May 2025
Volume 23, Issue 1
American Fisheries Society—Ontario Chapter

the LATERAL line

2025 AGM/Conference Summary

American Fisheries Society
Ontario Chapter

Contents:

The 2025 Ontario Chapter of the American Fisheries Society Annual General Meeting and Conference was held March 21-23rd. This year's meeting was hosted at the University of Guelph in partnership with the Ontario Chapter of The Wildlife Society (OCTWS) and was very well received by members of the two societies and all other attendees. The theme "Fish, Fur and Feathers: Science across Ontario's Ecosystems" encompassed aquatic and terrestrial wildlife and provided a holistic exposure and discussion of research on a variety of different species and topics for attendees. Apart from the number of excellent presentations, the meeting offered workshops, networking and sharing opportunities.

The meeting was both initiated and concluded with a traditional Indigenous ceremony performed by elder Gary Pritchard. In keeping up with the principles of the Diversity and Inclusion Subcommittee, Indigenous participation and perspectives were welcomed aiming to bridge communication gaps, foster inclusivity and engagement, and encourage equity in the natural sciences. The ceremonies were well-attended, with high levels of engagement and both continuing well past the scheduled time.

AGM/Conference summary— *cont.*

This year's meeting hosted three keynote speakers who highlighted the meeting's theme with topics on fish physiology and bioenergetics and caribou conservation. Dr. Sarah Alderman's (University of Guelph) talk "Comparative physiology of marine and freshwater fish" highlighted her work in the West Coast on the effects of diluted bitumen on the early life-stages of salmonids, and in the Great Lakes on the lasting physiological response of lake trout to sea lamprey parasitism. The presentation of Dr. Quinn Webber (University of Guelph) titled "Caribou ecology, behaviour and management in Canada", provided the audience with overview of the anthropogenic and natural threats facing caribou populations across Canada, and highlighted his ongoing work in Ontario. Dr. Graham Raby's (Trent University) presentation was titled "Unravelling the mystery of sexual size dimorphism in walleye" and excited and inspired the attendees with accelerometer tagging data on energy expenditure and activity behaviour in the wild for these species. All keynote speakers provided engaging large-scale perspectives into the research initiates in Ontario for both aquatic and terrestrial animals.

Almost as a reflection of the keynote speakers' work, the general program (both oral presentations and posters) included research on topics ranging from bioenergetics, conservation, invasive species and novel technologies among others. The poster session in particular, apart from exciting science, provided further opportunities for research-focused interaction and networking among all attendees.

The AGM Social event was packed with games and mini breakouts allowing for semi-organized, semi-spontaneous fish chats, laughs and learning. The customary AFS-OC Student Subunit Raffle was this year replaced by a Silent Auction. The great variety of prizes among which were a couple of beautiful originals of Indigenous art and a workshop at the Royal Ontario Museum (graciously provided by some of our sponsors) had the excitement build with bidding wars up until the very end of the auction and lots of laughs at the end.

AGM/Conference summary— *cont.*

The high quality of oral and poster session presentations made the judging for awards challenging. The 2025 winner of the E.J. Crossman Award was Raegan Davis from Carleton University for her presentation on fish strandings downstream of hydropeaking facilities. In the poster category, the Al Dextrase Award for best student poster presentation went to Jacob Lasci from Western University with poster titled “Effects of introduced salmonids on native lake trout in Lake Huron ”.

The Outstanding Mentor Award, the purpose of which is to recognize a fisheries professional who has contributed to an improved experience, such as networking, intellectual support, encouragement and training opportunities, for AFS-OC students or young professionals was given to Dr. Graham Raby, Trent University. The award was announced at the Meeting by Ontario Chapter Student Subunit President Raegan Davis.

The 2024 AFS-OC/OCTWS Annual Meeting showcased the great science and research undertaken in Ontario in both aquatic and terrestrial sciences and allowed for excellent networking and sharing opportunities. The organizing committees of both societies would like to extend sincere thanks to all speakers, attendees and sponsors for their contribution to the success of the meeting.

E.J. Crossman Award winner Raegan Davis (center) receives her award from Connor Reid (left) and Silviya Ivanova (right).

The Al Dextrase Award for best student poster went to Jacob Lasci (right).

With plans already in the works for AFS-OC’s AGM 2026, we are looking forward to seeing you there.

AFS-OC Student Subunit

The student subunit had an awesome time at the Canadian Nature Museum for the World Ocean Day. We organized and set-up a booth at the event to educate the public on anadromous fishes. Everyone who attended had a great time and the Plinko migration game was a fan favourite.

The student subunit has had a great time in 2025 planning and gearing up for the AGM. This year, we held a joint mentorship event at the AGM with the Ontario Wildlife Chapter. This was a more casual event which allowed mentees to chat with both mentors and mentees. We also held a joint silent auction at the AGM. There were many awesome prizes including artwork of fish from Fishful Thinking Art, fish jewelry, fishing tackle, books, and a ROM Fish Identification course.

At the AGM, we were able to announce the winner of the Outstanding Mentor Award. This years winner was Dr. Graham Raby from Trent University leading the Integrative Fish Ecology Lab. We would like to congratulate you on your award and thank everyone for the thoughtful nominations. We would also like to thank Alyssa Goodenough for handmaking the prize.

Keep your eyes open on social media for information regarding upcoming events such as a tour at the Alma Aquaculture Research Station and a R tutorial web series! We are looking to grow our AFS-OC student subunit, in hopes to connect with more students and host more events in the future. Please reach out to the student subunit if you are interested in joining. We hope everyone enjoys their summer fieldwork and ask you to share any photographs with us! Happy Fishes!

Student Subunit — *cont.*

Above: Outstanding Mentor Award winner Dr. Graham Raby. Students pictured: Amber Fedus, Laura Haniford, Christian Bihun, and Erin Stewart.

Below: Cooke lab members Connor Reid, Ryan Hodgson, Raegan Davis, and Anne Haley .

