



Message from the President



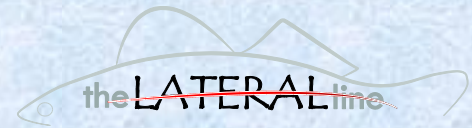
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It has taken great time, effort, and thought to write this message given the current state of the world. As we head into year three of a global pandemic, the hope that society, work lives, and personal lives return to a state of normalcy is a pervasive feeling. It has been made clear that what many of us consider normal and acceptable was inadequate for many individuals and communities. Sadly, the effects of the pandemic have reflected and are additions to the continuous struggles of many. In desperation, many individuals, communities, and even organizations abandoned sustainable practices out of necessity, eliminating much of the progress that has been made in the last decade to protect the environment and biodiversity. Marginalized groups have further suffered from the immense disparity created in an already problematic system. Therefore, as we eventually come out of the pandemic with the hopes of resuming our regular in-person activities, I challenge you all to strive to help those around you.

The ExComm prides itself in creating a supportive space for students and young professionals, a characteristic of AFS-OC that I have experienced and am very thankful for. Despite this, the fisheries field is not without its problems. Having experienced and observed sexism and sexual harassment as well as witnessed racism, the dismissal and devaluing of Indigenous Knowledge by Western scientists in the field, among others, I take great responsibility in learning to better protect and lift up marginalized members within the Western scientific framework, as well as recognize that this is not the only path to knowledge of fisheries resources. Throughout my career so far, I have recognized that fisheries management is primarily about the management of human behaviour, perceptions, and impacts, and that if we collectively take a step back, nature does a very good job at managing itself. In that regard, I would like to emphasize our roles in shaping society's perceptions of the natural world and our obligations to care for it. I encourage everyone to take some time out of their busy lives to reflect on the messages very clearly outlined at the AGM - that we need to value the diverse perspectives of many different cultures that live in Ontario. We also need to take the time to connect with our families, friends, and communities now more than ever to urge change in our daily practices

Message from the President — *cont.*



and how we treat the land. The more respect we can develop, the less destruction. Of course, we cannot individually change the destruction that is happening on a global scale, but all of us are part of the problem and part of the solution. All of us can take a moment to think about our actions, what we do or do not say, what we do or do not purchase, how we interact with nature and the land around us and what we share with others. All of us can work towards healing the land, whether it is volunteering, donating, spreading awareness, making a more sustainable choice in our daily lives, and in turn we will be better for it.

I have heard the calls from our Northern members for more accessible resources and events, I have heard the calls from students to navigate the uncertainty of these times, I have heard the calls to become allies to underrepresented groups and to create a more welcoming chapter. I will continue to work hard to make these changes for the benefit of our current and future members with the intention for all to carry forward this momentum, slowly changing the frameworks for the betterment of all.

I encourage you to listen to the voices of others, to come to an understanding, to discover mutual respect for the land and our natural resources for which we are extremely privileged to still have. Now is the time to encourage individuals to experience nature in a respectful way that promotes the healing of both human and land. With support of the ExComm I have been working very hard to create opportunities in these trying times to reconnect, to support each other, to learn, and hopefully soon to gather again in person on the land and in the waters.

I wish you continued strength to navigate these challenging times and while I certainly do not hold many of the answers, I welcome any assistance in finding them or offer to lend an ear to the disheartened. Throughout this newsletter you will find some of the opportunities and ideas in motion.

Happy fishing, hiking, gardening, camping, or any other nature related experience that brings you peace and joy.

Sarah Steele, AFS-OC President

Career Talk



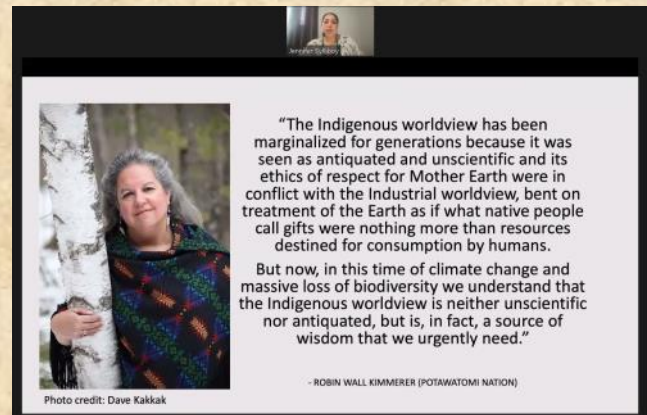
Ann Rocchi and Megan Lloyst (left photo) presented an AFS-OC sponsored Career Talk for Trent University's Fourth Year Fisheries Management Course. Instructor, Jenilee Gobin.

Approximately 40 students attended, either in person or by Zoom (right photo).



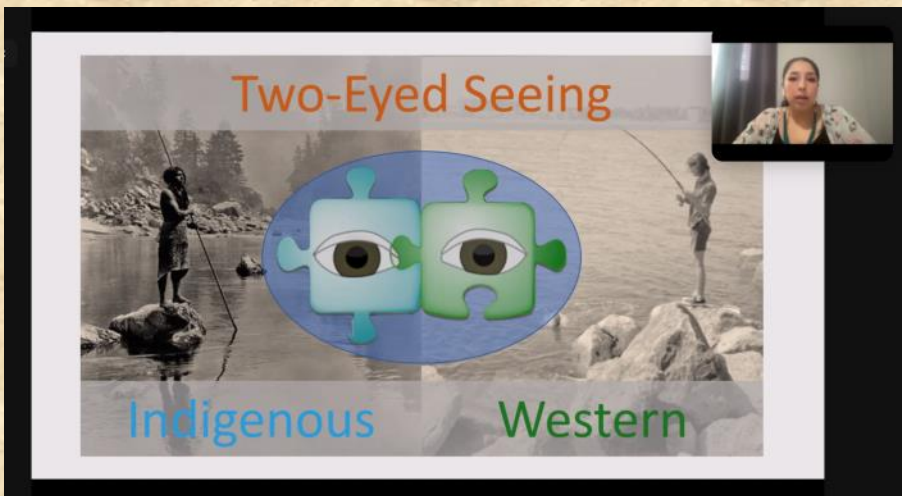
2022 AFS-OC Annual General Meeting

On March 25-26 2022, the Ontario Chapter of the American Fisheries Society hosted our 2022 Annual General Meeting. Building upon our successful virtual Zoom platform from the 2021 AGM, we expanded into the SpatialChat realm to recreate some of the lost in-person interaction we miss so dearly. This year’s conference theme was “Rebuilding from the Ground Up: Fundamental Interactions in Aquatic Restoration and Management” to encourage discussions surrounding the important relationships that need to be healthy and strong in order to successfully restore or manage fisheries resources. The theme also tied into the United Nations Decade on Ecosystem Restoration, which emphasizes the need to prevent, halt, and reverse the global degradation of ecosystems that proportionally has greater impact on Indigenous and impoverished communities. The call was heard, and we saw an amazing line-up of talks surrounding these very relationships.



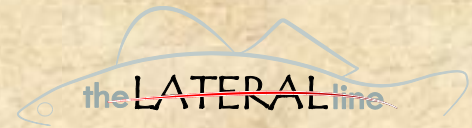
Early on in the planning stages, the Diversity and Inclusion Subcommittee members agreed it was imperative in this year’s AGM that we actively invite and welcome the perspectives of Indigenous individuals, communities, and organizations. The intention was to make space for sharing of Indigenous-led management and restoration or strong partnerships between Indigenous and Western science groups where Indigenous Knowledge is valued and used for the betterment of the land and resources.

Our Keynote speaker was Jennifer Sylliboy, Integrative Knowledge Systems Researcher at the Unama’ki Institute of Natural Resources in Cape Breton, with a talk entitled “Using Two-Eyed Seeing (Etuaptmuk) as a Tool for Collaboration: Successes & Lessons Learned in Aquatic Research & Fisheries Management at UINR”. Jennifer Sylliboy’s talk highlighted valuing the importance of Indigenous cultural values, beliefs, ceremony, storytelling, and government as equal to scientific observation and experimentation. From the Mi’kmaq lens, the steps toward integration of Indigenous perspectives and Western science were made clear for all of us to consider in our present and future, both in the workplace and in our personal lives.

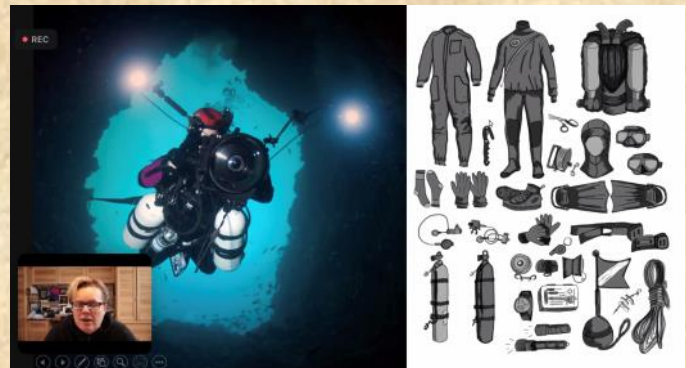


Jennifer Sylliboy, our Keynote speaker.

2022 AFS-OC AGM — cont.



The program consisted of a Professional Lightning Session, Student Lightning Session, a Mussel and Host Relationships Session, and two Aquatic Restoration and Management Sessions covering a number of topics including aquatic habitat restoration, impacts of contemporary and historical development on fish communities, effective partnerships for restoration and beyond, anthropogenic stressors, and monitoring of Species At Risk, among many more.



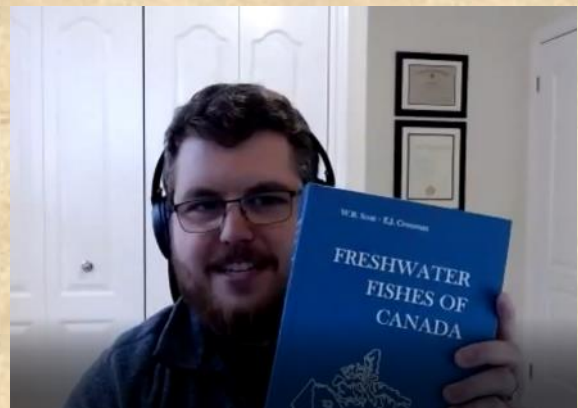
We also hosted a Poster Session on SpatialChat allowing for more interaction between presenters and the audience compared to our previous virtual meeting. Barb Elliot, 2021 winner of the Outstanding Mentor Award, also shared an inspiring journey and encouragement to always partake in life's opportunities.



Finally, we attempted to recreate our mentorship/networking event from in-person meetings, allowing for discussion among professionals and students. The AFS-OC Student Subunit worked very hard to put

together a Professional Scavenger Hunt to encourage students and young professionals to seek out and connect with many professionals attending. The event was a success, and many of us continued talking long into the night.

