* (alligatorweed), *Cyperus blepharoleptos* (Cuban bulrush), *Panicum repens* (torpedograss), and *Triadica sebifera* (tallowtree). In addition to detecting new instances of invasive species, these surveys helped describe the native flora of Mississippi. Several state and county records were observed, improving our understanding of the Mississippi's aquatic and wetland flora.

Development of Management Strategies for a New Hydrilla Invasion on the Connecticut River

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The US Army Corps of Engineers initiated a research and demonstration project in 2023 to develop management strategies of a new genetic strain of the invasive aquatic plant, hydrilla, that was first identified in the lower Connecticut River. The technical approach to address this new aquatic plant management challenge was constructed based on existing data gaps related to plant biology and ecology, herbicide concentration-exposure time relationships, and bulk water exchange rates. In 2023, research efforts included field and laboratory-scale phenology studies, mesocosm-scale herbicide bioassays, as well as site-specific water exchange experiments to generate data required to inform operational-scale field verification studies in 2024. In the summer of 2024, operational-scale field studies were deployed at five representative sites in Connecticut and have been monitored to date. This presentation will discuss research findings and the future outlook on managing the spread of this invasive plant.

Genetic Identification and Diversity of Native and Introduced Eelgrass (*Vallisneria*)

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Montana State University, Bozeman, MT

Eelgrass (*Vallisneria*) is an important component of aquatic ecosystems and is frequently used in aquatic habitat restoration efforts. Recent genetic analyses have identified a non-native hybrid cultivar in the US (*V.* × *pseudorosulata*; also known as “Rock Star”). Further, there has been historical taxonomic uncertainty and debate about whether native *Vallisneria* in North America comprises one versus two species. The current consensus is that North American *Vallisneria* contains two geographically distinct species – *V. americana* with a more northern distribution and *V. neotropicalis* with a more southern distribution. There is a necessity (or desire) to balance control of non-native eelgrass species with preservation and restoration of native species. However, eelgrass management and restoration are hindered by difficulties in identifying species using morphology, and species identification increasingly relies on genetic methods. Tringali et al. (2023) developed a rapid PCR assay to distinguish native and non-native eelgrass in Florida. Here, we apply this assay to identify and map the distribution of native and non-native eelgrass throughout Florida. We found that native *V. neotropicalis* is much more common than introduced *V.* × *pseudorosulata* across Florida. However, *V.* × *pseudorosulata* is well-established and widely distributed across the state (and beyond). Although useful, the PCR assay cannot distinguish between *V. americana* and *V. neotropicalis* or distinguish different genotypes within any species. Therefore, we also employ genotyping-by-sequencing to study genetic variation of native and non-native eelgrass. Our results corroborate previous findings of distinct *V. americana* and *V. neotropicalis*, and we found evidence for hybridization between the two. Further, we find evidence for genetic variation in all species of *Vallisneria* in the US. Additional studies will focus on occurrence and distribution of native and non-native eelgrass species across the US, and how genetic variation may impact management and restoration outcomes.

Vallisneria spiralis Control When Grown in Mesocosms

G. Turnage, M. Gebhart
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Vallisneria is a genus of submersed macrophytes with several taxa that have become invasive in the U.S., potentially due to aquaria release. In Florida, *V. spiralis* is an introduced species that has become problematic in large waterbodies such as the Braden River. Due to major taxonomic revisions, previous research on *V. spiralis* management is lacking, leading to the necessity of chemical management research. Mesocosm studies were used to assess the herbicide efficacy of 13 herbicides labelled for aquatic use and 14 herbicides with potential for a special local needs label. Overall, contact herbicides were less effective at reducing *V. spiralis* 12 weeks after treatment; however, the systemic herbicides endothall, bensulfuron, metsulfuron, rimsulfuron, sulfometuron, and trifloxysulfuron reduced biomass and warrant inclusion in future research. Concentration exposure time relationships of the chemistries listed above should be investigated for *V. spiralis* biomass reduction.

