



Message from the President

Hello Ontario Chapter members and those who are not members YET! As I compose this President's message, I can't help to ponder the upcoming good weather and bass opener! I am then inundated with emotion over the responsibility that we all have to ensure the sustainability of our great fisheries resources in Ontario so that they may be safeguarded for future generations to enjoy. As our province experiences population growth, the social interest in our great aquatic resources will also increase. This can be positive, as this social interest often results in more action to help protect, conserve, and restore these aquatic and surrounding terrestrial eco systems. However, it can also be negative, as increased interest often results in increased use which can lead to more encroachment into the aquatic and terrestrial features resulting in over exploitation, more garbage, disturbance, and habitat loss. I recently finished reading that the 3 major threats to aquatic biodiversity include habitat loss from land-use change, climate change, and invasive species. As all of these are driven by anthropogenic influences, we all need to do our part to ensure that we keep our finger on the sustainable pulse of Ontario's fisheries and the aquatic resources that make these fisheries some of the best in the world.

I strongly encourage you to consider becoming part of the chapter or at least promote its work. You don't have to be a fish expert or a fish head. You don't need to have a degree in the sciences or be a university graduate. All you need is to be a fan of the outdoors, perhaps a cottage owner who loves their lake, or someone who enjoys taking a walk along a river to show their kids the annual trout or salmon runs. By becoming a member you will have the opportunity to meet and network with fisheries professionals and to listen to interesting presentations on research, restoration projects, and other topics relevant to Ontario fisheries. You will have access to various career opportunities and mentorship sessions, which is a great opportunity to learn about the industry. You will have access to participate in organized events for chapter members. Previous activities have included guest lectures, social events and tours of research facilities. I urge you to take advantage of these opportunities and let myself or any member of the Executive Committee know if there is a particular event or activity that you would like to see and we will do our best to bring it to fruition. More importantly I urge you to continue to care for and be responsible when using and immersing yourselves in Ontario's great outdoors. In the meantime, enjoy the summer, catch 'em big and throw 'em back!

Sincerely with hope,

Jan Moryk M.Sc, AFS-OC President

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2019 AFS-OC Annual General Meeting

On February 28-March 2, the Ontario Chapter of the American Fisheries Society hosted their 2019 Annual General Meeting & Conference at the YMCA—Geneva Park in Orillia, Ontario.

This year’s conference theme was **“Sustainable Development and Fisheries, can the two co-exist”** and we had a great lineup of oral and poster presentations, a talk from the Keynote Speaker, and one workshop.

Our Keynote speaker for this year’s AGM was Dr. Mark Ridgway, Research Scientist and Director of the Harkness Laboratory of Fisheries Research, Aquatic Research and Monitoring Section, Ontario Ministry of Natural Resources and Forestry. Dr. Ridgway gave a captivating overview of some of the new research occurring at one of Ontario’s most important aquatic conservation areas, Algonquin Park. In his talk



“Algonquin Park as an Aquatic Conservation Area: History, Ecology, and a Modern View of an Iconic Landscape and Waterscape” the audience got an inside look into the role this park has played, past and present, in preserving some of Ontario’s most iconic aquatic species.

This year’s workshop was hosted by Gary Pritchard and was focused on providing an overview of First Nation Treaties and advice on Engagement. Gary Pritchard is one of the leading experts on these topics in Ontario having worked on behalf of First Nations peoples throughout Ontario and currently holds the position of Cambium’s Aboriginal Environmental and Climate Change Sector Manager. Some of understanding the dynamics between working in

the topics highlighted in this workshop were Indigenous and Settlers Resource Management Frameworks, understanding the complexities of working within Traditional Territories/Treaty Areas, advice on who to contact when working within the Indigenous communities, and how to aid in the healing process between Indigenous and Canadian Communities.

On the Friday evening, a mentoring session and social was held that included a raffle to support the student subunit. Thanks to all who contributed to this being a great evening as always. If you weren’t able to join us this year, we looking forward to seeing you at next year’s AGM.



2019 AFS-OC Annual General Meeting — Awards

President’s Award co-winner
Jacob Burbank (left) with
Andrew Drake (right) ↓



President’s Award co-winner
Britney Firth (centre) with Michael
Power (left) and Andrew Drake
(right) ↑

The Outstanding Mentor Award was won by Andrew Drake (Fisheries and Oceans Canada, and adjunct at the University of Waterloo). The award was displayed by Britney Firth (left), Erik Dean (2nd from left), Jaqueline Chapman (centre), Jacob Burbank (2nd from right) and Justin Hubbard (right) →



E.J. Crossman Award winner
Andrea Reid (right) with
Ontario Chapter President Jan
Moryk (left) ↑



AFS-OC Social

AFS-OC Social after the TD Walter Bean Lecture in Environment “On the State of Freshwater Fish and Fisheries: Finding a Future for the Forgotten” by Dr. Steven Cooke on Wednesday November 21, 2018.