With so many great talks and nominations, it must have been a difficult decision for judges. The E.J. Crossman Award for best student paper (oral presentation) was awarded to Jordanna Bergman with the talk entitled "Spatial ecology of muskellunge during a winter drawdown in a regulated, urban waterway in Canada". The AFS-OC President's Award for best student poster presentation was awarded to Jessica Reid with the poster entitled "Habitat use and movement patterns of muskellunge in the Jock River, Ontario". Congratulations to you both, and thank you to all the students for your excellent contributions. The 2022 Outstanding Mentor Award was awarded to Nicholas Mandrak, Professor at University of Toronto Scarborough among many other roles, who has excelled at providing immense support and opportunity for students and young



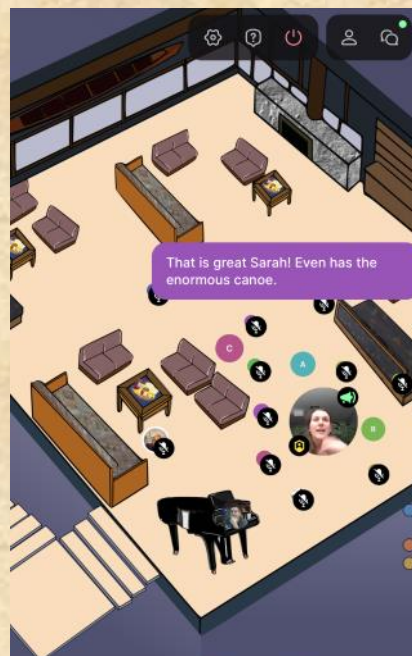
Zach (above) virtually presents the Crossman award to Jordanna (below)

2022 AFS-OC AGM — cont.



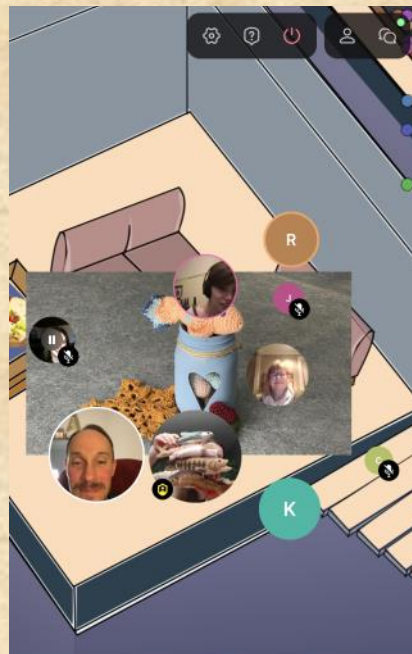
professionals in his lab and beyond. An honorable mention went to Graham Raby, Assistant Professor at Trent University; we certainly acknowledge you are on a positive trajectory with your mentorship and we encourage continuation of your amazing support!

This second virtual AGM was a huge success, and we thank all speakers and contributors that made this such a great event. Thank you to all who joined us, we worked hard so the online platform was even smoother and more enjoyable. Participation peaked around 90 participants, and we also were excited that half of the registrants were non-members at the time and hope that many become members after this event. If you missed the meeting, content will be available online shortly at <https://www.afs-oc.org/about-us/2022-afs-oc-annual-meeting>.

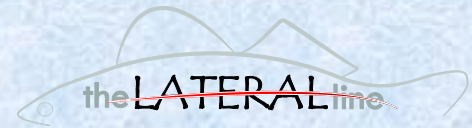


We are hopeful our next meeting will be in person, however we may not be able to host at our beloved YMCA Geneva Park in Orillia. For those who had experienced this wonderful place and were able to join our SpatialChat events, I hope you enjoyed the surprise replica of the YMCA lounge courtesy of Sarah Steele (President) which pays tribute to our memories there. We look forward to seeing you at next year's AGM during February/March 2023, in whatever space the future holds! If you have ideas about potential venues for AGM 2023, please get in touch.

The Executive Committee looks forward to seeing you there!



Electrofishing Update



By Jon Clayton (Credit Valley Conservation)

Summary of current discussions:

- Conservation Authorities (CAs) offered a course in 2021 for CA staff only; it was a free, virtual course with field training at the attendee's place of employment.
- Direction from Conservation Ontario is that current insurance does not allow CAs to provide electrofishing training to people not employed by a CA.



- CAs plan to explore what changes need to happen to allow them to train others but no guarantees that this will occur.
- Is there a role for or interest in the Chapter in electrofishing training?

Some questions about future electrofishing:

- Does there need to be Class 1 and Class 2?
- Should it/could it be free?
- Should it/could it be virtual?
- What are the criteria for instructors?

2021 AGM Mentorship Event Highlights

Accreditation:

- Ontario Stream Assessment Protocol*
- Ministry of Transportation Protocol⁺
- ROM Fish ID Workshops
- SVOP and Vessel Safety
- Backpack Electrofishing Certification
- Post-grad Certificate > Grad School
- Legislation: Fisheries/Species at Risk/Endangered Species Acts
- Masters + Practical Experience^o

* Conservation Authorities

⁺ Consulting

^o Government

Screening:

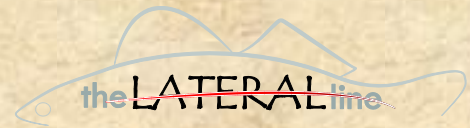
- Write resumes and cover letters for real people
- Give examples/details of your experience and application to job requirements
- Cover letter + Multi-page Resume (+ External Info[†])
- Use same keywords as job descriptions
- Content > Spelling/Grammar > Formatting (No photos!)
- Personal experience is valid, just be clear how it applies

[†] Consulting hiring manager can use any information in decision

General:

- Step out of comfort zone to talk to professionals
- Meet the people that will be hiring (a great place: AFS-OC events!)
- Do not get discouraged
- Short contracts, summer jobs, volunteering are great opportunities to network
- Show you have taken initiative to try to learn if lacking skill/experience/training

AFS-OC Student Subunit



It has been another interesting year in the ‘virtual world’, but we are excited to get back to in person activities. This year we have new Student Subunit officers, Connor Reid is the new Vice President and Jordanna Bergman is the new Secretary and Treasurer. Both Connor and Jordanna are PhD students in the Cooke Lab at Carleton University, and they are excited to serve you in their new positions. Jacob Burbank, a PhD student at the University of Waterloo in the Power and Drake Labs was the Vice President and is President of the Subunit this year.

We just wrapped up an exciting and interesting Virtual Annual General Meeting. The Student Subunit helped organize and facilitate an enjoyable mentorship event and raffle that took place in SpatialChat. Students had a great time moving around the virtual room to interact with and learn from a diverse group of mentors. We were all very appreciative of the advice provided by mentors and some fun raffle prizes were a bonus. This year’s Poster Session was also held in SpatialChat and worked to mimic an in-person Poster Session. It was a success and we saw some great work from students in the subunit.

We have some exciting news, the R Web series for Fisheries Analysis is being made available to all via our website (www.afs-oc-subunit.org). Lesson 1 is posted, and Lessons 2-4 will be live within the next few weeks. If you are new to R or looking to brush up your skills, the free, always available web series provides exposure to introductory and intermediate Fisheries analyses in R. It goes over tips and tricks to organize data, conduct various analyses, and produce high quality figures. You can work through the lessons at your own pace from home and there are several resources including RMarkdown files available for each lesson. We encourage students and young professionals to check it out at their leisure.

R Webseries for Fisheries Analysis

This webseries contains 4 lessons of increasing difficulty to introduce individuals to R. The webseries goes over the basics of R, how to conduct some analysis related to fisheries science in R and how to plot results. A wide variety of topics are covered over the 4 lessons. All lessons consist of recorded Google Slides presentations and activities conducted in R. There are also R markdown files provided as PDFs that go over all code used within the lessons. Lastly there are post-lesson activities that allow one to practice what they have learned within each lesson.

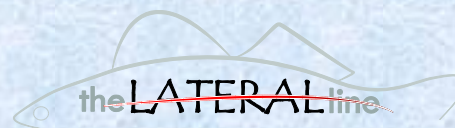
NOTE: As of February 28th, 2022 lesson 1 has been posted, future lessons are coming in the next few weeks and will be release sequentially.

Lesson 1: Introduction to R

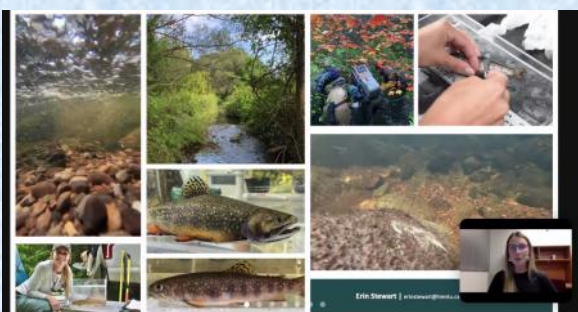
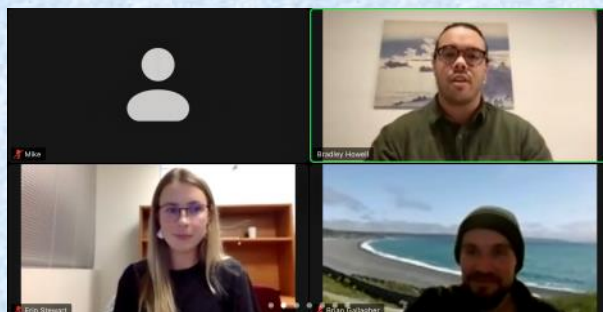
Keep an eye out on our [Twitter](#) and [Instagram](#) pages for upcoming events. We hope to return to in person events soon and are planning to hold events such as a mentor pub night, a tour of the Canadian Museum of Nature and a Student Success Workshop in 2022. Thank you all for supporting the AFS-OC Student Subunit, we look forward to an exciting year of learning.

Jacob Burbank
President Student Subunit
afsocsu@gmail.com

2021 Fall Symposium



On November 17, 2021, the Ontario Chapter of the American Fisheries Society hosted the 2021 Fall Symposium. As the 2021 AGM was held virtually, and Zoom fatigue ran rampant in our membership, the ExComm decided it was best to restrict the number of talks and impose lightning sessions to shorten the meeting. To make up for the losses, the Fall Symposium was dreamt up to spread fisheries knowledge throughout the year and connect our membership. The event was a huge success!



