



AMERICAN FISHERIES SOCIETY
ONTARIO CHAPTER
ANNUAL GENERAL MEETING

January 26 – 28, 2024
Bayview Wildwood Resort, Severn Bridge, ON

“Our forgotten freshwater fauna”



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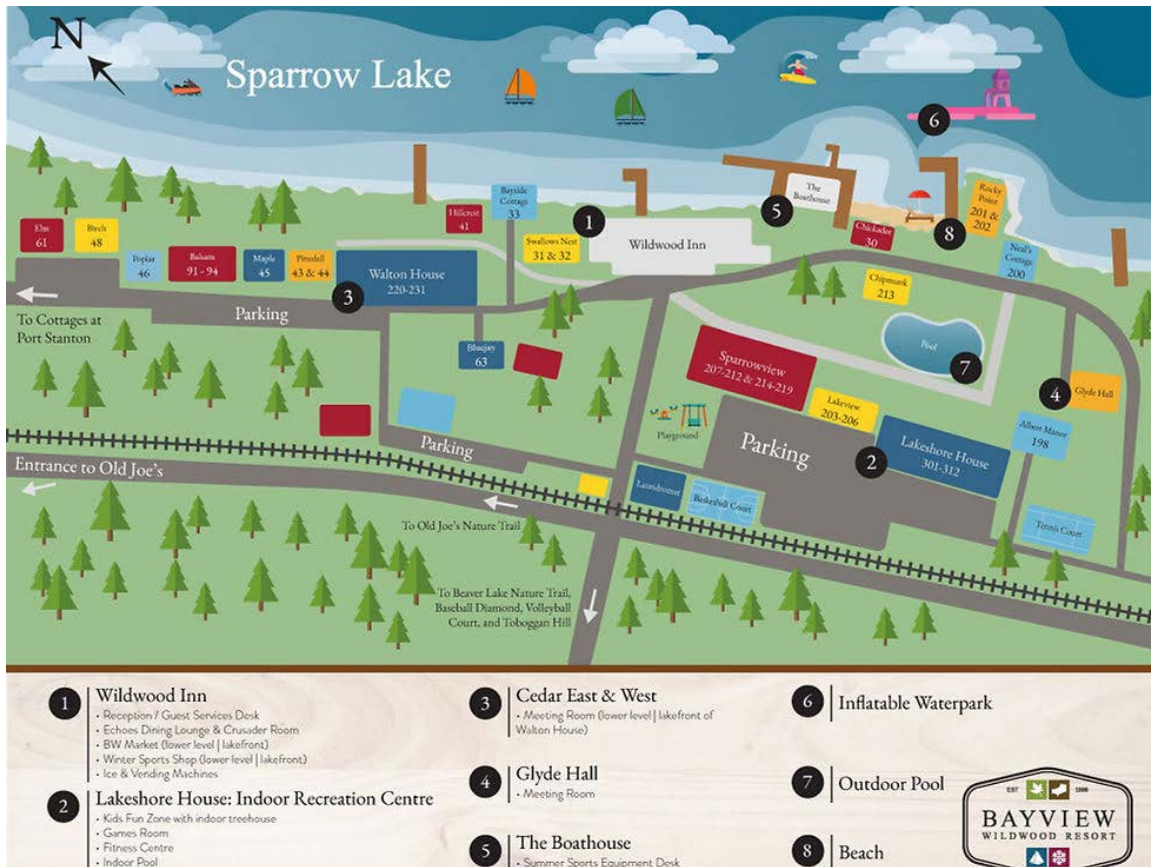
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AMERICAN FISHERIES SOCIETY

ONTARIO CHAPTER
ANNUAL GENERAL MEETING

January 26 – 28, 2024

Bayview Wildwood Resort, Severn Bridge, ON

“Our forgotten freshwater fauna”

Friday January 26th

4:30-on **Arrival, Registration (Reception/Service Desk – Wildwood Inn)**

6:00-10:00 **Opening Mixer (Alcohol-free; Cedar Room – Walton House)**



Saturday January 27th

07:30 **BREAKFAST (*Echoes Dining Lounge – Wildwood Inn*)**

08:30 **GREETING AND CONFERENCE OUTLINE (*Cedar Room – Walton House*)**
Erik Tuononen, AFS-OC President

08:45 **OPENING CEREMONY**
Gary Pritchard, Giniw/Golden Eagle

Session 1

09:00 **Keynote: *Hornyheads, Madtoms, and Darters: Narratives on our Forgotten Freshwater Fauna***
Dr. Stuart A. Welsh