Reducing Carrier Volume for Crested Floating Heart (*Nymphoides cristata*) Control

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Crested floating heart [*Nymphoides cristata* (Roxb.) Kuntze; CFH] is an invasive aquatic plant spreading throughout the southeastern United States. Without continuous management, CFH can overtake lakes, reservoirs, and ponds with dense floating leaves, disrupting the ecology and utility of these waterbodies. Long-term control is challenging due to CFH's rapid asexual reproduction and dispersal via ramets. Reducing carrier volume of foliar sprays may improve control by increasing herbicide concentration on CFH leaves, while maintaining the same use rates. This study evaluated how reduced carrier volume affects CFH biomass and ramet production.

Two herbicides—florpyrauxifen-benzyl (FPB) and glyphosate—were tested in separate experiments. Each herbicide was applied at 0.5x, 1x (maximum label rate), and 2x rates, and at three carrier volumes: 10, 50, and 100 gallons per acre (GPA). Weekly visual estimates of percent surface leaf coverage were conducted to assess efficacy. At 12 weeks after treatment (WAT), plants were destructively harvested. Biomass and ramet counts were collected and compared to non-treated controls (NTCs) using two-way t-tests. Biomass and percent ramet reduction were analyzed using ANOVA (α=0.05), and means were separated using Fisher's Protected LSD Test.

Plants treated with FPB showed a clear rate response, with greater control at 1x than 0.5x. Glyphosate-treated plants showed limited rate response, with 0.5x and 1x performing similarly. Neither herbicide provided long-term control, as regrowth was observed by 12 WAT. Carrier volume had no significant effect on efficacy, indicating applicators may select carrier volumes based on convenience without compromising control. These studies will be repeated to confirm results.

Control of Monoecious Hydrilla in a Lotic System Using Automated Treatment Technology

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Monoecious hydrilla is a highly invasive federally-listed noxious weed that has infested several counties within NY State and the Northeast United States. An infestation was discovered within the Croton River

(NY) in 2014, requiring rapid response before it spread to the Hudson River Estuary and its many tributaries. The New York State Department of Environmental Conservation led the rapid response effort and the Croton River Hydrilla Control Project began in 2017. This presentation summarizes how the infestation was effectively controlled between 2017-2022 using the deployment of the SATT (SePRO Automated Treatment Technologies) platform. The platform allowed for herbicide (fluridone) to be meter-injected into a lotic system by pesticide applicators from a remote dashboard during 6 growing seasons. No hydrilla tubers have been found in the Croton River since 2018 and no hydrilla plants were found remaining in the river during the 2022 post-treatment survey. This presentation will cover the operational details, permitting challenges, and survey data for both target and non-target impact assessments for the Croton River Hydrilla Control Project.

A Comparative Analysis of the Ecophysiology Between the Invasive Macroalgae Starry Stonewort (*Nitellopsis obtusa*) and the Native Macroalgae Chara (*Chara* sp.) to Predict Invasion Potential

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Starry stonewort (*Nitellopsis obtusa*) is an invasive macroalga from Eurasia. Currently starry stonewort's invasive range consists of the upper Midwest and Great Lakes region including the Mississippi River. Starry stonewort poses recreational and ecological problems by forming dense canopies that extend through the water column. Starry stonewort occupies a late season niche space with dense biomass occurring in late July and persisting well into fall. To date there is a lack of information on the ecophysiology of starry stonewort. Photosynthetic capabilities were examined across a range of temperatures to better understand its ecophysiology and to help predict invasion potential. Chlorophyll fluorescence was used on both starry stonewort and chara populations to determine photosynthetic efficiency at temperatures between 4-45°C with chara serving as a control due to its widespread presence throughout the United States. Dark-acclimated (F_v/F_m) measurements, indicated starry stonewort had a higher maximum quantum efficiency than chara at temperatures from 4-30°C. Light-acclimated (Φ_{PSII}) measurements indicated similar current quantum efficiencies between the two species at each temperature except 30-35°C. These results indicate that the temperature optimum for quantum efficiency is 30°C for starry stonewort and 25°C for chara. Yields declined between 30-40°C for starry stonewort and for chara between 25-40°C with a decrease of 31% and 33.6%, respectively. This data suggests that starry stonewort has the potential to expand its range into warmer climates. Future research will further assess the photosynthetic abilities of starry stonewort by conducting gas exchange analyses along with comparing regional differences in starry stonewort photosynthetic capabilities.