The symposium almost exclusively revolved around a Chapter favourite, Brook Trout, with excellent talks from Brian Gallagher (Concordia University), Erin Stewart (Trent University), and Bradley Howell (Trent University) surrounding impacts of climate on population dynamics and physiology, as well as impacts of electrofishing on embryo survival. The tone then shifted to one more gloomy, the confirmation of Ranavirus in the Credit Valley Watershed and management plans outlined by Phil Bird (Credit Valley Conservation). Our final talk was given by Nathan Lujan, the new Associate Curator of Fishes at the ROM, on his new role and his research programs on population genetics of Ontario fishes and macroevolution of armoured sucker-mouth catfishes (Loricariidae) of Neotropical freshwaters.

The formal presentations were enthusiastically followed by a social event on SpatialChat to test this platform as a possible means to incorporate our beloved mentorship, networking, and ice-breaker events from in-person meetings into the virtual realm. Working out the kinks and sharing field stories, career dreams, and fun fish facts, participants enjoyed the rest of the evening in a more free-form framework. The optimism that this platform could recover some of the interaction that best describes our AGM and its value, especially to students and young professionals, was unanimous.

It is almost certain a Fall Symposium will be held Fall 2022, so be sure to watch out for announcements!

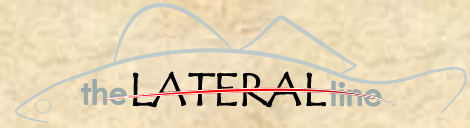
Artifishal Film Screening

On January 27th, 2022, the AFS-OC hosted a screening of the documentary *Artifishal*, which is a film about people, rivers, and the fight for the future of wild fish and the environment that supports them. It explores wild salmon's slide toward extinction, threats posed by fish hatcheries and fish farms, and our continued loss of faith in nature. The screening had opening remarks and an enlightening follow up Q&A with the documentary producer and wild fish advocate Dylan Tomine. Twenty participants registered for this screening.



The film is available for viewing at: <https://www.youtube.com/watch?v=XdNJ0JAwT7I>

Diversity and Inclusion



By Sarah Steele

Scientists acknowledge problematic lack of racial and ethnic representation of Black, Indigenous, and people of colour (among other underrepresented and marginalized groups) in science and are in search of clear actionable steps they have the power to immediately enact. Here is a summary of three useful articles on steps to consider. While much focuses on support for BIPOC students, the tools are widely applicable and adaptable to increase support of other groups. Citations available below for full read.

Ten simple rules for building an antiracist lab

Take Home Message:

- It is our responsibility to take action and simple concrete steps can and must be made toward addressing individual, institutional, and systemic racism
- The work in our labs can begin today; no additional committees, focus groups, or surveys are required

Problems:

- Scientists lacking background adopt inaccurate viewpoints/weak policies that harm BIPOC or contribute to loss of trust
- Engaging in objectifying thought experiments questioning the value of BIPOC in science
- Confusing race as a biological (genetic) entity rather than social construct
- Hijack discussions of race with anecdotes from other discrimination (e.g. gender-based, class-based)
- Antiracist lab building vs. avoiding racism (“not racist” = neutrality)
- Being kind, treating people equally, colour-blind are not antiracist
- Statements of solidarity – bare minimum/no actionable item

Needs:

- Develop and support antiracist policies

“Phase 1” Inclusion and Retention

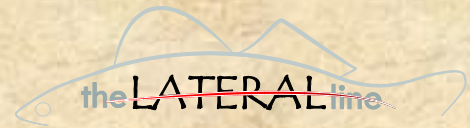
Rule 1: Lead informed discussions about antiracism in your lab regularly

- Realize that overt and covert racist incidents are regular and go unreported (e.g., microaggressions, tokenism, white savior complex, tone policing, etc.)
- Create an environment in which all members feel comfortable talking about race and reporting racism
- Discussions signal racial discrimination is not tolerated/silence is implicit acceptance of racism
- Engage in journal club readings of peer-reviewed literature (equity in STEM), DEI speakers, brainstorming policies
- **PI role** = moderator of discussion, give opportunity for minority voices

Rule 2: Address racism in your lab and field safety guidelines

- Lab/field safety guidelines should acknowledge additional support for BIPOC to conduct work safely
- Ask BIPOC members what can be done to facilitate safety on campus/in the field
- Diversity needs to be included in lab and field staff
- Advocate for BIPOC lab members harassed/harmed by campus security/others that think they don’t “belong”
- **PI role** = be knowledgeable about historical/contemporary racism at field site; provide identification/official apparel/work buddies for BIPOC

Diversity and Inclusion — *cont.*



Rule 3: Publish papers and write grants with BIPOC colleagues

- Academic currency = papers/grants, measures of success and key to tenure/promotion/career longevity
- More impactful science is done in teams, but collaboration networks are insular
- BIPOC should be involved in more than data collection/manual work
- **PI role** = reach out to BIPOC to co-lead workshops/symposia, and to collaborate on papers/grants

Rule 4: Evaluate your lab's mentoring practices

- Racial biases (conscious and unconscious) can stress mentor-mentee dynamic/reduce mentee success
- Multi-mentor models are favoured to centre mentee needs/goals
- Mentorship = feedback, sponsorship, professional development and/or emotional support
- **PI role** = assess gatekeeping behaviours (e.g. not encouraging pursuit of advanced degrees/prestigious opportunities, poor mentorship in identity issues, tone policing, advising to avoid politics) and encourage mentors outside of the lab/institution to support, mentorship building via culturally relevant professional societies/online communities

Rule 5: Amplify voices of BIPOC scientists

- Read papers/cite work by and nominate BIPOC scientists
- Highlight scientific achievement, not just contributions to DEI
- **PI role** = Consider compensating BIPOC to speak to/educate your community and include venue to talk about research

Rule 6: Support BIPOC in efforts to organize

- Provide safe spaces for BIPOC to organize and discuss issues (absence of white people)
- Identify barriers affecting academic endeavours and develop plans of action to remove

"Phase 2" Recruitment (*not before addressing Rule 1:6)

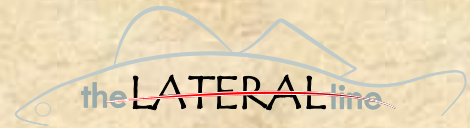
Rule 7: Intentionally recruit BIPOC students and staff

- Evaluate lab hiring practices to identify racial or ethnic biases
- Do not assume racial or ethnic identity from appearances/names, information should be collected from lab members/applicants in a self-reported/voluntary manner
- Use candidate/job ad diversity statements, targeted recruitment, targeted listservs/databases
- **PI role** = advocate for targeted retention/inclusion at department/university level

Rule 8: Adopt a dynamic research agenda

- Flexible research agenda could allow more diverse hires, increased intellectual perspectives, and more innovative science
- Underrepresented minority group scholars produce higher rates of novelty, but contributions typically less valued/not incorporated

Diversity and Inclusion — *cont.*



Rule 9: Advocate for racially diverse leadership in science

- BIPOC participate in science in supportive/subjugative roles; sponsor them to improve chances of securing jobs/grants/leadership roles
- Encourage (do not demand) involvement in leadership/advocacy roles within and beyond the university

Rule 10: Hold the powerful accountable and don't expect gratitude

- White scientists praised for DEI work while BIPOC are punished
- Recognize performative action and focus on the cause and outcomes for BIPOC
- Educate on effective bystander intervention techniques
- Develop and/or use accountability mechanisms for healthy workplaces

Promoting inclusion in ecological field experiences: Examining and overcoming barriers to a professional rite of passage

Take Home Message:

- Field experience is important for recognition as an ecologist, requirements for programs, and to be competitive for positions
- Fieldwork can be a barrier or negative experience that discourages career choices in ecology and is more frequent among women, minorities, and other underrepresented groups

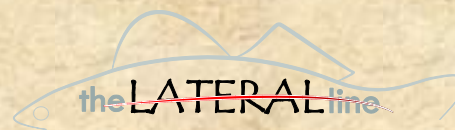
Problems:

- Skills and discovery attained by participants are not shared by groups excluded from fieldwork
- Lack of confidence building in excluded groups
- Many field experiences/uncertainty/risk of failure cannot be replicated in the lab
- Sense of agency and career affinity lacking in excluded groups
- Stresses of fieldwork can increase risk of conflict with peers/instructors
- Issues (e.g. power imbalance, racial prejudice, sexual harassment) can occur in the field since institutional oversight may be minimal/hard to enforce
- Issues at the intersection of marginalized identities can be exacerbated
- Field experiences can have identities created by past participants/faculty/discipline paradigms which can marginalize those who do not fit the "model"

Solutions:

- Redefine "the field" to make opportunities more accessible and more relevant
- Use universal design for learning in courses to make material accessible to all, rather than tailor to specific individuals as needed
- Create code of conduct for all individuals to create a safe and welcoming environment
- Cultural competence training for instructors and students

Diversity and Inclusion — cont.



Collectors, Nightlights, and Allies, Oh My! White Mentors in the Academy

Take Home Message:

“Also, if you are a well-meaning White mentor, please do not use this article to ask your students/colleagues of Color, whether you are a Collector, Nightlight, or Ally. As I have discussed these concepts with my fellow scholars of Color, most agree that if one has to ask which category of mentor applies to them, they are most likely a Collector.”

Problems:

- Need for more BIPOC (particularly Black) graduate students
- Dearth of BIPOC faculty and lack of mentors for BIPOC students
- Greater access to resources for white peers/colleagues
- BIPOC lacking trust or experiencing microaggressions/tokenism/stereotyping
- Lack of instructions for mentorship of BIPOC students

*Missing = Perspective of BIPOC students being mentored by white faculty

Collectors

- Most common type of mentor BIPOC will interact with
- Interactions are limited to ‘diversity’ events, and mentees are “trotted out” on display rather than a valued and equal member of the team
- Often unintentional in condescension/not bad people
- Desire to help BIPOC is misguided and motivated by the “white saviour complex” to “rescue”
- Putting qualifiers on their identities (e.g. “my Latinx students”) rather than “my students”
- Hints at claims of ownership, rather than a respective connection/collaboration
- BIPOC relationships tend to be constrained to the university/professional, while white colleagues are more friendship based
- Challenge: Collectors who feel they are an Ally, difficult to explain the difference to them (e.g. patronizing kindness); defensive when confronted about wrong opinions or improper word use

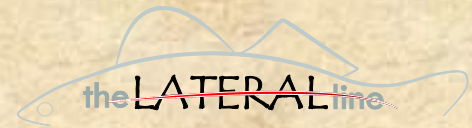
Nightlight

- White mentors who understand challenges inherent at highly white institutions and can help in navigation
- Help is temporary and contextual
- Often no relation to or understanding of BIPOC, but acknowledge systemic racism
- Use privilege to highlight/expose rules/barriers that BIPOC with likely encounter (“reveal the hidden curriculum”)
- There is no deep connection with this type of mentor, only practical value

Example scenarios of practical use:

- Intervening during a meeting when BIPOC becomes representative of all BIPOC
- Nominating BIPOC for committee/task not related to race/difference
- Read a colleague’s or student’s work and sponsor it
- Taking a moment to learn about a situation before making conclusions

Diversity and Inclusion — cont.