Dr. Steven Cooke was selected as the TD Walter Bean Visiting Professor in the Environment Department at the University of Waterloo for 2018 and 2019. As part of his visiting tenure, Dr. Cooke presented “On the State of Freshwater Fish and Fisheries: Finding a Future for the Forgotten” - a free lecture for the public. His lecture focused on the undervalued and overlooked freshwater fishery and provided a roadmap for elevating the status of freshwater fish and to ensure its future conservation (available at <https://livestream.com/itmsstudio/events/8461596/videos/183887651>). The event was advertised within the AFS-OC community and following the lecture, a social for AFS-OC members was held at Molly Bloom’s Irish Pub on University Ave in Waterloo. Approximately 20 AFS-OC members came out for the social, including Dr. Cooke!

AFS-OC Student Subunit



The student subunit has had another busy 2018-2019!

The highlight of the year was the 3rd annual Student Success Workshop, which drew students out to chat about science, conservation, and post-graduate life! The workshop included:

- An introduction to R workshop hosted by Robert Lennox
- A presentation on consulting by Charles Hatry (Kilgour and Associates)
- A Panel discussion on professional experience with:
 - Randi Anderson, Policy Advisory to the Minister (DFO)
 - Dominique Lapointe, Researcher, St. Lawrence River Institute
 - Joe Bennett, Professor, Carleton University
 - Mike Donaldson, Canadian Science Publishing
 - Milica Mandic, Post Doc, University of Ottawa
 - Catherine Proulx, Kilgour and Associates

Over 50 students attended the event, which was followed by a “mentor mingler” after the panel discussion to give students the opportunity to chat one on one with the mentors. It was a great evening and we look forward to the next Student Success Workshop!

The AGM this year was another highlight for the subunit. The student raffle was filled with excellent prizes thanks to our generous sponsors, and even more generous raffle participants! We were once again able to raise enough money to support ongoing activities and bursaries for our membership. Also, the subunit continued the new tradition of inviting the previous year's Outstanding Mentor Award recipient to give an oral presentation at the AGM in Orillia. Last year's recipient Dr. Katie Gilmour gave an excellent presentation on the study of chronic social stress in rainbow trout feeding behaviour, and the challenges of isolating specific physiological mechanisms driving fish behaviour. The recipient of this year's Outstanding Mentor Award is Dr. Andrew Drake with Fisheries and Oceans and adjunct at the University of Waterloo. We look forward to Dr. Drake's presentation at the next AGM!

The student subunit also welcomes its new Executive:

- President: Alice Abrams - Carleton University (student-president@afs-oc.org)
- Vice President: Jacob Burbank - University of Waterloo (student-vice-president@afs-oc.org)
- Treasurer/Secretary: Britney Firth - University of Waterloo (student-secretary@afs-oc.org)
- Regional Representative: Peter Holder - Carleton University (student-rep@afs-oc.org)



Series: Fish Species Complexity — Highlighting Diversity in Ontario

One fish, two fish, red fish, blue fish

Will Jarvis, MSc | University of Ottawa

Any angler who has spent time on lakes in eastern North America will be familiar with the striking colours of Pumpkinseed sunfish (*Lepomis gibbosus*). Despite sometimes being a source of frustration when they get in the way of catching more desirable fish, few could deny they are a good-looking fish. The speckled orange and blue spots, the wavy lines on the head, and the bright red spot on the opercular flap seem like they should belong to a tropical reef fish.

Pumpkinseed colouration plays an important role in their reproductive biology. Males use their brightly coloured opercular flaps in territorial displays while defending their nests, flashing them at rival males and potential nest predators^{1,2}. Colouration also seems to be used to attract mates (C. Nolan, unpublished data), as female Pumpkinseed tend to prefer males with larger and more prominent opercular flaps³. Interestingly, female Pumpkinseed have the same general colour pattern as males, suggesting that colouration may serve other functions such as social interactions with other Pumpkinseed or influencing predator-prey interactions by camouflaging motionless fish in shallow, vegetated water.

While investigating pumpkinseed ecology from 2015-2018, researchers from the Robinson lab at the University of Guelph began to notice Pumpkinseeds with a drastically different colour pattern. These mystery fish were more uniformly silver-blue and lacked the distinctive red spot on the opercular flap and the golden belly. To confirm that they were in fact Pumpkinseed, and not another sunfish species or hybrid, they used DNA barcoding and compared it against known samples of Pumpkinseed and other centrarchid sunfish. The blue colour morphs were indistinguishable from Pumpkinseed, indicating they were the same species.

We don't know how widespread the blue colour morph is, or how long it has existed. In Ashby Lake, Ontario, where the team first noticed them, the local Pumpkinseed population was roughly 15% blue sunfish in 2017 (Will Jarvis, unpublished data).

They seem to be more abundant in the deeper, pelagic areas of the lake and anecdotal observations suggest that they may be present in other clear, oligotrophic lakes in eastern Ontario (Mathew Stefan, personal communication).