POSTER ABSTRACTS

Abstracts are listed in alphabetical order by presenter's last name

† = Student Competition

† Herbicide Efficacy and Degradation Patterns in Managing Eurasian Watermilfoil (*Myriophyllum spicatum*) in Bear Lake

O. Adeyemi, T. Lawrence, F. Santos de Oliveira, E. Westra, C. Ransom, M. Ortiz
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Eurasian watermilfoil (*Myriophyllum spicatum*; EWM) is an invasive aquatic species that poses significant ecological and economic challenges in freshwater ecosystems like Bear Lake. Limited data exist on EWM growth and herbicide efficacy for EWM control in nutrient-rich environments such as Bear Lake, where unique water chemistry may influence plant growth and herbicide behavior and effectiveness. This study evaluated the EWM growth and the efficacy of two herbicides, florpyrauxifen-benzyl (FPB) and 2,4-D, in Bear Lake water compared to dechlorinated tap water. EWM shoot fragments were propagated in both water types, and growth parameters- including plant height, shoot number, and biomass- were assessed monthly for three months. Additionally, herbicide degradation was monitored over 72 h (2,4-D) or 384 h (FPB), while efficacy trials assessed biomass reduction after 24- or 48-hour exposure times to 2 mg ai L^{-1} (2,4-D) or 0.02 mg ai L^{-1} (FPB). Results indicate that EWM exhibited significantly enhanced growth in Bear Lake water, with higher shoot production and biomass than tap water. Herbicide degradation patterns were similar across water types. While 2,4-D was more effective in tap water, achieving significant biomass reductions within 24 hours, significant control (>85%) in Bear Lake water was only reached after 48 hours. Similarly, FPB demonstrated reduced efficacy in Bear Lake water, achieving <85% biomass reduction even after 48 hours. These findings underscore the impact of Bear Lake's unique water chemistry on EWM growth and herbicide efficacy, highlighting the necessity of adapting management strategies to account for specific environmental conditions in nutrient-rich freshwater systems.

† Do Fragments of *Hydrilla verticillata* Remain Viable After Treatment With Florpyrauxifen-Benzyl?

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Florpyrauxifen-benzyl can be used to selectively treat many troublesome aquatic weeds listed on North Carolina's Noxious Weed List including monoecious *Hydrilla verticillata* (hydrilla), *Ludwigia hexapetala* (creeping water primrose), *Myriophyllum spicatum* (Eurasian watermilfoil), and *Alternanthera philoxeroides* (alligatorweed). A unique symptom of florpyrauxifen-benzyl treatments is the facilitation of stem fragmentation. Netherland and Richardson (2016) reported that Eurasian watermilfoil stems became brittle and easily fragmented after just 1 to 2 days of exposure. While these fragments have been assumed to eventually suffer mortality, scientific investigation has been limited. This study evaluated the fate of six-inch fragments of hydrilla, creeping water primrose, Eurasian watermilfoil, and alligatorweed after exposure to florpyrauxifen-benzyl for 0, 6, 24, 72, and 168 hours. At 6 weeks post-treatment, percent visual control estimates (0%: no response to treatment; 100%: complete plant senescence) were assigned to tested fragments of all species and was statistically analyzed. Stem fragments of creeping water primrose, Eurasian watermilfoil, and alligatorweed that were

exposed to florpyrauxifen-benzyl for greater than 0 hours exhibited 100% control, or were non-viable post treatment. However, hydrilla fragments exposed to florpyrauxifen-benzyl for less than 72 hours demonstrated viability post-treatment. These findings indicate that the fate of florpyrauxifen-benzyl treated plant fragments can be species-specific. Special attention should be given to treated monoecious hydrilla populations in field scenarios, and the potential of post-treatment fragmentation and distribution should be considered.