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AFS-OC Comment on Changes to the ESA

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As part of the public comment process for notices posted on the Environmental Registry of Ontario, AFS-OC submitted the following comments on the proposed changes to the Endangered Species Act and its replacement with the Species Conservation Act (https://ero.ontario.ca/notice/025-0380):

The Ontario government is proposing to replace the *Endangered Species Act*, *2007* (ESA) with the *Species Conservation Act, 2025* (SCA) based on the concern that the existing legislation is too complicated and causes unnecessary delays and costs for housing, transit, and critical infrastructure. The goal of the new SCA is to "focus on the core protections essential to the conservation of species". As fisheries professionals, we are concerned with this new legislation, as it is being proposed during a time of profound declines in biodiversity. Amongst our concerns are the redefinitions of habitat, the removal of specific protections related to the harassment of species, the elimination of the goal of species recovery, and the removal of Ontario's independent scientific committee's authority to determine the listing of at-risk species. Altogether, these changes do not represent the optimal path forward for maintaining our province's biodiversity.

Provincial species at risk legislation is meant to supplement federal legislation (1). Aquatic species (fish, shellfish, crustaceans, and marine animals) are protected under the federal Fisheries Act, which includes their habitat and prohibits its harmful alteration, disruption or destruction (2). The new SCA eliminates provincial protection for SARA (federally) listed aquatic species.

As an example, the Critical Habitat Order for Redside Dace issued on January 27, 2025 stated that its listing under the ESA afforded additional provincial protection of the species and its habitat (3). Because Redside Dace are an aquatic species listed under SARA as endangered, they are excluded under the new SCA and would no longer have this provincial protection. The ESA had established specific rules and best practices for protecting Redside Dace, such as techniques for installing sediment control fencing (4). These additional guidelines will be lost under the SCA.

There are several relevant publications (both from the scientific community [1,5] and the Auditor General [6]) outlining how the current protections for at-risk species could be improved. The government should be focusing on strengthening, not weakening, current legislation.

Specifically, the AFS-OC opposes the following changes to the ESA:

Habitat is being redefined

Defining habitat is one of the most complicated but important parts of species protection. The ESA had a good definition of habitat: "an area on which the species depends, directly or indirectly, to carry on its life processes, including life processes such as reproduction, rearing, hibernation, migration or feeding" (7). The new SCA would define habitat (for an animal) as "a dwelling place or the area immediately around it, such as a den, nest or other similar place, that

is occupied or habitually occupied by one or more members of a species for the purposes of breeding, rearing, staging, wintering or hibernating". The important changes in the new definition are the removal of places that are "indirectly" necessary, the narrowing of spatial areas to "immediately around" a dwelling place, and the removal of protection for "life processes" such as feeding. These items should not be removed from the definition of habitat. Such changes are reminiscent of those made to the Fisheries Act by the federal government in 2012–2013 that saw habitat protections, a critical cornerstone of that Act, stripped away in the absence of evidence of prior meaningful consultation with subject-matter experts and rightsholders (8, 9). We have similar concerns (i.e., the removal of indirect but essential components of habitat) for the vascular plant definition of habitat in the new SCA as well. The government appears to be relying on the assumption that populations can be conserved by attempting to prevent only the most direct forms of potential harms to habitats and individuals. This is not good enough.

The recovery of species is no longer a goal

The ESA had the explicit goal of helping species recover, in addition to the protection and stewardship of those species. The SCA has removed those goals and replaced them with "protection and conservation" while "taking into account social and economic considerations including the need for sustainable economic growth in Ontario." Even the word "stewardship" has been replaced with "conservation", yet the term "conservation" has not been defined. We strongly disagree with the removal of species recovery as a goal for threatened and endangered species in Ontario. The status quo should not be the goal, and the term "restore" should be kept as the explicit goal of all at-risk species legislation.

The new SCA also removes the requirement for the Ontario government to develop a recovery strategy, management plan, response statement, and review of progress for at-risk species. This reduces the availability of recovery plans for species in Ontario to those listed federally under SARA. However, species are not equivalent to one another; there is no one-regulation-fits-all approach. That's why each species at risk has its own recovery plan – they have their own threats and biological requirements that affect recovery. Ontario has published recovery strategies for 180 species at risk as of December 2024. Are these strategies still going to be used, or are those efforts and research now obsolete?

The Ontario government controls which species are listed

The Committee on the Status of Species at Risk in Ontario (COSSARO), as an independent committee of experts, classifies species using scientific information. Under the ESA, this committee submits their report to the Minister of the Environment, Conservation and Parks (MECP) who is required to amend the Species at Risk in Ontario List to include those species within twelve months.

Under the SCA, the listing authority moves to the Lieutenant Governor of Canada instead of MECP. This is not a problem in and of itself. The problem is that the governor is no longer required to list any species classified by COSSARO and is given the power to revoke current listings. Not only that, but the Minister of the Environment, Conservation and Parks is now given the authority to recommend who sits on COSSARO to the Lieutenant Governor.

ESA comment — *cont.*

Ontario's ESA legislation was once considered the best in Canada, mainly due to the automatic listing and protection of habitat (10). By giving the listing power over to the government, the impartial scientific process of listing species is undermined, and species' listings will be subjected to the government's political and economic interests, instead of science. This essentially turns COSSARO assessments into a formality with little to no actual impact.

We believe that the best part of Ontario's existing legislation should not be changed; whoever is tasked with officially designating species on Ontario's Species at Risk List must follow COSSARO's recommendations.

Harassment would be permissible

The ESA prohibits harassment and harm of protected species. Harassment disrupts the normal behaviour of an animal, while harm results in physical injury. The new SCA removes harassment as a prohibited activity, though the term "harm" would remain. Harassment could result in individuals stopping feeding or nest-building. These species are already facing imminent extinction or extirpation, or will be if current threats continue. These are the species that most need to be left alone. Harassment is an important component of disturbance that should remain as an illegal activity.

