



Biolink

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2023 Spring Seminar on Geospatial Techniques



On April 25th our members gathered in Sackville, New Brunswick, for our annual Spring Seminar. This year's theme was geospatial techniques. This field has evolved over the past 20 years, but significant leaps in application have been made in recent years thanks to LiDAR imagery, drones, and other emerging techniques.

We heard talks from a range of presenters. Kristin Elton from the New Brunswick Invasive Species Council introduced everyone to the new app, "IMAP" for reporting invasive species. It is a citizen science project that hopes to improve and increase our knowledge of invasive species occurrence across the province. John Carr from the Atlantic Salmon Federation, updated us on the Telemetry Program that is underway in natal salmon river systems. Mike Parker from East Coast Aquatics, showed everyone how geospatial data is used to track wood turtles and map their habitats in Nova Scotia. Michael Arsenault from the Wolastoq Nation of New Brunswick went over how to employ geospatial techniques to assess fish passage across the stream network. Abby Lewis from Mersey Tobetic Research Institute gave an overview of the Working Woodlands Trust Private Land Prioritization Tool. Courtney Baldo and Jason Airst rounded out our presentations with a talk on using Survey123 and Remote Sensing for Species at Risk Population Assessments.

Thanks to all who made this event happen and to all those who attended!

We are pleased to announce that our 60th Annual General Meeting will be held in Newfoundland this fall!

Thank you to Dr. Christine Campbell and team for hosting this event

More details soon — Stay tuned!

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The Newsletter is published twice a year. Articles and opinions do not necessarily reflect the views of the Society or its members. Do you have a research project, wildlife topic, upcoming event, photo, story, or anything else that you would like to see included in Biolink? If so, our newsletter editors! We are always looking for content ideas and photos from our membership!

Thank you to all who contributed to this issue!



Atlantic Society of Fish and Wildlife Biologists



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ASFWB Fish and Wildlife Research Grant

The ASFWB Fish and Wildlife Research Grant was established in the fall of 1994 to assist members who are conducting or supervising wildlife or fisheries research in Atlantic Canada. The grant provides funding up to **\$500 annually for research projects**. Any aspect of fish and wildlife research will be considered, but projects with applied management goals will receive priority. Applicants must be members of the ASFWB. Projects that are largely government sponsored or funded are not eligible for this award.

Applications are OPEN until March 30 of each year.

For more information or **TO APPLY**, visit: <http://asfwb.ca/the-asfwb-wall-of-fame/asfwb-fish-wildlife-research-grant/>

Supporting Students in Atlantic Canada

ASFWB members have always been committed to helping advance the careers of Atlantic Canadian students in the field of biology. To this end, ASFWB has been integral in setting up scholarships that directly support top biology students at three universities in Atlantic Canada.

The David J. Cartwright Memorial Scholarship was established in 1991 at the University of New Brunswick, to honour David J. Cartwright who was a member and strong supporter of the ASFWB for many years and contributed to wildlife management in Atlantic Canada. The Cartwright scholarship is for students entering the final year of Forestry (Wildlife Option) or Science (Biology Option). The Donald G. Dodds Scholarship was established in 2010 at Acadia University with preference for graduate students in the Biology Department, though honours and undergraduate students are considered. Potential candidates for all scholarships should have combined scholastic ability with a demonstrated interest in biology and/or wildlife management. Disbursement is approximately \$1000/year.

Funds continue to be raised for the Gilbert R. Clements Scholarship at Holland College for graduating students entering the University of Prince Edward Island Wildlife Conservation Program. If you would like to support our students, consider making a donation – contact Holland College today!

Become an ASFWB Member

Regular Membership: \$20/year

Student Membership: FREE!

To renew or become a new member, visit www.asfwb.ca or contact our Treasurer, Ed Torenvliet (ed.torenvliet@gnb.ca) for other payment options.

Your membership supports:

- Hosting the Annual General Meeting,
- Disbursement of the ASFWB Research Grant,
- Scholarship Contributions

ACAP Saint John: Community-based monitoring in the Saint John Harbour

By: Roxanne MacKinnon



ACAP
SAINT JOHN

ACAP Saint John is a community-based, non-profit organization that encourages communication, partnership, and active involvement from all sectors of the Saint John community in managing our local environment. The Saint John Harbour is located at the mouth of the Wolastoq (St. John River) in New Brunswick. This is a dynamic area with a tidal influence of 8 meters and a number of human influences including an ever growing industrial and shipping demand, freshwater inputs, and other changing natural conditions. Since 1992, we have worked with many organizations, researchers, and our community to inspire environmental change and conserve our coastal and freshwater habitats.