Allies

- Most aware of the experiences of BIPOC, make meaningful connections without asserting equality (e.g. gender, LGBTQI+2)
- Most likely to invite mentees to conferences, introduce to important individuals in meaningful ways, co-author with graduate students to support them
- Allies have done the work to develop appreciation and admiration for experiences of BIPOC
- Help BIPOC rescue themselves, listening and supporting rather than finding solutions or getting angry
- Allies can recover from disagreements and understand when and how to use privilege in spaces where BIPOC and other minorities are not heard; take constructive criticism to heart and always learning how to improve
- Knows when to push or when to support, when to question and when to validate
- Trust is most important in this relationship, developed through consistency and humility
- BIPOC are less likely to perceive negative campus climate or prejudice if treated with respect, receive honest feedback about abilities, challenged intellectually, given emotional support
- Do the work, do not wait for BIPOC to become an easily accessible teacher

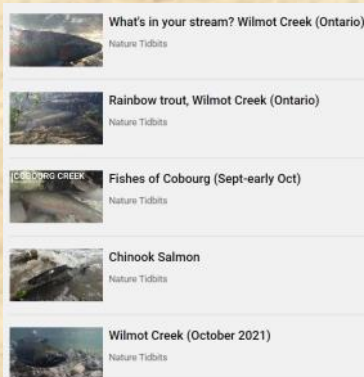
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People in the Field



So you've done science. How are you going to communicate it to the general public? I have terrestrial, underwater, and drone capabilities for filming your project and can make a final film for your use. Or, if you want documentation of the neat critters you interact with during field work, let me tag along! Email Kathryn Peiman to discuss ideas: kats_eyez@hotmail.com.

If you're bored, check out my videos posted under NatureTidbit! They include stream life in some Lake Ontario tributaries. <https://www.youtube.com/c/NatureTidbits/videos>



Fish Focus: BLACKSIDE DARTER (*Percina maculata*)

By Siobhan Ewert

Identification: The Blackside Darter is an elongated fish, and has 6-9 dark blotches along the lateral line with a black line in between. It has scaled cheeks, spiny and soft dorsal fins which are separated, and the snout does not extend past the upper lip. The upper lip is joined to the snout by a frenum.



Life: The Blackside Darter prefers vegetated and brush areas in relatively quiet streams. Spawning occurs on gravel and sandy bottomed areas, when water temperatures reach 16°C. This occurs for several weeks with females and males having multiple partners. The female can lay >10 eggs at a time. Blackside Darters have retained their swim bladders, which enables them to move freely within the water column to feed on aquatic insects, crustaceans and occasionally small fish. Maximum age is 4 years old, with the Ontario record measuring 9.9 cm in length.

Distribution: The Blackside Darter ranges from central Canada, south of the Mississippi drainage to Oklahoma and Louisiana, east along the southern Great Lakes to western New York. When it comes to the Northeast, it is only found in western New York in the Allegheny, Lake Erie and Lake Ontario drainages.

Lake Ontario's Lost Seal Population

By Brian Morrison

The Lake Ontario drainage basin has been considered since the 1700's to be the most productive of all the deepwater Laurentian Great Lakes for fish production and is extremely valuable for its historical commercial fisheries catches. Historical accounts are replete with this productivity, especially when referencing Atlantic Salmon populations. In addition to Atlantic Salmon, Lake Ontario contained a diverse coldwater fish community dominated by Lake Trout, whitefishes (Coregoninae), and Burbot along with rich cool and warmwater fish communities. Lake Ontario also contained marine relict species, such as Harbour Seal, Threespine Stickleback, and possibly Sea Lamprey, Rainbow Smelt and Alewife along with the catadromous American Eel (Morrison 2019). Following European colonization of this watershed, extensive land-use change, overfishing, dam construction, habitat degradation, pollution, hatchery use, and invasive species all contributed to the decline and extirpation of many na-

tive species and shifts in aquatic species communities.

Of the species noted, one prominent one has received little attention and was unique within the Great Lakes. The Lake Ontario Harbour Seal was one of four endemic landlocked seal populations in the world, with the others occurring in Lake Illiama, Alaska; Lacs des Loups Marins, Quebec; and Lake Baikal, Russia. Two of these other populations occur at low abundances, with the Lacs des Loups Marins population believed to fluctuate between 100 – 600 individuals (COSEWIC 2007) and the Lake Illiama population ranging from 137 – 321 individuals (Withrow and Yano 2008). The Lake Illiama seals live in the lake year-round; although the lake is connected to Bristol Bay via the Kvichak River 120 km (75 mi) in length, there are no known accounts of immigration or emigration (Withrow and Yano 2008).

The Lake Ontario landlocked Harbour Seal was recorded from Onondaga Lake (Forest and Stream 1882), Lake Ontario (New York Times 1895), possibly Rice Lake (Lizars 1913) (Figure 1), and the Ottawa River as far up as present-day Ottawa (COSEWIC 2007), but outside of individual records, there's no estimate of abundance. The Harbour Seal recorded in 1895 from Onondaga Lake "measures just six feet from tip to tip, and will weight about 100 pounds" (New York Times 1895). Harbour Seal were considered extirpated from the Lake Ontario basin in the 1880's (COSEWIC 2007) despite records of them in the basin after this time. Some of the last records of seals in Lake Ontario occurred around 1895, where three were shot at the upper end of Wolfe Island, and three years previous one was captured at Cape Vincent (Forest and Stream 1895). It was noted by Farley Mowat in Sea of Slaughter (1984) that the Lake Ontario seals winter below the great cataracts of the upper St. Lawrence River. This is supported by a report from

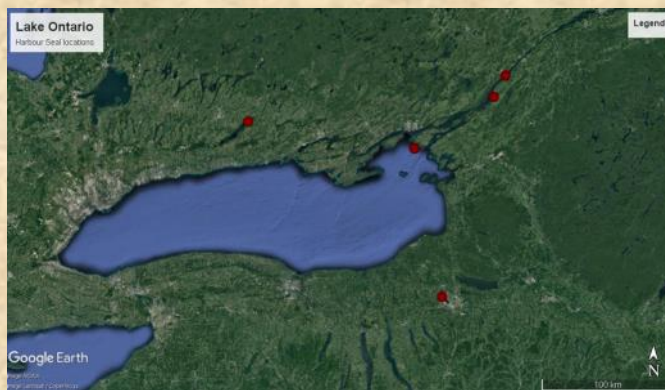


Figure 1. Spatial distribution of documented Harbour Seal records within the Lake Ontario basin.



Figure 1. Lake Illiama seal. Photo credit: Jason Ching

Lake Ontario's Lost Seal Population — *cont.*

Marriam (1884) when a seal was observed on January 11, 1884 a quarter mile from Morristown (NY) where it was “making an abortive attempt to capture two winter ducks, failing in which it suddenly went underwater and out of sight”, and was said to be very dark brown and the size of an ordinary Newfoundland dog. The January observation supports year-round residency within the Lake Ontario basin. It was also noted that one was caught circa 1882 in a gill net at Chippewa Bay (NY), which is twelve miles above Brockville (ON) (Marriam 1884). Like other species that were in the lake prior to the construction of the Welland Canal such as American Eel and Atlantic Salmon, Niagara Falls was a significant obstacle to colonizing the rest of the Great Lakes, thereby confining them solely to Lake Ontario.

Lake Ontario agencies have developed many management plans and strategies to restore fish species, such as Bloater, Atlantic Salmon, and Lake Trout, with the goals of restoring not only those species, but also restoration of the various ecological roles those species played within the ecosystem. An omission to the discussion centered around restoring native species to Lake Ontario has been restoring a Harbour

Seal population. Critical questions will come with this, such as where to source a population and how many individuals would be necessary for reintroduction? What will the ecosystem/trophic effects be with seals in the ecosystem? For example, Lake Illiama seals preferentially predate upon Sockeye Salmon, but also heavily utilize lamprey as a prey source during seasonal periods when salmon are not abundant (Hauser et al. 2008). Could seal predation be a tool to control Sea Lamprey within the lake? Are there important First Nation linkages to seals within the lake? Perhaps the most important question is, what would the social reception be to reintroducing a top mammalian predator into the ecosystem? Without an open dialogue to recognize that a population existed, and the importance of restoring a complete suite of species to the lake and trophic pathways, there will always be a part missing within Lake Ontario.

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ROM Announcements and Request

By Sarah Steele

The Ichthyology (Fishes) staff at the Royal Ontario Museum (ROM) have been important supporters of AFS-OC students and young professionals for many years. From providing members with expert advice and assistance, to tours of the ROM facilities, to donating spots in the ROM Fish ID Workshops and field guides for the Student Subunit raffle, the ROM is an integral part of many of our professional and personal lives. I have been privileged to have the opportunity to work alongside ROM staff in various capacities and wanted to say a thank you on behalf of the ExComm and membership for the continued support of and connection with the Chapter.



Former ROM graduate student Viviana Astudillo-Clavijo at the ROM Fish ID Intro Workshop, with instructors Mary Burrige and Erling Holm (2015)

behalf of the Chapter, so if you have stories, a thank you, or a photo to share please send them along. If you have ideas to expand this, I am building a list!

Finally, many of the fish specimens used in the Fish ID Workshops have been in service for decades and are also in need of a well-deserved retirement. ROM staff are requesting new materials to be donated for use in the workshops, with several species in desperate need of replacement materials. If you conduct fieldwork or labwork and have ability to collect some specimens (DISCLAIMER: Please follow permit protocols, do not collect specimens without appropriate permits) please get in touch for species lists and storage protocols.

Inquires or offers of specimens may be sent to Sarah Steele (president@afs-oc.org).



Behind the scenes look at the fishes collection of the Royal Ontario Museum

Many of you are anxiously awaiting the release of the updated ROM Field Guide to Freshwater Fishes of Ontario. The book is set to be released in late spring/early summer, with a Book Launch scheduled for June 2022. The authors Erling Holm, Nicholas Mandrak, and Mary Burrige will be onsite for book signing, and guides will be available for purchase at the event. A presentation on the updates will be given by Nicholas Mandrak. Stay tuned for details.