09:40 **Talk 1: *Calibrating Remote Underwater Video (RUV) for surveying North American freshwater fish in littoral waters***
Jacob C. Bowman, Amber Fedus, Michael G. Fox, Graham D. Raby

10:00 **COFFEE, TRADE SHOW (*Cedar Room – Walton House*)**



Session 2

- 10:20** *Talk 2: Going Against the Flow: Small-Scale Hydrodynamics Influence Trap Entry by Sea Lamprey (*Petromyzon marinus*).*
Deven Nicholson, Kaylin Jones, Aline J. Cotel, Scott Miehl, Daniel P. Zielinski, Robert L. McLaughlin
- 10:40** *Talk 3: Repeatability of critical thermal maximum (CT_{max}) in freshwater ectotherms.*
Samuel D. Chasse, Graham Raby, Erin Stewart
- 11:00** *Talk 4: Environmental DNA as a tool for monitoring a spawning fish population and potential egg predator in Lake Huron.*
Markelle Morphet, Ryan Lauzon, Nicholas E. Mandrak
- 11:20** *Talk 5: Using exclusion mesh to improve the sampling efficiency of larval light traps*
Jennifer R. Powell, Nicholas E. Mandrak
- 11:40** *Talk 6: Long term population dynamics of an invasive fish in a contaminated ecosystem*
Sigal Balshine, Adrienne McLean, Sina Zarini, Erin McCallum, Julie Marentette, Marten Koops, Ben Bolker
-

- 12:00** **LUNCH (Echoes Dining Lounge – Wildwood Inn) & TRADE SHOW (Cedar Room – Walton House)**
-

Session 3

- 1:00** *Talk 7: Validation of an acoustic telemetry transmitter for the study of predation events in small fishes*
Mitchell Shorgan, Heather Bauer Reid, Bradley Howell, Silviya Ivanova, Aaron Fisk, Steven Cooke, Luc LaRochelle, Graham Raby
- 1:20** *Talk 8: Using acceleration transmitters to assess activity patterns of Muskellunge*
Amber L. Fedus, Graham D. Raby, Jake W. Brownscombe
- 1:40** *Talk 9: Ontario's Sustainable Bait Management Strategy: a new framework for the use and transport of baitfish and leeches in Ontario.*
Scott Gibson
- 2:00** *Talk 10: Navigating the Flow: Overview of the Flowing Waters Information System and how it supports Fisheries Research.*
Les Stanfield
- 2:20** **COFFEE & TRADE SHOW (Cedar Room – Walton House)**
- 2:40-3:30** **SHARING CIRCLE SESSION (Cedar Room – Walton House)**
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- 3:30-4:30 ANNUAL BUSINESS MEETING (*Cedar Room – Walton House*)
- 4:30-6:00 TRADE SHOW (*Cedar Room – Walton House*), POSTER SESSION,
DEMONSTRATION OF FWIS, ICE FISHING
-
- 6:00-7:00 DINNER (*Alcohol served; Echoes Dining Lounge – Wildwood Inn*)
-
- 7:00-10:00 MENTORSHIP EVENT, RAFFLE AND SOCIAL (*Cedar Room – Walton House*)
Dedication to Will Wegman



Sunday January 28th

07:30 BREAKFAST (*Echoes Dining Lounge – Wildwood Inn*)

Session 4:

Virtual Link: <https://us06web.zoom.us/j/87073169238>

08:30 *Dedications to Al Dextrase*

Al Dextrase and Our Forgotten Freshwater Fauna
Dr. Nicholas E. Mandrak

Repeat sampling, occupancy models and detecting rare Ontario fishes
Dr. Scott Reid

*Evaluating the Ecological Benefits, Risks, and Feasibility of Conservation Translocations:
A Tribute to Al Dextrase*
Dr. Andrew R. Drake, Karl A. Lamothe

09:30 *Talk 11: Short-term consequences of recreational angling on lake trout*
**Bradley E. Howell, Giulio Navaroli, Simon W. DePasquale, Steven J. Cooke,
Caleb T. Hasler**

09:50 *Talk 12: Rough water or smooth sailing: the behaviour of freshwater fishes in response to
storm conditions*
Brett M. Studden, Reilly F. O'Connor, Bailey C. McMeans

10:10 COFFEE & TRADE SHOW (*Cedar Room – Walton House*)



10:30-11:30 **BREAKOUT SESSION: DIVERSITY & INCLUSION within AFS-OC**
(Cedar Room – Walton House)

11:30-12:30 **PRESENTATION OF STUDENT AWARDS & CONFERENCE WRAP**
(Cedar Room – Walton House)
Rededication of the President's Award to Al Dextrase

12:30-1:30 **LUNCH (Echoes Dining Lounge – Wildwood Inn)**



Keynote:

Saturday January 27th, 09:00

Hornyheads, Madtoms, and Darters: Narratives on our Forgotten Freshwater Fauna.