Permits are no longer required

The Ontario government states that a "registration approach is already in place and used by the ministry for 95 per cent of projects subject to the current ESA". The number of projects is not the important metric; rather, it is the magnitude of projects that matters. The current activities that require registration instead of permits are mainly those that help protect or recover species – not for those that may cause a lot of harm. Permits are currently required for land development, infrastructure, aggregate pits and quarries, or projects that result in a significant social or economic benefit to Ontario – typically large-scale projects (11). Permits are required for these so that projects with the largest potential negative impact on species are reviewed and the proponent receives guidance around best practices to minimize impacts to the species they're going to harm. They also ensure that the proponent has thought about reasonable alternatives to the activity and, if harm must happen, has taken steps to reduce this harm.

The government's proposed one-regulation-fits-all approach will not work, especially considering they haven't even decided what the new regulation will be. As the existing policy says, "Given the unique biology and behaviours of each species at risk in Ontario and the variety of human activities occurring within the province, determining whether an activity is likely to kill, harm or harass a member of a protected species will generally need to be done on a species-by-species, case-by-case basis." (12) We believe the current permitting system should not be changed.

Retroactive enforcement

The government states that the SCA will "strengthen our ability to enforce species protection laws to ensure that all proponents comply with the rules and expectations of this new approach", without providing any details about how this will occur. We note that the MECP/MNRF did not

inspect a single project of the 6,539 approved under the ESA between 2007 to 2020 for compliance (13), raising questions about how the SCA will do this better. The government also has not provided any evidence that their proposed retroactive approach — removing the ability to conserve and recover species up front, and instead focusing on penalizing people who harm species after it has happened — is a better strategy for the conservation of at-risk species.

Unclear definitions

We believe that the SCA should define any terms it uses up front, instead of giving cabinet the power to define these terms as they see fit. These include “adverse effect”, “alternative habitat”, “in the wild”, and “significant adverse effect”, new terms that are proposed but undefined.

The big picture

The proposed changes in this bill indicate that the government fails to understand that the functioning of each stream, watershed, forest, meadow, and wetland is dependent on the species present in it, and that each river functions differently as soon as a species is lost. This bill is committing Ontario to an impoverished legacy for future generations. Ontario already has 22% more species at risk in 2020 compared to 2009 (13), and the new legislation will not prevent this number from climbing further. Biodiversity in southern Ontario is worth an estimated $84.4 billion per year (in 2008 dollars) through ecosystem services such as provision and purification of fresh water, nutrient cycling, air quality, carbon storage, flood control, pollination, culture, tourism, and aesthetics (14). As we lose biodiversity in each habitat, we lose these services. AFS-OC cares about Ontario’s biodiversity, and we call upon the Ontario government to do better to protect it for current and future generations.

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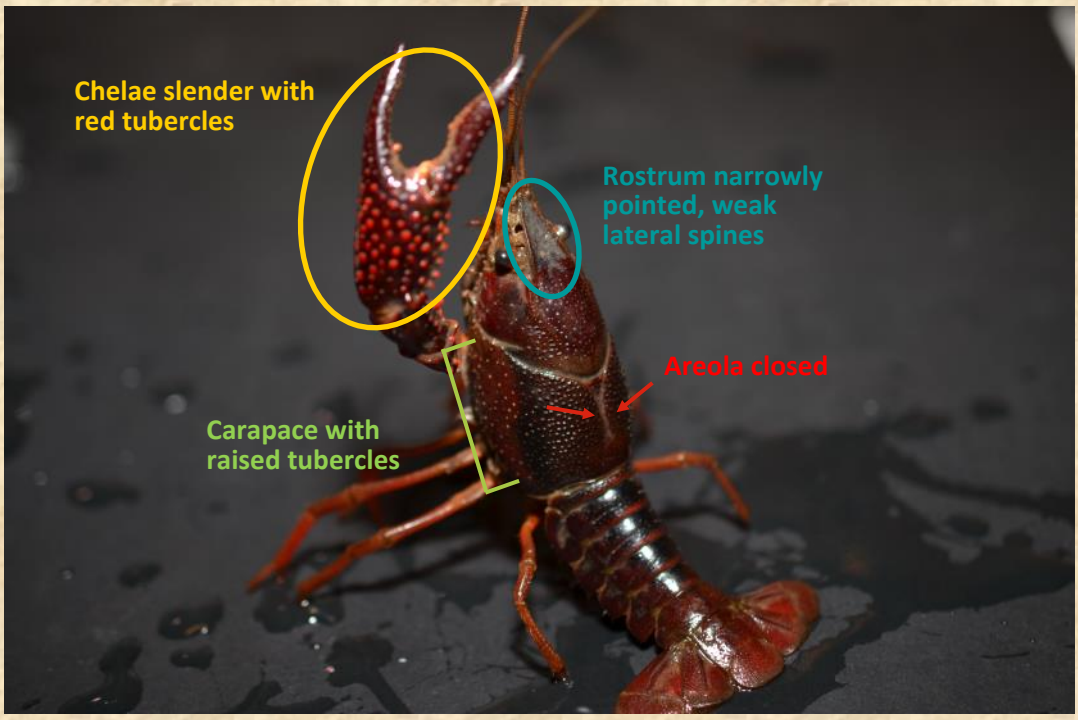
Invasive Crayfish, Old and New

By Sam Turner

Invasive crayfish are nothing new to Ontario. The familiar Rusty Crayfish (*Faxonius rusticus*) has resided in Ontario since at least the 60's where it was first reported from Lake of the Woods and the Kawarthas (Crocker & Barr 1968). A lesser-known species, the Allegheny Crayfish (*Faxonius obscurus*) was also discovered in Central Ontario at a similar time (Crocker & Barr 1968). Although, where the Allegheny Crayfish has generally persisted in the same area in relatively low density, the Rusty Crayfish was exceptionally successful in its expansion throughout Ontario having invaded nearly all but the northern and southwestern extremes of the province. Generally, its thought that the introduction of these species is attributable to anglers from the midwestern United States releasing bait. This theory is supported by that fact that the first Ontario records are from vacation, cottage, and sportfishing areas, though we will never know for certain.