† Influence of Sediment and Water Nutrient Concentrations on the Growth of Three *Hydrilla verticillata* Biotypes

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Hydrilla verticillata (Linn. f.) Royle (Hydrocharitaceae) is a submerged aquatic macrophyte and has been considered one of the most invasive aquatic species worldwide since it was introduced to the United States in the 1950s. The proliferation of hydrilla poses significant ecological threats to freshwater ecosystems. Understanding environmental drivers of hydrilla growth is critical for effective control. Among these, nutrient availability in water and sediment remains understudied—specifically for clade C hydrilla, a recently documented hydrilla biotype in the US. This study investigates the impact of varying nutrient concentrations on the growth of three distinct *H. verticillata* biotypes. The study was conducted in a greenhouse, using a 9×3 factorial design to evaluate growth responses of three *H. verticillata* biotypes—clade C, monoecious, and dioecious—under nine nutrient treatments. These treatments combined low and high nitrogen (N) and phosphorus (P) concentrations in sediment and water. Plants were monitored weekly for stem length, branch count, and branch length. Water samples were collected pre- and post-treatment to confirm nutrient concentrations, and biomass was measured at initiation and six weeks after treatment (6 WAT). Preliminary results show that low nutrient concentrations in sediment positively affects the development of stem length for clade C hydrilla ($p\text{-value}<0.05$), with a mean of 6.5cm of growth per week. The results will inform future management strategies for hydrilla in freshwater ecosystems.

† Response of Selected Aquatic Plants to Combination Treatments including Florpyrauxifen-benzyl

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North Carolina State University, Raleigh, United States

Invasive plant management is key to ensuring proper ecosystem function and maintaining use of water bodies. Aquatic invasive macrophytes, such as hydrilla (*Hydrilla verticillata* [L.f. Royle]) can have negative ecosystem and economic impacts on invaded areas. Native species, in contrast, can provide many desirable ecosystem services, such as habitat and food for fish and wildlife, soil stabilization, and improve water quality. An outdoor mesocosm trial was completed at North Carolina State University on dioecious hydrilla, spatterdock (*Nuphar advena*), vallisneria (*Vallisneria neotropicalis*), and waterlily *(Nymphaea odorata*). Plants were treated via a directed foliar spray method with florpyrauxifen-benzyl (30 ppb) in combination with flumioxazin (200 ppb), endothall (1.5 ppm), diquat (0.37 ppm), and bispyribac (20 ppb) with 2, 8, and 24 hour exposure periods. All active ingredients were also tested alone with 24 hour exposure periods. Mesocosms were monitored until 6 weeks post-treatment, and at this time, all biomass was destructively harvested, dried, and weighed. Treatments that were most effective (100% biomass reduction by 6 WAT) for dioecious hydrilla control included florpyrauxifen-benzyl (24 hr), flumioxazin (24 hr), flumioxazin + florpyrauxifen-benzyl (2, 8, 24 hr), bispyribac + florpyrauxifen-benzyl (24 hr), diquat + florpyrauxifen-benzyl (24 hr), and endothall + florpyrauxifen-benzyl (8 & 24 hr). Many of these treatments that effectively reduced hydrilla biomass significantly reduced biomass of non-target species. In general, white water lily was the most sensitive to treatments that included florpyrauxifen-benzyl as evidenced by high stem and leaf epinasty and reduced new growth. When applied alone with a 24 hour exposure period, diquat provided high hydrilla biomass reduction (98%) with limited biomass reduction to non-target species (spatterdock: 16% reduction; vallisneria: 46% reduction; white water lily: 34% reduction).