Dr. Stuart A. Welsh

US Geological Survey, West Virginia Cooperative Fish and Wildlife Research Unit; West Virginia University



Bio: Stuart A. Welsh is a fisheries research scientist with the U.S. Geological Survey's Cooperative Fish and Wildlife Research Units Program, where he addresses research and technical needs of the U.S. Geological Survey, West Virginia Division of Natural Resources, U.S. Fish and Wildlife Service, and other natural resource agencies and organizations. He also serves as a Professor of Ichthyology at West Virginia University, where he has mentored 35 graduate students and conducted fish research in the areas of taxonomy and systematics, species distribution, movement ecology, habitat use, and endangered species. He has taught courses in

Ichthyology, Astacology, and Quantitative Ecology, and has published 85 peer-reviewed publications in scientific journals.

Stuart attended West Virginia University (BS), Frostburg State University (MS) and West Virginia University (PhD). He is a member of the American Society of Ichthyologists and Herpetologists, the American Fisheries Society, and the International Association of Astacology. He has also served on committees of the Atlantic States Marine Fisheries Commission for the management and conservation of Striped Bass. His most recent award recognition was the U.S. Fish and Wildlife Service's Recovery Champion Award as a member of the Candy Darter Conservation Team.

Presentation abstract:

North America has a diverse and fascinating array of freshwater fishes, a fauna that is well documented and often celebrated by the scientific community. Some of our fishes, many of which are of conservation concern, are not well known to the general public. Increased public awareness will likely lead to improved conservation efforts. Many conservation agencies have made recent efforts in this area, particularly through internet sites and social media. Zoos and public aquaria have also increased efforts to display regional native fishes. Books may also play a role, particularly if the science is explained in user-friendly terms. In this presentation, a recently published book is featured on the fishes of the Central Appalachians, including examples to engage and educate readers, and promote public awareness of our "forgotten" fishes.



Oral Presentation Abstracts

Saturday, January 27, 2024

Saturday January 27th, 09:40

Talk 1: *Calibrating Remote Underwater Video (RUV) for surveying North American freshwater fish in littoral waters*

Jacob C. Bowman^{*1}, Amber Fedus¹, Michael G. Fox¹, Graham D. Raby¹

***Presenting Author**

¹*Trent University*

Methods for surveying fish assemblages can be invasive and typically involve removing fish from their environment. Remote Underwater Video (RUV) is an emerging non-invasive survey technique that is ideal for sampling species at risk and other organisms that are sensitive to disturbance. In this study, we test the effectiveness of RUV for surveying the littoral fish assemblages of Stoney Lake and the Otonabee River, Ontario. To understand how RUV compares to other commonly used monitoring tools, we used RUV, 15-m snorkel transects, baitfish traps, and 100-m² beach seine nets to sample the same sites (n = 70). Results suggest that RUV measures a higher level of species richness than baitfish traps and snorkel transects, but underestimates species richness relative to beach seine nets. Species-specific detection rates indicate that each sampling method has advantages for surveying certain species. This suggests that the best choice for surveying littoral fish assemblages is a combination of methods. With an improved understanding of efficacy, groups interested in monitoring fisheries will have justification to adopt this minimally invasive tool.

Saturday January 27th, 10:20

Talk 2: *Going against the flow: small-scale hydrodynamics influence trap entry by Sea Lamprey (*Petromyzon marinus*)*

Deven Nicholson^{*1}, Kaylin Jones², Aline J Cotel², Scott Miehl³, Daniel P Zielinski⁴, Robert L McLaughlin¹

***Presenting Author**

¹*University of Guelph Department of Integrative Biology*

²*University of Michigan Department of Environmental Engineering*

³*U.S. Geological Survey, Great Lakes Science Center, Hammond Bay Biological Station*

⁴*Great Lakes Fishery Commission*

Scientists are being asked to develop methods of controlling or eliminating invasive species and their unwanted effects. Trapping is one method being



explored. We examined experimentally if small-scale hydrodynamics at the opening into traps influenced rates of trap entry by Sea Lamprey (*Petromyzon marinus*), an invasive species in the Great Lakes and the target of a basin-wide control program. Entry rates into traps need to improve before trapping can become a viable method of control. Our experiments tracked the search and entry behaviour of Sea Lamprey released in flumes where trap design (funnel opening placed in a mesh versus solid wall) and discharge through the funnel opening (low versus high) were manipulated across nights to elicit changes in hydrodynamics at the trap entrance. We expected a funnel opening in a mesh wall would be harder to find, but easier to pass through, while a funnel in a solid wall would be easier to find, but harder to pass through. Hydrodynamics in front of the funnel entrance differed between treatment groups. Overall, Sea Lamprey were twice as likely to enter a funnel in a mesh trap under high funnel discharge than a mesh trap under low discharge, or a solid trap under low or high discharge. Time spent searching for the funnel opening similarly varied with trap design and discharge. Our findings will benefit the Sea Lamprey control program by helping resource managers identify trap designs that could provide the trapping efficiency needed for control purposes.