With a metabolic rate greater than our native species and opportunistic diet, Rusty Crayfish eliminates entire macrophyte beds, impacting aquatic invertebrates and fish throughout the watercourse. Their aggressive nature quickly reduces native crayfish populations (Philips 2010). Where Northern Clearwater Crayfish (*Faxonius propinquus*) populations are present, hybridization with the Rusty Crayfish accelerates the elimination of the Northern Clearwater Crayfish from the area (Arcella *et al.* 2014). In my own observations at the Speed River in Guelph, its rare to find any species other than the hybrid Rusty Crayfish.

Hindsight has revealed an understanding of the drastic detrimental effects a single invasive crayfish has. Our small consolation lies in the fact the species shows a preference to moderate flow and seems to be intolerant of low-oxygen environments, restricting its spread to wetland habitats.



Photograph 1: The Red Swamp Crayfish (*Procambarus clarkii*) caught in Tilbury, ON. Key Identification features are labeled.

Invasive Crayfish — *cont.*

Photograph 2: Agricultural drain where the Red Swamp Crayfish (*Procambarus clarkii*) was captured. A muddy, seasonally inundated drain dominated by Purple Loosestrife (*Lythrum salicaria*) and Flowering Rush (*Butomus umbellatus*).

In 2023 the first clonal Marbled Crayfish (*Procambarus virginalis*) was discovered in a Burlington stormwater pond – almost certainly an aquarium release – and a slew of news reports followed in 2024 with sensational headlines such as "Attack of the clones". The pond has since been drained over two winters to "freeze it out" but its eradication hasn't been confirmed. At Pelee Island and Severn there are simultaneous invasions of the White River Crayfish (*Procambarus acutus*), first reported from Pelee Island in 2015 (Hossie & Hamr 2024). Signage and monitoring has occurred at the Severn locations, though no known control response has occurred. On January 1, 2024 the Ontario *Invasive Species Act* was amended to prohibit the possession of *Procambarus* crayfish but the damage has already been done. That same year the White River Crayfish reached the Georgian Bay coast.

As an aquatic ecologist with AECOM, I regularly complete fish salvages in advance of construction. I always make special effort to ensure that mussels and native crayfish are included in the buckets of fish that we rescue. Last summer, our team completed a salvage outside the town of Tilbury in an ephemeral agricultural drain and like usual I was collecting the crayfish stranded as the water fell. An abundance of Calico Crayfish (*Faxonius immunis*) were at this location, well into the hundreds. As I reached for my hundredth crayfish, I noticed one significantly larger than the others. Water to wash away the mud revealed a massive dark red crayfish unlike any of our native species. It was immediately recognizable as the Red Swamp Crayfish (*Procambarus clarkii*), the first to be found in Ontario and now the third *Procambarus* species present in the province. A report to the Invading Species Awareness Program initiated a rapid response where a second individual was discovered several kilometres away. Additional monitoring is set to occur in 2025 to determine the extent of this invasion, but at this time its unclear what tools are available to eradicate an invasive crayfish. No successful eradication of any invasive crayfish has occurred in Ontario to date.

These *Procambarus* crayfish are exceptional invaders, lent in part by their adaptability. Despite the native range of most *Procambarus* species centered in the southeastern United States, recent reports of introduced *Procambarus* on east and west Canadian coasts demonstrate a hardiness to withstand Canadian winters. During summer months the species are semi-terrestrial; as water levels fall, they simply burrow to wetter conditions. On rainy nights, its not

uncommon to see observations of the species walking the roadside dispersing to the next nearest ditch. The species excels in eutrophic water bodies and is tolerant of anoxia, but that isn't to say it would take advantage of any other waterbody it had access to.

The Rusty Crayfish demonstrated the damage a single invasive species could do. In just ten years, three new crayfish have established themselves in Ontario. It's improbable that that White River Crayfish can be contained at this point, but we're in earliest stages of the Marbled and Red Swamp Crayfish invasion where eradication remains a possibility. The impact of these crayfish is unrealized in Ontario, but they will no doubt harm the ecosystems they invade through habitat alteration via burrowing, exclusion of native crayfish, and opportunistic feeding of vegetation and invertebrates. Its imperative that leaders act before its too late. Individuals can learn to identify crayfish, and we should all remember that bait and aquariums should never be released.

Photograph 3: Calico Crayfish (*Faxonius immunis*). A native species most likely to be mistaken for Red Swamp Crayfish (*Procambarus clarkii*) due to similarities in the chelae, rostrum, and habitat preferences.

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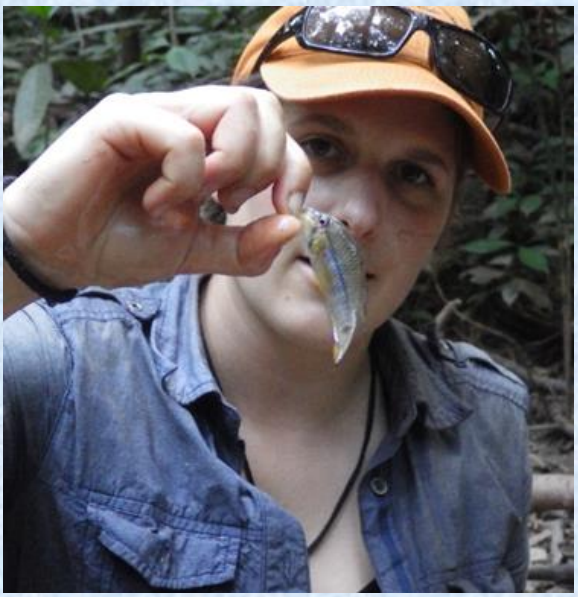
The Fish Life List: Obvious or Obscure?

the LATERAL line

By Sarah Steele

As I pondered what I would like to share from my experience fishing from the tropics to the Arctic, I had a thought. Somewhere out there, some fishheads must have a lifer list equivalent to birders. I considered how many species I have been lucky enough to handle throughout my career. Could it be close to 1000 given my tropical work? Or does a distant memory of those hot, humid field days exaggerate the diversity I caught? Does it even count if it isn't all angling? More importantly, what if it was a group effort, as when using a 50ft beach seine? Who gets the credit?

