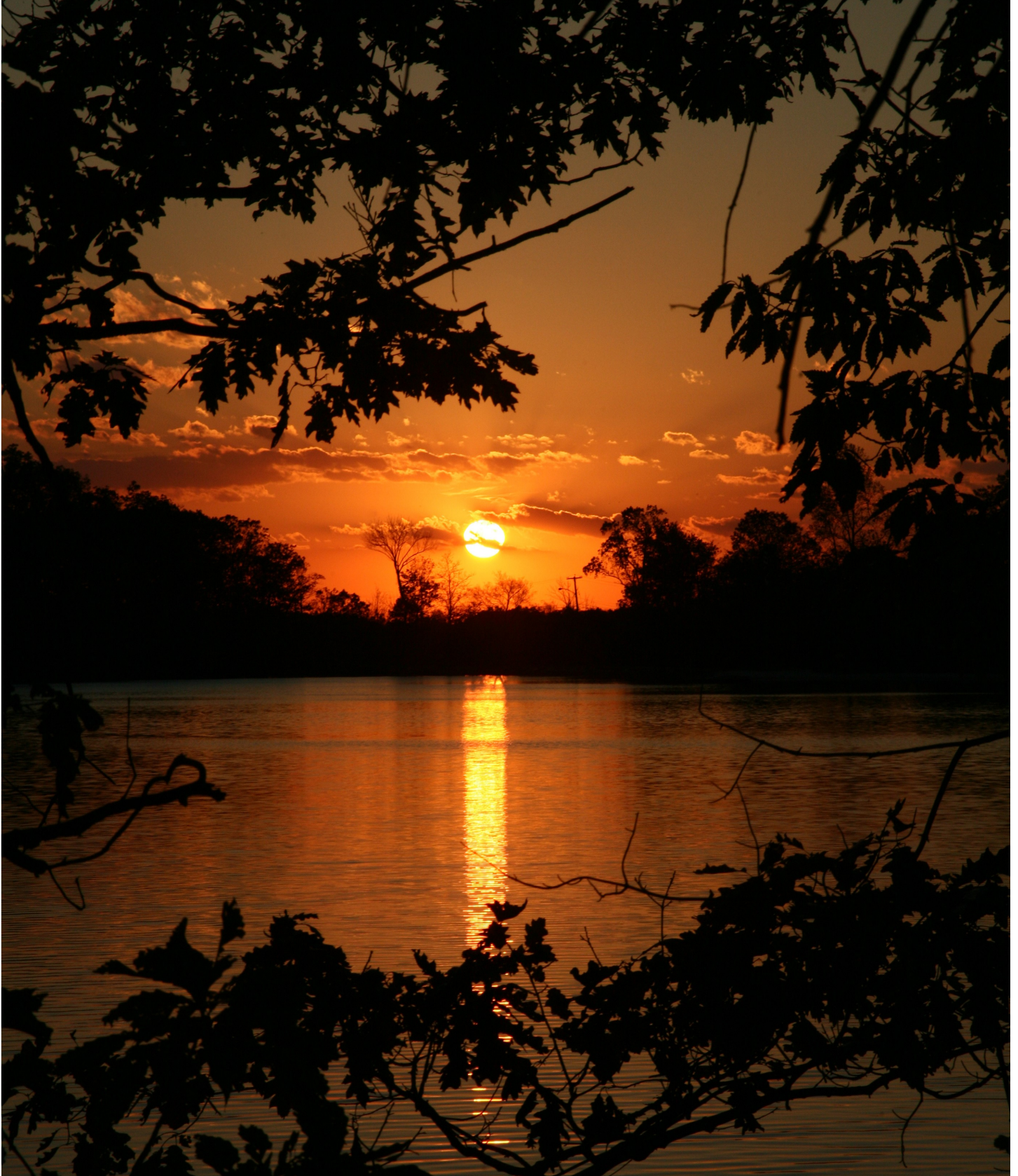




NOR'EASTER

A Newsletter of the Northeast Aquatic Plant Management Society

Volume 19, No. 1



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The Purpose of the Society shall be to assist in the management of aquatic vegetation, to provide for the scientific and educational advancement of the members, to encourage scientific research in all facets of aquatic plant management, to promote an exchange of information among members, and to extend and develop public understanding in the discipline.

Mission Statement, adopted April 20, 1999

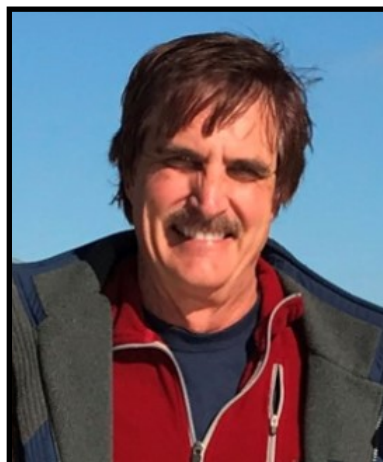
Cover Photo: Forest Lakes (NJ)—Richard Schaars

PRESIDENT'S MESSAGE

GREG BUGBEE

Well, this past year has been something else. The pandemic has caused changes in our personal and professional lives at a pace like never before. In many areas, technology came to the rescue. Telecommuting, virtual meetings, and rapid deliveries of products provided nearly seamless continuation of many of our necessities. Unfortunately, many important personal interactions were suspended, but these have certainly not been forgotten. Social distancing created a reawakening of the outdoors for many, and this should reinforce the need to protect our lakes and ponds. With the likely waning of the pandemic, what will be the “new normal?” Telecommuting and virtual conferencing are probably going to be far more routine than before. While many other groups cancelled their 2020-21 conferences, our 2021 NEAPMS conference organizers moved forward with a highly successful virtual version that was able to attract nearly the same number of attendees and a group of highly acclaimed speakers that would likely not have been possible with an in-person event. I want to express a particular thank you to the many commercial sponsors whose support is so important to our organization. In 2022, our conference plans to return to its in-person format at The Resort and Conference Center at Hyannis on Cape Cod. The Board may need to make some tough decisions on how much can be virtual without losing in-person attendees that would make the physical event impractical. I have full confidence that our highly skilled planners will make the right decisions. We move forward with deep appreciation and gratitude for the efforts of Amy Smagula and Chris Doyle who invested in honing NEAPMS a well-oiled machine have decided to take a well-deserved break from positions on the Board of Directors. Fortunately, both are still going to be assisting the Board and will remain instrumental in the planning and execution of our annual conference. Replacing Amy as Secretary is Meg Modley who comes highly qualified with a resume that includes being a former President of NEAPMS. Thank you so much Meg for stepping up as Amy is a difficult act to follow.