Saturday January 27th, 10:40

Talk 3: Repeatability of critical thermal maximum (CT_{max}) in freshwater ectotherms

Samuel D. Chasse*, Graham. Raby, Erin Stewart

***Presenting Author**

Trent University, Biology Department

Aquatic ectotherms are particularly vulnerable to the increasing frequency and intensity of extreme temperature events due to their inability to regulate their body temperature. Outside environments have a more substantial influence over their metabolism, performance and overall fitness compared to other organisms. To understand how ectotherms will cope with changing climate conditions or estimate their potential for adaptation, there must be a reliable metric of upper thermal tolerance that is consistent and repeatable. Critical thermal maximum (CT_{max}) has become the most broadly used metric of measuring the upper thermal limits across various ectotherms since its occurrence in peer reviewed literature in the 1950s. However, aspects of the metric such as its within individual repeatability remain largely unknown for most species. CT_{max} tests involve acclimating organisms at a consistent increasing temperature rate over time until loss of motor function is observed. We examined the within individual repeatability of CT_{max} in two common species of freshwater ectotherm: Rusty Crayfish (n = 31) and Pumpkinseed (n = 40). This was done by subjecting the same individuals to weekly CT_{max} tests with varying environmental conditions to determine if CT_{max} is repeatable and if repeatability is influenced by trial



conditions. The preliminary results suggest low within individual repeatability however mean CTmax was influenced by thermal acclimation.

Saturday January 27th, 11:00

Talk 4: Environmental DNA as a tool for monitoring a spawning fish population and potential egg predator in Lake Huron.

Markelle Morphet^{*1}, Ryan Lauzon², Nicholas E. Mandrak¹

***Presenting Author**

¹Department of Biological Sciences, University of Toronto

²Chippewas of Nawash Unceded First Nation

Lake Whitefish (*Coregonus clupeaformis*) populations in northern Lake Huron and Georgian Bay have been declining since the 1990's. Investigations into causes for their decline found a negative correlation with the invasion of dreissenid mussels, which are linked to decreased density of *Diporeia* spp., amphipods commonly preyed upon by Lake Whitefish. Further food web shifts have been observed including Lake Whitefish incorporating the invasive Round Goby (*Neogobius melanostomus*) into their diet. In addition, Round Goby has been known to prey on salmonid eggs, but it is not known whether it feeds on Lake Whitefish eggs. In conjunction with the Saugeen Ojibway Nation, we investigate the capability of eDNA barcoding to detect changes in concentrations of Lake Whitefish and Round Goby as the Lake Whitefish spawning season progresses. We predict: 1) Lake Whitefish eDNA concentrations will correlate with Lake Whitefish biomass estimated by gillnetting; and 2) Round Goby eDNA concentrations and catch will increase on the shoal during Lake Whitefish spawning season if gobies are consuming Lake Whitefish eggs. Our findings provide insight into the utility of eDNA as a population monitoring tool in a large lentic system and aid our understanding of invasive fish interactions with native fishes.

Saturday January 27th, 11:20

Talk 5: Using exclusion mesh to improve the sampling efficiency of larval light traps

Jennifer R. Powell^{*1}, Nicholas E. Mandrak²

***Presenting Author**

¹Department of Physical and Environmental Sciences, University of Toronto

²Department of Biological Sciences, University of Toronto

Larval light traps, while a useful tool, can also be difficult to deploy effectively due to wide variations in the effectiveness of different gears and light lures, issues which have been well covered in the literature. A potential issue that has only started to be explored is the effect of within-trap predation by juvenile and adult fishes on larvae abundance in light traps. A preliminary study in 2022



observed that larvae were only found in traps without juvenile centrarchids. To test whether exclusion of juvenile fishes from quatrefoil light traps would improve larval collections, in the spring of 2023, 1 x 1 cm black plastic mesh wrapped traps were tested against unmeshed controls. Preliminary results found that significantly more larvae were collected in meshed traps, but that the effect varied depending on the colour/intensity of light lure used. The interactions between mesh presence, light lures, and trap style on larval collections will be discussed.

