



Message from the President



Hello Ontario Chapter members,

As the dark and oppressive cold of winter soon approaches us, so too does our AGM & Conference (which will certainly be less dark and cold). I am excited to once again be able to converse with similarly afflicted “fish nerds” this January. Our theme for this year’s AGM is “Our Forgotten Freshwater Fauna” which is a topic that is very near to me as “forgotten freshwater fauna” directly resulted in my entrance into the world of fish ecology. “Rough” fishes within heavily urbanized streams of eastern Toronto provided an eye-opening angling experience for me as a child. I quickly realized that the degraded urban streams I passed by were teeming with life, which began my lifelong interest in fish ecology. I am now thankful many years later to be able to represent the Ontario Chapter of the AFS among so many other members with a shared passion for our native fish species.

Our upcoming annual conference is a great opportunity to hear about some of the latest aquatic research and to network with an eclectic mix of fisheries professionals. We will be returning to the Bayview Wildwood resort in Severn Bridge (which also happens to be well positioned for ice fishing purposes). I would like to thank our volunteers for the hard work they have done in organizing the AGM, running our social media, and overall going above and beyond in all aspects of chapter affairs. In addition to the AGM, our Executive Committee has continued to organize workshops and other events related to current issues affecting fish and fisheries in Ontario. I would encourage everyone to take advantage of these events and if you are interested in further involvement, please contact myself or any member of the Executive Committee.

I hope to see you all at the AGM!

Erik Tuononen, AFS-OC President

president@afs-oc.org

Contents:

- * Message from the President...P1
- * 2024 AGM & Conference...P2
- * AFS-OC Student Subunit...P3
- * Fish Name Changes...P4
- * Barrier Mitigation Workshop...P5
- * Snorkelling for Fish...P6-8
- * Spotted Gar Record...P9-10
- * New Books...P11-12
- * Will Wegman Tribute...P13
- * Book Review...P14-15
- * From the Field...P16
- * Fish Focus: Brassy Minnow...P17
- * “On the Hook!”...P18

2024 AFS-OC AGM & Conference - Jan 26-28



CONFERENCE & ANNUAL GENERAL MEETING

OUR FORGOTTEN FRESHWATER FAUNA

JANUARY 26TH - 28TH, 2024

BAYVIEW WILDWOOD RESORT SEVERN BRIDGE

Join us for the 2024 Annual General Meeting and Conference at the Bayview Wildwood Resort near Severn Bridge. Our theme this year is “**Our Forgotten Freshwater Fauna**”.

Those planning to present papers or posters must submit abstracts by **January 8, 2024**. There are limited slots available for oral presentations, or you can choose to present a poster. Presentations are solicited for all aquatic resource topics, and on completed studies, preliminary results, or case studies.

Abstracts should be submitted in Microsoft Word format using the provided template [here](#) as an email attachment to Silviya Ivanova (president-elect@afs-oc.org).

Student oral presentations are eligible for the E. J. Crossman Award. For details on eligibility and evaluation please see: <https://www.afs-oc.org/awards/e-j-crossman-award>.

Student poster presentations are eligible for the President’s Award. For details on eligibility please see: <https://www.afs-oc.org/awards/presidents-award>.

Online registration is now open and can be found at the [AFS-OC Online Store](#). Early bird rates will be available until **January 15, 2024**.

The Executive Committee and Student Subunit are delighted to announce we will be sponsoring two bursaries for travel or conference related expenses for this year’s meeting:

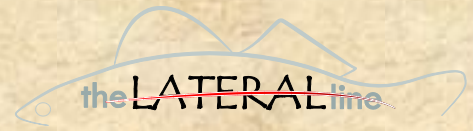
- Up to \$250 for three Student or Young Professional AFS Ontario Chapter members
- Up to \$350 for one Regular AFS Ontario Chapter member

To apply, please submit via email a brief bio and explanation of how these additional funds could help pay your way to Bayview Wildwood Resort (up to 3-4 paragraphs). All applications will be reviewed by the voting members of the AFS-OC Executive Committee/Student Subunit Executive and awarded based on need. Please submit your application by email to Zachery Wells (past-president@afs-oc.org) by **December 15th, 2023**.

For the latest information see <https://www.afs-oc.org/about-us/2024-afs-oc-annual-meeting/> or contact our Erik Tuononen (president@afs-oc.org).

You can view programs from past meetings at <https://www.afs-oc.org/annual-meetings>.

AFS-OC Student Subunit



Since the spring, the Ontario Chapter Student Subunit has been laying low due to the fieldwork season. In August, some of us got together for a tour of Normandale Fish Culture Station in southwestern Ontario. We had an enjoyable time learning how the hatchery operates and stocks Atlantic Salmon into Lake Ontario and elsewhere. We hope to organize another hatchery tour in the future, outside of field season, so more members can attend.

The new 2023-2024 subunit Executive Committee is currently planning for some fun and educational events following the AGM. We are working on revitalizing our student/professional mixers, designing workshops and web series, and organizing a World Fish Migration Day event! More details to come regarding all events via email and social media posts (@afs_oc_su on Instagram and X).

Have any questions or comments for us? Feel free to reach us by email at afsocsu@gmail.com.



Recent Changes to Ontario Fish Names

Several changes to Ontario fish names have occurred according to *Common and Scientific Names of Fishes from the United States, Canada, and Mexico, 8th Edition*.