† Chemical Management of *Azolla caroliniana* as Foliar and Submersed Treatments

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Native floating plant species, such as *Azolla caroliniana* (mosquito fern), often play a key role in their ecosystems; however, these species can also form nuisance populations leading to water quality degradation. In such situations, chemical management often is necessary to control nuisance populations. Because of its growing occurrence as a problematic species, *A. caroliniana* was screened with aquatic labelled herbicides as both foliar and submersed applications. Plants were placed into 18.9 L buckets filled with water and a slow-release fertilizer, and given two weeks to grow. Treatments were applied at maximum and half-maximum label rates; plants treated with contact herbicides were harvested at 8 weeks after treatment (WAT) and plants treated with systemic herbicides were harvested 12 WAT. Herbicide impacts to *Azolla* biomass were statistically analyzed with a mixed-model ANOVA and Fisher's LSD. Generally, foliar treatments of contact and systemic herbicides (except 2,4-D and triclopyr) were effective. Submersed treatments of contact herbicides, (except copper), were effective but among the systemic herbicides, only bispyribac-sodium, florpyrauxifen-benzyl, penoxsulam, imazamox, and topramezone were effective at both rates. These data offer several management options for stakeholders managing nuisance *A. caroliniana* populations.

Vegetation Assessment After an Operational-Scale Herbicide Treatment to Hydrilla (*Hydrilla verticillata*) in the Connecticut River

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In the summer of 2024, operational field-scale herbicide treatments were demonstrated at five locations in the lower Connecticut River to address management of a genetically distinct strain of hydrilla first identified in 2016. Herbicide selection was based on previous site-specific water exchange experiments to address complications with concentration exposure time requirements in tidal systems. Relative abundance of hydrilla and native submersed aquatic vegetation (SAV) were monitored for four months post-treatment. Preliminary results indicated significant reductions in hydrilla abundance, while native SAV was largely unaffected by the treatments.

Establishing Aquatic Herbicide Degradation and *Hydrilla verticillata* Research Projects as Part of a First Year BAA Grant

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There are limited registered herbicides for aquatic weed control in the US, mainly due to the expense in registration associated with potential marketing of either existing or new products. Currently the IFAS

Center for Aquatic and Invasive Plants list 15 herbicides for various aquatic weed control, with ten having registrations in the last 23 years. 2,4-D (1959), endothall (1960), diquat (1962), glyphosate (1977), and fluridone (1986) were some of the first herbicides used. It was 18 more years until triclopyr (2002) was registered which was then followed by imazapyr (2003), carfentrazone (2004), penoxsulam (2007), imazamox (2008), flumioxazin (2011), bispyribac (2012), topramezone (2013), sethoxydim (2017), and most recently florpyrauxifen (2018). Advancing knowledge about the dissipation of herbicides is needed to provide new information as aquatic weeds continue to become a major issue in North America.

Controlled herbicide dissipation and behavior experiments, utilizing a Waters™ UPLC (Acquity H-Class) coupled with a Tandem Quad MS (Xevo® TQ-S micro), are being conducted through collaborative efforts between USDA-ARS, USACE, and the University of Georgia. Additionally, the current establishment of 4 x 0.6 x 0.5 m long, wide, and deep metal troughs, respectively, with continuous flowing water are being used to simulate a flowing stream, allowing us to understand herbicide behavior more accurately. Through the establishment of hydrilla (*Hydrilla* spp.) nursery mesocosms for tuber, turion, and plant production, biological research on each biotype is being conducted. Circular stainless-steel mesocosms are being used to conduct herbicide dose-response studies on whole plants while thermogradient tables are being used to test tuber and turion germination over wide ranging temperatures. The establishment new aquatic weed research with collaborations between the University of Georgia, University of Florida, USDA/ARS, and US Army Corps of Engineers, promotes the basic understanding, and garners information, on how to control aquatic weeds.