For those who have not yet heard the news, Erling Holm has officially retired from the ROM. Lucky for all, retirement means nothing for dedicated biologists. Erling will continue to help out in the department and at ROM Ichthyology events, including the Fish ID Workshops, so no need to swarm the ROM at this time. I am in the process of putting together a tribute to Erling on



ROM Ichthyology staff on the shores of Georgian Bay on the journey to the 2017 Trout Bay Canada Bioblitz in Thunder Bay. From left to right: Former Curator of Fishes Hernán López-Fernández, newly retired Assistant Curator of Fishes Erling Holm, Assistant Curator of Fishes Mary Burrige, and Ichthyology Technician Marg Zur.

Series: Fish Species Complexity — Highlighting Diversity in Ontario

Deep water spawning in Lake Trout

Shawn Sitar | Fisheries Research Biologist, Marquette Fisheries Research Station

Lake Superior has four documented ecotypes (subspecies) of lake charr including the lean (common across all Great Lakes), humper, siscowet, and the recently documented redbfin. Each of these ecotypes differentiated morphologically due to niche partitioning (primarily due to depth) operating in the species complex. Leans inhabit waters less than 80 m, siscowets are mostly distributed at depths > 80 m and have been documented at the deepest extent of the Great Lakes at just over 400 m. Humpers and redbfins are found at intermediate depths associated with offshore sea mounts or island areas. Although there is extensive knowledge on the lean lake charr ecotype, very little is known about the other forms including their spawning locations and habitat. An interagency research team (Rick Goetz, John Janssen, U. of Wisconsin-Milwaukee; Tom Binder, Michigan State University; Chuck Krueger, Andrew Muir, Great Lakes Fishery Commission; Mark Romanski, National Park Service; Shawn Sitar, Michigan DNR) has been studying these ecotypes in Lake Superior in the last 15 years and have measured the reproductive biology, bathythermal habitat, and trophic ecology of lake charr forms. The team had located and documented a spring spawning population of siscowet lake charr at Isle Royale and this led to the



Figure 1. Michigan DNR research biologist Shawn Sitar (standing) and University of Wisconsin-Milwaukee professor John Janssen (seated) on the R/V Lake Char surveying deep-water lake trout spawning habitat at Isle Royale using the remotely operated vehicle.

Great Lakes Fishery Commission funded project to locate a siscowet spawning site. The team used acoustic telemetry to pinpoint the siscowet spawning locations by first tagging spawning condition fish and then deploying the deepest acoustic receiver array in the GL to date on the north side of Isle Royale at depths between 40-180 m to track the position of tagged animals. Analysis of acoustic telemetry data collected over two years indicated target locations at 100-120 m and in June of 2021 the team deployed a deepwater ROV with electrofishing and suction capabilities to search for eggs and egg predators. The team was able to collect lake trout eggs sucked up by the ROV and from the stomachs of sculpins that were captured, thus documenting the deepest lake charr spawning in the Great Lakes. Furthermore, the team observed that the target sites comprised rocky substrate indicating that siscowet eggs require similar protection like lean lake charr. The next phase of the project is underway with the team studying embryo development of fertilized siscowet eggs in incubators deployed in 100 m of water in Lake Superior.

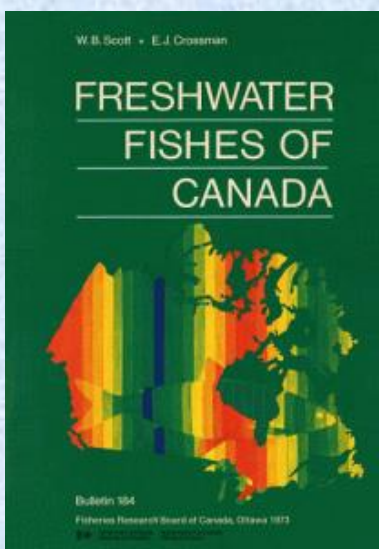
The E.J. Crossman Award: Looking Back and Reconnecting with Awardees

By Warren Dunlop

It's been more than fifteen years since the inaugural E.J. Crossman Award was presented in 2004, and it seems like a good time to take another look back. When Dr. Edwin J. Crossman [passed away suddenly](#) in December of 2003, it shocked and saddened fisheries people across Canada. In remembrance of Dr. Crossman (pictured to the right), the Ontario Chapter of the American Fisheries Society (AFS-OC) created the [E.J. Crossman Award](#) for the Best Student Oral Presentation at the Ontario Chapter Annual General Meeting (AGM).

The award is intended to encourage participation at an American Fisheries Society (AFS) event. Eligibility for the award is open to graduate or undergraduate students enrolled at a university or college. The award includes financial travel support to attend a scientific meeting, a one-year student membership to the AFS and the AFS-OC, and a copy of Scott and Crossman's [Freshwater Fishes of Canada](#).

The Award has been presented sixteen times over the years, usually at the AFS-OC AGM. In 2008, the year that Ontario hosted the American Fisheries Society meeting in Ottawa, the award was presented at a special [E.J. Crossman Award Symposium](#). No award was presented in 2009, when the AFS-OC held a joint annual meeting with the Wisconsin and Minnesota Chapters in Duluth, Minnesota. Likewise, there was no award in 2014 when the AFS-OC AGM was held in conjunction with the AFS meeting in Quebec City. Last year, due to the global COVID-19 pandemic, the award was presented virtually during AFS-OC's first online AGM.



As someone who has been recruited to help judge student posters and oral presentations at the AFS-OC Annual Meetings, I can attest to the high quality of the presentations and enthusiasm of the presenters. The final decision is never an easy one.

I thought it would be interesting to try to reconnect with awardees to find out where they are now, what they are up to, and what motivates them. I also wanted to hear their perspectives on the AFS-OC, the E.J. Crossman Award, and any lessons they've learned as they've navigated their career paths. I hope you will find their stories interesting and informative (I certainly have!); and I hope current students and early career professionals will perhaps find some guidance as they figure out their own paths.

This is the third article that profiles the E.J. Crossman Award winners. I hope to connect with more recipients for the next issue.

Dr. Tej Heer – E.J. Crossman Award Winner 2017

It's been quite a couple of years for Tej Heer. In April 2020, in the midst of the first wave of the COVID-19 global pandemic, he secured a position (working remotely) as Senior Research Associate with [Evidence for Democracy \(E4D\)](#). Later that year he successfully completed his PhD, working out of the [Mandrak Lab at the University of Toronto Scarborough](#) and co-supervised by [Dr. Mathew Wells in the Environmental Fluid Dynamics Lab](#).

“My research passions are varied and ever changing,” notes Tej. Much of his research has focussed on physical processes within an environmental context, specifically interlinked with climate change. He says, “I am passionate about addressing the current climate crisis and protecting at-risk ecosystems and species.” Throughout his research career, he has tried to work across disciplines to make his research relevant to policy development. Toward the end of his PhD, he did some work evaluating how science informs policy, work he was excited to continue at E4D.

One component of E4D's Vision is “Strong public policies, built on the best available evidence, for the health and prosperity of all Canadians”. This aligns with Tej's interests in increased evidence-based decision-making and improving transparency about how those decisions are made.

Most of us have, in recent years, become acutely aware about how on-line misinformation can threaten democracies. During a pandemic, that misinformation can also threaten our health and safety. During his first year with E4D, one of the many projects Tej worked on built on recent [E4D work on how to recognize and respond to misinformation](#). He indicates that his role was to “initiate new research looking at potential policy and regulatory solutions to minimize the harm of misinformation on our democracy.”

In January 2022, E4D released a report on which Tej was a co-author, “[Eyes on evidence II: an assessment of the transparency of evidence usage in the Government of Canada](#)”.

Tej's presentation at the 2017 AFS-OC AGM entitled “*Preliminary Assessment of Asian Carp Spawning Potential in Tributaries to the Canadian Lake Ontario Basin*” was based on [his PhD research that focused on the prevention of spawning of four Asian carp species](#). You can check out an [interesting Twitter thread from Mathew Wells](#) outlining the importance of Tej's research, and which includes some cool animations. Prior to his PhD, Tej completed a MSc. in Climate Change from University College London and a BSc. in Physics from McGill University.

As have many Crossman Award winners, Tej identifies the relatively small venue of the AFS-OC as beneficial for meeting other students and professionals. “I would recommend any student present at the meeting, whether poster or talk,” he says, “the crowd is friendly and you will receive useful feedback.”

In addition to the networking opportunities at meetings, Tej recognizes the benefits that mentorship can provide with making connections and for providing information that is sometimes “unwritten”. In particular, he recommends that students seek advice on where to look for positions and how to approach employers or researchers for collaborations.

An important lesson that Tej has already learned from his academic career is the importance of work-life balance and interpersonal relationships, which he points out, “Can help with dealing with stress and leads to better research, all while avoiding burnout.” An important message to remember in these unprecedented times. You can connect with Tej via [email](#).



Sarah Walton-Rabideau – E.J. Crossman Award Winner 2018

“Slow down and smell the lilacs when they bloom in late spring. They’ll brighten your day - guaranteed” says Sarah Walton-Rabideau. Good advice with spring coming and two years into a global pandemic!

Sarah’s award winning presentation “*Exploring the Spatial Ecology of Juvenile Esocids in a Large Fluvial System*” was based on her [MSc. thesis](#) work with the [Cooke Lab at Carleton University](#). She had been looking forward to graduate school since earning her bachelor’s degree four years prior and felt that the MSc. highly influenced her ability to secure the positions she’s held since graduation.

When I first contacted Sarah, she was moving from a Research Associate position with [McMaster University’s Coastal Ecology Laboratory](#) to two jobs focused on species at risk research. One was a full-time GIS Technical Assistant with the [Lower Thames Valley Conservation Authority](#) (LTVCA) and the other a part-time American Eel Biologist with the [Canadian Wildlife Federation](#) (CWF).

Exactly one year after connecting with Sarah, she began a one-year parental leave to enjoy the beginnings of parenthood with her daughter. She now works as a Species at Risk Monitoring Technician for the LTVCA.

While she’s had a varied career in the field of natural resources, she’s focused on research, monitoring and stewardship associated with aquatic ecology and species at risk. She enjoys challenging herself and is an emerging science communicator, so the AFS-OC AGM was a logical place to share experiences with fellow “fish heads” and meet potential new colleagues while studying at Carleton.

The AFS-OC experiences provided opportunities to expand her network, see old friends and boost her confidence. Being acknowledged for her work (via the Crossman Award) persuaded her to apply for the positions she landed after her MSc.

Sarah acknowledges that mentorship has been one of the most critical components in her career success to-date. She numbers many different people among her mentors, including her parents, husband, graduate supervisors and associated post-docs, as well as her student colleagues and close friends.

She feels that they have all played an important role “by encouraging and supporting me to discover exactly who I am.”