All but two species previously assigned to Family Cyprinidae (carps and minnows) were transferred to Leuciscidae (minnows), Tincidae (tenches) and Xenocyprididae (sharpbellies). Cyprinidae (carps and minnows) are now (carps).

The genus *Myoxocephalus* was transferred from Cottidae (sculpins) to Psychrolutidae (fathead sculpins).

Longjaw Cisco (*Coregonus alpenae*) was removed from synonymy of Shortjaw Cisco (*Coregonus zenithicus*) and Nipigon Cisco (*Coregonus nipigon*) was removed from synonymy of Cisco (*Coregonus artedii*).

Changes to the common and/or scientific names occurred for the following species:

Previous Name

Bowfin (*Amia calva*)

River Shiner (*Notropis blennioides*)

Spottail Shiner (*Notropis hudsonius*)

Pugnose Shiner (*Notropis anogenus*)

Blackchin Shiner (*Notropis heterodon*)

Sand Shiner (*Notropis stramineus*)

Ghost Shiner (*Notropis buechanani*)

Mimic Shiner (*Notropis volucellus*)

Blacknose Dace (*Rhinichthys atratulus*)

Largemouth Bass (*Micropterus salmoides*)

Current Name

Emerald Bowfin (*Amia ocellicauda*)

Alburnops blennioides

Hudsonius hudsonius

Miniellus anogenus

Miniellus heterodon

Miniellus stramineus

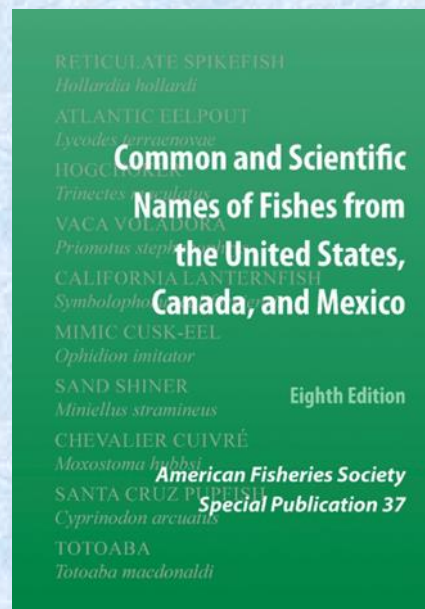
Paranotropis buechanani

Paranotropis volucellus

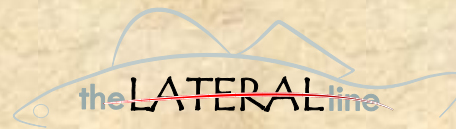
Western Blacknose Dace (*Rhinichthys obtusus*)

Micropterus nigricans

Common and Scientific Names of Fishes from the United States, Canada, and Mexico, 8th Edition is an authoritative reference that provides an up-to-date checklist of common and scientific names for all described and taxonomically valid fish species living in freshwaters and marine waters of North America. This eighth edition reflects taxonomic changes that have occurred since 2013 and is expanded geographically to include all species found within the exclusive economic zones of Canada, Mexico, and the United States. It includes names for 5,089 species and 333 families, an increase from 3,875 species and 260 families in the seventh edition. It also provides the rationale and methodology for common name allocation and history of changes from the previous edition and includes English, French, and Spanish names. The publication was compiled in collaboration with the American Society of Ichthyologists and Herpetologists. To purchase a copy visit the [AFS Bookstore](#).



Barrier Mitigation Workshop



By Brian Morrison

The Ontario Chapter of AFS hosted an instream barrier removal workshop on November 29th, 2023 at the Nottawasaga Valley Conservation Authority's Tiffin Centre for Conservation, in Utopia. A total of 51 persons attended the workshop, comprised of representatives from consulting, non government organizations, conservation authorities, government, and private citizens. The workshop was followed by a social event at Flying Monkeys Craft Brewery in Barrie. Presentations from the event will be posted on the AFS-OC Continuing Education webpage (<https://www.afs-oc.org/continuing-education>). The AFS-OC would like to thank all the presenters as well as the NVCA for donating the use of the Jose building for the event!



Photo credit: CLOCA



Photo credit: Laura Wensink (NVCA)

Snorkelling For Fish

Snorkelling Freshwater Systems: A Viable Method for the Well-Being of a Fish Nerd

By Sarah Steele; Photo Credits: Mike Swift and Sarah Steele

I was first exposed to the idea that people do not snorkel enough in freshwaters during the AFS-OC screening of *Hidden Rivers* in April 2021. It may have been the cold of an Ontario April evening, or the flash of diversity in the waters of the southern United States that clouded my memory, but I immediately set snorkelling Ontario waters as a priority (realistically, in future when time allowed). As I reflect on my snorkelling in Gatineau Park to write this article, I realize I have indeed taken part in snorkelling in Ontario. With only a few exceptions, the waters were bleak and almost lifeless... the odd *Lepomis* sp. juvenile covering in a rocky crevasse as the sound of motors surrounded me. After each of these outings, I returned to shore, defeated, disheartened, and preoccupied with aquatic biodiversity loss not only in Ontario, but around the world.