Male Pumpkinseed guarding his nest.

Photo credit: Kathryn Peiman



Top: Typical Pumpkinseed colouration; bottom: novel blue colouration. Photo credit: Beren W. Robinson

One fish, two fish, red fish, blue fish – *cont.*

In a species where colour clearly influences social interactions including territoriality and mating, it is remarkable to see individuals with such a unique colour pattern. We can only speculate as to how the blue colouration provides benefits to sunfish in the pelagic habitat (perhaps camouflage from predatory loons?) and the consequences for Pumpkinseed populations and the fish community as a whole. Such novel trait variation surely merits further investigation, as well as a more widespread survey of the extent of this trait across the Pumpkinseed range.



References

- ¹Rios-Cardenas, O. & Webster, M.S. 2005. Paternity and paternal effort in the pumpkinseed sunfish. *Behavioural Ecology* **16**(5):914-921.
²Colgan, P. W. & Gross, M. 1977. Dynamics of Aggression in Male Pumpkinseed Sunfish (*Lepomis gibbosus*) over the Reproductive Phase. *Z. Tierpsychologie*. **43**:139-151.
³Goddard, K. & Mathis, A. 1997. Do opercular flaps of male longear sunfish (*Lepomis megalotis*) serve as sexual ornaments during female mate choice? *Ethology Ecology & Evolution* **9**: 223–231.

Fish Focus: **BROOK SILVERSIDE** (*Labidesthes sicculus*)

This elongated silvery fish can often be seen in large schools jumping in an arc out of the water, sometimes jumping ten times the length of their body! Silversides are unfortunately short-lived, maturing at the young age of one year old. Since they have a shorter life span, these fish spawn several times during the spring.

To survive the short Canadian seasons, eggs that hatch within the early spring are typically females. There are a total of 104 species within the Silverside family occurring in fresh and salt waters from North to South America.

Habitat: Warm surface waters of clear streams and nearshores of lakes.

Reproduction: Brook Silversides spawn in shallow, vegetated areas in spring and summer when the water temperature reaches 17 degrees Celsius. Males chase females and they release sperm and eggs which have adhesive filaments and microscopic hairs that attached to the surrounding vegetation. As mentioned above, Brook Silversides are fractional spawners, spawning several times during the spring and summer. Adults die shortly after spawning.

Prey: Silversides catch their prey of flying insects in mid-air, by jumping out of the water. They will also consume aquatic insects and crustaceans.

Maximum Age: 1 **Ontario Record Length:** 10.8 cm

Ontario Average Length: 7.5 cm



AFS-OC Fall Webinar



On November 22, 2018, the AFS Ontario Chapter hosted a webinar presented by Dr. Ray White. Dr. White talked about “Healing sick trout streams: Ecological restoration, not artificial restructuring of channels”. There were 44 registered individuals or sign in nodes that participated in this event. To view Dr. White’s slides, please visit http://www.afs-oc.org/wp-content/uploads/2018/12/Healing_Sick_Streams-Nov-22-2018.pdf.

Migratory Fish

2019 is the International Year of the Salmon! Through outreach efforts, the IYS will raise awareness of what humans can do to better ensure salmon and their varied habitats are conserved and restored against the backdrop of increasing environmental variability. The overall theme is “Salmon and people in a changing world” (<https://npafc.org/iys>). Visit <https://yearofthesalmon.org> for events and projects.



INTERNATIONAL
YEAR OF THE SALMON

Connecting fish, rivers, and people: World Fish Migration Day is a one day global celebration to create awareness on the importance of free flowing rivers and migratory fish. The next WFMD is May 16, 2020. <https://www.worldfishmigrationday.com/home>



The film Love Flows brings to life the challenges that rivers and fishes face. It captures the growing passion of thousands of people from across the globe that join together on WFMD to celebrate their love and work for rivers and fish.

<https://www.youtube.com/watch?v=7tBtz2uv8fl>

Behind the Scene Tour of the ROM Lab



On Thursday May 30, 2019, a dozen AFS-OC members got a behind the scenes tour of the ROM's off-site lab in Burlington, guided by the one and only Erling Holm (Assistant Curator of Ichthyology), who seemed to have the whole wide (fish) world in his head - his knowledge of everything ichthyological was endless.



Jars upon jars greeted our eyes as we entered the rooms of specimens, ranging from the tiny (the world's second smallest vertebrate,

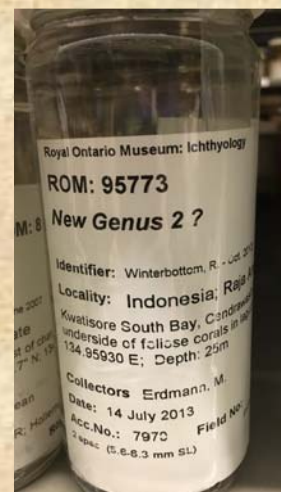
Paedocypris progenetica, at <8mm mature length) to the huge (a sterile female Lake Trout, *Salvelinus namaycush*, weighing 102 lbs). Some members searched out the unusual (the single specimen of a Least Darter from the Credit River) while others admired the unknown ('new genus 2?'). The massive and ancient coelacanth (often called a 'living fossil' although it has evolved over the past 390 million years, just super slowly) was a very cool sight to see.