Saturday January 27th, 11:40

Talk 6: *Long term population dynamics of an invasive fish in a contaminated ecosystem.*

Sigal Balshine^{*1}, Adrienne McLean¹, Sina Zarini¹, Erin McCallum^{1,2}, Julie Marentette^{1,3}, Marten Koops⁴, Ben Bolker^{5,6}

***Presenting Author**

¹*Department of Psychology, Neuroscience & Behaviour, McMaster University,*

²*Department of Wildlife, Fish and Environmental Studies, Inst för vilt, fisk och miljö
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³*Fisheries and Oceans Canada, Ottawa*

⁴*Great Lakes Laboratory for Fisheries and Aquatic Sciences, Fisheries and Oceans
Canada, Burlington*

⁵*Department of Mathematics and Statistics, McMaster University*

⁶*Department of Biology, McMaster University*

Invasive species are a global problem with large ecological and economic costs. A better understanding of how invasive species populations change over time, how these species become integrated into ecosystems, and how their population demographics vary across different types of environments could help inform management priorities and shape the design of control strategies. For over 20 years my lab has monitored Round Goby population in an industrial harbour, an area of concern because of high levels of contaminants, Hamilton Harbour, Canada. Fish are sampled across six sites that vary in their level of contamination. Across time Round Goby abundance has decreased and so has body size. In contrast, body condition, gonadosomatic index (GSI), and the proportion of reproductive males in the population has increased over time. Although catch per unit effort did not differ between high and low contamination sites, the fish were smaller, lighter, and had larger investment in gonads at sites of high contamination. Taken together, our results show that changes in invasive populations over time are complex and populations can differ fairly dramatically across sites in relation to anthropogenic stressors, even when the sites are in relatively close proximity and within a single ecosystem. Studies like this one are valuable because they can trace how species can change over time since invasion and can inform our understanding on how



anthropogenic impacts in the form of industry can influence population dynamics.

Saturday January 27th, 1:00

Talk 7: Validation of an acoustic telemetry transmitter for the study of predation events in small fishes

Mitchell Shorgan*¹, Heather Bauer Reid¹, Bradley Howell¹, Silviya Ivanova², Aaron Fisk², Steven Cooke³, Luc LaRochelle³, Graham Raby⁴

***Presenting Author**

¹*Environmental and Life Sciences Graduate Program, Trent University*

²*Great Lakes Institute for Environmental Research, University of Windsor*

³*Fish Ecology and Conservation Physiology Laboratory, Department of Biology and Institute of Environmental and Interdisciplinary Science, Carleton University*

⁴*Department of Biology, Trent University*

Technological advancements in recent years have led to the miniaturization of acoustic transmitters, which has permitted the study of smaller fishes. However, as small fishes are consumed by other fishes at high rates and transmitters continue to function inside predators, researchers have had difficulty interpreting the data. In this project, we examine the performance of Innovasea Systems Inc. new V3D miniaturized predation-sensing transmitters, which combine the functions of typical acoustic transmitters with the added ability to report the predation of tagged animals. We first conducted staged predation events where acoustically tagged Rainbow Trout were either fed to Largemouth Bass across a wide range of water temperatures or kept alive in the absence of predation. Predation events were successfully identified in 92% of trials and no false positives were recorded. Signal lag, i.e., the time required for a predation tag to indicate that predation occurred, decreased strongly with increasing water temperature. We then assessed the performance of V3D predation tags in a whole-lake receiver array. In general, these tags had a maximum detection range of ~150 m, with relatively high detection efficiency within 50 meters of a receiver. Together, this research demonstrates the value of V3D predation-sensing transmitters as tools for improving estimates of the predation of small fishes while also providing important context for their use in wild fishes. Ongoing and future acoustic telemetry research projects using this receiver array will also be discussed.

Saturday January 27th, 1:20

Talk 8: Using acceleration transmitters to assess activity patterns of Muskellunge.

Amber L. Fedus*¹, Graham D. Raby¹, Jake W. Brownscombe^{1,2}

***Presenting Author**

¹*Trent University*



²*Great Lakes Laboratory for Fisheries and Aquatic Sciences, Fisheries and Oceans Canada*

The transmitters used for acoustic telemetry can be equipped with acceleration and temperature sensors, which allow for a better understanding of fish movement and environmental surroundings. Here, we assessed activity patterns in Muskellunge (*Esox masquinongy*) at different timescales in Stoney Lake, Ontario (part of the Kawartha Lakes). Eight Muskellunge were tagged with Innovasea V16AT acoustic transmitters in Stoney Lake in fall of 2022 and spring of 2023 as part of an acoustic telemetry project involving multiple species. We then focused our analyses on within- and among-individual variation in activity (acceleration) across two timescales: as a function of time of day, and date. Using this information, we can begin to understand activity and behaviour of Muskellunge at different timescales, which, when paired with information on habitat use (i.e., position) can be useful for conservation of this species in the rapidly changing Kawartha Lakes.