In June 2023 I was very lucky to begin a Research Assistant position at the Canadian Museum of Nature in Ottawa, and almost immediately started helping in the field. This meant lots and lots of minnow ID, and it seems to be a different level of skill to ID minnows, especially juveniles and in the hundreds, alive and well in the field. It was amazing to see some fishes I had not seen before (alive), and to practice somewhat forgotten, or at least less used, ID. I fell in love with the many small lakes of nearby Gatineau Park, some of which are surrounded by beautiful landscapes, full of life, and with a striking absence of machines and humans. Those who did show up on the adjacent trails had a natural curiosity, and I enjoyed many chats about the diversity and excitement this park still holds and wonders yet to learn.



Sundews on emergent logs.



It was shortly after this that I convinced my hesitant partner to join me, underwater camera in tow, to snorkel one lake in particular. It reminded me fondly of our favourite backcountry camping spot (in Massassauga Provincial Park), left behind in our recent move. I had seen 14 species of fishes in just this one small lake, and there are likely several more.

Snorkeling For Fish — *cont.*

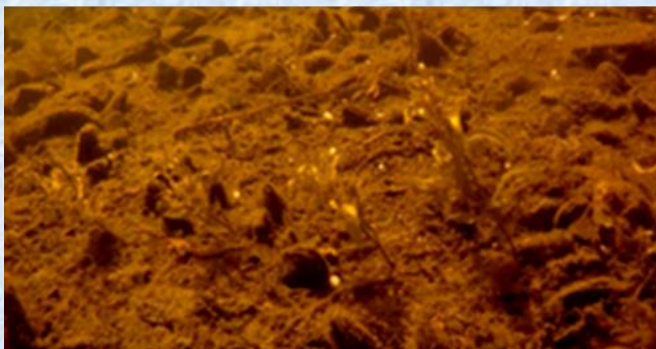
Reluctant but curious, he accepted the weekend activity proposal. Our first snorkel adventure yielded several species of minnows, schooling in the thousands, among seemingly untouched woody debris and vegetation. The substrate was polka-dotted with mussels, feeding happily in the shallow waters, relatively undisturbed by our presence. Then came the shockers. Freshwater jellyfish and sponges! These unexpected inhabitants greeted us that day. We were also grateful to see Iowa Darters, with males still so vibrant, approaching us with great confidence. We were hooked!



Juvenile Blacknose Shiners amongst freshwater sponge. There are 15 species of freshwater sponge known from Eastern Canada.



Male Iowa Darter.



Mussel bed of Eastern Elliptio and Giant Floater, 2 of 6 species recorded in Gatineau Park.



Mixed school of minnows, so many minnows



More minnows...



Even more (small) minnows...

Snorkeling For Fish — *cont.*



Freshwater Jellyfish



Blacknose Shiner juveniles

Three additional snorkel adventures to the lake in the remaining weeks of warmth, with a better camera and wetsuits, offered crayfish (suspected but not yet seen), tadpoles, and more fish species. The darters often were the focus of our attention, with many minnows darting in and out of frame, curious about the happenings. In October, on our final venture for the year (we are not yet brave enough for very cold-water snorkelling), I was reminded of those aquatic voids. For a whole hour, along the entire southern shore, a few lonely looking *Lepomis* sp. juveniles, looking like they had been left behind during some grand migration. I suddenly felt the pang of emptiness, of loss. But where did the fish go? Possibly a question I should know the answer to. I carried on, with hope that I would find something to show me that everyone was ok. In the dappled sunlight filtering through the vegetation (one day I will learn all my aquatic plant friends) I caught a fleeting silvery shimmer. I carefully moved deeper into the weed bed, and there before my eyes the thousands of fishes had gathered. I floated there, as the schools circled around me, investigating my digits and my gear, as the gentle song of drying leaves dancing in the wind echoed in my ears. It was magical.



More minnows...



Even more (small) minnows...

I recall one observer (of very few), stopping to ask about our snorkel adventure. It was suggested that I never share the name of this lake with anyone, for fear of negative impact on such an amazing place. I understand, and yet I feel if more people visited a place like this, and saw the wonders of something so seemingly boring, the desire to respect, to learn, to enjoy nature and care for it would be that much greater.

The lake is named Kidder.

New Record of Spotted Gar

Asian carp monitoring yields new record of Spotted Gar (*Lepisosteus oculatus*) from the Grand River

By Nathan Lujan, Mary Burridge, Brenna Wells

A lot of the fun of boat electrofishing comes from not knowing what the next species or large fish to shoot up from the depths might be. Often, fishes come up so quickly they have to be dumped into the live well with barely a glance, and the real surprise doesn't come until later, when species identifications can be confirmed under careful review. Such was the case this past summer when a DFO Asian Carp Monitoring team (Fig. 1) netted the first ever record of a Spotted Gar (*Lepisosteus oculatus*) from the Grand River across from the Dunnville, ON, boat launch. The DFO boat crew was excited about their tentative discovery and, fortunately, a team of ROM fish taxonomists headed by legendary Assistant Curator (retired) Erling Holm were at the dock waiting for their return.

Erling and his long-time colleague Assistant Curator Mary Burridge quickly pulled the fish from the live well and confirmed its identification with the help of collections technician Brenna Wells and Associate Curator Nathan Lujan. The relatively short, broad snout (compared with the more common Longnose Gar, *Lepisosteus osseus*) and the abundant bold spotting confirmed the specimen's identification (Fig. 2). Till then, no Spotted Gar



Fig. 1. DFO Asian Carp Monitoring boat and crew with ROM biologists at the Dunnville boat ramp. On August 3, 2023, DFO and ROM staff collected the first record of a Spotted Gar (*Lepisosteus oculatus*) in the Grand River while sampling for invasive species.