Whether you're a lumper or splitter, Erling's advice to us fishheads is the same: take pictures and document what you catch and see. We know so little about



the fundamental diversity of our lakes and streams, and unusual sightings probably pass us by too often. Be observant, don't assume, and don't be afraid to ask - maybe you'll find a specimen that has unusual characters, and it'll turn out to be the first recorded hybridization between two species, or a new record of a species for that watershed. How cool would that be???



Series: Fish Species Complexity — Highlighting Diversity in Ontario

Ontario's silver Lake Trout

Chris Wilson, Research Scientist | Ontario Ministry of Natural Resources and Forestry

Lake Trout are one of Ontario's most valued fish species, and are uniquely vulnerable to human activities and changing ecological conditions. This is particularly true for populations in southern Ontario, which represent close to ten percent of all Lake Trout populations in Canada and are subjected to substantial ecological pressures from species invasions and expansions, warming climate, and increasing human development. The ecological and genetic variation among these populations represents a significant component of Ontario's aquatic resources and biodiversity, and reflects thousands of years of isolation and local adaptation in inland lakes as well as the raw material for future adaptation.

Kingscote Lake at the southern tip of Algonquin Park (Figure 1) holds a unique population of Lake Trout. These small-bodied Lake Trout differ from the typical spotting pattern for Lake Trout in having no

spotting or vermiculations at all, instead having a uniform silver or chrome-like appearance (Figure 2). This difference in colour and patterning variation is parallel to how Aurora Trout (*Salvelinus fontinalis timagamiensis*) differ from regular Brook Trout, and the Kingscote Lake Trout are at least as unique. Although historical accounts refer to "grey trout" and "salmon trout" in the Algonquin Park to Pembroke region (Addison 1974; Quinn 2002; T. Haxton, OMNRF, pers. comm.), evidence of this phenotype in other Lake Trout populations has so far only been confirmed from Barker Lake in Bancroft district (S. Lawrence, OMNRF, pers. comm.). Other colour variants have been reported for Lake Trout, although none so extreme (Wilson and Mandrak 2004). Although Lake Trout with large vermiculations have been reported from populations where lake trout are known to hybridize with Arctic Charr, and are hypothesised to

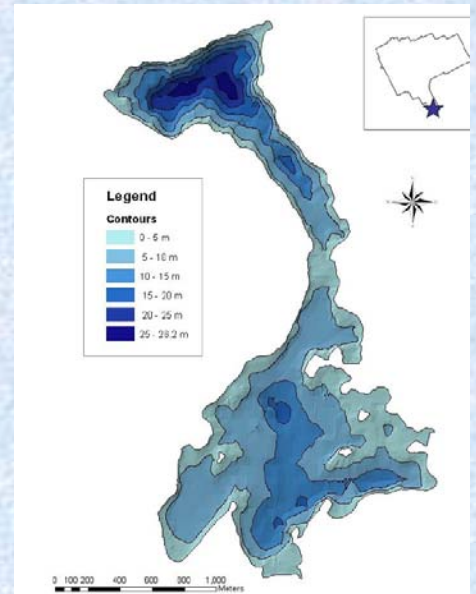


Figure 1: Map of Kingscote Lake, showing bathymetric contours and location within Algonquin Park

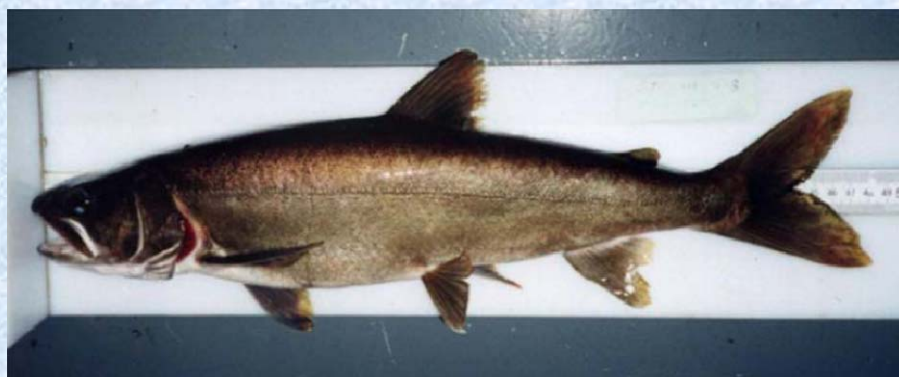


Figure 2: Photograph of "silver" Lake Trout from Kingscote Lake, showing the absence of typical phenotypic markings

result from differential expression of a developmental gene controlling timing of chromatophore expression (Wilson and Hebert 1993), no evidence of ancestral hybridization exists for the Kingscote Lake population (Yott 2000).

