

## Breakout sessions

*Thank you to our funders who make our research possible! All projects are funded by the Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources and private donations, unless otherwise indicated.*

### The results are in: Estimating AIS risk for Minnesota lakes

*Nick Phelps*

Quantifying the likelihood of AIS invasion can be useful for prioritizing intervention, resource allocation and surveillance. For the last four years, MAISRC researchers have been working to answer the questions 'Can the AIS get there?' and 'If it does, will it survive?' We will present answers to those questions and rankings of all lakes in the state, with a demo of online tools for use by managers. We suggest attending Bob Haight's session, *Locating boat inspection stations on Minnesota lakes*, after this session as they complement each other.



### New findings on new invaders: the latest on starry stonewort spread and hybrid watermilfoil behavior

*Dan Larkin and Wes Glisson*

Come learn about our latest findings on the potential for spread of the invasive alga starry stonewort and how hybrid watermilfoil's growth patterns compare to those of its native and invasive parents.



### Engineering the carp genome: A new paradigm for the control of invasive species

*Samuel Erickson*

Recent developments at the cutting edge of genetic editing technology promise a new world of tools for invasive species control offering reliability and economic feasibility while simultaneously protecting the environment from off-target impact. I will discuss Synthetic Genetic Incompatibility (SGI), a novel biocontrol method in which "sterile" carp are bred in captivity and strategically released in the wild. A MAISRC-supported, unique breeding facility has been established to facilitate the year-round experimentation required to develop and demonstrate this technology in an aquatic invasive species.



## Public participation in aquatic invasive species solutions

*Megan Weber*

MAISRC has partnered up with University of Minnesota Extension to bring new opportunities for volunteerism, citizen science, and education across Minnesota. We'll provide information and updates on our programs launched in 2017 (AIS Detectors and Starry Trek) and chat about how our pilot season with our citizen science program focused on invasive aquatic plant management, AIS Trackers, has gone. We've opened up fun educational opportunities this year to anyone, including floating sessions to learn about starry stonewort and behind-the-scenes tours of federal research facilities and infrastructure. There is something for everyone in our offerings. Learn more about how anyone, including you, can become part of the aquatic invasive species solution in Minnesota here.



## An air curtain coupled with sound can block over 98% of invasive carp passages in the laboratory

*Peter Sorensen and Clark Dennis*

Several types of acoustic deterrents are currently being considered for placement at locks and dams in the hopes of preventing the spread of invasive bighead and silver carp. This talk will discuss which acoustic stimuli are most promising to deter invasive carp while still allowing native fish passage.



## What's new at MAISRC?

*Abdenour Abbas, Jessica Kozarek, and Amit Pradhananga*

Attend this session to hear an overview about MAISRC's newest projects, just launched this summer. Abdenour Abbas will discuss a novel technology for eDNA collection and concentration; Jessica Kozarek will talk about early detection of zebra mussels using multibeam sonar; and Amit Pradhananga will go over an eco-economic analysis of ecosystem services.



## Findings: are zebra mussels hiding in the nooks and crannies of your boat?

*Adam Doll*

This talk will focus on the results of a two-year study that collected residual water from recreational equipment to determine if zebra mussel veligers were present. The second phase of this project studied veliger mortality by conducting laboratory live well and ballast tank mortality trials in order to better understand the risks associated with moving recreational boats containing residual water from one body of water to another. (Funding provided by the Brunswick Freshwater Boat Group, the Brunswick Public Foundation, and Tonka Bay Marina with in-kind support from the Minnesota DNR.)



## **New common carp management techniques: selective toxins and Whooshh**

*Przemek Bajer and Peter Hundt*

This session will describe two innovative methods for managing common carp, which dominate fish biomass and degrade aquatic ecosystems. We will talk about: 1) using a species-specific corn-based bait to deliver a biological toxin to control carp without harming native species and 2) our novel use of a conservation tool – the “Whooshh” system, repurposed as an automated carp cannon – to remove carp as they migrate between lakes to spawn.



## **Managing zebra mussels: developing treatments to eradicate localized populations and evaluating low-dose copper treatments**

*Jim Luoma*

Summary results and insights gained from a comprehensive, laboratory-based study that was conducted to evaluate the use of four potential toxicants for the eradication of localized zebra mussel populations at various water temperatures will be discussed. Additionally, the project plans for a study that will be conducted to evaluate the use, as well as the non-target impacts, of low-dose copper treatments for the management of zebra mussels will be discussed.



## **Honing aquatic plant management by hoarding spreadsheets**

*Mike Verhoeven*

MAISRC has a vision for a central data repository for aquatic plant data, where all managers, researchers, and agencies will share monitoring data from on-the-ground management efforts. We can use those monitoring datasets to analyze and improve the way that we manage plants in our lakes. We'll discuss how that vision is being brought to life at MAISRC, and as an example, we'll show what manager spreadsheets tell us about native responses to curly-leaf pondweed management.



## **Mussel poo holds the answer for biocontrol**

*Mike Sadowsky*

While mussels are all around us, we do not know everything about their biology or how to control invasive species. In this presentation I will talk about use of DNA sequencing technologies on the microbes present within and on AIS to determine if 1) some of these microbes are unique to mussels and 2) if this information can be used to develop biocontrol strategies. We will discuss work done with two AIS: zebra mussels and Eurasian watermilfoil.