Below we have highlighted one of our great projects!

To build on our existing datasets, we spent the past four years collecting baseline fish community data through the Coastal Environmental Baseline Monitoring Program. Understanding what baseline conditions are currently in the harbour and surrounding area gives us a snapshot in time of the current state of the environment that can be used as a reference point in the future. It also allows us to better understand what is taking place ecologically in an industrial port such as Saint John Harbour.

Through this project we were able to fish, and get stuck in the mud, at eight sites throughout the harbour. Over the four years we managed to collect a total of 41,715 fish and invertebrates, representing 38 species, in beach seines and fyke nets across the sites. Fishing took place once a month between May and October starting in 2019. Total catch varied between sites with Spar Cove recording the greatest total catch (13,423 individuals), while Little River had the lowest total catch of 451 individuals. Our top three most frequently caught species were Sand Shrimp (*Crangon septemspinosa*), Atlantic Silverside (*Menidia menidia*),



Photo by ACAP Saint John. Striped Bass caught in a fyke net in Courtenay Bay.

and Threespine stickleback (*Gasterosteus aculeatus*). Going forward, this dataset will provide valuable comparative data for us and many other organizations and stakeholders to track changes in the Saint John Harbour.

ACAP Saint John is hiring a Forest Technician! If you or someone you know is looking for a job with a super cool organization, apply at [Employment Opportunity - Forestry Technician — ACAP Saint John \(acapsj.org\)](https://www.acapsj.org/employment-opportunity-forestry-technician) !



 ACAP Saint John

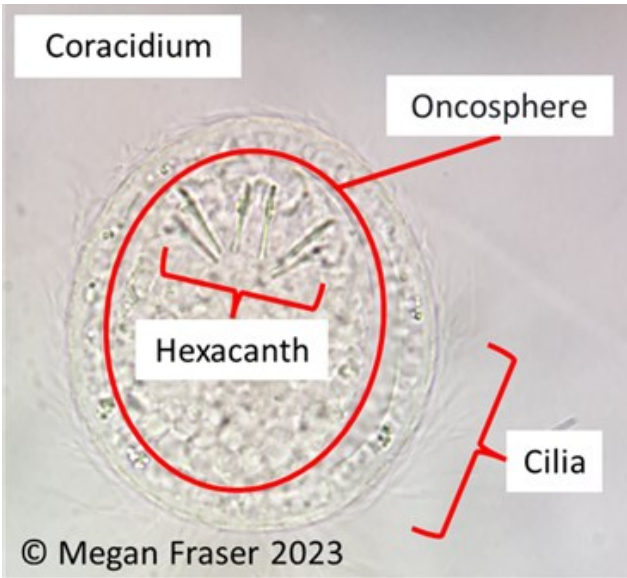
 @acapsj

 www.acapsj.org

First Report of *Ligula intestinalis* Tapeworm in New Brunswick Fish: How Recreational Fishermen Can Become Citizen Scientists!

By: Megan Fraser

Parasitism is a symbiotic relationship between two organisms; the parasite lives on or inside of its host organism and survives at the expense of the host. Cestodes, also known as tapeworms, are one class of parasitic flatworms. Tapeworms can have a variety of impacts on their host, such as robbing nutrients, altering behavior, or impacting fertility. Parasitic worm infections are common in fish of both marine and freshwater environments, and an estimated 30,000 species of parasitic worms infect fish worldwide (Jyrwa *et al.* 2016).



The cestode *Ligula intestinalis* was recently discovered in New Brunswick for the first time, infecting a southern population of Blacknose dace (Fraser *et al.* in press). *Ligula intestinalis* reproduces in the intestine of a piscivorous bird, and its eggs fall into a body of freshwater with the bird's feces. The eggs hatch and free-swimming ciliated larvae known as "coracidia" (singular "coracidium") emerge, and emerge, which are eaten by freshwater copepods. Inside a copepod the coracidia release their inner "oncospheres", each with a six-hookletted hexacanth structure to claw through the intestine and enter the haemocoel. Here, the larvae develop into the "procercoid" stage. Infected copepods are eaten by planktivorous fish; the parasite larvae move into the fish's abdominal cavity and develop into juvenile tapeworms called "plerocercoids". Infected fish are eaten by birds, and the life cycle repeats. *Ligula intestinalis* is typically found in dace, shiner, minnow, chub, and sucker, but percids and salmonids may also be infected. This tapeworm is of interest due to the parasitic castration effect that it has on its fish host. *Ligula*

intestinalis may pose a threat to freshwater fish populations, especially those facing additional barriers to reproduction. The disease caused by *Ligula intestinalis* infection in fish is known as "Ligulosis".

