2024 Ontario Phragmites Working Group Meeting

The 2024 Ontario Phragmites Working Group (OPWG) conference theme is: **Finding a Balance**. We will examine the importance of finding a balanced approach to invasive species management by considering different perspectives, management approaches, and goals. The conference will encourage people to broaden their perspectives and cooperate to find a balance towards healthy ecosystems and biodiversity in a changing climate. There will be opportunities to explore strategies, programs, and partnerships. This can lead to an integrated and balanced approach towards the management of invasive species.

This year's conference will encourage people to work together towards healthy ecosystems and biodiversity in a changing climate. It will provide an opportunity to explore strategies, programs, partnerships, knowledge and research that shape and build resilient management of Invasive Phragmites.

Agenda

Date Thursday, January 25, 2024

Time 9:00am-5:00pm EST

Location *Virtually hosted on Remo.co*

Register here: https://www.eventbrite.ca/e/2024-oipc-annual-conference-and-opwg-annual-meeting-tickets-736337223457?aff=oddtdtcreator

Schedule

Time	Speaker	Presentation Title
9:00am	System Opens	
9:10am	Janice Gilbert and Gabby Nichols, Co-Chairs Ontario Phragmites Working Group Rebecca Lord, Executive Director, CCIS Brandon Williamson, Chair, OIPC Emily Mitchell, OIPC	Ontario Invasive Plant Council (OIPC) and Ontario Phragmites Working Group (OPWG) Introduction and Welcome Opening remarks, thank sponsors OIPC background & Introduction to Remo
9:30am	TBC	Indigenous Welcome
Keynote Presentation		
9:50am	Alex and Tyler Mifflin AKA "the Water Brothers"	Paving over Paradise Documentary
10:40am	Networking Break	
Biocontrol Research Updates		
10:50am	Dr. Michael McTavish, University of Toronto	Current status of biological control of introduced Phragmites in Ontario
	Dr. Ian Jones, University of Toronto	Biological control of introduced Phragmites: Optimizing release and monitoring strategies in an expanding program

	Claire Schon, University of Waterloo	Finding a competitive balance: native plants benefit from invasive Phragmites australis biological control
11:20am	Q and A	
11:30am	Lunch Break and Project Slideshow Reel	
	Research Updates Continued	
12:10pm	Cayla Darling, Blazing Star Environmental	Combining phragmites management, habitat connectivity, and community engagement to protect an isolated turtle population
12:30pm	Madeline Sutton, Canadian Wildlife Service, Environment and Climate Change Canada	Outcomes of a large-scale Phragmites management program on federal lands in Southern Ontario
12:50pm	Jersey Allyson Fontz, University of Waterloo	Tracking Wetland Regeneration: A Long-term Assessment of Vegetation Dynamics Post-Phragmites australis Suppression
1:10pm	Grace Lew-Kowal, University of Waterloo	First-year insights on the suppression efficacy of RPAS-based imazapyr application on Phragmites australis
1:30pm	Kurt Kowalski, Great Lakes Science Centre, U.S. Geological Survey	Advancing development of new Phragmites treatments based on genetic and microbial biotechnology
1:50pm	Networking Break	
	First Nations engagement, knowledge, and perspectives on finding balance	
2:10pm	TBC	TBC
	Province-wide and Regional Project Updates	
2:40pm	Taaja Tucker-Silva, Great Lakes Phragmites Collaborative, Great Lakes Commission	Advancing the Great Lakes Phragmites Collaborative and Phragmites Adaptive Management Framework
3:00pm	Colin Cassin, Invasive Species Centre and Kyle Borrowman, Nature Conservancy of Canada	Green Shovels Collaborative 2023 Phragmites Update
3:20pm	TBC	Roadway Management Update
	OPWG Overview	
3:40pm	Phraggers Phorum Gabby Nichols and Janice Gilbert	Interactive discussion & closing remarks • Certification of Phragmites Management • Letter of Opinion permitting process • Control gaps: rail lines, hydro corridors • Next meeting
4:00pm	Brandon Williamson, OIPC	Closing Remarks
4:15pm	Mix and Mingle	
5:00pm	Online Meeting Closes	