Saturday January 27th, 1:40

Talk 9: Ontario's Sustainable Bait Management Strategy: a new framework for the use and transport of baitfish and leeches in Ontario.

Scott Gibson

Ontario Ministry of Natural Resources and Forestry

The harvest and use of live bait has been an important part of Ontario's fishing industry for nearly a century. However, management of the bait resource has become more challenging due to new environmental pressures. The movement of bait poses ecological risks related to the potential spread of aquatic invasive species and fish-based pathogens (i.e., disease, parasites) and poses risks to Ontario's fisheries and the industries that rely on them. The Ministry of Natural Resources and Forestry (MNRF) has recently made regulatory changes around the use, harvest and transport of baitfish and leeches in Ontario. This talk will provide an overview of the changes outlined in Ontario's Sustainable Bait Management Strategy (2020) and the process that was taken to develop the strategy.

Saturday January 27th, 2:00

Talk 10: Navigating the Flow: Overview of the Flowing Waters Information System and how it supports Fisheries Research.

Les Stanfield

Retired MNR Research Biologist



The Flowing Waters Information System (FWIS) helps Ontario's conservation practitioners to manage information on flowing waters or streams, including data about fisheries, benthos, habitat and more. It contains data collected using the Ontario Stream Assessment Protocol and as such supports analysis of how stressors and a changing climate impact fish distribution and production. But the system is underutilized. So, in this presentation, the focus will be on introducing practitioners to how some of the 50,000 sample events might support a variety of analysis and management questions.

Later in the day there will be a hands-on demonstration of FWIS to show practitioners how to navigate the system.



Sunday, January 28, 2024

Sunday January 28th, 08:30

Dedications:

Al Dextrase and Our Forgotten Freshwater Fauna

Dr. Nicholas E. Mandrak

Department of Biological Sciences, University of Toronto

In 2023, we lost a champion of our forgotten freshwater fauna, Dr. Alan Dextrase. Al was a long-term OMNRF biologist, who started his career in northern Ontario and migrated south to Peterborough. Throughout most of his career, he was passionate about, and responsible for, protecting of our freshwater biodiversity. Among his major accomplishments, beyond his family, were leading the first aquatic ecosystem recovery strategy in Canada, being an architect of the provincial Endangered Species Act, participating in the development of the Ontario Biodiversity Strategy, and completing his doctoral dissertation later in life, which paved the way for the adoption of occupancy modelling to better understand fish distributions in Canada. Al served on the COSEWIC Freshwater Fishes SSC for 20+ years and, most recently, attended its annual meeting in Burlington in July 2023 at which he shared his encyclopedic knowledge with the new generation of committee members equally committed to protecting our forgotten fishes. The meeting field trip ended with two old friends toasting over ice teas, rather than the usual hoppy IPAs. Here's to you Al, thank you for everything you did for our forgotten freshwater fauna!



Repeat sampling, occupancy models and detecting rare Ontario fishes

Dr. Scott Reid

*Aquatic Research and Monitoring Section, Ontario Ministry of Natural Resources,
Peterborough, Ontario*

Twenty years ago, the notion that fish sampling efforts imperfectly detected species was not widely acknowledged by researchers; nor the associated bias for species lists, distribution maps and habitat suitability models. Dr. Alan Dextrase's doctoral dissertation was a pioneering application of repeat sampling and occupancy modelling to study Ontario fishes; directly accounting for the issue of imperfect species detection. Al later applied this modelling framework to develop much needed guidance on the sampling effort required to confidently detect Ontario fishes at risk. In this talk, I will present two examples from our collaborations on the use of repeat sampling and occupancy models to inform the design of rare fish surveys: (i) a comparison of different seines to collect Eastern Sand Darter (*Ammocrypta pellucida*); and (ii) an evaluation of the pelagic (or Mamou) trawl to detect riverine wetland fishes (with a focus on Pugnose Shiner).