I see NEAPMS as a critical resource for bringing science to the forefront of aquatic plant management and therefore assuring the practices are effective and safe. As I write this, I have been getting a flurry of concerned emails regarding a recent article in the prestigious journal SCIENCE. Initially, the article confirms what we already knew, that cyanobacteria neurotoxins associated with hydrilla were to blame for the deaths of wildfowl, from the Carolinas to Arkansas, including over 100 bald eagles. The more troubling part is the article proposes that the cyanobacteria only produce the neurotoxin when elevated levels of bromide are present and bromide from diquat (diquat dibromide) treatments of aquatic vegetation may be to blame. Could this put a dark cloud over our profession? I hope not, but NEAPMS will be needed to separate fact from



Past NEAPMS Presidents

- Charles Gilbert** (1999/2000)
- Gerald Smith** (2001)
- Gerald Adrian** (2002)
- Jim Sutherland** (2003)
- Bo Burns** (2004)
- Amy Smagula** (2005)
- Larry Eichler** (2006)
- Glenn Sullivan** (2007)
- Marc Bellaud** (2008)
- Bob Johnson** (2009)
- Ann Bove** (2010)
- John McPhedran** (2011)
- John McPhedran** (2012)
- Paul Lord** (2013)
- JoAnn Dunlap** (2014)
- Charles Boylen** (2015)
- Chris Doyle** (2016)
- Mark Heilman** (2017)
- Meg Modley** (2018)
- Will Stevenson** (2019)
- Bin Zhu** (2020)

“I see NEAPMS as a critical resource for bringing science to the subject of aquatic plant management and therefore assuring the practices are effective and safe.”

fiction and reality from perception.

The future of NEAPMS is bright. We have an excellent mix of veteran, seasoned, and new Board members to chart the waters of the “new normal.” Our newest members have brought the society into the age of social media by bringing a NEAPMS presence to the most popular sites such as Facebook and Twitter. Our membership includes an excellent blend of commercial, academic, and governmental entities as well as citizen scientists and other stakeholders who work together for our common cause. Our reserve account is at the highest level in its history and we were able to provide scholarship funds to Kyle Clonan for his work on the fate of cyanobacteria toxins. Continual improvement is the hallmark of successful organizations, and the NEAPMS is working on a comprehensive financial plan, enhancement of student opportunities, expansion of membership, and expanding its mission to include additional organisms.

In January, I took over the role of President of NEAPMS. When I think of the highly talented individuals that preceded me, it is a great honor. Because it was a virtual meeting, I was not able to pound the gavel as Presidents have done before (darn, I was looking forward to that). On behalf of the Board of Directors, I wish you all health and success in the coming year and look forward to seeing you in Hyannis. Together, we will navigate NEAPMS through the “new normal” and be better than ever!

Greg Bugbee

YOUR 2021 NEAPMS BOARD OF DIRECTORS AND OFFICERS



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 CHRIS BOREK	 WILL STEVENSON	 BIN ZHU	 BO BURNS	 ERIN VENNIE-VOLLRATH	 KYLE CLONAN	 SCOTT KISHBAUGH

PICTURES FROM VIRTUAL CONFERENCE



Diatom Algae – (Nitzschia/Navicula)

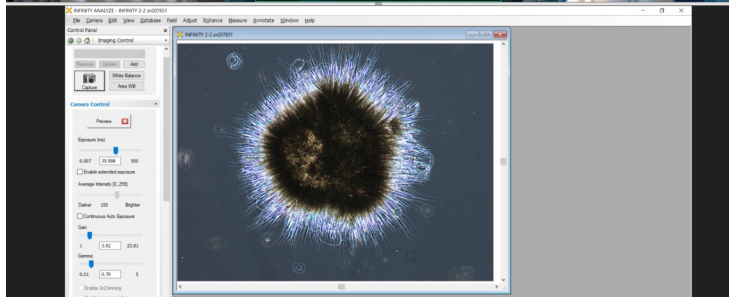


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- ◆ Resistance noted in multiple nuisance blue-greens and greens
- ◆ Usually applied to surface, but can be injected deeper
- ◆ Less effective at colder temperatures

A special thank you to Ann St. Amand for donating her winnings of the raffle to the Student Scholarship fund!
THANK YOU, Ann!



Screenshots from the virtual conference:
Top Left: Ann St. Amand presenting during Algae workshop.
Top Right: Ken Wagner presenting methods of control for algae blooms.
Bottom Right: (left to right) Chris Doyle, Ann St. Amand, and Ken Wagner

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MEET YOUR NEW STUDENT BOARD MEMBER KYLE CLONAN

Kyle is pursuing his master's degree in Earth and Environmental Science at Montclair State University while employed as a Watershed Protection Specialist with the New Jersey Water Supply Authority (NJWSA). Kyle joined the Authority and began his graduate studies in 2018 after working for the Monmouth County Division of Planning and the Delaware DNREC. Kyle earned his B.S. in Environmental Science from Fordham University in 2014, where he aided in research on stormwater filtration effects of different rooftop garden vegetation.

Kyle works on a myriad of efforts for NJWSA including aquatic plant management, phytoplankton monitoring, boat steward programs, data analysis, and outreach through the NJWSA's participation in the River-Friendly Certification programs for businesses, schools and golf courses. Kyle never tires from field work, whether it is on a boat, in a stream, in a freezing cold stream with leaking waders, or entails

crisscrossing New Jersey to deliver samples. He believes NJ is the greatest of the 50 states due to its diversity of lakes, forests, rivers, reservoirs, ocean and bays. He loves nothing more than running the boardwalk and surfing after spending a day tossing rakes in the reservoir.