As I sat about to write, I did a quick search "Lifers for fishing" just to see what came up. While the hits were not as overwhelming as expected for birding, I was intrigued by a few articles and blog posts on the matter. Turns out that it is a (small but growing?) thing. Some of you reading might be thinking "Of course, Sarah. Fishheads have lists!". One individual, Steve Wozniak, has now increased his goal from 1000, to 2000, to 3000 (now just shy of that new goal). I dare not search further, as I could feel the nature collecting desire bubbling up…and I just don't have time for that kind of obsession these days. Had I researched microfishing back when it was introduced to me, I probably would have been an avid microangler today. It certainly fits my research interests in small-bodied fishes.



Despite the urban lifestyle during grad school (Toronto), I was quite lucky that the stars aligned for me to fish in some pretty amazing places, a springboard for my continued research expeditions and new (though unrecognized at the time) lifers. My passion for fish "collecting" of course began with fishing in Southern Ontario (targeting juveniles and minnows) and in keeping aquaria at a very young age (PhD period South American tank above), but that passion never transformed into an [micro]angling obsession later in life…maybe not until now when the idea of a life list wormed into my brain. The closest I came to being cognizant of the fish lifer concept was catching an Apistogramma dwarf cichlid (left, Photo Credit: Karen Alofs), one target of my PhD thesis, in the wild for the first time. I was ecstatic, posing jokingly and dorky with

Life list — *cont.*

my “massive” catch. But I certainly didn’t start a list. In fact, on most of my expeditions I have always kept a casual bird and mammal list, even a plant list (usually photos to be identified later) ….but for some reason never a fish list. . I suppose our field notebooks contained all that critical information, but it wasn’t MY list. It was shared. I was fishing for the greater good of science, apparently. Even now as I think about it…I have a lifer bird list! I don’t actively pursue it, but when I see a new species it is eventually added to my list. What is so different about fishing that I don’t keep a record of first sightings?

Perhaps it is the focus on scientific accuracy and getting the right identification in the field. Perhaps it is being so caught up with the joy of fishing, seeing species in the wild rather than at a pet store, frolicking in tropical streams hand catching tricksy plecos, hoping it was a new species to add to our collective list, documenting biodiversity in the name of conservation. Historical precedence? Possibly this new obsession will take over as I embark on a massive biodiversity survey this year, with the primary aim to catch every species in a given region. Now, maybe, is the time for the fish lifer obsession to take hold.

With that, the foundations of my list (in rough chronological order) are:

Ontario (Lifetime)

Some number of species, at least all the GTA urban fishes. All species from my childhood, except pumpkinseed, are a mystery. A very important lifer: Lake Sturgeon (left, Nov 7 2023 – I got to hold it)! Photo Credit: Benjamin Aubrey

Florida (1998, 9 yrs old)

I was allowed to angle off a pier once on family vacation. My catch (unidentified) was exciting (to me), but apparently only good enough for bait bucket of the angler next to me! Traumatic.

Norway (2014)

I went cod fishing with a local, I don’t think I was personally successful! I at least had a nice view.

Life list — *cont.*

Suriname (2014, 2015)

Some number of species. Here is some of the diversity!

French Guyana (2014)

A few species; we accidently took a detour, so maybe I can't count them anyway!

Guyana (2015, 2018)

Some number of species, possibly overlapping with Suriname… but maybe not? I did angle one of the largest piranha (Black Pirahna) I have seen in my life (the one pictured was not the largest, but it seems like I am also bad at taking photos of my catch).

Texas (2017)

Angled one I can recall (redacted), but I was told after I was really not supposed to catch it. I was with officials that could….bend the rules.

Iceland (2016, 2019-2020)

Here it is easy, only a few endemic freshwater species. Plenty of Arctic Charr, and a handful of Icelandic Stickleback, Brown Trout, and the non-native European Flounder (caught one individual by hand as I crossed a river during a hike). Photo Credit: Han Xiao

Tennessee (2022)

ROM expedition, the minnows and darters in breeding colour were amazing…then I got covid. The rest was a blur.

Quebec (2023 – current): Getting to identify live minnows, only previously seen in ROM fish id test jars! Highlight, lifer (I think) Brassy Minnow in Gatineau Park (July 2023). New species list additions to come this year!

Nunavut (2023, 2024)– some (much much smaller) number of species, it is hard to fish in the Arctic. But again….does a scientific list count? For the amount of effort here, I would say it does. MY contribution was a whopping 5 species. If I consider the list a team effort, certainly a highlight was a Banded Gunnel which evaded MY capture (caught accidently by Phycologists scuba-diving picking up garbage in 2024 while I was surface support in the same area I pinned an individual in a dipnet in 2023 but somehow failed to capture it; the irony is amazing). Lifer Arctic Shanny (minnow trap, August 11 2023) below. Photo Credit: Noel Alfonso

All in all, I kept an embarrassingly poor record of my lifers along the way, but I promise my field notes for the team were much better! Maybe one rainy day I can't be in the field, I will dig up my notes and finally make my list.