The unique colour phenotype of the Kingscote Lake trout is more than an evolutionary novelty, and provides evidence that the Kingscote population is locally adapted and has higher local fitness than introduced hatchery fish. During the first decades of the 20th century, the population was reduced to the point that supplemental stocking was

Ontario's silver Lake Trout — *cont.*

initiated using outside sources (OMNR and OMOE 1993). Beginning in 1925, thousands of Lake Trout were stocked, continuing after the incorporation of Bruton Township into Algonquin Park and ending in 1985 with the establishment of park policy to end stocking from outside sources onto self-sustaining trout populations in the Park (OMNR 1998; Yott 2000). According to local knowledge and angler diaries, the relative abundance of silver Lake Trout compared with normal-appearance Lake Trout in Kingscote Lake substantially increased over this time interval, from a low of less than 10% of the population in the mid-1920s to approximately 50% in the early 1960s (C. Cowan, Haliburton, pers. Comm.). Intensive sampling since 1999 has shown that the silver Lake Trout now make up more than 95% of the population (Yott 2000; OMNRF unpubl. data). Breeding experiments between the Kingscote silver Lake Trout and normal-appearance ("wild type") Lake Trout showed that the silver colouration was not a dominant genetic trait (OMNRF unpubl. data), indicating that the increasing proportion of silver lake trout over time was due to their higher recruitment rather than the spread of a dominant colour variant. The persistence and significant recovery of the silver Lake Trout, after a long history of stocking with non-native Lake Trout, suggests that this population is locally adapted to conditions in Kingscote Lake.

Despite being locally adapted, the Lake Trout population in Kingscote Lake is still vulnerable

to anthropogenic and environmental stressors. As the southern access point for Algonquin Park, the lake is potentially vulnerable to species introductions despite the park's prohibition on live baitfish. Introduced Rock Bass are established in the lake and have been shown to negatively impact Lake Trout in other southern Ontario lakes (Vander Zanden et al. 1999). Because of the lake's size and bathymetry (Figure 1), suitable habitat for Lake Trout is reduced to its north basin by mid-July. Seasonal oxygen levels also highlight the population's vulnerability to habitat limitations (Wilson and Evans 2010).

As well as their evolutionary uniqueness, the silver Lake Trout of Kingscote Lake exemplify the vulnerability of southern Lake Trout populations in general. To help ensure the persistence of this unique form of Lake Trout, wild egg collections from Kingscote Lake and hatchery rearing have been used for rehabilitative stocking and to establish 'satellite' populations within and outside Algonquin Park. As well as using native fish to foster rehabilitation and introduction events, it is hoped that these efforts and ongoing monitoring will help ensure a future for this unique biodiversity element of a highly valued species.

For more information about Kingscote Lake Lake Trout, visit: <http://www.ontla.on.ca/library/repository/mon/24008/300600.pdf>.

References

- Addison, O. 1974. Early days in Algonquin Park. McGraw-Hill Ryerson, Toronto, ON.
- OMNR. 1998. Algonquin Park District Fisheries Management Plan. Queen's Printer, Toronto, ON.
- OMNR and OMOE. 1993. Inland lake trout management in southeastern Ontario. Kemptonville, ON. 160pp.
- Quinn, N. 2002. Algonquin wildlife: lessons in survival. Natural Heritage Books, Toronto, ON.
- Wilson, C.C. and P.D.N. Hebert. 1993. Natural hybridization between *Salvelinus alpinus* and *S. namaycush* in the Canadian arctic. Canadian Journal of Fisheries and Aquatic Sciences 50: 2652-2658.
- Wilson, C.C. and N. Mandrak. 2004. History and evolution of lake trout in Shield lakes: past and future challenges. p. 21-35 in J. Gunn, R. Steedman, and R. Ryder (eds). *Boreal Shield Watersheds: Lake Trout Ecosystems in a Changing Environment*. Lewis/CRC Press.
- Wilson, C.C. and D.O. Evans. 2010. Algonquin's silver lake trout: highlighting the history, habitat, and concerns for a unique biodiversity element. Aquatic Research and Development Section. Ontario Ministry of Natural Resources. Peterborough, Ontario
- Yott, D. 2000. A genetic analysis of the silver lake trout of Kingscote and Log Dog Lakes, Algonquin Park, Ontario, Canada. Biology Honours thesis, Trent University, Peterborough, ON.
- Vander Zanden, M.J., J.M. Casselman and J.B. Rasmussen. 1999. Stable isotope evidence for the food web consequences of species invasions in lakes. Nature 401: 464-467.



Electrofishing and Breathable Waders

By **Patrick Cooney, Certified Fisheries Scientist**

Director of Electrofishing Science | Business Development Director

To understand why I and so many other people have been electrified while electrofishing with breathable waders, it is important to understand how breathable and non-breathable waders work.