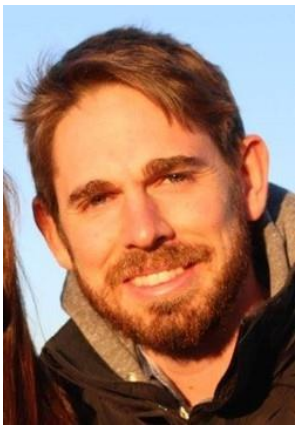
Abstracts and Biographies

Dr. Michael McTavish, University of Toronto

Dr. Michael J. McTavish is a postdoctoral research fellow working with the Smith Forest Health Lab at the University of Toronto. He has a research background in the fields of ecological restoration, invasion science, and the biological control of weeds. His current research focuses on biocontrol of introduced Phragmites and garlic mustard (*Alliaria petiolata*) and the ecology of non-native earthworms.

Current status of biological control of introduced Phragmites in Ontario

Field releases of the stem-boring moths *Archanara neurica* and *Lenisa geminipuncta* (Lepidoptera: Noctuidae) as classical biological control agents for introduced *Phragmites australis australis* began in Ontario in 2019. As of fall 2023, we have released approximately 24,000 insects across 30 sites. This presentation will provide a brief overview of current release methods for biocontrol of introduced Phragmites, and a summary of the annual monitoring data from the first couple of years following release. We have had a high success rate detecting initial biocontrol agent feeding damage immediately following release (92% of release sites), and in the first and second years of follow-up monitoring (82-86% of sites). For monitoring purposes, the amount of initial feeding damage following release is a strong predictor of the amount of agent activity in subsequent years. Preliminary results demonstrate that biocontrol agents can reduce the height and reproductive output of damaged introduced Phragmites stems. The amount of initial biocontrol feeding activity has been very encouraging, and the persistence over multiple years of monitoring suggests agent populations are beginning to establish on the landscape. The development of these initial robust "nurse site" populations will facilitate further scaling up of additional releases at new sites to help manage introduced *Phragmites* across Ontario.



Ian Jones, University of Toronto

Dr. Ian Jones is a postdoctoral research fellow working with the Smith Forest Health Lab and Agriculture and Agri-Food Canada (AAFC). His research focuses on the ecology of insect-insect and insect-plant interactions. Ian received a Masters degree in Applied Entomology from Imperial College London, and completed his PhD at Florida International University. Ian's postdoctoral work focuses on classical biological control of invasive plants. Through an understanding of the ecology of biological control insects, and their interactions with native species, Ian seeks to improve the release strategy and establishment of these beneficial organisms, contributing to more effective and sustainable control of invasive weeds.

Biological control of introduced *Phragmites*: Optimizing release and monitoring strategies in an expanding program

Introduced *Phragmites*, *Phragmites australis australis*, is one of the most invasive plants in North America. Two biological control agents, *Archanara neurica* (Hübner) and *Lenisa geminipuncta* (Haworth) (Lepidoptera: Noctuidae), have been approved for release in Canada, as a tool to control the weed. To date, over 23,000 of the stem-boring moths have been released across 30 sites in Ontario. Post release monitoring of these sites has been extremely encouraging, indicating successful reproduction and overwintering of the agents. In order to bolster this early success, research is ongoing to improve release protocols and develop tools to monitor the biological control agents and their impacts.

This presentation will provide an overview of the research conducted in the summer of 2023. Formal experiments were conducted to identify optimal larval release densities for the biological control agents, and to examine the effects of hydrological conditions on release success. Chemical attractants, designed to capture adults of both biological control agents in pheromone traps, were tested in the field. Finally, work was carried out to develop the use of drones to monitor the spread of introduced Phragmites and the biological control agents.

Releasing approximately 40 *A. neurica* larvae at a single location was found to maximise damage to the weed while minimizing agent loss through presumed intraspecific competition. Identifying optimal release densities will allow biological control practitioners to gain maximum efficacy from the finite number of lab-reared insects, and minimize the labour associated with individual releases. Both egg and larval releases of *A. neurica* were equally effective across a range of hydrological conditions. Understanding how abiotic factors affect agent performance will inform release decisions and help to further refine monitoring protocols. Pheromone traps proved to be effective in capturing *A. neurica* adults, and can now be used to study dispersal behaviour in the moths and predict their rate of spread across the landscape. Drone flights have been conducted at release sites at varying stages of agent establishment, and at different times during the growth season. The resulting imagery will be analyzed to determine how and when agent activity can best be observed using aerial photography.