We aim to determine geographic range and alternate permissive hosts of this parasite across New Brunswick by surveying lakes using lethal and non-lethal diagnostic techniques. A "citizen science" initiative has also been launched to collect specimens from recreational fishermen, who often find tapeworms while gutting their catch. This is a fantastic opportunity to retrieve specimens from additional locations! Infected fish may present with swollen abdomens and/or tapeworms erupting from the vent. Infected fish may also exhibit abnormal surfacing behavior or persist closer to shore. These tapeworms are often visible upon opening the abdomen of the fish due to the large parasite size and are typically found wrapped around the internal organs. *Ligula intestinalis* plerocercoids are white and smooth, lacking external segmentation. If you find a tapeworm in your catch that you believe may be *Ligula intestinalis*, please save the specimen (frozen in a Ziploc bag) and contact Megan Fraser (email: mfrase12@unb.ca) to coordinate collection. Please see the attached poster (pg 15) for more information.



Acknowledgements: Ben Andrews, Sarah Van De Reep, Dr. Michelle Gray, Dr. Michael Duffy, Dr. Shawn MacLellan, Kerstyn Dobbs, Hannah Lazaris-Decken, Nathanael Moore, Stephanie Scott, Tyler Lynn, Becky Graham, Sara Plant, Allain Cassie, John Robinson.

Working with Nova Scotia's Mi'kmaq people to better understand our shared impact on moose

By: Jason Airst¹, Jenna Priest¹, Clifford Paul², Anthony King³, Alison Bernard⁴, and Jason Power¹

¹ Nova Scotia Natural Resources and Renewables

² Unama'ki Institute of Natural Resources

³ Confederacy of Mainland Mi'kmaq

⁴ Kwilmu'kw Maw-klusuaqn



Moose are an important species in Nova Scotia that is collaboratively managed by both the Nova Scotia government and Mi'kmaq people. However, one of the greatest challenges with managing this species is trying to determine the impact of First Nations harvest. To address this question the Nova Scotia Department of Natural Resources and Renewables, the Unama'ki Institute of Natural Resources, Kwilmu'kw Maw-klusuaqn (the Mi'kmaq Rights Initiative), and the Confederacy of Mainland Mi'kmaq partnered to run a voluntary moose check station in Cape Breton. The project ran from September to October each year from 2019 to present. The check station was staffed by government and a Mi'kmaq representative each day and all project materials were printed in English and Mi'kmaq. Our other goal was to improve communication and trust between

the Nova Scotia government and Mi'kmaq communities.

The project involved hunters voluntarily filling out survey forms and submitting tissue samples. Since 2019 we have collected 237 surveys and 379 tissues samples (Table 1). Of the 319 moose organs voluntarily submitted from 2019 to 2021, 40 showed signs of parasites. A subset of those organs suspected of parasites were submitted to the University of Saskatchewan and came back positive for *Echinococcus canadensis* (Priest et al., 2021), the first record of this a zoonotic tapeworm in any of the three maritime provinces.

Overall, the project has successfully improved communication between the government and our Mi'kmaq partners and has allowed us to collect significant amounts of important biological samples. It also represented a rare opportunity for wildlife managers to better understand the impacts of First Nations harvest and allowed for a more transparent sharing of information between our groups. It has also generated positive feedback from both Indigenous and non-Indigenous communities.

Finally, this work shows that First Nations and government can work together to overcome challenges and develop a stronger relationship.

Year	# Surveys	# Tissues Sampled
2019	61	101
2020	70	116
2021	70	102
2022	36	50



For more information about the Cape Breton Moose Check Station, please contact Jenna Priest or Jason Power at wildlife@novascotia.ca

Ducks Unlimited Canada Acadia University Student Chapter

By: Mark Maddox, Acadia University

Ducks Unlimited Canada (DUC) carries out the mission to conserve, restore and manage wetlands and associated habitats for the benefit of North America's waterfowl, other wildlife, and people. DUC works towards engaging and connecting youth with wetlands, including a recent initiative in forming the first DUC Youth Advisory Council. Since 2021, this youth advisory council has been providing insight and recommendations regarding conservation and engagement strategies on how the organization can better connect to youth. One of many recommendations this council has provided DUC is to expand on support for college and university student clubs. We (the DUC Youth Advisory Council, on behalf of our age group) would like to see more environmental/wetland focused student-led clubs facilitate hands-on wetland related experiences, tackle conservation projects, and provide access to wetlands for youth who may not have otherwise had the opportunity.