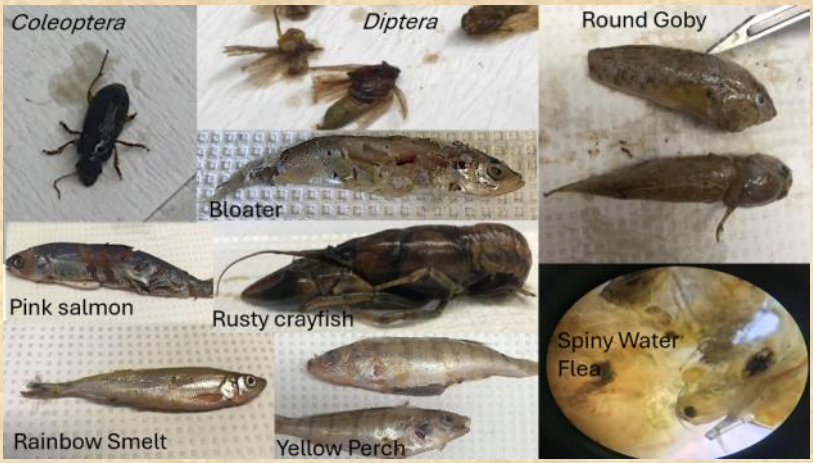
I am curious, do you have a lifer fish list? Share your numbers, highlights and photos on our social media channels!

From the Lab

the LATERAL line

By Jacob Lasci

Introduced species pose a threat to native species within ecosystems. Throughout the 1900s Lake Huron experienced an influx of alewife, an introduced prey fish. In a two-fold effort to control the alewife population and supplement the recreational fishery, multiple species of Pacific salmon and trout (salmonids) were introduced to the lake. By 2003, the alewife population in Lake Huron had collapsed. Our study examined the diets of the introduced salmonids and native lake trout to assess changes in food competition among salmonids. We found that in recent years, diets of the salmon and trout overlap more than before the collapse of alewife. Our findings are the first to report diet overlap between lake trout and introduced salmonids in the Great Lakes, highlighting a potential threat to the reestablishment of the native lake trout population in Lake Huron. The paper is available at https://doi.org/10.1139/cjfas-2024-0202.



Diversity of prey found in the stomach contents of Lake Huron's salmonids.

Molecular sequencing preparation of stomach content resulting in a DNA sample for each individual salmonid.

Lab angled Chinook salmon from Lake Huron (released— not included in these results).

Angling in Lake Huron's Canadian Main Basin.

Fish Focus: RAINBOW SMELT *(Osmerus mordax)*

By Siobhan Ewert

Osmerus: from Greek 'osmeros', meaning 'smelling'—a reference to the distinctive cucumber-like odor of smelts. Mordax: Latin for 'biting', possibly referencing their predatory nature and the fact that they have many teeth on the jaws, tongue and roof of the mouth.

The Rainbow Smelt was introduced to the Great Lakes in the early 20th century and has since spread to many inland lakes across Ontario. Although it is not native, it has become well-established in many ecosystems, sometimes impacting native fish populations.

Did you know? Rainbow Smelt are a popular food fish in Ontario and are often eaten whole after being battered and fried. In many communities, spring smelt runs are celebrated with traditional 'smelt fries,' where people gather to cook and share fresh-caught smelt.

Features: Rainbow Smelt are slender, elongate fish with a silvery body and a greenish to bluish back. They have a pointed snout, large mouth with prominent teeth, and a single adipose fin. Their scales are easily shed, and they emit a distinctive cucumber-like odor when fresh.

Habitat: Rainbow Smelt inhabit cold, open waters of large lakes and rivers. They prefer well-oxygenated waters and often form schools in the pelagic zone. In Ontario, they are found in the Great Lakes and many inland lakes.

Reproduction: Rainbow Smelt spawn in early spring when water temperatures range from 4-10 °C (often under ice). They migrate into tributary streams or onto gravelly lake shoals at night. Females release adhesive eggs over rocks or gravel, which are fertilized by males and left unguarded. .

Diet: Rainbow Smelt are a schooling fish and feed on mostly small fish, worms, crustaceans and insect larvae. They are opportunistic feeders and can have a significant impact on native fish larvae through predation.

Book Review

By Ross Claytor

Ignition: Lighting Fires in a Burning World. By M. R. O'Connor. 2023. Bold Type Books. 384 pages, Hardcover 39.00 CAD, E-book 22.99 CAD.

The Summer Canada Burned: the Wildfire Season that Shocked the World. By Monica Zurowski and Postmedia. 2023. Greystone Books. 192 pages. Hardcover 34.95 CAD, E-book 27.99 CAD.

 This review was originally published as: Claytor, R. 2024. "Ignition: Lighting Fires in a Burning World" by M.R. O'Connor, 2023 [book review]. The Canadian Field Naturalist 138(2):181-183. DOI: https://doi.org/10.22621/cfn.v138i2.3487

Wildfires are increasing globally (Koudenoukpo 2023). Reporting on fires, like many ongoing events, is subject to gaps created by news cycles, and it can be difficult for people to obtain an overall view on the extent of wildfire impacts and risks. Two recent books, *Ignition* by M.R. O'Connor and *The Summer Canada Burned* by Monica Zurowski, address these issues from different perspectives, but when read together they provide valuable insights on wildfire causes, costs, and solutions.

Both books begin with succinct descriptions of unprecedented and devastating wildfires. Zurowski, an editor and writer at the *Calgary Herald*, opens *The Summer Canada Burned* with statistics from the 6236 individual fires (18% above the 10-year average) that burned an area of 165 000 km2 (six times the national average) in Canada during the summer of 2023 (p. 5). In *Ignition*, science journalist O'Connor begins with a description of Australia's 2019 to 2020 fires that burned 185 000 km2, an area larger than New Brunswick, Prince Edward Island, and Nova Scotia combined (p. 3). From this common beginning the two books diverge in focus. Zurowski concentrates on fire's impacts on communities and individuals and the resources that were required to fight the 2023 summer fires. O'Connor focusses on wildfire strategies in the United States by obtaining wildfire fighting training. She then joins teams that fight wildfires and also set intentional fires as ecosystem management strategies. Using these experiences, O'Connor explores the paradox between fire as a creative force (directed by humans shaping the environment to promote diverse ecosystems and community well-being) versus the destructive force of increasingly powerful fires. Together these books challenge the reader to examine current wildfire fighting and management practices.