Claire Schon, University of Waterloo

Claire Schon is a PhD student at the University of Waterloo. Her research is part of the broader pilot program in North America for the biological control of invasive P. australis. Claire's work aims to capture the effects of the biocontrol agents to invasive P. australis and response of native wetland plant communities to P. australis biocontrol.

Finding a competitive balance: native plants benefit from invasive Phragmites australis biological control

Insect-based biological control (biocontrol) is an emerging management option for the highly invasive wetland grass, *Phragmites australis* ssp. *australis* (hereafter *Phragmites*). It uses two species of stem-boring moths that are highly selective for the invasive sub-species and feed on the plant vasculature. These biocontrol agents may reduce the height and biomass of Phragmites, allowing increased light penetration to the understory plant community. It is believed that competition for light is the primary mechanism allowing Phragmites to outcompete native plants. If biocontrol reduces light interception by Phragmites, it may be a promising option for both *Phragmites* suppression and plant community recovery. Yet, it is not known whether the reductions in the competitive ability of *Phragmites* by biocontrol agents will be sufficient to realize native plant community recovery. We sought to quantify the competitive interactions between invasive Phragmites and four perennial native wetland plants, which we planted across a gradient of biocontrol intensity. We established experimental plots, each in dense stands of Phragmites, into which we planted four phytometer (test plant) species: Allegheny Monkeyflower (*Mimulus ringens*), Joe Pye weed (*Eutrochium maculatum*), Fowl manna grass (*Glyceria striata*), and Bristly sedge (*Carex comosa*). Plots were then assigned to one of three treatment types: i) plots where biocontrol is active at a range of intensities, ii) control plots under the dense canopy without biocontrol, and iii) control plots that we mowed to remove aboveground plant competition. The four phytometer species varied in their competitive abilities against *Phragmites*, but all four responded positively to the removal of aboveground competition via mowing. In plots with biocontrol, we found that biocontrol reduces both the canopy height and density of Phragmites stems. In turn, we found that the amount of light reaching through the canopy was positively correlated with the intensity of biocontrol increases. The results of this experiment help shine new light on the mechanisms which facilitate the recovery of plant communities following invasive plant suppression via biocontrol.

Cayla Darling, Blazing Star Environmental

Cayla Darling is an Ecologist with Blazing Star Environmental. Cayla earned a Bachelor of Science in Conservation Biology at Trent University and a diploma Ecosystems Management Technician from Fleming College. Cayla has experience in restoration, and has coordinated several large-scale vegetation monitoring projects.

Combining phragmites management, habitat connectivity, and community engagement to protect an isolated turtle population

In 2018, Blazing Star Environmental discovered two Blanding's turtles at Jack van Nostrand Nature Reserve, a Northumberland Land Trust property located east of Cobourg. The discovery of these two turtles was the first recorded observation in this area in over twenty years and raised the question of how many other individuals remain in the area.

In the same year a patch of Phragmites australis was identified within the coastal marsh where the Blanding's turtles were observed. In collaboration with Northumberland Land Trust, Blazing Star Environmental developed a plan to improve the habitat found on the Jack van Nostrand Nature Reserve property. Through invasive species management and creation of a habitat connectivity plan, both organizations hoped that the isolated Blanding's population might be given a fighting chance.

Over the last year the team at Blazing Star Environmental has been working to manage the Phragmites on the property while engaging local landowners to restore and protect Blanding's habitat on their properties. As a result, the project has expanded beyond Jack van Nostrand Nature Reserve and now includes two other private properties within the population range. Further Phragmites removal and management is necessary to improve habitat, but with the help of local landowners and conservation groups, Blazing Star Environmental hopes to help this at-risk population last.

Madeline Sutton, Environment and Climate Change Canada – Canadian Wildlife Service

Since 2019, Madeline has been working as a Habitat Biologist with Environment and Climate Change Canada - Canadian Wildlife Service, supporting and leading the planning and implementation of the Phragmites management and monitoring program on federal lands in the Long Point region. Prior to this, Madeline completed her masters degree in environmental sciences at the University of Toronto and, as a proud east-coaster, attended Acadia University for an undergraduate degree in biology.