Figure 2. The first record of a Spotted Gar (*Lepisosteus oculatus*) from the Grand River. The fish was released after having photos and a fin-clip taken as permanent records in ROM's archives.

New Record of Spotted Gar— *cont.*

had ever been collected from the Grand River, and the nearest previous collecting localities were over 65 km west of the mouth of the Grand River in wetlands near the base of Long Point in Lake Erie, or nearly 50 km north across dry land in Hamilton Harbor at the west end of Lake Ontario (Fig. 3).

Spotted Gar has been listed as endangered in Ontario since the *Endangered Species Act* took effect in 2008, and it was reassessed as endangered in 2016. A microsatellite analysis of Spotted Gar in Canada and Michigan found that these northern populations were divided into two major genetic clusters and as many as 7–9 smaller sub-clusters (Glass et al., 2015). That study found that Spotted Gar specimens from Point Pelee were genetically distinct from individuals in Michigan and at more eastern sites on the north shore of Lake Erie as far east

as Long Point, all of which clustered together despite being on opposite sides of Point Pelee. Long Point was the northeastern-most site sampled in that study. Glass et al. (2015) also found that northern populations of Spotted Gar are genetically quite distinct from southern populations in Louisiana, Mississippi, and Missouri. Thus the discovery of a Spotted Gar in the Grand River is good news for both the northern population and the species as a whole. After being measured, photographed for addition to ROM's extensive archives, and fin clipped for future DNA studies, the beautiful Spotted Gar specimen was released alive back into the biologically rich Grand River wetland.

Reference: Glass WR, RP Walter, DD Heatch, NE Mandrak, LD Corkum. 2015. Genetic structure and diversity of spotted gar (*Lepisosteus oculatus*) at its northern range edge: implications for conservation. *Conservation Genetics*. 16:889-899.

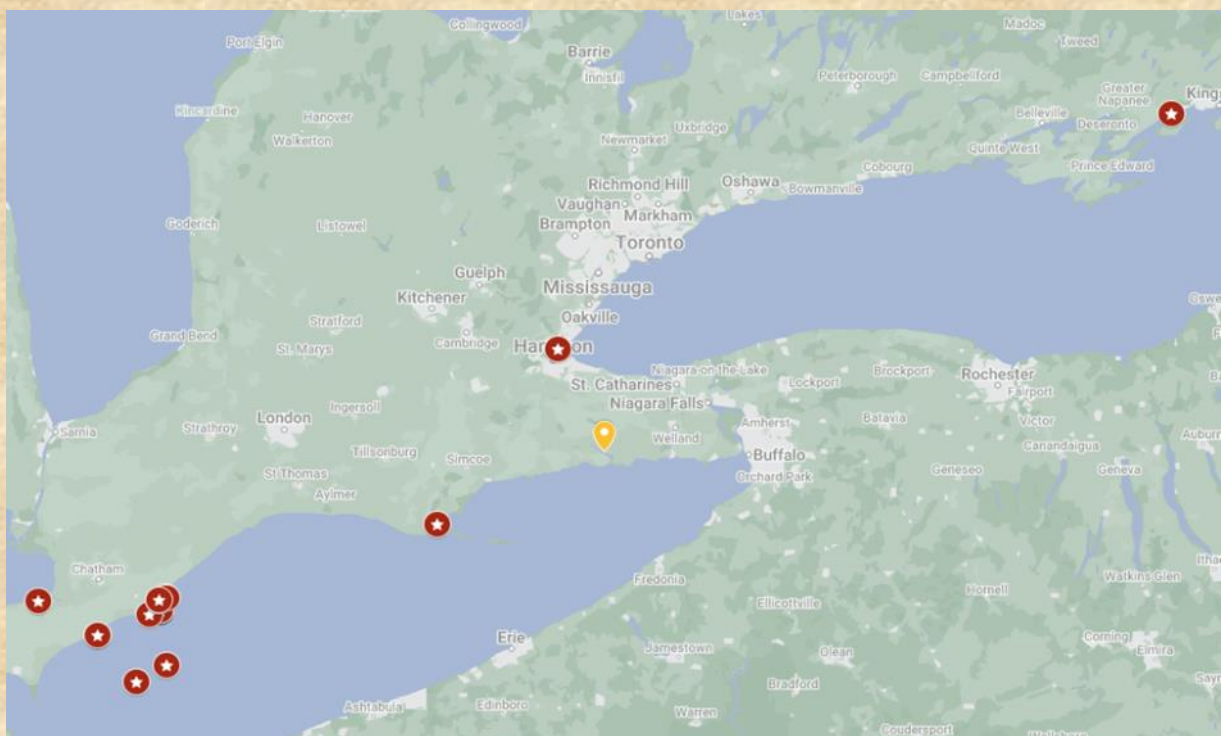
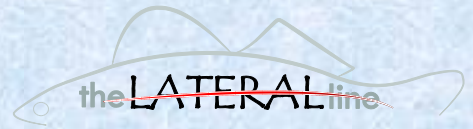


Figure 3. Map of Spotted Gar (*Lepisosteus oculatus*) collection localities in Canada. The new Grand River locality is indicated by an orange symbol.