Evaluating the ecological benefits, risks, and feasibility of conservation translocations: a tribute to Al Dextrase

Andrew R. Drake*, Karl A. Lamothe

***Presenting Author**

Great Lakes Laboratory for Fisheries and Aquatic Sciences, Fisheries and Oceans Canada

Dr. Alan Dextrase was a tireless advocate for the conservation of freshwater fishes. He was also passionate about the thoughtful use of science to inform management decisions. Al's PhD research on Eastern Sand Darter (*Ammocrypta pellucida*), published over a decade ago, is regarded as the most comprehensive study of this species in Canada. One of Al's professional aspirations was to undertake an experimental reintroduction of Eastern Sand Darter to Big Otter Creek, Ontario – a dream that would ultimately be informed by his extensive doctoral research. Al's comprehensive thesis and authoritative knowledge of Eastern Sand Darter paved the way for a formal evaluation recently performed on the ecological benefits, risks, and feasibility of an Eastern Sand Darter translocation. This presentation will review Al's contributions to the Canadian knowledge base of Eastern Sand Darter, describe current research to move his translocation dream forward, and pay tribute to an exceptional Canadian researcher.

Sunday January 28th, 9:30

Talk 11: *Short-term consequences of recreational angling on Lake Trout*



Bradley E. Howell^{*1,2}, Giulio Navarrolì¹, Simon W. DePasquale¹, Steven J. Cooke³, Caleb T. Hasler¹

***Presenting Author**

¹*Fish Biology and Conservation Laboratory, Department of Biology, University of Winnipeg*

²*Integrative Fish Ecology Laboratory, Department of Biology, Trent University*

³*Fish Ecology and Conservation Physiology Laboratory, Department of Biology and Institute of Environmental and Interdisciplinary Science, Carleton University*

Fish survival is undermined by inadvertent changes in behaviour and physiology. We therefore examined consequences of angling Lake Trout during the summer and fall spawning period. Immediately following capture or 0.5 h post-capture, fish underwent reflex and barotrauma assessments and blood sampling. Fish were then fitted with a tri-axial accelerometer and swam unhindered for 14 min. In the summer we observed an 18.9% mortality rate. Larger fish length, fight time, and angling depth increased barotrauma score. Multiple blood metrics changed from baseline values. Overall dynamic body acceleration (ODBA) decreased with angling depth. In the fall, fish displayed no mortality or reflex impairment and minimal barotrauma. Larger fish length and angling depth led to increased cortisol, with it being 65.5% higher in females. Other blood metrics changed from baseline values. ODBA was highest < 5 m and males exhibited higher activity. Our findings suggest that consequences of angling are context dependent.

Sunday January 28th, 09:50

Talk 12: *Rough water or smooth sailing: the behaviour of freshwater fishes in response to storm conditions.*

Brett M. Studden^{*1,2}, Reilly F. O'Connor³, Bailey C. McMeans²,

***Presenting Author**

¹*University of Toronto, Department of Ecology and Evolutionary Biology*

²*University of Toronto Mississauga, Department of Biology*

³*University of Guelph, Department of Integrative Biology*

In many parts of the world, the intensity, frequency, and duration of extreme weather events are thought to be increasing, with the potential to impose noteworthy consequences for freshwater environments. Research on the impacts of storms has delivered several key insights into their role in driving major shifts among algal communities. However, their immediate effect on larger mobile organisms remains unclear. Technological advancements facilitating the collection of fine-scale behavioural data have only recently enabled researchers to observe behavioural plasticity in response to hurricane events among several focal marine species, but similar patterns are yet to be uncovered in freshwater. Storms may drive mixing, influence temperature, and alter light and nutrient



availability. Consequently, this presentation highlights the behavioural patterns of three freshwater fish species (Lake Trout, Smallmouth Bass, and Burbot) in response to storm events using a continuous high-resolution acoustic telemetry system located in Smoke Lake, Algonquin Provincial Park, while discussing the potential consequences of storms from the individual to the community-level.



Poster Presentation Abstracts

*Pets going wild? Probability of Goldfish (*Carassius auratus*) dispersal from urban ponds*

Edina Illyes^{*1}, Christine M. Boston², Nicole A. Turner², and Nicholas E. Mandrak^{1,3}

***Presenting Author**

¹Department of Physical and Environmental Sciences, University of Toronto Scarborough, ²Great Lakes Laboratory for Fisheries and Aquatic Sciences, Fisheries and Oceans Canada, ³Department of Biological Sciences, University of Toronto Scarborough