Evaluation of Flumioxazin Tank Mixes with Select Herbicides for Cuban Bulrush Control

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During the past decade, the emergent aquatic Cuban bulrush (*Cyperus blepharoleptos*) is rapidly spreading via vegetative and sexual means throughout the southeastern U.S. and outcompeting other invasive plants including giant salvinia (*Salvinia molesta*) and water hyacinth (*Eichhornia crassipes*). Once established, the mono and poly biotypes of this epiphytic sedge are difficult to manage post-flower production with chemical control technologies. To date, most aquatic herbicides have been evaluated as stand-alone treatments; however, limited information exists on the impact of herbicide combinations on either biotype, especially after plants flower and reach maturity. Therefore, mesocosm trials were conducted from June to December 2024 in Louisiana (LA) and Mississippi (MS) to evaluate combinations of flumioxazin (429 g ai ha^{-1}) plus 2,4-D (3,196 g ae ha^{-1}), glyphosate (4,205 g ae ha^{-1}), diquat (1,121 g ai ha^{-1}), or florpyrauxifen-benzyl (29 g ai ha^{-1}) against two mono (LA and MS) and one poly (LA) biotype populations of Cuban bulrush. At 12 weeks after treatment (WAT), all herbicide treatments reduced mono biotype shoot and root biomass (populations pooled) 85 to 100% of the reference. Similarly, flumioxazin combinations with diquat, glyphosate, and florpyrauxifen-benzyl provided 96 to 100% control of the poly biotype shoots (LA population only). However, the combination of flumioxazin and 2,4-D resulted in only a 65 and 45% shoot and root reduction, respectively, by trial end. Future research is needed to evaluate other herbicide combinations and field trials should confirm the findings of the small-scale research.

Using Rhodamine WT Dye as an Aquatic Herbicide Tracer to Quantify Site-Specific Water Exchange Rates in Hydrilla-Infested Tidal Areas of the Connecticut River

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The Connecticut River Watershed, the longest river in New England, is spread over 11,260 square miles and encompasses parts of Quebec and five states. The Connecticut River is a valuable water resource providing drinking water, recreation, and hydropower to millions across the area. In 2016 the rivers integrity was threatened by the discovery of a genetically distinct biotype of hydrilla, a rapidly growing, submerged, invasive weed, in Hartford County. By 2021 hydrilla had spread to over 344 ha along a 113 km stretch of the river, necessitating management. Water movement out of tidal areas, like the Connecticut River, can reduce herbicide half-lives, potentially preventing treatments from achieving the necessary concentration-exposure time requirements to be effective. This study aimed to calculate bulk water exchange at selected treatment sites to inform herbicide selection as well as the bulk water exchange during subsequent treatments. In 2023, Rhodamine water tracer (RWT), an inert fluorescent dye, was applied at 10 ppb to sites and monitored with three to four deployable sondes and as well as six sampling points per site at three different depths with a handheld fluorometer until RWT concentrations reached zero or 10 days after treatment. Results from these studies, presence of non-target species, and state and label restrictions were used to determine herbicide choice for each site. In 2024 RWT was applied and monitored at selected sites using the same methods in conjunction with the herbicide treatments. Handheld sampling points were analyzed using kriging in ArcGIS Pro to visualize dye distribution across the study areas, while sonde data were regressed to estimate half-life times at each site. These half-life times varied significantly between sites, highlighting the variability in bulk water exchange across different tidal zones within the same river system.

Effect of Chilling Duration on Sprouting of Connecticut River Hydrilla Turions

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Hydrilla (*Hydrilla verticillata*) is a highly invasive, submersed aquatic plant, with H. v. verticillata (‘dioecious biotype’) primarily found in the southern United States and H. v. peregrina (‘monoecious biotype’) more common in the north. In 2016, a previously unrecorded subspecies in the United States, H. v. lithuanica (‘Connecticut River biotype’) was reported in Hartford County, Connecticut. A chilling period is required to induce the sprouting of tubers and turions for H. v. peregrina but not H. v. verticillata. This study aimed to determine whether a chilling period is necessary to break dormancy and stimulate sprouting in H. v. lithuanica turions. This study followed a completely randomized design with four replications per treatment. It was conducted in two separate trials: one in Gainesville, Florida, and the other in New Haven, Connecticut. H. v. lithuanica turions were subjected to different chilling durations (0, 2, 4, 8, and 16 days) before being transferred to a 30°C growth chamber with a 14:10 dark:light photoperiod. Sprouting, which was defined as ≥25% elongation and/or root development, was assessed over a 16-day period using ImageJ. Results showed no significant differences in percent turions sprouted across treatments until day 4, but by the end of the study, turions chilled for ≥ 8 days exhibited significantly higher sprouting (>97%) compared to the non-chilled control (73%). Additionally, time to

50% sprouting was reduced in chilled turions (2.6–3.7 days) compared to non-chilled turions (6.9–10.9 days). These findings indicate that chilling breaks dormancy and accelerates sprouting H. v. lithuanica turions, suggesting a potential for increased infestations following cold periods. However, since a large portion of non-chilled turions were able to sprout without a chilling period, it may also pose a threat to areas further south, beyond the typical range of H. v. peregrina.