New Books



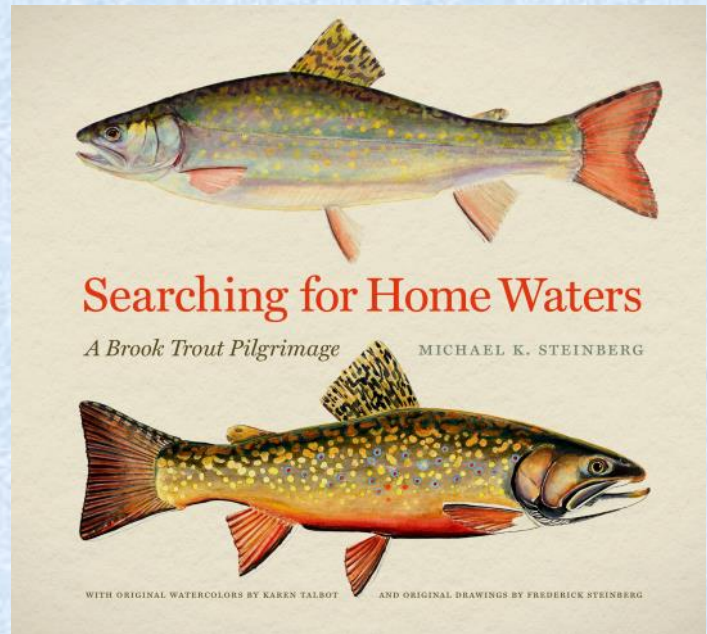
Searching for Home Waters: A Brook Trout Pilgrimage

By Michael K. Steinberg

Illustrated by Karen Talbot and Frederick Steinberg

Published by University of Georgia Press in June 2023

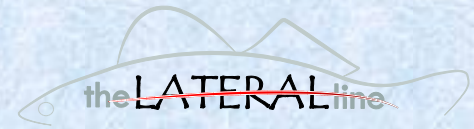
From the publisher's website: The brook trout (*Salvelinus fontinalis*) is an iconic species among fly anglers and cold-water conservationists in eastern North America. This fish registers as a powerful symbol for its beauty and its imagery in art and literature. Its presence also tells us a great deal about the health of the larger environment. When an angler has a brook trout in hand, there is confidence that the water is close to pristine. Besides being an important indicator species, the brook trout, with its gold and reddish markings and its camouflaged green and black back, is one of the most beautiful freshwater fish in North America. And beyond the beauty of the fish itself, the environment in which it is found is also part of its past and present appeal. To fish for brook trout is often to fish in the last remote and rugged landscapes in the East, "fishscapes" that have not been polluted by stocking trucks that dump nonnative brown and rainbow trout in most of the East's accessible cold waterways.



When an angler has a brook trout in hand, there is confidence that the water is close to pristine. Besides being an important indicator species, the brook trout, with its gold and reddish markings and its camouflaged green and black back, is one of the most beautiful freshwater fish in North America. And beyond the beauty of the fish itself, the environment in which it is found is also part of its past and present appeal. To fish for brook trout is often to fish in the last remote and rugged landscapes in the East, "fishscapes" that have not been polluted by stocking trucks that dump nonnative brown and rainbow trout in most of the East's accessible cold waterways.

Searching for Home Waters is part science, part environmental history, and part personal journey of the author, Michael K. Steinberg, and those he interviewed during his travels. The work takes a broad perspective that examines the status of brook trout in the eastern United States, employing a "landscape" approach. In other words, brook trout do not exist in a vacuum; they are impacted by logging, agriculture, fishing policies, suburban development, mining, air pollution, and climate change. Thus, while the book focuses specifically on the status and management of the brook trout—from Georgia to Labrador—it also tells the larger story of the status of the eastern environment. As a "pilgrimage," this book is also a journey of the heart and contains Steinberg's personal reflections on his relationship with the brook trout and its geography.

Available at <https://utpdistribution.com/9780820363622/searching-for-home-waters/> and the publisher was kind enough to create the code HOMEWATERS30 for 30% off the list price to use anytime in the next year!

Books — cont.**Walleye, the holy grail of game fish: on catching them, understanding their biology and history, and ensuring their survival**

By Paul J. Radomski

Published by University of Minnesota Press, 2022

\$24.95 paper ISBN 978-1-5179-1363-2

352 pages, 53 b&w photos, 15 color plates

From the publisher: Few know the walleye as well as Paul J. Radomski does—a fisheries biologist, lake ecology scientist, and old fisherman. In *Walleye: A Beautiful Fish of the Dark* he unspools the mysteries of this fascinating fish. From the simple pleasures of fishing for walleye to the most pressing questions about how this species survives, this book is the best word on this beautiful fish of the dark.