Habitat connectivity through the landscape is essential for conserving biodiversity. However, in the context of non-native species, the concept of connectivity constitutes a challenge as it can facilitate their dispersal and introduction to previously unaffected areas. With the increase of urbanization, this conundrum is further complicated. Urban development is often associated with the creation of stormwater management ponds (SWMPs) that are regularly connected and drain to natural waterbodies and have been found to be frequently inhabited by non-native species, such as Goldfish (*Carassius auratus*). By applying circuit theory and including land cover and watercourse types, elevation, and the location of culverts as potential barriers to fish movement across the landscape, we evaluated the potential of SWMPs facilitating the spread of non-native fish species to natural systems throughout Hamilton, Ontario. SWMPs that are connected to natural watercourses, such as streams, surrounded by naturalised land cover, and/or in close proximity to natural waterbodies, such as lakes, are characterized by greater relative conductivity and are inhabited by native fish species, which are hypothesized to have colonized them through natural dispersal. Conversely, such ponds may also be inhabited by introduced species which may represent risks to connected natural waterbodies and potential source populations of non-native taxa. Consequently, our work has implications for aquatic invasive species management, particularly in the light of continuing urbanization and SWMPs spreading across the landscape.

Exploring the fish-mussel connection in a Canadian context

Ben Aubrey^{1, 2}, André L. Martel¹, Sarah E. Steele^{*1}, Steven J. Cooke², and Katriina L. Ilves¹

***Presenting Author**

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Freshwater mussels of the order *Unionida* are globally distributed and comprise six extant families. Unionid mussels are also one of the most imperilled groups of animals on the planet, with a high percentage of at-risk taxa. These mussels have a unique lifecycle in which the female releases parasitic larvae called glochidia. To reach maturity, glochidia must successfully attach to either the fins or gills of a host fish where they complete a metamorphosis and are released as juveniles. After this point, the mussels are (effectively) sessile for the remainder of their lifecycle. Freshwater mussels (most species) are thus entirely reliant on their host fish, not only for metamorphosis completion, but also for long distance dispersal, including upstream dispersal in streams and rivers. The specificity and selectivity of the fish-mussel relationship varies interspecifically, spatially, and at the population level. Much of the knowledge regarding the fish-mussel connection comes from studies conducted south of the Canadian border, which often have widely different climatic and environmental conditions. As such, this M.Sc. thesis will aim to comprehensively review what is currently known about the relationships between Canadian freshwater mussels and their host fish(es). In addition, we plan to expand upon the knowledge base by studying one of the most common mussel species in eastern North America, the Eastern Elliptio (*Elliptio complanata*), a species that plays a most important ecological role in thousands of lakes, streams and rivers in Eastern Canada. Targeted lab work will be conducted to determine the reproductive phenology of *Elliptio complanata* by dissecting gravid females (from a combination of museum collections and field research) and examining the stage of embryonic development within the marsupial pouches. We also aim to verify, and perhaps expand upon, the list of known host fishes through field examination of fish gills from lakes and rivers of Gatineau Park, QC. Summarizing the current knowledge base surrounding the fish-mussel connection and further expanding it in a Canadian context will provide an important resource to management and conservation efforts for this ecologically important guild of freshwater invertebrates.



Diversity & Inclusion Events

Saturday January 27th, 02:40

Day 1: SHARING CIRCLE SESSION

Personal stories of fisheries experiences, research and work in projects with diverse groups of researchers, scientists, community members, and any other project participants that have been historically marginalized from fisheries conferences. These stories highlight work that was a success, was challenging, and/or had lessons we can learn from to apply to our own fisheries careers, passions, and interactions with others.

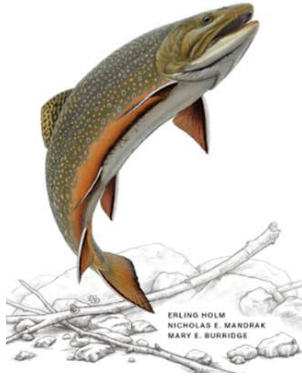
Sunday January 28th, 09:50

DAY 2: BREAKOUT SESSION - D&I within AFS-OC

Building on Day 1, we will work in breakout groups to discuss and address some key questions and how the Ontario Chapter can better support diversity and inclusion in the fisheries space.



A FIELD GUIDE TO
FRESHWATER FISHES
of ONTARIO



A Field Guide to Freshwater Fishes of Ontario

*Contributing authors: Erling
Holm, Mary E. Burridge, Dr.
Nicolas E. Mandrak.*

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A Field Guide to Freshwater Fishes of Ontario is the definitive guide to Ontario freshwater fishes. A beautiful and accessible full-colour field guide to all species of freshwater fish found in Ontario, this popular book has been revised and republished as a new edition. Containing more than 600 photographs, the book features new and revised species accounts, more than 150 new images and illustrations, as well as updated names, identification keys, range maps, and conservation statuses.

Wayne Mckenzie
International Native Artist

Kleinschmidt



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Notes:

