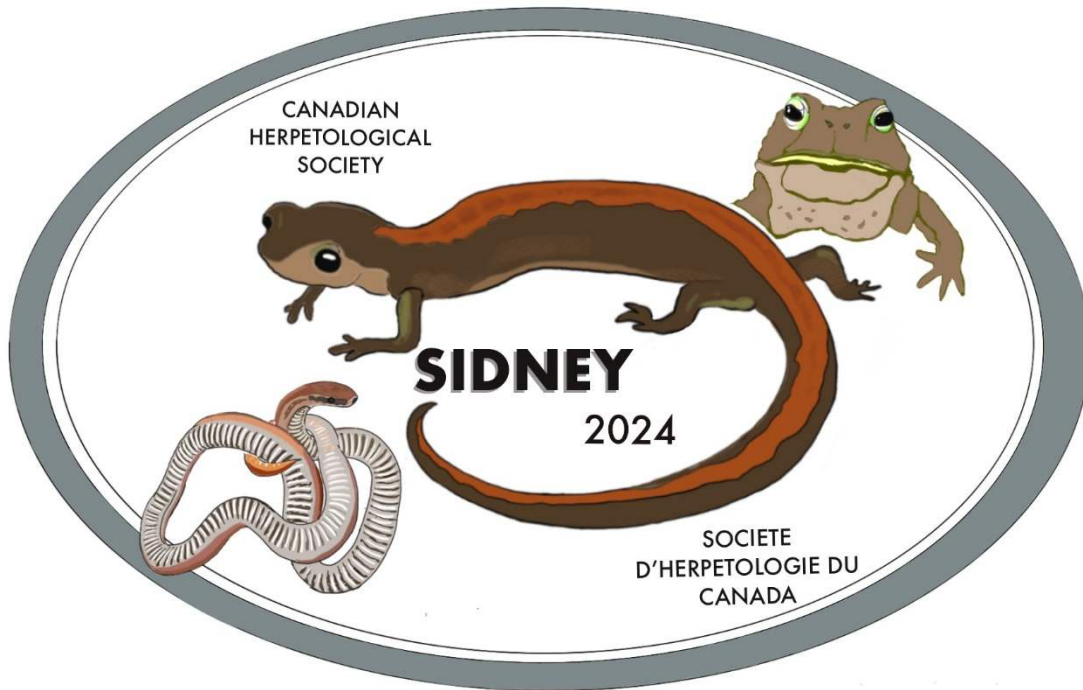


CHS / SHC Sidney 2024

***12th Annual Meeting of the
Canadian Herpetological Society***

***12^{ème} Congrès Annuel de la
Société d'Herpétologie du Canada***



**Sidney, British Columbia, Canada
September 20-23, 2024**

CHS / SHC Sidney 2024

Thank you/Merci to all our Sponsors!

Gold



Silver



Bronze



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Thanks to Donors

Thank you to the silent auction and book raffle donors: Alexander's Coffee, Andrea Gielens, Butchart Gardens, Char Corkran, Fickle Fig, Fish on Fifth, Kris Kendell, Kyle Horner, Leslie Anthony, Royal BC Museum, Thai Corner, Toadally Restored, Victoria Butterfly Gardens, Wildlife Preservation Canada, and others.



The Vancouver Aquarium has offered conference attendees discounted (\$25) admission tickets. The Greater Vancouver Zoo is also offering 50% off admission for conference attendees. Show your CHS conference name tag at the time of ticket purchase. Alexander's Coffee has provided attendees with a \$5 gift voucher. Almost \$400 was donated by private donors.

Brandon University and Pamela Rutherford for in-kind tech contributions.

All the CHS members, CHS Board of Directors, CHS Committee members, attendees, venue staff, catering staff, master of ceremony, field trip leaders, LOC members and volunteers, the student award competition judges, session chairs, and all those who helped make the conference a success.

CHS / SHC Sidney 2024

Welcome!

On behalf of the CHS Meetings and Workshops Committee and the Local Organizing Committee (LOC), welcome to the city of Sidney, British Columbia, for the 12th Annual Meeting of the Canadian Herpetological Society/Société d'Herpétologie du Canada. The Town of Sidney is located within the traditional and unceded territory of the W̱SÁNEĆ People whose nations include the Tseycum, Pauquachin, Tsawout, Tsartlip and Malahat Nations. The W̱SÁNEĆ People have stewarded the lands of the Saanich peninsula since time immemorial and continue to maintain strong connections and presence to this day. Those interested in learning more about W̱SÁNEĆ culture can find a range of resources available through the W̱SÁNEĆ Leadership Council. This year's meeting continues a long-standing tradition of annual meetings to promote research and conservation of amphibians and reptiles in Canada. We are excited to host everyone either virtually or in-person in Sidney. This conference will be conducted in English. Our logo reflects the region's herpetofauna by featuring the Western Red-backed Salamander, Western Toad, and Common Sharp-tailed Snake.

CHS Conference Organizing Committee

- Purnima Govindarajulu (Co-Chair, Local Organizing Committee)
- Leigh Anne Isaac (Co-Chair, Local Organizing Committee)
- Jolene Laverty (President, Canadian Herpetological Society)
- Amanda Bennett (Vice President, Canadian Herpetological Society)
- Hannah McCurdy-Adams (Co-Chair, Meetings and Workshop Committee)
- Pamela Rutherford (Co-Chair, Meetings and Workshop Committee; Past President, Canadian Herpetological Society)
- Allison Bogisich
- Nick Cairns
- Joe Crowley
- Rachel Fallas
- Jessica Harvey
- Michelle Hill
- Chloe Howarth
- Briar Hunter
- Justine Keating
- Claudia Lacroix
- Leslie Anthony Lowcock
- Roger Magoon
- Brent Matsuda
- Kendra Morgan
- Sacha O'Regan
- Kristiina Ovaska
- Krysia Tuttle
- Emily Upham-Mills
- Jordan Vos
- Megan Winand
- Elke Wind

2024 Logo Design: Asta Kovanen

T-Shirts: Printed by Big Magic Design



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Mary Winspear Centre, Sidney

Our conference venue is Mary Winspear Centre (2243 Beacon Ave, Sidney, BC V8L 1W9). The Mary Winspear Centre will be our main hub for the conference hosting every event excluding the Friday Social and the Field Trips.

The Friday workshop will be held in Activity Room 2 at the Mary Winspear Centre. Saturday and Sunday registration and breaks will be held in the Bodine Family Hall. The welcome, opening address, and keynote talks will be held in the Charlie White Theatre. The concurrent sessions will be held in the Charlie White Theatre and Activity Room 2. On Saturday, the poster session and banquet will be in the Bodine Family Hall.

Travel to/from Mary Winspear Centre

The Mary Winspear Centre is located in the heart of Sidney and in walking distance to accommodations and restaurants. The Centre is 10 minutes by vehicle from both the BC Ferries from the mainland, and the Victoria International Airport. There is free parking at the Centre on a first come first serve basis.

The Centre is also accessible via **public transit**. Visit <https://www.bctransit.com/victoria/schedules-and-maps/> for more information on public transit routes and fares, and to plan your trip.

The Mary Winspear Centre site **map** is available on the last page of this program.

Free Internet (Wifi) access:

Select the following network: MaryWinspear

Password: CharlieWhite@2024*

Washrooms

- Large washroom facilities are located by the south exit of the building across from Activity Room 2.
- Small washrooms are located between the reception desk and the theatre lobby.
- A private, accessible, gender neutral, washroom is located beside Activity Room 3 in the south/east corner of the gallery.

In case of an Emergency or alarms

- Muster station is located in the parking lot away from the building. If you can't safely get to the parking lot the
- Second muster station is the Sidney By the Sea sign by the highway.
- Theatre exits are located on both stage left and stage right. Use the exit closest to you if it is safe to do so.
- AED is located in the lobby beside the bar near the backstage door.