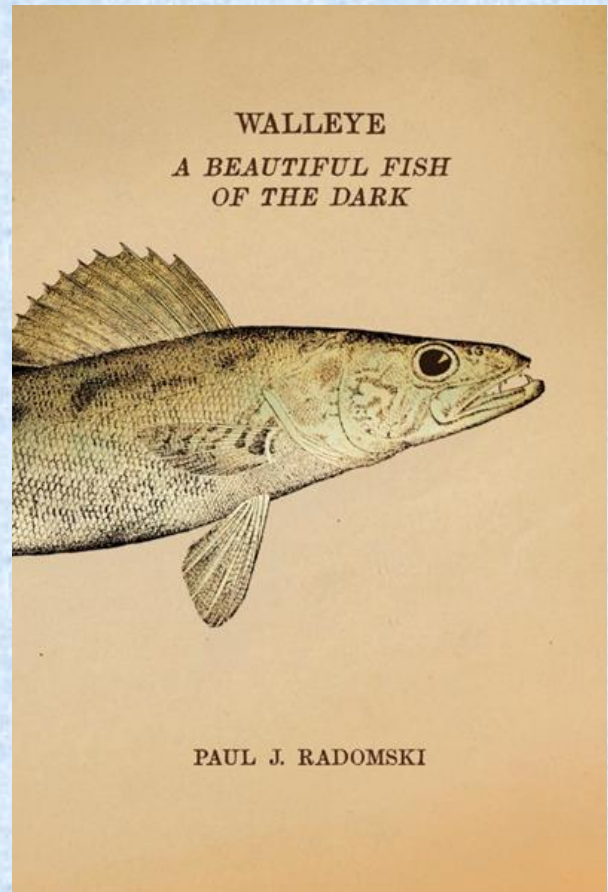
Among the more than 34,000 species of fish, few have the walleye's following—among anglers and diners, states conferring official status on the fish, and towns battling for recognition as the Walleye Capital of the World. And among those passionate fans, few know the walleye as well as Paul J.

Radomski does—a fisheries biologist, lake ecology scientist, and old fisherman. In *Walleye: A Beautiful Fish of the Dark* he unspools the mysteries of this fascinating fish.

Radomski looks at walleye from every angle, with something to say to the curious naturalist, committed ecologist, and avid fishing enthusiast. People who view walleye as the “lion of the lakes” might be surprised to learn that rivers are their ancestral habitat. Some might wonder about the name “wall-eye,” a nod to an evolutionary adaptation to dark water environments. Others might simply ask: why walleye? What are they, where do they exist, how do they survive, and how have people come to depend on them? Radomski discusses the principles and pitfalls of managing this predator of the twilight (and the history and methods of doing so) and shares his informed perspective on when and where stocking is prudent. Finally, he explores three of the best walleye lakes: Winnebago, the largest inland walleye fishery in Wisconsin, and Mille Lacs and Red Lake in Minnesota.

From the simple pleasures of fishing for walleye to the most pressing questions about how this species survives, this book is the best word on this beautiful fish of the dark.

Available at <https://www.upress.umn.edu/book-division/books/walleye>.



Wil Wegman Tribute

By Kate Gee and Eva Bobak

May 20th 2023 saw an outpouring of messages and memories as the fishing and conservation community mourned the loss of Wil Wegman. He was beloved as a mentor, a leader, a knowledgeable and avid conservationist but most of all as a genuine and kind person.

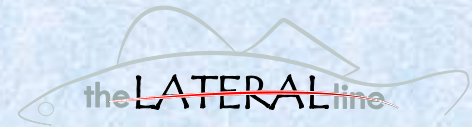
Wil was one of those people that brought others together, always willing to share his knowledge and his passion with everyone—whether they just met or were an old friend. His love for the outdoors was infectious and led to his over 30 year career with the Ministry of Natural Resources and Forestry leading conservation and outreach programs including the Lake Simcoe muskie restoration project, wild rice restoration and fishing initiatives aimed at families and children. His passion for fish was not restricted to his profession, Wil was just as dedicated to fishing recreationally and competitively and found great success at both, co-founding the Aurora Bassmasters and traveling around the globe to fish with his sons.



Wil dedicated a lot of his time and energy, both professional and personal, to Lake Simcoe. He understood the fish communities and their complexities, but also the entire lake ecosystem, spearheading many restoration and conservation programs throughout the watershed. This drive to make his home better was tireless and he taught and inspired many other to do the same and to continue the work that he started.

The loss of Wil is the loss of a true legend on the water.

Book Review



By Ross Claytor

Swamplands: Tundra Beavers, Quaking Bogs, and the Improbable World of Peat. By Edward Struzik. 2021. Island Press. 312 pages, 39.95 CAD, Hardcover, 33.95 CAD, Paper, 29.99 CAD, E-book.

Reproduced under the [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/). This review was originally published as: Claytor, R. 2023. "Swamplands: Tundra Beavers, Quaking Bogs, and the Improbable World of Peat" by Edward Struzik, 2021 [book review]. *The Canadian Field Naturalist* 136(4):382-383. DOI: <https://doi.org/10.22621/cfn.v136i4.3225>

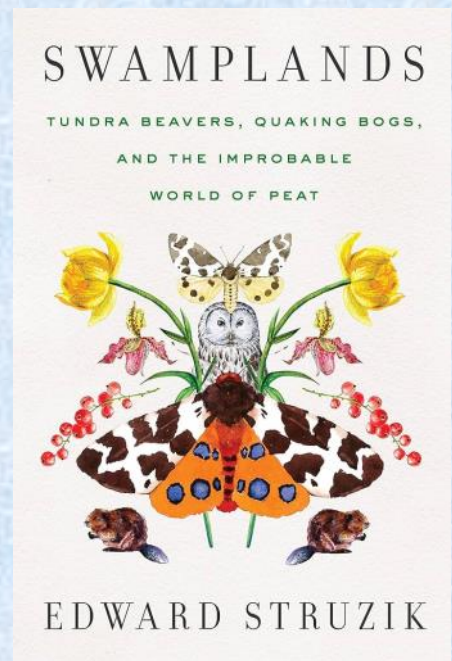
Swamplands focusses on the preservation and restoration of peatlands (swamps, bogs, and fens) in Canada and the United States. Throughout the book, Struzik relies on current research and interviews with active researchers to emphasize that peatlands are globally the most important ecosystem for storing carbon and controlling the effects of climate change. The book will be appreciated by all those readers looking for a comprehensive introduction to these essential and diverse ecosystems.