As Student Director of NEAPMS, he hopes to continue the growth in student attendance at the annual conference. Kyle is also interested in starting a mentorship program, matching students with more experienced NEAPMS members to keep students engaged in the Society and provide an outlet for career development. He has been a member of NEAPMS since 2019 and hopes to be an active member of the society for many years to come.



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MEET YOUR NEW BOARD MEMBER SCOTT KISHBAUGH

Scott Kishbaugh enjoys his life as a babysitter for his first grandchild Margo, father to two sons and a husband, occasional kayaker and aging lake lover, blissfully removed from these challenging times (but also runs the risk of obsolescence as the science of aquatic plant management continues to advance). Scott was a founding member of the Society back in the late 1990s, and served two separate terms on the Board of Directors prior to signing on to this reunion tour.

Prior to his retirement after nearly 34 years working for the New York State Department of Environmental Conservation (NYSDEC) in 2019, he was chief of the Lake Monitoring and Assessment Section for the previous decade. He handed off the reins of the Division of Water AIS and water quality monitoring and management activities in 2019, the NY Citizens Statewide Lake Assessment Program (CSLAP) in 2018, and the NY HABs program in 2015. Scott was the principal author of two editions of Diet for a Small Lake: A New Yorkers Guide to Lake and Watershed Management, the water chestnut chapters in several editions of the AERP BMP manual, and thousands of CSLAP and other lake reports. Scott worked with lake associations, agencies, lake managers and others to promote sound lake and aquatic plant management actions for his entire career. He received his B.S. and M.S in Environmental Engineering from Cornell University at a time when many NEAPMS members were not yet born, but somehow still thinks of himself as 'not that old'. Scott suffers each year as his beloved hometown Philadelphia Phillies find innovative ways to lose.



Scott hopes to find ways to contribute to outstanding work of the Society, with a focus on developing standardized methods for evaluating and assessing lake floral quality, sharing data, white papers, and minor research within the Northeast region, and continuing to build partnerships within the entirety of the aquatic plant management community. And finally get some sleep.



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MEET YOUR NEW BOARD MEMBER ERIN VENNIE-VOLLRATH

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YouTube: @NEAPMS



Erin is the New York State Department of Environmental Conservation's Lake Champlain Coordinator. She is a member of the NEIWPCC/Lake Champlain Basin Program team that works to provide ongoing coordination and collaboration with all NYSDEC program areas to achieve the goals of the Lake Champlain Basin Program. In her role, she engages with aquatic invasive species for a variety of projects, but the main one is overseeing New York's portion of mechanical water chestnut harvesting in the southern bay of Lake Champlain.

Erin began working on aquatic invasive species during undergraduate school in the lab of Jake Vander Zanden at the Center of Limnology, University of Wisconsin-Madison. After earning her B.S. in Zoology, she spent two years as a Peace Corps Volunteer in Madagascar working on agriculture and environmental issues. She returned to the UW-Madison for a M.S. in Water Resources Management, during which she also volunteered at the River Alliance of Wisconsin and began working at the Wisconsin Department of Natural Resources on aquatic invasive species monitoring and rapid response. Becoming the Aquatic Invasive Species Coordinator for The Nature Conservancy's Adirondack Park Invasive Plant Program brought Erin to the Adirondacks in northern New York, where she has lived now for over six years. She has been a member of NEAPMS since 2015. Much of Erin's time outside of work is spent on the small farm she owns with her husband where they grow vegetables for their local community and raise chickens, turkeys, llamas, goats and two young children.



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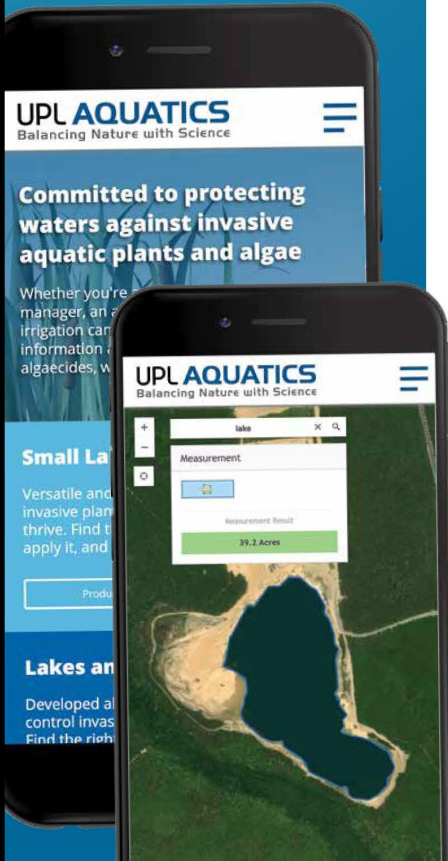
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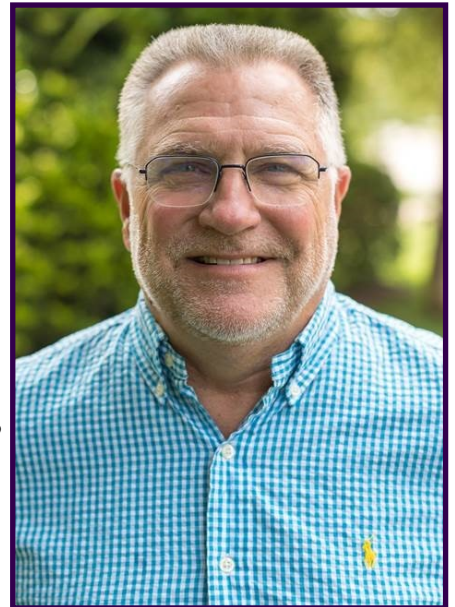


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MEET YOUR NEW BOARD MEMBER / VP BO BURNS

What an honor to be considered and accepted as another board member and vice president to the Northeast Aquatic Plant Management Society. I believe I know a large majority of the membership as I have been involved with the Society since its inception. For all those newer members, which I may not know I truly look forward to meeting and interacting with all of you. I hold this Society very close to my heart and it has been a big part of my 35 years working in this industry. Having served time on the board in the past and even served as a past president has been a real honor for me as I see this Society as a very professional Society which serves the best interest of our environment and especially our waters.