In the early 2000s, scientists began to use the term megafire to describe the "large, complex, and intense fires" that open both books (p. 100 *Ignition*). O'Connor explains that megafires are characterized by aerosols that enter the atmospheric boundary between the troposphere and the stratosphere. This boundary, labelled the tropopause, varies in its distance above the Earth, from 18 km above the equator to six km above the polar regions (SKYbrary 2024).

Michael Fromm, a U.S. Naval Research Laboratory meteorologist and physicist, told O'Connor he refers to clouds generated from these fires as pyrocumulonimbus or pyroCBs. PyroCBs are important because they are the precursors to the fire tornados that make megafires so dangerous. Fromm's team began investigating this phenomenon in 1998 after tracing aerosols observed over Sweden back to a fire in Canada's boreal forest. The first pyroCB in Australia was

Book Review — *cont.*

observed in 2003 and was accompanied by fire tornados with winds over 181 km/h. PyroCBs were subsequently viewed in western Russia in 2010 and South America and Africa in 2018. In *The Summer Canada Burned*, Mohammad Reza Alizadeh, a climate scientist at Massachusetts Institute of Technology and McGill University, explains to author Zurowski that climate change contributes to the common characteristics preceding megafires, including drought, high temperatures, low humidity, and strong winds.

Zurowski points out that the resources needed to fight megafires are unprecedented. For example, as early as 12 May 2023, the extent of the year's fires had already exceeded the ability of Canada's domestic firefighters and military personnel to contain them. Fortunately, Canada was able to call on firefighters from the United States, Spain, Mexico, South Africa, France, Australia, New Zealand, Portugal, Brazil, and South Korea. The costs of fighting these fires included evacuations for more than 120 000 Canadian homes, sheltering sites for evacuees, management of automobile traffic in areas with few exit routes, helicopters for remote community evacuations, and resources to handle the needs of farm animals and pets. Commercial and personal financial losses came from the destruction of businesses and homes, but also from interruptions—often lasting more than a month—in business and personal incomes caused by the evacuations. O'Connor emphasizes that wildfires that become megafires are amorphous and have unpredictable behaviours that differ from structural fires. Therefore, additional training for firefighters is required that focusses on handling situations where fires burn faster than expected, turn back, and restart. Firefighters need to learn how to set backfires and build individual safety zones. Implementing these strategies requires preparation and leaders with scientific knowledge and experience who can interpret and predict changes in weather and how it will affect fire behaviour.

Wildfires, particularly megafires, have not only financial costs, but also physical and mental health impacts. *The Summer Canada Burned* includes the toll that air quality degradation has on health, noting that New York City and Montréal had at various times the worst air quality in the world in 2023 because of the Canadian fires (pp. 50 and 78). In Ottawa, the fine particulate matter index reached a high of 260 micrograms per cubic metre compared to its average of four to 11 micrograms (p. 68 *The Summer Canada Burned*). *Ignition* delves into the psychology of wildfire fighting, from the highs of beating a fire to the post-traumatic stress disorder (PTSD) that can come from being caught in unpredictable fire events. These events can quickly overtake a firefighter and require sheltering in a personal fireproof tent to wait for rescue. As one firefighter explained, "In the dark, smoky shelter with the heat bearing down, the urge to look outside to see if you should run is almost insuppressible" (p. 124 *Ignition*). Sometimes multiple flame fronts pass before rescue crews arrive. O'Connor explores the symptoms of PTSD resulting from these near-death incidents through interviews with survivors, colleagues, and family members. Both books emphasize that the economic and health consequences of megafires are creating unsustainable pressures on public resources and urge that solutions be explored.

Exploring these solutions in-depth is beyond the stated objective of *The Summer Canada Burned*; they are covered in a cursory manner using quotes from firefighting organizations, politicians, scientists, and the public. *Ignition*, in contrast, has a specific objective to explore how humans have and are using fire as a constructive solution for shaping the environment. Drawing on examples from the Jemez Mountains in northern New Mexico, Hecate Island in British Columbia, and the pine barrens in the eastern United States, O'Connor describes tree-ring fire scarring studies that indicate Indigenous communities across diverse environments altered landscapes for centuries using small and patchy fires. These fires created habitats to support the growth of the specific plants and animals they harvested. Learning from these Indigenous community practices, early settlers often adopted fire as a constructive force. These types of Indigenous practices form the basis for scientific studies conducted today by the Indigenous Ecology Lab at the University of British Columbia (https://www.indigenousecology.com).

Stephen J. Pyne, Arizona State University emeritus professor and author of several publications on fire management, explains to O'Connor that viewing fire as a destructive, rather than creative force began with harvesting timber for profit and the displacement of Indigenous communities from traditional lands. Pyne explains that fire suppression regulations, designed to eliminate all fires regardless of origin, intent, or danger, began to be codified in the mid-1800s as the British developed scientific forestry principles to maximize yields for the lumber industry in the colonial territories of India, Canada, and Australia. Only in Burma, where locals went on strike, was fire suppression officially renounced.