Each *Swamplands* chapter begins with a short story about an individual researcher followed by the ecological history and current state of preservation or restoration taking place at a particular location. Struzik's conversational writing style effectively brings uninitiated readers into the story. Each chapter stands alone, summarizing the subject with enough depth to leave the reader informed but not overwhelmed, and providing a set of Notes at the back of the book for those wishing to explore topics in more detail. However, reading the book in sequence leads to an improved understanding of the context and challenges facing peatland

reclamation and preservation.

The first two chapters set the historical context by contrasting two views of North American swamplands that began with early European settlers and persist today. One perspective views peatland as not only worthless but also a danger to public health. The other, more closely aligned with those of Indigenous people who adapted to peatlands rather than subdued them, is exemplified by Henry David Thoreau—"without wetland the world would fall apart" (p. 60)—and the ironically named George Perkins Marsh, who supported considerations of peatland preservation and restoration during development in the latter half of the 19th century and urged all to become a "co-worker with nature" (p. 60).

Struzik devotes four chapters to the American perspective on species restoration. He looks at North Carolina's swamplands, the preservation of Hawaii's tropical peatlands, peaty wetlands formed around ponds in Mojave Desert oases, and western Alaskan tundra peatlands. Canadian perspectives on preservation issues are described in five chapters, which include discussions of the small Wagner



Fen in Alberta, Ontario's Georgian Bay peatlands, Alberta's Crowsnest Pass peatlands, the Hudson Bay Lowlands, and ending in High Arctic peatlands.

Each chapter explores the following points about peatland ecological value, preservation, and restoration:

1. Peatlands are evolutionary petri dishes and often contain endemic species and rich species assemblages (e.g., over 2000 arthropods and 16 of the 26 orchid species native to Alberta are in Wagner Fen, Alberta).
2. They have unique habitats that are critical to individual species. Larval development of rare Aweme Borer (a small brown moth) depends on Buckbean, which only grows in peatland sedge mats. Rattlesnakes use peat for overwintering in Georgian Bay. The Hudson Bay Lowlands serve as breeding

Book Review — *cont.*

grounds for migratory birds (e.g., Hudsonian Godwit), and peaty hillsides provide dens for Polar Bears. As an aside, each of these species has been recently assessed by The Committee on the Status of Endangered Wildlife in Canada (COSEWIC; Government of Canada 2022).

3. Restoration and preservation projects depend on the efforts of dedicated individuals within governments, citizen scientists, local volunteer groups, and non-governmental organizations (NGOs) like The Nature Conservancy, which has made preservation purchases of several peatland sites in Canada and the United States.

4. Restoration and preservation projects commonly encounter conflicting objectives among user groups, such as deer hunters fearing that Red Wolf restoration will threaten local deer populations in North Carolina's Albemarle-Pamlico Peninsula wetlands.

The final two chapters of *Swamplands* focus on whole ecosystem restoration of peatlands extracted for resource use and the increasingly precarious areas of warming permafrost that are poised to release large amounts of stored carbon and encourage, rather than mitigate, climate change effects.

Line Rochefort, a scientist at Université Laval, has worked on the restoration of more than 100 peatlands, including work with a company that extracts peat for horticultural products in Saint-Fabien, Quebec. Rochefort's restoration technique depends on the presence of an intact

foundation that can be conditioned so that reintroduced sphagnum and brown mosses will promote peat growth. Thus far, restoration of early succession plants has been successful, but restoring the later successional plants requires additional time and work.

The area affected by Alberta's oil sand peatland extraction is much larger than the Saint-Fabien peatland and the production process has not left an intact reclamation foundation. Efforts to restore oil sand peatland have been unsuccessful.

Struzik also provides a comprehensive review of projects directed at reversing or stalling the destruction of peatland from warming permafrost. The mixture of approaches and the intense debates over unintended consequences are summed up by Rebecca Rooney, an aquatic ecologist at the University of Waterloo:

if this continues without a clear wetland reclamation policy, we will have more than 65 percent less peatland and very little of the plant and animal life that existed there in the past. (p. 246)

Struzik describes the wide variety of environments in which peatlands exist and the large number of diverse projects proposed for their preservation, reclamation, and use. *Swamplands* closes by emphasizing the importance of developing an objective and consistent framework for evaluating the relative costs and benefits of pursuing one peatland restoration project over another. Large-scale comparative exper-

iments, like Spruce and Peatland Responses Under Changing Environments (SPRUCE) managed by the U.S. Forest Service in Minnesota, will be essential for quantifying the costs of restoration, the value of ecosystem functions (e.g., storing carbon, filtering water, mitigating floods, and creating animal refuges), and the economic benefits of resource extraction over a range of environmental conditions.

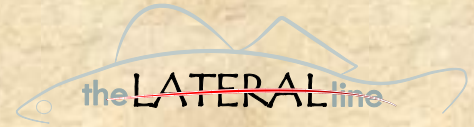
Swamplands reminds us that each new energy source—peat, coal, and oil—was promoted as essential in its time. The book documents the environmental scars and cumulative effects that remain while we search for new energy sources. Most importantly, *Swamplands* contributes to discussions on how to create a sustainable future and avoid repeating past errors. Whether at home or the library, this book belongs on an accessible shelf next to Aldo Leopold's *A Sand County Almanac* (Oxford University Press, 1949) and Rachel Carson's *Silent Spring* (Houghton Mifflin, 1962). You will be referring to all three soon.