I have worked many different jobs over the last 35 years but all within this same industry and environment of aquatic plant management/vegetation management. Some of those job changes were my decision and some were made for me but the bottom line is, it has brought me a lot of experience in a lot of different aspects of aquatic plant management. I am truly looking forward to working with so many new younger people to learn from them and help provide them with the experiences I have gained from so many great aquatic plant managers before us. Wishing everyone a safe and happy 2021.



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AQUATIC PLANT SPOTLIGHT:

EUROPEAN FROGBIT (*HYDROCHARIS MORSUS-RANAE*)

Erika Haug
North Carolina State University

European frogbit (*Hydrocharis morsus-ranae*) is a perennial, stoloniferous, monocot that has invaded large parts of the northeastern US and Canada^{2,3,7,8}. It is native to Europe and northern parts of Asia⁸. *H. morsus-ranae* is a free-floating aquatic species, however, its roots can grow to be nearly 50 cm long and are able to extend into soil to anchor the plants in place in shallow water^{2,5}.

The leaves of this species are entire and heart shaped with a cordate base². When immature or uncrowded, the leaves of *H. morsus-ranae* tend to lay flat on the water's surface⁵. However, as plants mature and with increased crowding, the leaf angle increases, and the leaves emerge arranged in a rosette⁵. Leaf petiole lengths are quite long with a maximum length of 14 cm and average length of between 6 and 8 cm². Leaves are thick and fleshy⁶ and remain upright due to ribs of thickened non-lignified cells and cellular turgor pressure⁵.

Both staminate (male) and pistillate (female) flowers consist of three white petals with a yellow center^{2,4,6}. The male flowers arise from a spathe

with two-bracts, each with a long peduncle. Conversely, the female flowers arise singularly from a peduncle^{2,4}. The plant is considered mostly dioecious, given that the male and female flowers rarely occur on the same rosette^{2,5}. Interestingly, the male and female flowers can occur on ramets arising from a rosette of the opposite sex and studies have observed turions of one sex producing plants of the opposite sex the following season². These observations possibly indicate that the plant may be considered monoecious².

Despite both male and female flowers being present in the US and Canada, seed production is not the primary means of reproduction for *H. morsus-ranae*^{2,4}. Rather, in the summer months the plant spreads primarily through the stoloniferous growth of up to ten ramets per sprouted turion. Each of these ramets can produce up to ten turions that fall^{2,4}. The turions, or modified buds, are produced on the ends of stolons². In the fall, an abscission layer is formed, and these modified buds fall to the sediment surface where they remain dormant until spring⁵. Turions can remain dormant and viable for up to two years⁵. Under favorable conditions, turions

will float to the surface in the spring and sprout⁷. Sprouting does require a chilling period and appears to be stimulated more-so by favorable light conditions than by temperature⁷.

The prolific vegetative reproductive capabilities of *H. morsus-ranae* through ramet and turion production are extremely important factors in the increase in density and distribution within an aquatic system. It is thought that the species primarily spreads by water flow movement of ramets or floating turions^{1,2}. Other proposed modes of distribution include wildlife and waterfowl movements, "hitchhiking" on motorboats and unintentional release from water gardens or cultures^{1,8}.

A wide range of habitats are suitable for *H. Morsus-ranae* including both lentic and slow-moving lotic systems such as ponds, marshes, roadside ditches, canals, and the backwaters of lakes and rivers^{1,2,8}. European frogbit can tolerate up to 2ppt salinity⁵ and therefore can invade lower salinity marshes. Terrestrial forms in saturated soils have been induced in experimental settings but are not considered common in nature⁵. In Canada, this species has invaded along much of the St. Lawrence River System and spread from there to impact many regions within Ontario and Quebec^{1,2,7,8}.



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“ [In] hopes to advance the understanding of lacustrine CyanoHAB causes.”

Past Student Directors

Kara Foley (2019)

Emily Mayer (2020)

It has spread into the US invading south through New York, New Jersey and parts of Vermont including Lake Champlain and the Mettawee River^{6,8}. The species has also been observed in several locations in Michigan, Ohio and Pennsylvania and single observations have been made in Maine and Washington state⁸. The negative impacts of an invasion by European frogbit are similar to that of other invasive floating aquatic plants. The species forms dense mats which can shade and outcompete native aquatic plant species^{2,8}. These mats can also slow waterflow and impede wildlife and recreational uses of the waterbody^{2,8}. Please keep an eye out for this invader in the upcoming field months!

Citations:

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Student Scholarship Spotlight

Kyle Clonan, Watershed Specialist NJWSA & Grad Student at MSU

Kyle Clonan, the recipient of the NEAPMS 2021 graduate student scholarship and current NEAPMS Student Director, aims to complete his master's thesis at Montclair State University during the fall 2021 semester. Kyle is currently collecting data for his thesis, which will focus on the downstream fate & transport of cyanotoxins from lacustrine sources.



Data for his thesis is being collected as part of a larger study between the United States Geological Survey, the New Jersey Water Supply Authority, the New Jersey Department of Environmental Protection, and Montclair State University. This team is tracking the transport of cyanobacteria and cyanotoxins from three headwater lakes and reservoirs to downstream drinking water intakes in the Raritan River Basin, where the upstream sources converge to serve 1.5 million people drawing water from the Lower Raritan River. Each of the sites are analyzed for dissolved microcystin by ELISA for both passive SPATTs (Solid Phase Adsorption Toxin Tracking passing samplers) and discrete water samples taken throughout the year. SPATTs are deployed and retrieved in coordination with discrete sampling events. Each discrete sample is also analyzed for cyanotoxins, phytoplankton community composition, phycocyanin, chlorophyll-a, and a variety nutrients and water chemistry parameters. Additionally, every site is paired with a USGS real-time gage, seven of which include phycocyanin and chlorophyll-a.