While Sarah enjoys hard work, she recognizes that it’s important to take time for oneself to recharge. For her, that usually involves spending time outdoors hiking, canoeing, or snowshoeing and sharing the joys of her new daughter with family. She does admit to guilty pleasures like Critical Role, a YouTube Dungeons and Dragons series, when the weather is not appropriate for outdoor activities.

Sarah also has a couple of messages for students and early career professionals who are pondering their futures. “Do not take your strengths for granted - have confidence in your abilities,” adding that it is OK for your journey to take twists and turns, because those moments make everything so much more interesting. Trust in your instincts and take the plunge. It will make for a great story someday.

If you want to connect with Sarah and learn more about her experiences or just chat about fish, message her via [Twitter](#).



Dr. Miranda Chen Musgrove – E.J. Crossman Award Winner 2015

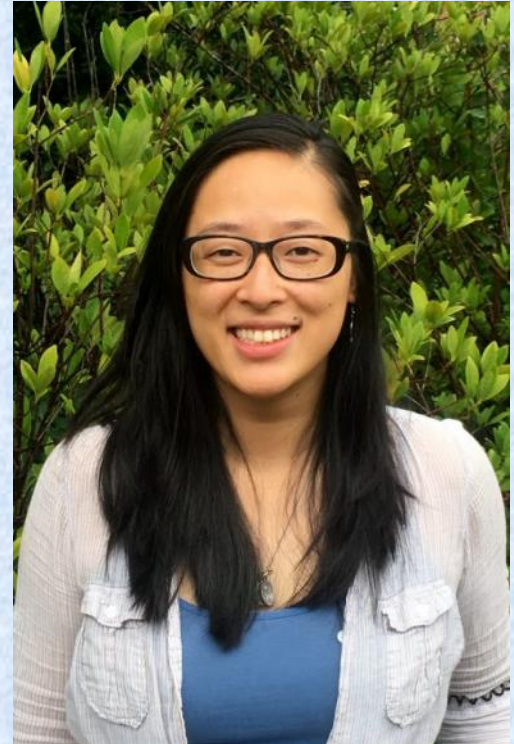
Miranda Chen Musgrove fondly remembers the AFS-OC conference where she presented *“Panic at the Cisco: Predicting the effects of climate change on Cisco distributions in Ontario”*. She says that her M.Sc. advisor, [Dr. Sapna Sharma \(York University\)](#), highly recommended the AGM conference, indicating that the people there were very welcoming and it was a good community. She says it was all true; the AFS-OC community made her feel validated and increased her sense of belonging in the scientific community, particularly as a woman of faith.

Of her faith, she says, “If you were to measure my religiosity, it would be through the roof!”

“I love the Lord as a devout Catholic,” she declares, “I hope that my life as a Catholic scientist can demonstrate to people that faith and science are not opposed to each other, rather complementary.”

Miranda is involved in her faith community through teaching and local volunteer efforts. She credits her faith and her community as being integral in helping her cope with graduate school ups and downs and she looks forward to paying that back by fostering that sense of community in every place she lives, especially if called to be a leader in her academic community.

Since winning the E.J. Crossman Award, Miranda’s research has taken a bit of a change of course from her Master’s in Ecology and Evolution, focusing on aquatic ecology. She really enjoyed teaching, but didn’t want to pursue a career that focused solely on that. Luckily, one of her mentors at York U., [Dr. Tamara Kelly](#), introduced her to the world of science education research; where academics research the best practices in pedagogy, student motivation, teachers’ self-efficacy, etc. Dr. Kelly led her to opportunities in the United States, where faculty were looking for Ph.D. students.



As a result, Miranda ended up in [Dr. Beth Schussler’s Lab](#) in the Ecology and Evolutionary Biology department at the University of Tennessee in Knoxville, specializing in science education research. As a Discipline-based Education Researcher (DBER), her dissertation focused on mental health in academia, particularly with Biology graduate teaching assistants (GTAs). In summer 2020, she completed her Ph.D. and began a post-doc in Dr. Lisa Corwin’s [RE³ACH Lab](#) at the University of Colorado, where she is examining undergraduate Biology student interests and persistence in Biology.

As with most academic jobs, Miranda’s day-to-day schedule largely depends on which stage of a project she’s working on. She could be writing a grant application with collaborators, writing protocols for the Human Subjects Review Board, scheduling interviews with study participants, drafting surveys, reading literature, meeting with colleagues or research assistants, teaching introductory courses, or doing environmental outreach in public schools.

Crossman Award Winners — *cont.*

“What keeps me engaged on the topic of my research is its relevance and potential to positively impact the lives of undergrads, graduate students, and faculty,” says Miranda.

Of how she got to where she is now, Miranda observes that, while one may have a clear plan for themselves, it can drastically change and that’s okay. She encourages people to “Roll with the punches and enjoy the ride!” By following your natural interests and talents, and advocating for yourself and others, she feels that you’ll see where you can fill a need in your community or society, and work will be there for you.

In seeking out mentors, she recommends that you find solid mentors who care about you, your successes, and who can advocate for you when you're absent. She has tried to model her mentoring with her Research Assistants in the same way by encouraging academic growth, forwarding opportunities, offering their names up for awards, and getting to know and care for them as people.

Miranda is grateful to, and thankful for, the great mentors in her undergraduate, Master's and Ph.D. programs who helped her get to where she is today. She says, “I have to be better at this, but try to thank your mentors, as well! Think back and maybe shoot them an email saying thank you.”

Miranda feels that the AFS-OC community has been a great support to her and is a great advocate for students. She is thankful to the Chapter for generously donating funds to support the [Ontario Ecology, Ethology, and Evolution Colloquium \(OE3C\)](#) conference she and her colleagues organized at York in 2015.

Connect with Miranda via [email](#), [Twitter](#), or check out her [Google Scholar](#) page.

Volunteer Opportunities and Habitat Restoration

The United Nations, after a proposal for action supported by over 70 countries, declared this the UN Decade on Ecosystem Restoration (2021-2030) to call for increased support of habitat restoration globally to meet the deadline for the Sustainable Development Goals. For many of us, the need for restored habitat for wildlife, return of function for healthy ecosystems, and reconnection of all the beings in a landscape is painfully obvious, and even more obvious for those communities reliant on the lands and resources directly for their well-being. To answer this call, AFS-OC placed the focus of the 2022 AGM on the theme of habitat and fisheries restoration and management, particularly for the betterment of the earth itself and those communities most notably impacted by the degradation.

The ExComm is working to create opportunities for members to participate in restoration efforts, among other opportunities, throughout the province. We are discussing building a Volunteer Core Program, in the footsteps of the Conservation Halton Volunteer Core Program, for AFS-OC members. The intention is to provide opportunities for students, young professionals, and life-long learners to learn new skills and build networking connections, while providing passionate, skilled hands to organizations to complete larger, longer, or more effective restoration projects that are often resource-limited.

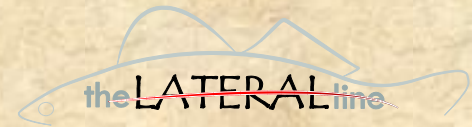
If you would like to hear more details about this initiative, discuss a potential opportunity your organization has for volunteers, or be informed of potential opportunities to get involved with this effort, contact Sarah Steele (president@afs-oc.org).

Looking forward to seeing you in the field/nature to get our hands dirty and give back to the earth.



Conservation Halton staff Mike Heyming (left) and Logan Mercier (Middle), joined by CH Volunteer Core Member and AFS-OC President Sarah Steele (right), create sediment traps to narrow a Brook Trout stream in Halton Region.

Native Species Art



By Craig Paterson, Conservation Biologist, AFS-OC Past-President

There are few biologists working to preserve the rich and diverse waters of Ontario that have encountered a Gravel Chub in the wild and there are even fewer that have encountered a painting of one. Last detected in the Thames River in 1958 and subsequently deemed extirpated in 1987, the Gravel Chub is yet another species lost to history. However, the forgotten beauty of this fish has been resurrected through the flick of a brush.



The remarkably detailed images you see in this article were created by Melody McLean, artist and owner of Amberwing Art Studios. A Bear Management Technician for the Ministry of too many names (formerly known as the MNRF) during the summer months, Melody helps local residents navigate interactions with Ontario's Black Bear population and in winter, when the bears return to slumber, she navigates a population of paint brushes to create outstanding works of art. Recently, I sat down with Melody to delve a little deeper into her inspiration and discover why she uses her creative skills to paint rare fish.



Where does your inspiration to paint come from?

My inspiration comes from studying nature and a natural love for the environment. Not everyone has the opportunity to see what I see and through art I can share the beauty with others whilst shining light on the complex relationships found in the natural world. It also helps coming from a highly creative family, with several other painters in the family particularly, my granddad.

Why did you choose to paint these species?

People don't care about the things they don't know about. These species are the underdogs, I could paint major game species like Bass and Walleye, but the less known species are seeing population reductions from numerous threats and I want to give them the recognition they deserve.

How important do you feel the role of art is when trying to raise awareness of rare species?

It is very important, art can be used to convey a message. My message is to bring light to these species and show the beauty of the natural world. I want to make people think, look how beautiful that fish is. To do this we need both art and science and that's why I include a little piece of science with every painting.

What are you currently working on?

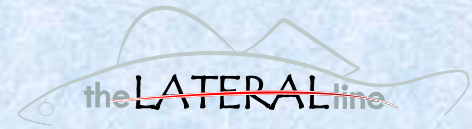
I just finished painting some bookmarks, one with a Five-lined Skink that appears to crawl off the page and one with a few native insects. I plan to continue painting rare fish species and a juvenile salmonid collection. My next big project is attempting to paint a Saw Whet Owl and a Flying Squirrel under blacklight, to showcase the unique colours and patterns that are only revealed to us through the ultraviolet spectrum.

I think many a reader will share in Melody's sentiment, communicating the wonders and importance of nature through a painting can foster a sense of stewardship towards the multitude of species that share both the land and water with us. *'The history of nature tells us we have been a part of a great forgetting, and now can be a part of the reminding'* - J. B. Mackinnon. Art is surely our greatest resource for remembrance.

These images were produced using acrylics on a mixed medium background with activated charcoal. You can view Melody's work on Instagram [@amberwing_art_studios](https://www.instagram.com/amberwing_art_studios) and place orders through amberwing.artwork@gmail.com.



Book Review



A Sand County Almanac and Sketches Here and There by

Aldo Leopold. 2020. Oxford University Press. 340 pages, 15.95 CAD, Paper. Originally published in 1949.