Book Review — *cont.*

In the United States, two main proponents of fire suppression were the U.S. Forest Service's first head, Gifford Pinchot, and John Muir, a founder of America's conservation movement. Pinchot adopted objectives to maximize high yields and lumber board feet rather than conserve the diverse forests of Western Larch, Giant Sequoia, Pitch Pine, and Lodgepole Pine that were the results of cultural burning. Yosemite National Park, an area where Indigenous communities had used fire to create a diverse ecosystem over centuries, entered a fire suppression regime under Muir's guidance. Pyne explains, "'Muir understands fire, but he doesn't see it as necessary or useful, he thought it was something that you could remove from the landscape to make it better'" (p. 90 *Ignition*). In the 1940s, the U.S. Forest Service hired psychologist John Shea to investigate the use of fire in the southern United States where cultural controlled burning was legal. He subsequently characterized the belief in controlled burning as the "defensive beliefs of a disadvantaged culture group" (p. 93 *Ignition*). Studies like these coincided with advertising campaigns using Smokey Bear to highlight the importance of fire suppression in reducing wildfires and conserving healthy forests.

O'Connor identifies 1962 as a turning point in the use of fire suppression as the dominant method of controlling fires and managing forests. A sequence of papers, citizen action plans, and reports supporting active fire intervention to restore national park forests to pre-colonial conditions were circulated at scientific and public conferences. As a result, the 1970s became a decade when fire as a constructive force was practiced and researched However, during the 1980s fire suppression policies began to dominate again as urban residents near rural areas demanded fire protection, as *Ignition* explains. Two notable prescribed burns that got out of control set back the use of controlled fires for management. A burn in Yellowstone National Park in 1988 and then on Cerro Grande, a mountain in New Mexico, in 2000 led to cuts in fire programs throughout the United States. Nevertheless, isolated cases of controlled fires for ecological management continued in Gila National Forest (southwestern United States), Flint Hills (Kansas), and Yosemite (California). Currently, fire suppression as a fire management policy is beginning to wane as researchers investigate links between climate change and megafires and the use of fire as a constructive force by Indigenous communities becomes better understood.

The legacy of fire suppression is in the background of *The Summer Canada Burned* but very much in the foreground of *Ignition*. However, each book describes recognition among members of the public, conservation groups, and others that controlled burns have a place in fire management and that the role of intentional burning in controlling megafires will be an ongoing process that will vary among ecosystems. Readers interested in a record of the extent and costs of the 2023 fires in Canada will find *The Summer Canada Burned* an important reference. However, the lack of an index hinders the reader in finding their way back to specific topics of interest. *Ignition*, in contrast, is well indexed with an extensive Bibliography and Notes. It presents an in-depth look at the individual, societal, and ecological relationships that humans have with fire while challenging readers to consider how societal objectives influence the definition, direction, and interpretation of science.

Additional perspectives and work on these issues can be found in:

• An article on the North American tree-ring firescar network: https://www.fs.usda.gov/rm/pubs_journals/2022rmrs_2022_margolis_e001.pdf.

• *CBC Ideas*'s two-part podcast series called "Healing the Land": https://www.cbc.ca/player/play/audio/1.7126114 (Part 1) and https://www.cbc.ca/player/play/audio/1.7127150 (Part 2).

• *Hakai Magazine*'s story in May 2024 called "Not Too Wet to Burn": https://hakaimagazine.com/features/not-too-wet-to-burn/.

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Koudenoukpo, J.B. 2023. As wildfires increase, integrated strategies for forests, climate and sustainability are ever more urgent. UN Chronicle: 31 July 2023. Accessed 9 November 2024. https://www.un.org/en/un-chronicle/wildfires-increase-integrated-strategies-forests-climateand-sustainability-are-ever-0.

SKYbrary. 2024. Tropopause. Accessed 12 December 2024. https://skybrary.aero/articles/tropopause.

Ross Claytor

Ketch Harbour, NS, Canada

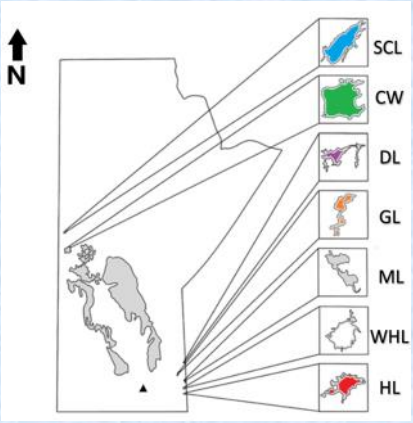
"On the Hook!"

the LATERAL line

The Publican House in Peterborough was packed for February's Conservation Cafe's presentation **Islands of water in a sea of land—Newly discovered species diversity of fish In Algonquin Park** by Dr. Mark Ridgeway, Ontario Ministry of Natural Resources. If you would like to catch a Conservation Cafe presentation, and have the second Tuesday of the month free, you can request to be added to the mailing list: conservation@trentu.ca. All are welcome and there is delicious food and frosty beverages for purchase. Photos: Left—Ann Rocchi, Nick, and others; middle—Dr. Graham Raby and Mark; right–Mark dancing like an Egyptian.

A historical tidbit: "From Overseer L. E, Bliss, of Nepigon, for the River Nepigon, Lake Nepigon, and waters tributary to the said river and lake...Pike fishing: The men employed at this work this season accomplished wonders, as large quantities of pike and suckers were caught and destroyed. It is most noticeable now after the two seasons of pike fishing, the comparative absence of pike in the shallow grassy bays, I would very strongly recommend that these men be placed at this work next season, as it is only by keeping right at it that we can hope to overcome this detriment to the trout." https://dn790003.ca.archive.org/0/items/annualreportofga191420ontauoft/annualreportofga191420ontauoft.pdf

Member publication: Application of a population status model on several recreational lake trout (*Salvelinus namaycush*) fisheries in Manitoba, Canada.



A very gravid sculpin, caught in Marden Creek (Guelph), May 2025. Photo by Ann Rocchi.

The 2023 Lake Ontario Management Unit Annual Report is available at https://www.glfc.org/loc_mgmt_unit/LOA%2024.01.pdf. It contains the yearly summary of index fishing reports, recreational and commercial fisheries, age and growth, contaminants monitoring, stocking program, and research activities.

In 2023, 37,147 wild, mature salmon and trout migrated up the Ganaraska River (a number which doesn't account for harvest in the lower section).

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