Kyle's research, in addition to the larger team effort, hopes to advance the understanding of lacustrine CyanoHAB causes, prevention, monitoring and management; few studies have examined cyanobacteria and cyanotoxins travelling from lacustrine CyanoHAB through fluvial systems used for potable water supply. The persistence of cyanobacteria and cyanotoxins during downstream transport from upstream lakes and reservoirs is not well quantified nor are the mechanics well understood. Information on downstream transport of cyanobacteria and cyanotoxins holds ramifications for downstream waterbody managers and users, especially drinking water intakes. In light of being awarded the NEAPMS 2021 graduate student scholarship, Kyle is thankful to everyone who has ever bought a NEAPMS raffle ticket. The award is going a long way to aid his degree completion. Kyle hopes lake and freshwater management professionals of NEAPMS will be able to use information from the study to guide the design their own toxin sampling plans. He and others from the project team look forward to sharing their findings at future NEAPMS conferences.

What is the purpose of the Words of Wisdom column? - An expert shares their journey of how they got into the lake management industry and provides advice to students/ young professionals entering the limnology field.

“The best practical advice I could give to a perspective intern in the field of lake management: Never stop learning!”

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Words of Wisdom From: Chris Doyle, CLM

Chris Doyle, Naiad Consultants

Once upon time, when I told folks I was a lake manager, it would often generate the obligatory, “What’s a Lake Manager?” response. I would go on to tell them it’s a lot like Limnology (quickly followed by an explanation of Limnology). And really our field shares many parallels with Limnology. Limnology is the study of aquatic ecosystems, and combines the following scientific disciplines are: biology, chemistry, physics and geology. As an aside, I’d also add the social science discipline in there due to stakeholder interactions which are common while managing natural resources. And unless you attended SUNY’s Lake Management Program for your post graduate studies, you likely came from one of these varied scientific disciplines before embarking on the journey of a Lake Manager. Indeed, I had many colleagues from a wide range of scholastic backgrounds over the years. I’ve worked with chemists, geologists, fishery scientists, marine biologists, and ecologists.

My journey to Lake Management started at Cook College, Rutgers University, for my undergraduate studies in Environmental Science (briefly), before settling into the Natural Resource Program. My focus was fisheries science, but I had a keen interest in aquaculture. The best part of my undergraduate program was a required semester (or summer) internship. It was a graduation requirement! I had two choices: I could work at the state-run trout hatchery for no pay, or take a paid internship at a private toxicology lab that had an aquatic culture department. Although my preference would have been the Hatchery, my bank account pointed me toward the paid position. That choice likely shaped the direction of my career, as I would spend decades in the private sector. If I “put in my time” at the State Hatchery, I likely would have ended up as State employee (eventually).

I learned more practical science in that three-month internship than in my entire college career (I’m looking at you, poetry class!). After ten years in an aquaculture laboratory, and a brief stint as a Stay-at-Home Dad, I found my way to a small lake management firm in Northern New Jersey. Our small but dedicated full-time staff relied on seasonal hires to accomplish all of the busy field season tasks. Although some seasonal employees returned from season to season, we often used interns to fill in the workload gaps.

In my opinion, internships are crucial to identifying the next generation of Lake Managers. Let’s be honest, this career is not a 9 to 5 job in an office building. Many potential candidates during interviews claim that they want to work outside all the time. But do they, really? Even when it’s 95° F and humid with no shade on the water, or in the wind and rain to “get the data collected”. Or tuber sampling in November when the spray of the boat is freezing on the deck. It’s not all 70s and sunny during a short field season in the Northeast. And don’t get me started about the travel to and from the project sites, often requiring leaving the house hours before sunrise, and getting back hours after the pot roast has cooled. The best way to determine if a colleague has the passion and dedication to “make it” in this field is to actually have them experience it for a growing season. And when you identify the “keepers”, it is imperative to mentor them, challenge them, and reward them, as appropriate.

The best practical advice I could give to a prospective intern in the field of lake management: *Never stop learning!* Any field of science is constantly moving forward and advancing, usually at a pace that seems impossible to keep up with when you have a full-time career. Lake management is no exception. Fortunately, we have many continuing education options available aside from advanced collegiate studies. Workshops and training sessions are readily available, some provided by professional societies, others from colleges. Rutgers University has offered a Short Course in Lake Management annually for decades. Professional conferences often host workshops, in addition to providing an opportunity to work on social interaction skills via oral or poster presentations. Even manufacturers in our industry offer valuable training courses, often featuring new products or applications. But you need to *want* to learn. And keep learning, as your supervisor will not always push you!





“A mentor is someone whom you can seek advice from and who can coach you through your career goals.”



Picture: Chris Doyle and Emily Mayer search for hydrilla tubers in the Croton River.

Another suggestion would be to identify a mentor and shadow them, especially regarding tasks that are not your responsibility. Just because you have limited client or government regulator interactions doesn't mean you will never find yourself in that situation. Attend client or municipal meetings, sit in on a Board of Directors meeting, develop the pricing for a project, or learn the procurement process for the government Request for Proposal. You might not need to understand these processes or skills today, but maybe someday.

It all starts with a willingness to get out of your comfort zone and apply yourself to becoming a well-rounded scientist. And a willingness to continue to learn long after you've paid off your student loans. The opportunities are out there. But it is your responsibility to seize them, like a rare aquatic plant fragment just out of reach!

Finding Your Way to a Lakefront-Career

Emily Mayer, Biology Project Manager/ Senior Aquatic Biologist, SOLitude Lake Management

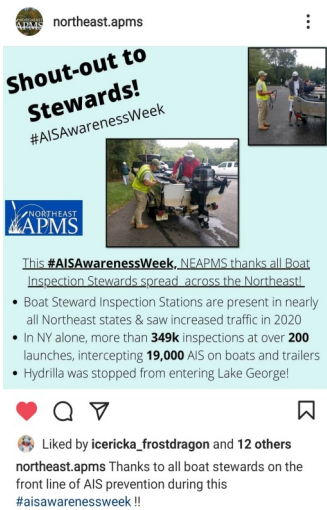
A question from the crowd at a career panel session was directed towards me, “how did you know that this industry existed? That lake management was a “thing”? My answer: “I didn't know, but I discovered it existed through an internship.” I proceeded to tell my journey of how I became a biologist in lake management. I sent an email to a small environmental consulting firm and thought nothing of it. I had just been fulfilling a high school requirement so I could finally leave the small town behind and travel the world! Little did I know that sending that email would change my life, I had no idea what I was in for, that's for sure.