Outcomes of a large-scale Phragmites management program on federal lands in Southern Ontario

Since 2019, the Canadian Wildlife Service – Ontario Region (CWS) has been managing invasive Phragmites within three National Wildlife Areas (NWAs) in Ontario's Priority Place for Conservation Action, with the objective of protecting and conserving Species at Risk (SAR), other wildlife and their habitats. To date, CWS has managed approximately 700 hectares of Phragmites and has implemented a robust ecological monitoring plan to evaluate outcomes of this large-scale habitat restoration program, including impacts to SAR plants, birds, anurans, turtles, snakes and fish. Monitoring results to-date have shown high management efficacy, habitats trending towards native conditions, and no negative impacts to species.

These efforts have been in collaboration with the larger Phragmites management program in the Long Point region and our conservation partners, including the Nature Conservancy of Canada, the University of Waterloo, the Province of Ontario, and others.

Jersey Allyson Fontz, University of Waterloo

Jersey Allyson Fontz is a PhD student in the Waterloo Wetland Lab, spearheaded by Dr. Rebecca Rooney at the University of Waterloo. Her project involves using trait-based ecology to promote the active revegetation of natural and created wetlands after the herbicide-based suppression of non-native Phragmites australis in these areas. Her goal is to help the native seed bank by creating and adding seeding prescriptions onto them to bolster their natural biotic resistance against P. *australis* and other non-native species.

Tracking Wetland Regeneration: A Long-term Assessment of Vegetation Dynamics Post-*Phragmites australis* Suppression

Wetland biodiversity is greatly threatened by the invasion and spread of non-native plants such as Phragmites australis ssp. australis such that P. *australis* suppression efforts have made it a goal to be "Phrag-free by 2033". In a pilot project to suppress P. *australis* in Lake Erie coastal marshes, large areas of P. australis were treated with a glyphosate-based herbicide and dead stems were subsequently mowed/rolled. The Waterloo Wetland Lab started a long-term monitoring program to track the efficacy of the herbicide-suppression through the changes in vegetation community. Post-herbicide suppression, regrowth of vegetation in this area relied solely on propagule influence from nearby plant communities and the seed bank. Initially, monitored plots were overrun with secondary invasions from other non-native species such as European frog-bit (*Hydrocharis morsus-ranae*). Fortunately, vegetation in monitored plots started to transition to an abundance of native plant species approximately 3-5 years post- herbicide suppression. Subsequently, we have shifted our focus from characterizing how the treated plots have diverged from the plots still invaded by P. *australis*, to evaluating how closely treated plots are beginning to resemble plant communities that were never invaded by P. australis – communities we term "reference sites." Our objective is to determine whether the vegetation in our treated plots is returning to reference conditions or is transitioning into some kind of novel plant community type. We will continue to the monitor the vegetation community by returning to the 1 m by 1 m established quadrats and performing a percent cover analysis. This data will be used to calculate species richness, Shannon-Weiner diversity, Simpson's diversity (1/D), Pielou's evenness (J), and mean coefficient of conservatism. We are hoping that the results of this work will help us better understand plant community dynamics post-herbicide suppression and evaluate whether the goal of restoring a healthy native plant community.

Grace Lew-Kowal, University of Waterloo

Grace Lew-Kowal is a master's student in the Waterloo Wetland Lab at the University of Waterloo. Her research focuses on the assessment of a novel method to control invasive Phragmites australis in Canadian wetlands. She is investigating the ability of this tool to provide an effective and accurate approach for invasive plant management that will minimize damage to native plants and the surrounding habitat. Grace uses a combination of field-collected data along with GIS and remote sensing techniques to conduct her research. Outside of her current project, she is broadly interested in examining the stressors and threats posed on wetlands by invasive species, urbanization, and climate change.