Non-Breathable Waders

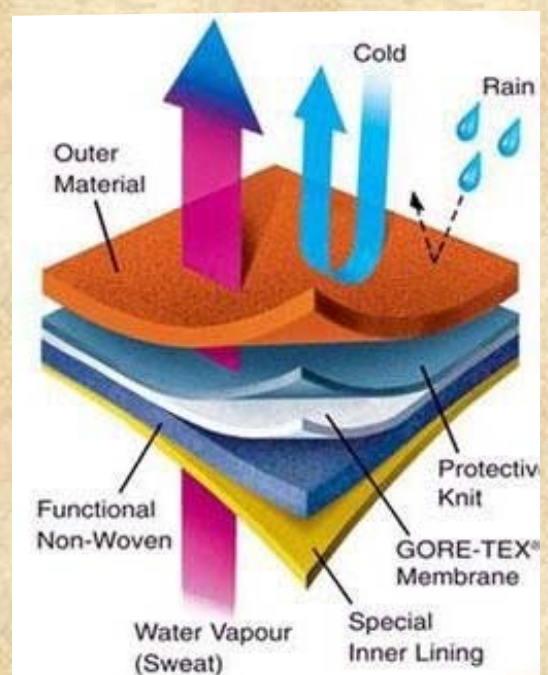
Solid, non-porous layers of material are found on waders made with PVC, Rubber, and/or Neoprene. There are no micropores to allow vapor, water, air, sweat, electrons, or other particles to pass through. Of course, should you develop holes in your waders, you are creating pathways for transfer of particles from one side to the other, including electricity (the movement of electrons). Therefore, it is always advised to immediately patch all holes, no matter how small, in your waders to prevent being electrified. Years of use have demonstrated that at the voltages used with electrofishing, non-breathable waders act as an effective electrical insulator. Similarly, proper rubber gloves (lineman gloves), are an additional tool that is strongly recommended to further provide electrical insulation.

Breathable Waders

Gore-Tex, and other “Breathable” textiles, are not a solid layer. The textiles have purposefully designed micropores that are designed specifically to be larger than water vapor, but much smaller than water droplets. In fact, the pores are 700 times larger than water vapor and 20,000 times smaller than a water droplet. (<https://www.moosejaw.com/content/goretex-fabric>)

As you sweat inside of your breathable waders, the moisture is in vapor form, and is able to penetrate through the porous material and vacate your waders, making them “breath-able”. Whereas, the water droplets on the outside of your waders force against the porous material, but are too large to penetrate.

As the day transpires, you continue to sweat. As some of the sweat vapors inside your waders collect to form droplets, your clothes become increasingly saturated with sweat. Additionally, as you go into cool water, the vapor cools and more easily collects as droplets. Further, when you walk into deeper water, the pressure of water on the outside of your waders forces out the air on the inside of your waders. In turn, this pushes the saturated fabric of the waders tighter against your clothes and skin. Air is a much better insulator than water. Unfortunately, your sweat, which contains a lot of electrolytes, is an excellent conductor, and therefore begets the ultimate reason why breathable waders are not recommended.



Electrofishing and Breathable Waders — *cont.*

Electricity

We have all heard that “Electricity takes the path of least resistance.” What you may not be aware of is that when breaking it down to a simple form, electricity is the movement of electrons. Guess what is smaller than water vapor in size? Electrons!

As the layers of materials in your breathable waders become saturated with sweat on the inside and water on the outside, liquids press against either side of the porous layer. As mentioned, the sweat (salt water) on the inside of your waders is far more conductive than the freshwater around it, and as you go into deeper water and force the air out of your waders, the tiny electrons pass through the porous “breathable” layer, and exploit a pathway through your waders and eventually your body. This results in you receiving an electrical shock.

Take Home

Can you electrofish with breathable waders and not get electrified. You can, until you can't! With dry clothes on under your breathable waders and electrofishing in very shallow water, one can electrofish all day without being electrified. Unfortunately, this provides a lot of anecdotal evidence where people profess “I have never been shocked while wearing breathable waders, so I don't see what the big deal is!”.

However, not everyone electrofishes under those “ideal” conditions. In more diverse conditions, as you sweat and enter water about knee depth, the likelihood of becoming “shocked” increases, especially if you are electrofishing in low conductivity water and/or have the electrofisher operating at higher voltages (electrical pressure).

Should one of the electrodes get close to your legs while electrofishing with breathable waders, you will feel an even greater “shock” because the electric field is strongest (most dense) in closer proximity to the electrodes. Additionally, it seems to get people in the sensitive skin on the back of the knee, which in turn, increase the risk of falling. We have found that falling while electrofishing has led to far further injuries than being electrified. So, don't get electrified, and stay on your feet to stay safe!

Safety is a Priority

Smith-Root makes your safety a priority. We designed our backpack electrofishers to have the greatest number of safety standards in the world. We know that you work in remote regions and protect some of our most vulnerable natural places and organisms. Therefore, we aim to also protect you...the protectors. Please know that we understand that non-breathable waders can be less comfortable than breathable waders in terms of sweat, heat, and long walks. But, we'd much prefer to know that you made it home safe and completed your scientific/management objectives while minimizing/eliminating the risk of being electrically shocked.