On the first day of my internship, I hopped in the truck with Chris Doyle, who would be my mentor moving forward. We visited Estling Lake in Denville, NJ before heading to Mountain Lakes for our usual routine sampling regime. Over the following months, I asked Chris LOTS of questions—probably too many. He trained me in field sampling techniques, plant identification, survey skills, algae identification and more. Most of my time was split between sitting in front of the microscope in the closet-sized lab and on lakes in the fresh air. I presented my small study of zooplankton and phytoplankton populations of several NJ lakes to my class and mentors in the room. At the time, I was not quite 18 years old yet and was asked by Chris to keep in touch as the consulting firm often hired seasonal biologists for the summer and that they may be able to hire me. I kept in touch, but that summer they weren't looking for anymore seasonal biologists, so I enjoyed the freedom of my last summer in 2011.



In 2012, I was hired on by the consulting firm as a seasonal biologist, with Chris as my supervisor, which continued every summer throughout my college years. I had a blast every year learning more and more about the industry, hearing about conferences like NEAPMS, NALMS, (which I eventually started attending) and what they were like. I was told stories about other colleagues' adventurous work days or lives. Overall, I did not have it all figured out—a frequent common misconception when I speak to other young professionals or students about my career path. I found some golden nuggets of advice and tips that I picked up along the way that I hope will help other young professionals in their career journey (and can be applied to other industries as well):

- **Internships:** Whether or not the internship is paid, you cannot replace the valuable experience and skills you will learn on the job. This can help your resume stand out when applying for colleges, help you seem unique amongst other candidates when it comes to job interviews at companies and for advanced college applications. It is a way for you to “dip your feet in the water” to see if you like this area of interest, if it became a job. Even as an intern, don't be afraid to go the extra mile, and work the extra hours. It will hopefully be recognized in the future. This is also an opportunity to build connections and network.
- **Find a Mentor:** How does one find a mentor? Well, you don't find one off of Amazon; and even if you do Google it, you don't really get a clear answer. What is a mentor anyway? A mentor is someone whom you can seek advice from and who can coach you through your career goals. Typically, a mentor cares about your career growth and development, both professionally and personally. A mentor is not only there to support you throughout your career, but you are there for them as well (especially when getting an employee's perspective on situations if the mentor is your manager). A mentor can be your manager at work, a college advisor, a professional you've asked for advice on LinkedIn or a colleague you've met through an internship.
- **Attend Conferences:** Not many students are told about conferences at secondary education institutions or even realize there is an opportunity to be found there. However, more universities are starting to incorporate this into their curriculums or offering it as an optional trip. Take advantage of this! Often times there are sessions or workshops held on resume building/reviews from the experts that can help guide you. They have connections to potential internships or seasonal work!



- **Networking:** Build your connections! I cannot emphasize enough how important this is. Maybe right now you're thinking that guy in your chemistry class is never going to help you during that lab. Sure, maybe not in that moment, but if you become good friends and then six years later you're interviewing at a company—the same company he works at—hopefully he can put in a good word for you. See how that works? Or you work well with your clientele and have an established good rapport. Not only will this help build your reputation, but your connections overall.
- **Volunteer for Non-profits:** Similar to an internship, get involved in your local HOA (Homeowner's Association) or lake association. They may work with an environmental consulting firm that you can connect with or you might hop on the boat with them to conduct some CSLAP monitoring, etc. Or those conferences you may have attended could have openings for an editor, social media manager, student ambassador or student director positions to be part of the board and connect with working professionals.

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“If you were a lake or resource manager, could you easily search for students with expertise to recruit for internships, employment or graduate programs?”



Figure 2. Lauren Knose conducting a fish survey in a local stream near Middle Tennessee State University, Murfreesboro, TN.

NALMS: Connect Through an Interactive StoryMap

Lauren Knose, NALMS Student Director

When I sit on this row boat in the middle of the lake, rocking in the slight breeze with the warm sun on my shoulders, I look around and think of what an amazing “office” this is. Like many other graduate students in the field of limnology, I study inland lakes and how they are changing over time. This means I row out to the middle of Lake Lacawac, at the Lacawac Sanctuary and Biological Field Station in Northeast Pennsylvania, during the summer to collect information on the physical, chemical and biological conditions of the lake. I often think of how aquatic science and management was not on the list of careers, provided by my high school guidance counselor, for students interested in science. My high school was located within two miles of Lake Springfield (Springfield, Illinois), a 4,200-acre reservoir used in electricity generation, drinking water, and recreation. Yet, there was no educational connection between my high school and the lake. The lake still remains a dominant and influential feature of the region, yet I often wonder who is studying the lake and what academic programs in the region provide opportunities for students to study issues related to lake ecosystems and management.

As readers of the Nor’Easter, you are likely already aware of the different aspects lakes and other aquatic ecosystems impact your life and community. But, can you easily summarize where there are academic programs that study lakes or issues related to lake management, or know where to go to connect with

fellow students who are studying aquatic systems? If you were a lake or resource manager, could you easily search for students with expertise to recruit for internships, employment or graduate programs?

The North American Lake Management Society (NALMS) is working to address these needs by highlighting and mapping students and academic programs across North America that are focusing on lake science and management, using a StoryMap developed through the ESRI ArcGIS platform. The NALMS Student StoryMap features an interactive map of students and academic programs involved in lake science and management in North America and showcases their work (Figure 1). The StoryMap will be housed on the NALMS student member webpage, open to the public, and updated periodically. NALMS members and affiliates can search the map by region, academic level, or research topic to find academic programs, students and their stories, and any contact information provided by the students. The goals of the NALMS Student StoryMap are 1) to increase visibility of

NALMS students and the great work they do, and 2) help connect students that share the same interests with each other and potential mentors and employers.