† Range Expansion Predicted for Cuban Bulrush (*Cyperus blepharoleptos*)

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Aquatic invasive species are a critical threat to native biodiversity and they often impair aquatic ecosystem structure and function. A major goal for natural resource managers is to predict where invasive species will occur on the landscape. This study focused on Cuban bulrush (*Cyperus blepharoleptos*) and makes use of ecological niche models (ENMs) to predict its current and potential future distributions. For this study, ENMs were constructed with Maxent using 1,137 records and five BioClim (BIO1, BIO7, BIO12, BIO14, and BIO15) variables as environmental predictors. Once a best-fit model was selected, Cuban bulrush suitable habitat was predicted across North and South America in three different climate scenarios recent climate (1), best-case future climate for 2040 (2), and worst-case future climate for 2040 (3). The recent climate scenario predicts large, uninhabited portions of the southeastern United States are suitable for Cuban bulrush. Future climate predictions suggest further expansion of the Cuban bulrush ecological niche. These expansions are between 110% and 160% of the current ecological niche. Resource managers should investigate possible incursions of Cuban bulrush in Georgia, South Carolina, North Carolina, Arkansas, Texas, Tennessee, Oklahoma, and Virginia.

Knotgrass (*Paspalum distichum*) Control in Seasonally Drained Wetlands of Mississippi to Improve Waterfowl Habitat

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Knotgrass (*Paspalum distichum*) is a wetland and aquatic grass species that is native to the United States that has invaded many countries around the globe. However, it can be a nuisance species in its home range, particularly in rice production, wetland reserves, and water bodies managed for waterfowl habitat. Most chemical control mechanisms for knotgrass are not labeled for general aquatic use in the United States, thus, the purpose of this series of experiments was to 1) assess systemic aquatic use herbicides alone and integrated with prescribed fire for control of knotgrass and 2) assess rate reductions of each herbicide for control of knotgrass. Imazapyr (0.84 kg ae ha^{-1}), glyphosate (3.03 kg ai ha^{-1}), imazamox (0.56 kg ai ha^{-1}), and penoxsulam (0.04 kg ai ha^{-1}) provided 79 to 97% reduction of knotgrass biomass 12 weeks after treatment (WAT) when compared to non-treated references. For plants receiving herbicides and prescribed fire treatments 12 WAT, a 100% reduction in biomass was evident four weeks later, while prescribed fire alone reduced biomass 88% compared to reference plants. By 52 WAT, biomass reduction was only evident in plants treated with glyphosate and glyphosate + fire (86% and 94%, respectively). Reduced rates of imazapyr (0.42 kg ae ha^{-1}) and glyphosate (0.76 kg ae ha^{-1}) consistently reduced knotgrass biomass 98-99% and 84-97% compared to reference plants, respectively. However, reduced rates of imazamox and penoxsulam did not provide consistent knotgrass biomass reduction 52 WAT. Resource managers should not rely on prescribed fire for long term reduction of knotgrass. Glyphosate was the only herbicide that provided consistent knotgrass control in all experiments. Future work should evaluate other herbicides with differing modes of action and herbicide combinations for control of knotgrass.

† The Impact of Representative Management Interventions on Crested Floating Heart (*Nymphoides cristata*) Reproduction

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Crested floating heart (*Nymphoides cristata,* CFH) is an aggressive aquatic invasive species in the southeastern United States. It spreads primarily through asexual reproduction via ramets, which have been reported to rapidly re-grow post-management actions. Stress induced by mechanical or chemical management may inadvertently stimulate ramet production and hinder long-term control efforts. To investigate this, a mesocosm study was conducted to evaluate CFH response to three management approaches: mechanical removal, a slow-acting herbicide treatment (glyphosate), and a fast-acting herbicide treatment (diquat).