First-year insights on the suppression efficacy of RPAS-based imazapyr application on *Phragmites australis*

We are investigating remotely piloted aircraft systems (RPASs) as a precision tool for herbicide application in efforts to suppress invasions of *Phragmites australis* in wetlands. In 2022, we applied the herbicide imazapyr with an RPAS at selected pilot sites, marking the first-ever application of its kind in Canada. Our research revolves around characterizing the suppression efficacy of imazapyr on P. *australis* when applied with an RPAS. We completed vegetation surveys at two wetlands in southern Ontario, both before herbicide application and one-year post-treatment. We established plots using a spatially replicated Before/After Control/Impact (BACI) sampling design to assess the impact of the treatment in a way that accounted for year-over-year variation. I will present a summary of the first-year suppression efficacy results, highlighting changes in live and total P. australis stem density, as well as canopy height. Additionally, I will share insights into plant recovery observed after the first year of treatment through changes in species diversity, species richness, and floristic quality. The results of this work are the first to be produced in Canada and will help to inform the safety and feasibility of RPAS-based herbicide applications before this technology can be implemented across the country.

Kurt Kowalski, Great Lakes Science Center

Dr. Kurt Kowalski is a research wetland ecologist at the U.S. Geological Survey Great Lakes Science Center based in Ann Arbor, MI USA. His research focuses on the restoration and management of Great Lakes coastal wetland habitats, including the development of novel management approaches for the invasive Phragmites australis. He has extensive involvement in the application of research results into practice and policy, including the development of adaptive management approaches and online decision support tools.

Advancing development of new Phragmites treatments based on genetic and microbial biotechnology

Conventional approaches to managing invasive Phragmites (e.g., cutting, drowning, burning, herbicide) can be effective, but often they are resource intensive and not species specific. Therefore, the U.S. Geological Survey and several close partners are developing innovative new treatments provide resource managers with more options when treating invasive Phragmites. One approach is focused on a natural plant defense mechanism that limits the expression of certain genetic traits, and a second approach is seeking to disrupt the symbiotic relationships between invasive Phragmites plants and their microbiome (e.g., bacteria, fungi) as a way to harm the plant. Recent advancements in biotechnology research are leading to new treatment options for resource managers targeting invasive Phragmites.

Taaja Tucker-Silva, Great Lakes Commission

Taaja Tucker-Silva is a senior data analyst supporting a variety of invasive species and water resources projects at the Great Lakes Commission in Ann Arbor, Michigan. She has a bachelor's degree in Fisheries and Wildlife from Michigan State University (2008) and a master's degree in Conservation Biology from Central Michigan University (2011).

Advancing the Great Lakes Phragmites Collaborative and Phragmites Adaptive Management Framework

The Great Lakes Phragmites Collaborative (GLPC) formed in 2012 to facilitate communication among stakeholders across the region and serve as a resource center for information on invasive Phragmites biology, management, and research. In

2017, the GLPC established a participatory science program, the Phragmites Adaptive Management Framework (PAMF), to determine the most effective and cost-efficient ways to manage Phragmites. PAMF operates on an annual adaptive management cycle whereby participants collect and submit monitoring and management data to inform the PAMF predictive model, which in turn produces site-specific management guidance for participants based on the latest information about which techniques are working most efficiently and effectively to reduce Phragmites invasion. Both the GLPC and PAMF have made progress over the last year toward advancing the common agenda of the GLPC. The GLPC has been developing a variety of new online resources, including a set of guidance documents and several new online mappers. For PAMF, we improved the model's optimization process to produce more actionable management guidance for the 2023/2024 management cycle in response to feedback from program participants. To further improve the model's predictive power, PAMF is unveiling a new 'active adaptive management' component that aims to provide funding to managers performing underutilized, PAMF-specific management combinations.

Green Shovels Collaborative

Colin Cassin, Policy Manager at the Invasive Species Centre and the Coordinator of the Green Shovels Collaborative.

Kyle Borrowman, Acting Director, Habitat Restoration at Nature Conservancy of Canada.

Green Shovels Collaborative 2023 Phragmites Update

In 2023 the Green Shovels Collaborative continued to push to make resources available for Ontario's Phragmites community. In this presentation we will provide an overview of the Invasive Phragmites Control Fund, the 4th cycle of a funding program used to support mapping and control projects on Phragmites. We will also provide an update on the new Invasive Phragmites Guidebook to regional coordination and a few communities piloting its implementation. Finally we will provide an overview of genetic testing work being used to assist in native/invasive provenance testing and our hopes for future implementation.