Reproduced under the [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/). This review was originally published as: Charles, G. 2020. "A Sand County Almanac and Sketches Here and There" by Aldo Leopold, 2020 (Book Review). *The Canadian Field-Naturalist*, 134(2), 304. DOI: <https://doi.org/10.22621/cfn.v134i2.2637>

Aldo Leopold's seminal work, *A Sand County Almanac and Sketches Here and There*, is 70 years old this year. In that time, it has become a landmark in popular ecological literature, ranked alongside Rachel Carson's *Silent Spring*. Yet despite its broad relevance and large impact, the book begins with a narrow focus and a small scale. In the first section, Leopold de-tails chronologically by month (hence, *Almanac*) examples of his own experiences of nature in rural Wisconsin. Through these stories, Leopold portrays nature not only in isolation, or in simple juxtaposition to humans, but in a web of diverse and complex interactions between humans and (the rest of) nature. This is a beautifully written book about nature's raw wonder, but it is equally about nature's give and take in a world increasingly shaped by humans.

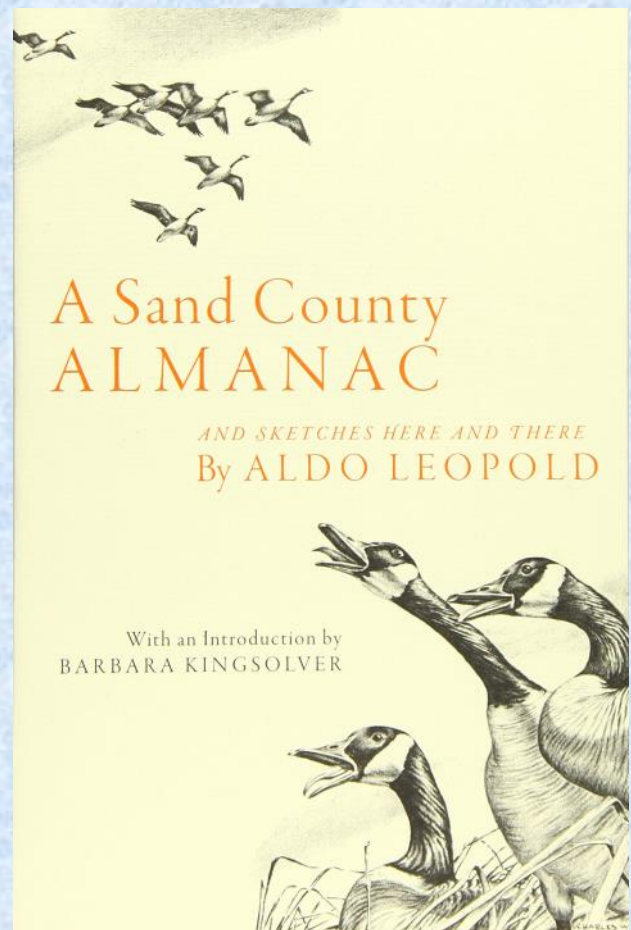
Leopold builds on the foundation of tangible local experience to pursue the book's greater ambition: exposing the common human failure to engage with the natural environment, and the loss that ensues. His description of the draba plant could be a metaphor for all of nature in the Anthropocene: "it subsists on the leavings of unwanted time and space", relegated to surviving on the margins of what human society deems to matter, straddling a fine line between being taken for granted and extinction (p. 24).

Yet equally central to Leopold's account is the wild's will to persist in the face of the tame, and the opportunity for awe that this contrast offers the

observant human. Throughout the book, Leopold suggests that nature is no more nor less than to be human. In this same struggle lies the potential for insights that stretch the human mind and spirit: an opportunity to be entertained, to be inspired, and to encounter and contemplate the truly unknown.

The second portion of the book, *Sketches Here and There*, features a series of chapters detailing Leopold's experiences in various parts of North America. These verbal vignettes are less detailed and methodical than the *Almanac* but maintain its rhetorical style, recounting eloquently yet accessibly a set of diverse and dynamic interactions between humans and nature, which to Leopold represent cause for both hope and concern. The third and final section of the book crystallizes these feelings into conclusions about the place of nature in contemporary culture and implications for land management, producing the 'land ethic' for which Leopold became famous.

On the whole, this book has aged well



and still rings true. Indeed, the modern reader may gloss over the truth that on several important ideas, Leopold was ahead of his time. His speculations on the complex relationships of wolves, deer, and mountains foreshadow the ecological conceptualization some 20 years later of keystone species and the ensuing reintroduction of wolves to Yellowstone National Park and elsewhere. He questions whether natural richness is adequately considered in calculations

Book Review



of wealth and poverty—“Do economists know about lupines?”—decades before Robert F. Kennedy challenged the premise of Gross National Product or Gro Harlem Brundtland popularized the notion of sustainable development (p. 96).

While many concepts in the book will be familiar, some of the language and facts will likely not. Leopold frequently uses colloquial or archaic terms, which in general are more pleasing than problematic, e.g. bluebill for scaup, teeter-snipe for Spotted Sandpiper. The writing is movingly dated in other ways too. In this book, Passenger Pigeon exists in living memories as well as museums; an offhand reference to Imperial Woodpecker

stands out because the bird is since believed to have gone extinct. To journey with Leopold is to journey in time as well as in place.

To guide the reader in this journey, Leopold’s essays, accompanied by the original illustrations of Charles W. Schwartz, are collected in this edition with an introduction by modern novelist Barbara Kingsolver, who deftly places the book within the frame of today’s environmental movement and crisis. Politicization and polarization are making the communication of ecological imperatives more challenging than ever. Kingsolver is right to suggest that Leopold’s effective telling of nature’s stories in clear, neutral, loving language is a contribution

of perennial value.

These writings were and remain an ecological call to action in the face of a natural world under threat. Yet this is not a work of desperation. To the contrary, Leopold is doubly hopeful: of humans’ ability to acknowledge and conserve nature, and of nature’s resilience when given a chance. This book is fundamentally a celebration of the human potential, when nurtured, to notice nature, and of the miraculous experiences possible for those who do. To anyone who has wondered at the natural world, or who cares about retaining the option, it is well worth reading.

Gavin Charles, Ottawa, ON

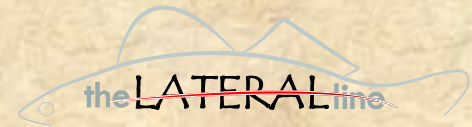
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Did you know that many useful resources are available online? Check out the [AFS-OC Links](#) page to peruse fishes archives and information, government links, online books/journals/publications, organizations/associations, software/apps, and AFS social networks.



New Book



Bruner, John Clay, and Robin L. DeBruyne. 2021. **Yellow Perch, Walleye, and Sauger: Aspects of Ecology, Management, and Culture.** Springer Fish & Fisheries Series book series (FIFI, volume 41):i-xii, 328 pp. eBook USD \$149.00, Hardcover USD \$199.99.

Yellow Perch (*Perca flavescens*)

Pages 1-1

Spawning Characteristics of Yellow Perch During Periods of Water Level Fluctuations in a Hydropower Reservoir. **Kyle J. Matt, Stuart A. Welsh, Dustin M. Smith**

Pages 3-32

A Comparison of Aquaculture Production Methods for Optimizing Production of Fingerling Yellow Perch (*Perca flavescens*). **Cathleen M. Doyle, David A. Culver, Morton E. Pugh, Jesse E. Filbrun**

Pages 33-54

Evaluation of a Statewide Yellow Perch Bag Limit for Michigan. **David F. Clapp, Andrew S. Briggs, Randall M. Claramunt, David G. Fielder, Troy G. Zorn**

Pages 55-88

Distribution and Abundance of Pelagic Larval Yellow Perch in Lake St. Clair (USA/Canada) and Adjoining Waters. **Robin L. DeBruyne, Taaja R. Tucker, Clara Lloyd, Andrew S. Briggs, Megan Belore, Edward F. Roseman**

Pages 89-111

Walleye (*Stizostedion vitreum*)

Pages 113-113

Using Genomic Data to Guide Walleye Management in the Great Lakes. **Peter T. Euclide, Jason Robinson, Matthew Faust, Stuart A. Ludsin, Thomas M. MacDougall, Elizabeth A. Marschall et al.**

Pages 115-139

Walleye Larviculture in Water Reuse Aquaculture Systems. **J. Alan Johnson, Kevin Kelsey, Robert Summerfelt**

Pages 141-190

Effects of Parasitocidal Hydrogen Peroxide Treatments on Walleye Hatching Success in a Recirculating System. **Guy D. Eroh, Robert B. Bringolf, Alvin C. Camus, Jean L. Williams-Woodward, Cecil A. Jennings**

Pages 191-208

Seasonal Movement Patterns and Distribution of Walleye in a Central Appalachian Hydropower Reservoir. **Dustin M. Smith, Stuart A. Welsh, Corbin D. Hilling**

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Managing Tribal Fisheries and Employees on the Reservation. **Carl A. Klimah**

Pages 239-270

Can You Hear Me Now? Design Considerations for Large Lake, Multispecies Telemetry Projects. **Aaron Shultz, Carl A. Klimah, Jocelyn Curtis-Quick, Rachel Claussen, Jalyn LaBine, Adam Ray**

Pages 271-290

Sauger (*Stizostedion canadense*)

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Sauger Restoration in the Upper Allegheny River Watershed, New York. **Justin R. Brewer, Jeffrey J. Loukmas, Michael Clancy**

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Comparison of North American and European Percid Fisheries

Pages 307-307

International Importance of Percids: Summary and Looking Forward. **Robin L. DeBruyne, Edward F. Roseman**

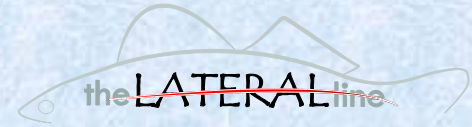
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Select Percidae References
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Biologist Highlight



Name: William Gardner

Born: North York Branson Hospital, Toronto, ON

Currently Living: Sault Ste. Marie, ON

Where did you go to school?

I did a partial degree in History and Political Science at the University of Guelph from January 1985 to April 1986, I then went to Sir Sandford Fleming College and took Fish and Wildlife from September 1986 to April 1988. I then did an Honours BSc. at the University of Guelph from September 1988 to December 1991.

Job Title/Years of Service: Field and Laboratory Technician/ 30 years and counting.

Workplace:

The Great Lakes Lab for Fisheries and Aquatic Sciences of Fisheries and Oceans Canada, located at the Great Lakes Forestry Centre in Sault Ste. Marie, ON.

What is a typical day like for you?

There is no typical day. In the late spring, summer, and early fall the day begins with a check on the weather, what are the winds like now and what are they predicted to be throughout the day. Then I make a lunch and walk to work. If the winds are favorable we get in our trucks, either launch the boat or go to where the boat is tied up, and begin lifting or setting nets, or we lift and download/maintain receivers. Interspersed throughout the day I take moments to fill out required paperwork, have safety discussions, check email, answer emails, record data, check up on how the students are doing, deal with any issues that have arisen from emails, etc. In the late fall, winter, and early spring I winterize boats, vehicles and equipment, I deal with data, I do a bit of writing, I purchase equipment, and I hire students. The consistent part to whatever day I will have is a walk to work and a few cups of tea.