Picture: The entire Ducks Unlimited Canada Youth Advisory Council joining for an in-person Innovation in conservation training program in Manitoba

Acadia University has approved of a Ducks Unlimited Canada Acadia University Student Chapter. Myself (Mark Maddox, Acadia University graduate student) and other Acadia students will be spearheading this wetland oriented student-led club over the 2023-2024 academic year. We are interested in establishing a duck nest box program, hosting training workshops, getting outdoors, and inspiring other students and the community to gain a mutual connection with wetlands. With the many partnerships DUC has with Acadia University through research projects and the establishment of the Beaubassin Research Station in Aulac, New Brunswick, we believe this is a great academic institution to further support DUC's mission. Additionally, DUC have restored, protected, and currently manage many wetlands within proximity to Acadia such as Belleisle Marsh, Sheffield Mills Marsh and Miner's Marsh across the Annapolis Valley where we can have students participate in experiential learning opportunities.

Ducks Unlimited Canada, along with the DUC Youth Advisory Council are working towards developing support for college and university student-led clubs, including Acadia University. The DUC Acadia University Student Chapter will be the first of its kind in Atlantic Canada.

If you are a part of an academic institution and interested in starting your own student chapter or would like to partner with the DUC Acadia University Student Chapter in some capacity, please feel free to reach out (markmaddox@acadiau.ca).

Recent Literature

Heading to the field and need some reading material? Keep up to date with fish and wildlife research publications from Atlantic Canada and beyond. Click on, or paste the DOI provided into your internet browser.

Adamo, S.A., A. El Nabbout, L.V., Ferguson, J.S., Zbarsky and N. Faraone. (2022). Balsam fir (*Abies balsamea*) needles and their essential oil kill overwintering ticks (*Ixodes scapularis*) at cold temperatures. Scientific Reports 12, 12999. <https://doi.org/10.1038/s41598-022-15164-z>

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Humpback Whale ©Joey Boucree, 2023

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Coyote © Joshua Ekrut ,2023

Recent Literature *(continued)*

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Hydnum atlanticum, © Alex Hood, 2022

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Arctic Tern © Stáňa Wolfová , 2022

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Tapeworms Infecting Fishes of New Brunswick Lakes



Ligula intestinalis (>26 cm) found free in a net after release through the vent of a fish host

Fish are hosts to a variety of parasites; parasitism is a natural part of most ecosystems. However, environmental changes may create conditions that are more suitable for some parasites, leading to "emergence" of parasites in places not recorded before. Tapeworms previously undocumented in New Brunswick have been discovered in small-bodied fishes. Host fishes include Blacknose dace, and various minnows, dace, suckers, and shiners. Tapeworms are found in the abdomen, and may escape from the vent of the fish.

Common Signs of Infection:

- Swollen abdomen of fish with thin stretched skin
- Tapeworm rupturing through fish abdomen or vent
- Slow swimming fish with abnormal surfacing behavior
- Free-floating tapeworms observed after fish handling (i.e., in a minnow bucket or after netting a fish)



Blacknose dace with a swollen abdomen suggestive of infection

We Need Your Help!

- If you encounter small-bodied fish with abnormally swollen abdomens, or if you find this tapeworm erupting from a fish:
- **Please**
 - Record **date of observation**
 - Record **lake/river name & location**
 - Take a **picture of the fish host and tapeworm**
 - Retrieve **tapeworm, place it in a Ziplock bag, freeze it or add 70% ethyl or isopropyl alcohol**
 - Contact Megan Fraser (mfrase12@unb.ca) to coordinate specimen pick-up



Ligula intestinalis erupting from the vent of a Blacknose dace



Host fish: Blacknose dace
(*Rhinichthys atratulus*)
Tapeworm: *Ligula intestinalis*

Ligula intestinalis **DOES NOT** infect or cause harm to humans. Regardless, always clean and cook wild caught fish thoroughly.

For more information please contact:

mfrase12@unb.ca or mduffy@unb.ca

Never transport live fish from one location to another without a permit. Parasites are moved with the fish that you transport and can have unfortunate consequences for other fish communities.

Have a research project, article, or photo you want to share in the Fall issue?
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