Therefore, **DON'T WEAR BREATHABLE WADERS!!!!!!!!!!**

Please look for PVC lined waders or neoprene waders. Additionally, wear dry clothing underneath your waders and proper rubber gloves on your hands. Finally, wear proper footwear to minimize the chance of falling.

Stay safe, and don't hesitate to let us know if you have any further questions that we can help answer. Write to the experts at: experts@smith-root.com.

Book Review

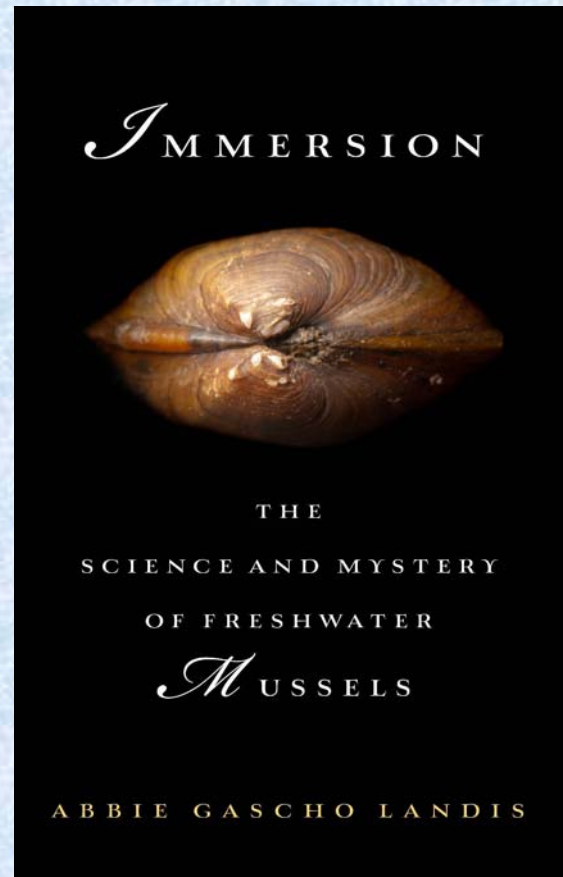


By Heather Cray

Immersion: The Science and Mystery of Freshwater Mussels. By Abbie Gascho Landis. 2017. Island Press. 256 pages, \$34.50 CAD, Cloth or E-book.

This review was originally published in *The Canadian Field-Naturalist*: Cray, H.A. 2018. "Immersion: the science and mystery of freshwater mussels" by Abbie Gascho Landis, 2017 (Book Review). *The Canadian Field-Naturalist* 132(3): 306-307. DOI: <http://dx.doi.org/10.22621/cfn.v132i3.2261>

Immersion is a book about reviewed journal articles freshwater mussels: what they are, from the scientists how they live, why they matter, whose work is featured why so many of them are in the text as well as imperiled, and how we can change news pieces and that. Best described as a popular reference texts. science book, this is no sterile Individual chapter examination of freshwater sections vary in length bivalves. The writing is funny and but none are overlong or charming, equal parts accurate, feel bloated. As each informative description, and section is a logical and transportive narration. In addition relatively self-contained to presenting a compelling parcel nested within the argument for why freshwater chapter's thematic mussels are fascinating creatures, whole, the structure of *Immersion* explores tensions the book lends itself both between water for crop irrigation to casual and to binge and water to keep the river reading styles. The line drawings about an interesting topic, the flowing, the *Endangered Species* peppered throughout the book are author and the researchers within *Act* versus corporate interests, and few but effective, illustrating key the pages carry you with them into mussel researchers versus the details in harmony with the text. their streams and laboratories. onslought of pollution, habitat loss, The author's prose is appropriately Like them, you may catch yourself proselytizing about mussel biology to friends and strangers alike. This and fragmented landscapes. A self descriptive and I was certainly not is not a book you will want to part -professed freshwater mussel left wanting for illustrations to visualize the subject matter. This with, instead revisiting it from time groupie, the author is a writer, to book ignites a sudden and urgent to time to refresh and revisit. If you veterinarian, and naturalist. She is impulse to grab a snorkel and run are new to the world of freshwater mussel biologist and the mother of to the nearest riffle. If you live in mussels, this book is guaranteed two creek-loving toddlers. Sourced northern latitudes, I recommend to change the way you look at your from field and laboratory visits with reading *Immersion* in the early local creeks, rivers, and streams. I experts as well as her own warm weather months, so that you can (and do) enthusiastically recommend this book to anyone musseling experiences, the ten can satisfy that urge when with so much as a glimmer of chapters are well organized and mussels are active (and without interest in the natural world. coherent, covering mussel the need for a polar bear dip). It is reproduction, research, and the quality of writing and depth of enthusiasm for the topic that sets restoration in engrossing detail. this book apart from other similar The selected bibliography provides popular science books. Instead of further reading for the dedicated enthusiast, including peer-passively informing the reader



about an interesting topic, the author and the researchers within the pages carry you with them into their streams and laboratories. Like them, you may catch yourself proselytizing about mussel biology to friends and strangers alike. This is not a book you will want to part with, instead revisiting it from time to time to refresh and revisit. If you are new to the world of freshwater mussels, this book is guaranteed to change the way you look at your local creeks, rivers, and streams. I can (and do) enthusiastically recommend this book to anyone with so much as a glimmer of interest in the natural world.