Lauren A. Knose is a PhD student with the Williamson Global Change Limnology Laboratory at Miami University, Oxford Ohio (Figure 2). The Williamson lab at Miami University has been studying lakes in the Pocono region of Northeast Pennsylvania since 2005. The North American Lake Management Society (NALMS) is a non-profit organization dedicated to forging partnerships among citizens, scientists, and professionals to foster the management and protection of lakes and reservoirs for today and tomorrow. If you are interested in becoming a member of NALMS, please visit www.nalms.org.

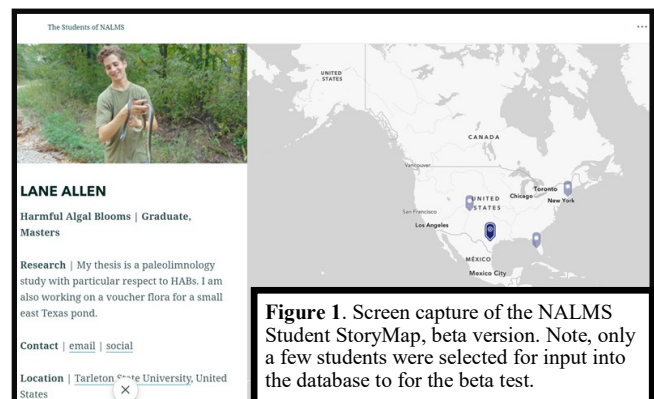


Figure 1. Screen capture of the NALMS Student StoryMap, beta version. Note, only a few students were selected for input into the database to for the beta test.



FROM THE WEB TO THE WATER UPDATES

Victoria Thiel, Seasonal Biologist, SOLitude Lake Management

From the Water to the Web is mini window into the depths of the internet retrieving lake management-related updates that have been or are currently going on in the world. These are a few excerpts of events that have occurred early this spring (2021).

• **Zebra Mussels Found in Aquarium Moss Balls:**

A destructive invader hides inside this adorable aquarium plant! Zebra mussels have been reported hitching a ride on the most recent shipment of moss balls, according to U.S. Fish and Wildlife service. Zebra mussels (*Dreissena polymorpha*) are originally native to the Black, Caspian, and Azov Seas. Since 1992, zebra mussels have been identified as an invasive species of North America. The larval mussels were introduced to the Great Lakes via the ballast of a commercial cargo ship traveling from the Black Sea. Invasive zebra mussels cause major biofouling by colonizing inside of water supply pipes.

Moss balls are rare form of growth of the filamentous green algae species *Aegagropila linnaei*. They are a popular aquarium plant to keep due to their low maintenance and unique appearance. Recently, moss balls purchased from pet stores have contained zebra mussel larva. Nationwide alerts have been issued to the public. Consumers that have purchased these moss balls are urged to destroy their algae balls before properly disposing of them. Moss balls can be destroyed by either freezing, boiling or chemically treating them with bleach or vinegar. The moss balls should then be placed in a sealed plastic bag before being disposed. After proper disposal, a thorough cleaning of the tank and its accessories must be performed as well. This includes destroying and disposing of any other aquatic plants in the aquarium. The most effective methods for disinfecting an aquarium have been hot water, salt water or bleach. The press release occurred around March 9th, 2021 when this was discovered.

• **Aquatic Societies Request Implementation of Science-Based WOTUS Rule:**

In mid-March, the Consortium of Aquatic Science Societies (CASS) sent a detailed letter to President Joe Biden urging the re-definition of WOTUS (Waters of the U.S.). The list of societies includes American Fisheries Society, Association for the Sciences of Limnology and Oceanography, Coastal and Estuarine Research Federation, Freshwater Mollusk Conservation Society, International Association for Great Lakes Research, North American Lake Management Society, Phycological Society of America, Society for Freshwater Science, and Society of Wetland Scientists. Under the Navigable Waters Protection Rule (NWPR), WOTUS became more narrowly defined which resulted in the loss of protection for millions of stream miles and acres of wetland.

Now that the Biden Administration has issued Executive Order 13990 to “listen to science”, the CASS is urging the Administration to define WOTUS as a science-based term again. More than half a century of scientific research has demonstrated how the integrity of “traditionally navigable” waters fundamentally depends on ephemeral, intermittent, and perennial streams as well as wetlands. This covers water-bodies both within and outside of the floodplains of “traditionally navigable” waters. WOTUS is already at risk from climate change and intensive land use such as agriculture, livestock grazing, forestry, mining, and urbanization. Research has also shown that climate change is warming rivers, lakes, streams, and wetlands as well as significantly altering precipitation patterns across the United States.

How Are We Doing?

What do you think of our newsletter? Please forward any suggestions, or if you would like to contribute an article or update to an upcoming newsletter, to:

Emily Mayer
(emayer@solitudelake.com)