Each management type had eight replicates: four were harvested six weeks after treatment (WAT) while the remaining four were harvested 12 WAT. Visual ratings of leaf coverage (%) on the surface of mesocosms were conducted weekly to assess efficacy over time. At harvest, ramets were enumerated and biomass was dried and weighed. Biomass and ramet reduction (%) were calculated, and data was subjected to ANOVA ($\alpha=0.05$) and mean separation using Fisher's Protected LSD Test.

At 6 WAT, reductions in ramets were observed across all treatments. Glyphosate had the greatest impact, reducing biomass and ramets through 12 WAT. Mechanical treatment produced moderate reductions by 6 WAT, but regrowth nullified effects by 12 WAT. Diquat caused initial injury by 2 WAT, but quickly regrew and was similar to the control thereafter. No treatment triggered an increase in ramet production, suggesting that stress from sublethal control efforts does not exacerbate reproduction in CFH. These results highlight CFH's resilience and rapid regrowth capabilities, underscoring the need for sustained, long-term management strategies for effective control.

† Field-based Monitoring of *Hydrilla verticillata* subsp. *lithuanica* Removal Impacts on Carbon Dynamics in the Lower Connecticut River

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Hydrilla verticillata subsp. *lithuanica* (CT River Hydrilla), an invasive aquatic plant in the lower Connecticut River, forms dense canopies that disrupt native vegetation and alter carbon cycling. In summer 2024, an herbicide treatment by the Army Corps of Engineers provided an opportunity to study the biogeochemical impacts of Hydrilla removal. This NSF RAPID project aimed at system scale monitoring of greenhouse gas dynamics, water chemistry, and vegetation changes across treated and untreated sites. Post treatment results showed a rapid decline in Hydrilla biomass, with positive retention of native species such as *Pontederia cordata* (Pickerelweed) and *Vallisneria americana* (Eelgrass). This was followed by an initial spike in CO_2, likely due to decomposition of the substantial Hydrilla biomass, and a subsequent reset of the daily diurnal CO_2-O_2 cycles. Prior to treatment, the presence of Hydrilla was associated with elevated CO_2 and reduced O_2 levels, contrary to the expected pattern in productive aquatic systems, which typically draw down CO_2 through photosynthesis. This suggests a switch to bicarbonate use and a decoupling of productivity from dissolved CO_2. These findings underscore Hydrilla's role in modifying ecosystem metabolism and greenhouse gas emissions and demonstrate the value of integrated field monitoring for invasive species management.

† Detecting Northern Hydrilla (*Hydrilla verticillata* subsp. *lithuanica*) in the Connecticut River with Satellite Imagery

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The Connecticut Agricultural Experiment Station Office of Aquatic Invasive Species (CAES OAIS) has surveyed freshwater systems in Connecticut since 2004, discovering northern hydrilla (*Hydrilla verticillata* L.f. Royle) in the Connecticut River in 2016. Since then, it has spread to at least six waterbodies in the region, posing significant ecological and recreational threats due to its rapid growth, high adaptability, and ability to outcompete native vegetation. Traditional survey methods to map hydrilla, such as point-intercept surveys, are time-consuming, labor-intensive, and costly. This study investigates the use of satellite imagery and Random Forest classification to develop a more efficient monitoring technique. Using September 2019 Planet imagery with 3-meter resolution, vegetation indices (e.g., NDVI, NDWI, MNDWI) were calculated and used in a Random Forest model to predict hydrilla, no hydrilla, and terrestrial. While the model effectively distinguished land from aquatic vegetation, further refinement is needed to improve hydrilla detection and reduce overclassification. This remote sensing approach shows promise as a scalable, cost-effective method for hydrilla monitoring in complex, mixed-vegetation systems like the Connecticut River.