Literature Cited

Government of Canada. 2022. Species at risk public registry. Government of Canada, Ottawa, Ontario, Canada. Accessed 19 October 2022. <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>.

Ross Claytor
Ketch Harbour, NS, Canada

From the Field



Pictures by Siobhan Ewert



Fish Focus: **BRASSY MINNOW** (*Hybognathus hankinsoni*)

By Siobhan Ewert



Hybognathus: hybos = hump; gnathus = one having a jaw, referring to the slight bump that is sometimes seen on the front of the lower jaw

Hankinsoni: named after a professor of Zoology at Michigan State Normal School, Thomas Hankinson.

Features: The Brassy Minnow has a small crescent-shaped mouth with a slightly overhanging snout. It has large scales and a complete lateral line. The most distinct feature is the deep groove that is towards the end of the upper jaw, sloping diagonally forward. .

Similar Species: Caution is recommended when identifying many fish within the Leuciscidae family, especially those that have a brassy-type colouration—of which there are many!

The Brassy Minnow is a type of minnow that is often misidentified with other brassy-coloured minnows (such as the Fathead Minnow, which is compared in the photo to the right).

Diet: They feed in large schools on benthic invertebrates, crustaceans, and algae.

Reproduction: Brassy Minnows congregate in large groups in shallow marshy areas from May-July when water temperatures reach 16-17°C. A female can lay up to 2,500 eggs, which are released on vegetation and along the river/lake bottom. They spawn once a year, can live for 3-5 years, and are usually sexually mature around 1 to 2 years of age.

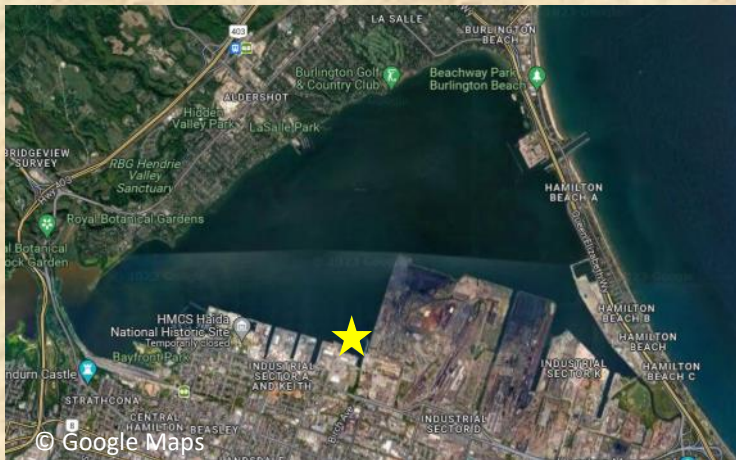
Habitat: The Brassy Minnow prefers cool, slow moving streams and lakes and is found in a variety of sediment types, but preference is given to waterbodies with silt, sand, and gravel.



“On the Hook!”



Hamilton Harbour Randle Reef rehabilitation underway: <https://globalnews.ca/news/9942974/third-and-final-stage-hamilton-harbour-randle-reef-restoration/>



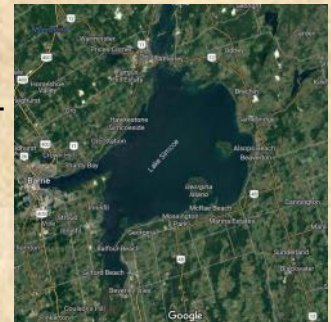
Check out Biinaagami’s interactive guide to the Great Lakes/St Lawrence watershed, including water quality and flowlines: <https://www.biinaagami.org/map>



NOAA habitat scientist Chris Jordan talks about the current science, fallacies of past approaches and some hard truths about stream restoration: <https://podcasts.apple.com/us/podcast/were-fixing-trout-streams-all-wrong-with-chris-jordan/>

\$1.3 million in funding to reduce phosphorus in Lake Simcoe:

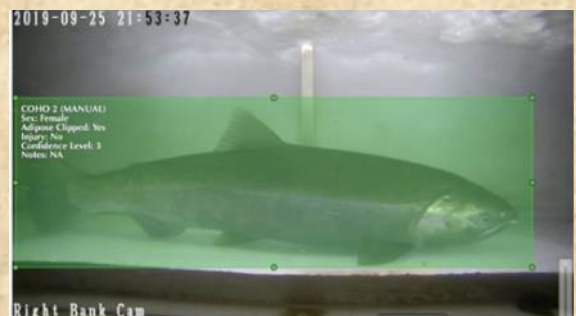
<https://news.ontario.ca/en/release/1003789/ontario-supporting-local-projects-to-protect-lake-simcoe>



© Google Maps



Watersheds Canada has a Freshwater Stewardship Community with monthly webinars: <https://www.youtube.com/playlist?list=PLn7t96YFncXjEWnaFSPJ9fSjPXJ0K1Z-Y>



Combining artificial intelligence with fishing weir technology: <https://wildsalmoncenter.org/2023/10/18/artificial-intelligence-meet-indigenous-fishing-technology/>