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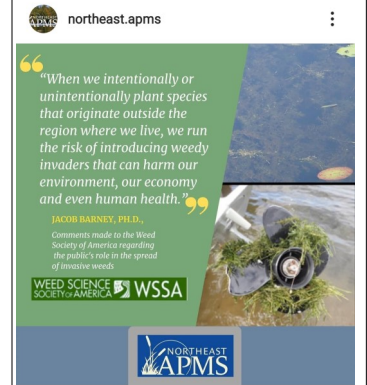
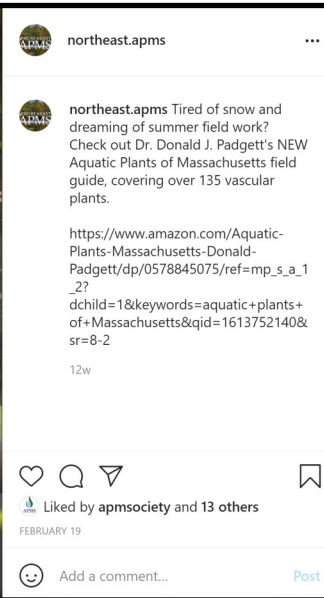
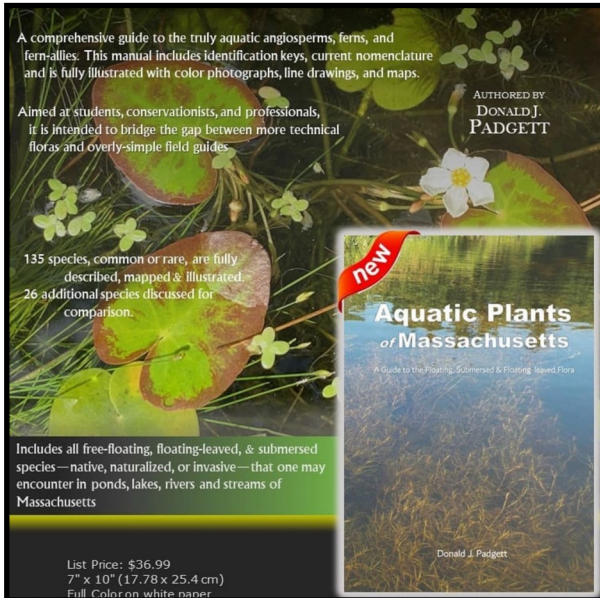
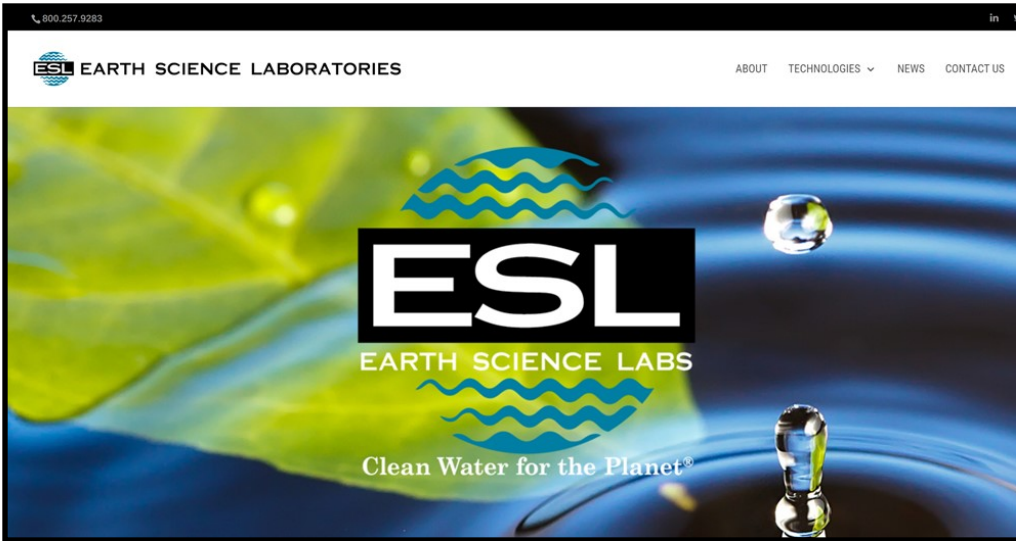
The CASS explains that these changes are accelerating and intensifying water-quality problems, altering the functions of aquatic ecosystems, and are impacting species' survival.

• **Rover Perseverance Landed in a Lake on Mars?:**

On February 18th, 2021, the NASA rover named Perseverance successfully landed on Mars. The mission is to find evidence of Martian life but not the "little green men" kind. The chosen landing zone was once the home of an ancient river delta, now known as the Jezero Crater. According to visual evidence, scientists believe that the Crater used to be an ancient lake. Videos displaying Perseverance's mission pathway show high shore banks that flank the clay deposits of the river delta. Back on Earth, scientists have found similar clay in the Mississippi River delta, where microbial life has been found embedded in the rock. Perseverance will collect a variety of Martian sediment samples over its two-year mission.

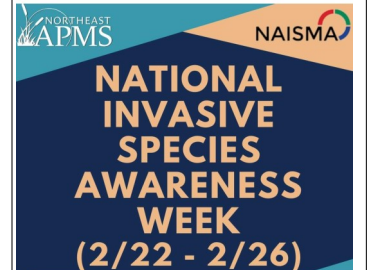
Citations:

- Aquatic Science Societies Call on Biden Administration to Restore Science-Based WOTUS Rule. (2021, March 18). Retrieved March 29, 2021, from <https://fisheries.org/2021/03/cass-wotus-letter-to-biden/>
- <https://www.dec.ny.gov/press/122505.html>
- <https://www.fws.gov/fisheries/ANS/zebra-mussel-disposal.html>
- <https://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=5>
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- <https://mars.nasa.gov/mars2020/mission/science/landing-site/>



Liked by icericka_frostdragon and 13 others
 northeast.apms The Weed Science Society of America (WSSA) cautions to "think before you act" and offers six tips to protect against the spread of invasive species—including promoting native species, checking yourself and your equipment for "hitchhikers", and reporting detections through EDDMapS and Wild Spotter. Copy the URL below to see their Press Release with all the details!

North East Aquatic Plant Management Society-NEAPMS
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 Don't forget its national invasive species awareness week! Check out this link where webinars will be held every day this week: <https://naisma.org/programs/professional-development/webinars/>
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 November 15-18, 2021
<https://www.nalms.org/nalms2021/>

FAPMS Conference
 Daytona Beach, FL
 2021 Conference Dates & Location TBA
<https://fapms.org/conference/2021-conference/>

TAPMS Annual Conference
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 The Stella Hotel
 November 15-17, 2021
<https://www.tapms.org/2021-annual-meeting/>

SCAPMS 41st Annual Conference
 North Myrtle Beach, SC
 Ocean Drive Beach and Golf Resort
 October 6-8, 2021
<http://www.scapms.org/meetings.html>

Phycological Society of America 75th Annual Meeting
 Virtual
 July 13, 15, 20, and 22, 2021
<https://www.psaalgae.org/meetings/2021/6/1/psa-2021-virtual-meeting>

NWQMC 12th National Monitoring Conference
 Virtual
 April 19-23, 2021
<https://www.nalms.org/2021nmc/>

Society for Freshwater Science 2021 Annual Meeting
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<https://freshwater-science.org/annual-meeting-info>



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