J.R. Dymond Publication



J.R. Dymond is part of a long line of prominent ichthyologists associated with the Royal Ontario Museum and the University of Toronto. He was named a CARS Legends of Fisheries Science and Management in 2016. Dymond also had an important role in the early development of research programs in Algonquin Park.

The Ontario Chapter supported the printing of a Friends of Algonquin Park publication which highlights J.R. Dymond's contributions to Algonquin Park. Dr. George Warecki (<http://brescia.uwo.ca/about/our-people/our-faculty/faculty-dr-george-warecki>) is currently working on a biography of J.R. Dymond (1887-1965) and authored the biographical manuscript "J.R. Dymond Scientific Research, Nature Reserves, and the Interpretive Program in Algonquin Provincial Park 1931-1954".

Check out the Friends of Algonquin bookstore in person or online (<http://store.algonquinpark.on.ca>) to get your copy today.

River and Stream Technical Meeting Update

North Central Division – American Fisheries Society

Rivers and Streams Technical Committee Annual Meeting, April 2-3, 2019 Milan, Illinois

The Rivers and Streams Technical Committee facilitates the proper management of Midwest cool, warm, and coldwater streams. This committee organizes and disseminate information and promote useful and timely research for the development of sound lotic management techniques that address aquatic populations and their environment.

Via webinar graciously provided by Megan Thul, Nick Jones presented an overview of streams in the province of Ontario highlighting important differences and similarities. For example, Ontario is a very large province with wine grapes grown in southern Ontario while polar bears room in the north. Also, unlike many states, Ontario has many lakes and interconnecting streams. Nick looks forward to future interaction with the committee and the opportunity to meet face to face.

Lunch and Learn

Ann Rocchi, Megan Lloyst and the 'Angler to be Named Later' gave an invited guest lecture to Trent University's fourth year Fisheries Management class. Pizza, pop and career advice courtesy of the AFS-OC. Thanks to Drs. Anna Rooke and Jenilee Gobin for the invite!!!

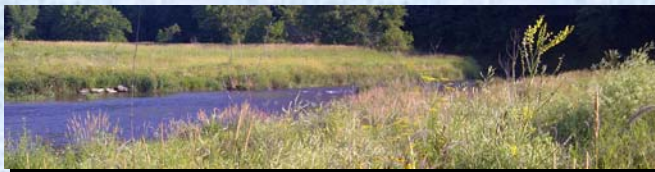


“On the Hook!”



Just over one-third (37%) of the world’s 246 longest rivers remain free-flowing. Learn about mapping the world’s free-flowing rivers:

<https://doi.org/10.1038/s41586-019-1111-9>
<https://www.facebook.com/McGillUniversity/videos/517025028832428/>

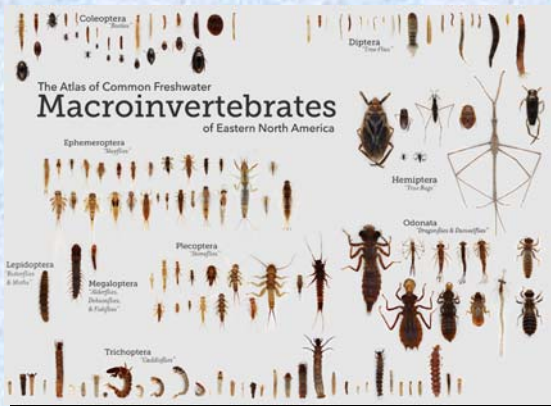


Check out this online river restoration toolbox developed by the Iowa Department of Natural Resources. <https://bit.ly/2IFtIq2>

Here’s an online key to the common freshwater invertebrates of Eastern North America. <http://macroinvertebrates.org>

Small streams have large impact on big lake: there are over 2,800 tributaries that flow into Lake Superior.

<https://bit.ly/2Wf1FHY>
<https://doi.org/10.1111/1752-1688.12695>



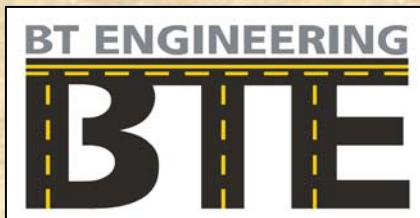
Even if you’re out playing with fish, remember to report all invasive species to help monitor their distribution:

<https://www.eddmaps.org/ontario>





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