## Field tests demonstrate that Mississippi River Locks and Dams could be used to block invasive carps and assist native fish

*Peter Sorensen, Jean Finger, Andy Riesgraf*

River depth in the Mississippi River is regulated by locks and dams and 29 of these structures lie between St. Louis (where Asian carp are abundant) and Minneapolis. All barges and fish must travel through these complex structures which control water velocities (and thus depth) and which are managed by the U.S. Army Corps of Engineers. Recent computational modelling conducted by the University suggests that locks and dams impede fish movement, and that this tendency could be enhanced to either stop carp or reduced to allow native fish to pass. In this talk we discuss an ongoing study which is tracking radio-tagged carp and native fishes around and through Lock and Dam #2 to test if this is really the case. Preliminary analysis suggests great promise. (Funded by the Minnesota DNR).



## You are what you eat: beginning to understand how AIS disrupt sport fisheries

*Gretchen Hansen*

Zebra mussels and spiny waterflea have the potential to dramatically change the food webs in lakes by consuming small prey. This means that less food and nutrients are available for prey fish and young of the year sport fish. This research project is seeking to understand whether what fish are eating is changing and how that changes their growth rates in the face of AIS. Field work has been conducted at nine large lakes at varying stages of invasion to develop management strategies for supporting fisheries in the case of invasion. Preliminary results suggest small but detectable changes in growth rates of both walleye and yellow perch associated with invasion of both zebra mussels and spiny water flea.



## Factors influencing spiny water flea entangling of various fishing gear

*Valerie Brady, Donn Branstrator, and Josh Dumke*

Although human recreational equipment is widely considered to be the most threatening vector of spiny water flea spread, we know little about the relative risk of entanglement associated with alternative types of gear. We simulated usage of fishing lines, downrigger cables, bait buckets, anchor ropes, and live wells to measure their susceptibility to entanglement. Gear was deployed during daytime and twilight hours on 1 kilometer long transects. The results have the potential to inform recreationalists, managers, and AIS personnel on where cleaning effort should be focused to best reduce potential spread of spiny water flea.



## ***Phragmites* pushback: Is eradication possible?**

***Sue Galatowitsch and Julia Bohnen***

Armed with knowledge of the distribution of non-native *Phragmites* in Minnesota, researchers are now taking aim at ways to facilitate treatment of this invasive grass of wetlands and roadsides. MNPhrag staff have confirmed that non-native *Phragmites* is able to produce viable seed in at least the southern two-thirds of Minnesota, which will enable further spread of the invasive if it is not effectively controlled. A management strategy based on the distribution and biology of non-native *Phragmites* will be critical to successful treatment. Non-native *Phragmites* occurs in 33 Minnesota counties. Populations often occur on properties where the landowners do not have the resources or knowledge to initiate and follow through with treatment, and many populations span areas that encompass more than one landowner. The physical stature of non-native *Phragmites* and its affinity for wetland habitats often requires specialized equipment and permitting for treatment. Coordination between landowners, as well as the distribution of resources and management expertise will likely be essential to the effort to control non-native *Phragmites*. In the coming year, the MNPhrag research team will explore opportunities and strategies to facilitate coordinated control of non-native *Phragmites*. Wisconsin's approach to prioritizing control may inform efforts in Minnesota. Control efforts in the Duluth area may also guide strategies for coordinating permitting and funding.



## **Viruses! Silver bullet for common carp in lakes?**

***Sunil Mor and Soumesh Padhi***

Over the last couple years, common carp in Minnesota have been dying in the thousands due to two viruses: koi herpes virus and carp edema virus. Importantly, these mortality events have been common carp specific, with no observed sick or dead native fish - a similar trend observed elsewhere in the world. Research is underway to evaluate these viruses for use as pathogenic biocontrol agents in Minnesota to control common carp. We are taking a very conservative approach to ensure the implementation of such a strategy does not cause more harm than the problem it aims to control.



## **Genetic variation and management of Eurasian and hybrid watermilfoil**

***Ryan Thum and Ray Newman***

Genetic variation has not historically been a focus of traditional aquatic plant management. While there are few published studies of molecular or heritable phenotypic variation for widely managed aquatic plant species, the few studies published reveal that cryptic taxonomic variation and phenotypic variation can be relevant to growth, spread, impact, and control. Here, I will present data on genetic variation in the widely distributed and managed invasive aquatic plant, Eurasian watermilfoil (*Myriophyllum spicatum* L.), and its implications for management and control. I will focus on Minnesota populations, but will include examples and context from other parts of the introduced range.



## Locating boat inspection stations on Minnesota lakes

*Robert Haight*

Boat inspection is an important way to prevent the movement of aquatic invasive species between infested and uninfested lakes; however, budgets limit the number of inspection stations that can be operated. The problem is to locate a fixed number of boat inspection stations within adjacent counties to minimize the risk of AIS moving into and establishing in un-infested lakes. Results are presented for preventing zebra mussel spread in Ramsey and Washington County lakes. We suggest attending Nick Phelps' session, *The results are in: Estimating AIS risk for Minnesota lakes*, before this session as they complement each other.



## Tour the state-of-the-art MAISRC Containment Lab

*Note: you must have pre-registered for a lab tour. Your assigned lab tour time is printed on your nametag.*

MAISRC's on-campus lab and holding facility underwent a total renovation in 2016, making it one of the most state-of-the-art aquatic research facilities in the country. Attend this session to get an inside-peek at real research projects and hear from researchers who are doing the work. You will hear about the latest in starry stonewort treatment options; stopping Asian carp with sound, air, and lights; and simulate going underwater to count zebra mussels, just like our researchers do.



*Note:* This session is approximately a five-minute walk from the Conference Center. Please meet in the lobby and a leader will walk everyone to the lab.

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