Research Interests/Areas?

I really enjoy when we find a species in a system that has never been recorded in that system. It has been in place all along, patiently waiting to be catalogued. I would like to work in the far north of Ontario or Canada.

Current projects?

We are doing 2 Lake Sturgeon projects in eastern Lake Superior right now. Since 2010 we have been doing a juvenile Lake Sturgeon index netting project in Goulais and Batchewana bays. In 2015 we began an acoustic



telemetry project in these same 2 bays and we tagged 100+ Lake Sturgeon and are tracking their movements using 90 or so acoustic receivers. We fit a host of other projects around those projects.

What do you like to do when you aren't at work?

I have a camp (Northern Ontario term for a cottage) that is a fixer upper so there is always something to do there or just time to relax. I hunt in the fall, a bit of ice fishing in the winter but mostly I love travelling. Covid has changed that, obviously, so during Covid I took up gardening.

Favourite field memory:

This is a hard question. I have so many. One that stands out is the River Darter (*Percina shumardi*) sampling in Northwestern Ontario I did in summer/fall 2014. We took a boat, a trawl net and visited many historical locations that River Darter had been found in. We sampled those locales, upstream and down stream of those locales, and some new locations. We found River darter everywhere, in numbers that compared to our catches of Johnny Darters. We got to visit the ends of the highway in Northern Ontario. Places like Red Lake, Pickle Lake and Sioux Lookout to name a few. It was a real adventure.

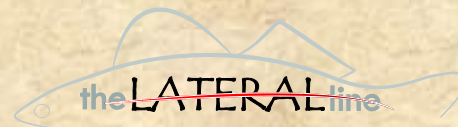
Favourite fish:

I would have to say the Lake Sturgeon as that is what I have spent the most time in my career working on. But really all of the fish species are of interest to me.

Favourite body of water/watershed:

Lake Superior. The changes that can occur over the span of a day are so awesome yet scary. Definitely deserves respect.

Bi-national Research



Assessing Early Life Stage Ecology of the Great Lakes Largest Lake Sturgeon Population

Ed Roseman (eroseman@usgs.gov) | Research Fishery Biologist, US Geological Survey Great Lakes Science Center

The St. Clair-Detroit River System (SCDRS) is the 145 km long corridor that connects Lake Huron to Lake Erie and is the epicenter of recovery for lake sturgeon populations. Since lake sturgeon recruitment can be limited by the quality and availability of spawning habitat, seven artificial spawning reefs have been constructed since 2004 near historic spawning locations to restore lost habitat and increase recruitment. These include Pt. Aux Chenes, Hart's Light, and Middle Channel reefs in the St. Clair River and Belle Isle, Fort Wayne, Fighting Island, and Grassy Island reefs in the Detroit River. Egg



Setting a D-frame net to collect drifting larvae in the St. Clair River. Credit: USGS GLSC.



Research technician deploying paired bongo nets to collect pelagic larvae. Credit: USGS GLSC.

mats, benthic D-frame nets, and stratified conical nets were used to gauge lake sturgeon use of the artificial reefs and movement throughout the system. We are currently preparing a U.S. Geological Survey Scientific Investigations Report for public release later this year that explores the past ten years of data. We found that lake sturgeon quickly made use of the artificial reefs, spawning on them almost always during the first spawning season, and then continuing to spawn on most reefs year after year. Data from the benthic D-frame nets revealed that larval lake sturgeon were captured throughout the system, with highest catch per hour at the St. Clair River reefs. This was expected given the large spawning population at the head of the St. Clair River near Port Huron, Michigan and Sarnia, Ontario. Depth-stratified conical nets were placed at surface, middle, and bottom depths in the rivers in 8 to 10 meters depth. Although we found the highest catch per hour in the bottom nets, both yolk-sac and post yolk-sac stage larvae were captured at all sampling depths. In 2021 we sampled for eggs near the spawning reefs and for larvae



Removing an adult lake sturgeon that was captured in the D-frame net set for larvae in the St. Clair River. Credit: USGS GLSC.



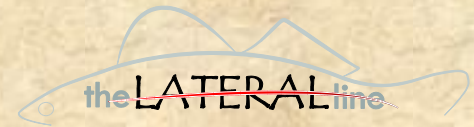
Larval lake sturgeon collected from the St. Clair River during the field season. Credit: USGS GLSC.

at new sites not associated specifically with the spawning reefs in the St. Clair River. We captured eggs at all functioning spawning reefs and caught a record number of larval lake sturgeon. This was a very exciting discovery for our group, and we plan to continue to assess lake sturgeon spawning and larval ecology as part of standard monitoring programs.



Looking for eggs on the egg mats set on the river bottom. Credit: USGS GLSC.

Bi-national Research



Bi-National Collaborative Research Makes Use of U.S. Geological Survey Great Lakes Science Center Larval Fish Sample Collection

Ed Roseman (eroseman@usgs.gov) | Research Fishery Biologist, US Geological Survey Great Lakes Science Center

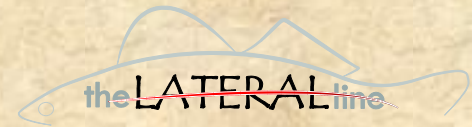
The U.S. Geological Survey Great Lakes Science Center team has been busy pulling lake whitefish and walleye larvae from our Detroit River collection to contribute to a new collaborative research project with Drs. Yingming Zhao and Chris Wilson, research scientists with the Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry and colleagues at multiple universities in Ontario, including Guelph, Queens, Windsor, Royal Military College of Canada, and The University of Toledo, Ohio. This work will use genetic markers to examine close kin recognition among groups and year-classes of larvae, identifying siblings who shared the same spawning habitats and identifying their source populations. This collaborative research attempts to estimate the number of sources of larvae in any collected location, and thus using the estimates for the entire western basin of Lake Erie, including the Detroit River, we can assess the contribution of different spawning sources/habitats to larval fish recruitment. Further, based on the ages/size and collection time, backtracking hydrodynamic algorithms can be developed to identify the spawning habitats and locations for walleye and lake whitefish.

A second objective of this collaborative research includes estimating the spatial and temporal patterns of stable isotopes for the larval fish community in western Lake Erie to provide an implication of their trophic status and resource use. Nitrogen stable isotopes will be used to estimate the trophic levels of fish larvae from different species and measure changes with ontogenetic development of larvae of same species (e.g., yolk larvae vs first feeding or feeding if samples available). Using carbon stable isotopes, we will estimate the resource/habitat use of fish larvae from different species or same species from different spawning grounds throughout their ontogenetic development. Lastly, this work will identify the spatial and temporal patterns of N and C stable isotopes in the larvae fish community in western Lake Erie.



Left: University of Toledo, Ohio Ph.D. candidate Zach Amidon deploying a bongo net in Lake Erie to collect larval fish. Right: Larval Lake Whitefish collected from western Lake Erie samples. Photo credit University of Toledo.

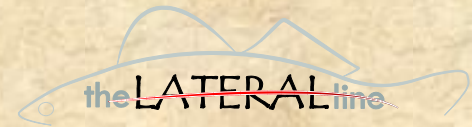
Bi-national Research



Recent USGS Great Lakes Science Center publications on bi-national connecting waters research

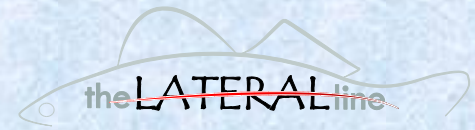
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Bi-national Research

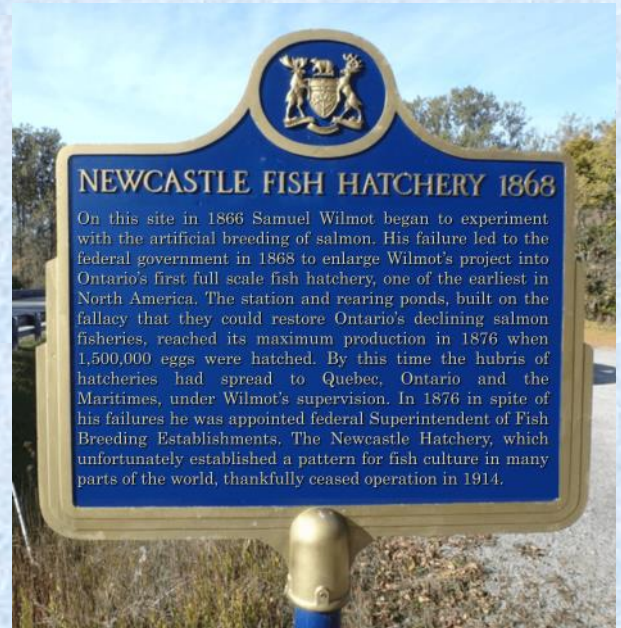


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“On the Hook!”



Gaia GPS: A topographic mapping tool that allows you to plan access, see terrain, and spatially locate where you are. Also great for adventuring!



The Fishing Forward podcast is a new podcast for fishery workers, with 5 episodes now under their belt. This is a collaborative effort spearheaded by the Coastal Routes Radio team at the University of Guelph and the Northeast Center.

Podcasts are available at: <https://coastalroutes.org/fishingforwardpod>

Historic Lake Ontario Atlantic Salmon and hatcheries: <https://thefisheriesblog.com/2022/03/21/old-stories-die-hard-fish-culture-hurt-more-than-helped-historic-atlantic-salmon/>



What3words: They divided the world into 3 metre squares and each square was given a unique combination of three words. It's a good tool for field staff who are on the water and may need to provide a location if help is necessary.

<https://what3words.com/embedded.fizzled.trial>

Aquatic Habitat Canada hosted expert speakers from multiple sectors to present their knowledge on the topic, Indigenous Perspectives in Aquatic Habitat Management and Restoration, and illustrated examples of Indigenous involvement and relationship-building to ensure impactful outcomes in their work. Presentations highlighted Indigenous-led and co-led initiatives and explored how Indigenous values are incorporated in aquatic habitat science. Panel speakers included: • Dr. Catherine Febria (Healthy Headwaters Lab) • Jennifer Sylliboy (Unama'ki Institute of Natural Resources) • Kathleen Ryan (Bruce Power).

Watch it at: <https://www.youtube.com/watch?v=mKx4qQo9fls&t=4926s>

Interested in learning about the history of the Saugeen Ojibway along the Saugeen/ Bruce Peninsula? Watch (until Aug 10):

<https://www.tvo.org/video/documentaries/the-fishing-chiefs>