CHS / SHC Sidney 2024

Meals

Light refreshments will be provided during morning and afternoon breaks in the Bodine Family Hall. **Conference attendees are responsible for bringing or purchasing their own lunches.** A variety of options are available near the Centre:

- Thrifty's (7am -10pm) and Subway (8am-10pm) = one block north east on 7th St.
- Five and Dime Diner (8am-3pm), Tim Hortons (5am-11pm), and Save-On-Foods (7am-10pm) = one block east of the Centre
- Alexander's Coffee (7am-3pmM-F;8am-3pmSat; *Closed*Sun.) = one block east on Beacon Ave.
- Starbucks (7am-5pm) = in Save-On-Foods one block east; four blocks east at Beacon Ave. and 4th St.
- Fish on Fifth (11am-8pm) = three blocks east on Fifth St. north of Beacon Ave.
- Thai Corner Restaurant (1130am-8pm) = two blocks east on Beacon Ave.
- Fresh Tandoori Flavour Indian Restaurant (11am-3pm; 4-9pm) = three blocks east on beacon Ave.
- Taste of Tokyo (4:30-830pm) = two blocks east on Resthaven Dr. north of Beacon Ave.
- The Charles Dickens Pub (1130am-1am) = across the street in the Days Inn on Beacon Ave.

Visit: <https://www.sidneybia.ca/eat-and-drink/>

Health and Safety

It is recommended, but not required, that attendees wear masks. We will provide optional masks at the registration desk. This is especially important if:

- You had symptoms of a communicable disease 5-10 days before the meeting.
- You were exposed to someone with a communicable disease within the 10 days prior to the meeting.
- If you have concerns about communicable diseases and/or the indoor air quality.

If you are experiencing symptoms of a communicable disease, please stay home (or in your hotel room), and contact CHS2024@canadianherptology.ca for the Zoom link and a refund of your in-person registration fees.

Contact Island Health, at info@islandhealth.ca for more details about local health conditions and guidelines.

CHS / SHC Sidney 2024

Silent Auction and Book Raffle

Funds raised from the silent auction and book raffle help CHS/SHC deliver student awards and conference bursaries — so please bid! The silent auction and book raffle open on Saturday 21 September at the start of registration (0900) and are on display and open for bids/raffle tickets until Sunday afternoon. The silent auction closes on Sunday 22 September at the final break (1540), followed directly by the live raffle. The silent auction and book raffle will be held in the Bodine Family Hall.

*Note that t-shirt sales, the bar at the Poster session and Banquet, silent auction, and book raffle are e-transfer, Paypal, or cash (no credit/debit cards). **ATMs** are available onsite, and at several convenient locations in Sidney: TD, BMO, and CIBC are located within one block, and ScotiaBank and RBC are three blocks east of the Mary Winspear Centre.*

Canadian Herpetological Society

The Canadian Herpetological Society (canadianherpetology.ca) is a registered Canadian charity that advances reptile and amphibian research and conservation in Canada by:

- promoting scientific research on reptiles and amphibians and disseminating the results;
- facilitating collaboration among amateur and professional herpetologists;
- advancing public understanding of our native reptile and amphibian species, the threats they face and the conservation solutions that exist; and
- promoting, supporting, and leading conservation and stewardship projects.

CHS is made up of researchers, conservation practitioners, naturalists, educators, and other individuals with an interest in Canada's reptiles and amphibians.

President: Jolene Laverty (Nova Scotia Department of Lands and Forestry, NS)

Vice-President: Amanda Bennett (Council of Canadian Academies, ON)

Past President: Pamela Rutherford (Brandon University, MB)

Treasurer: Ori Urquhart (Blazing Star Environmental, ON)

Secretary: James Paterson (Ducks Unlimited, MB)

Student Director(s): Megan Winand, Jeffrey Ethier

Directors at Large: Christina Davy, Claudia Lacroix, Hannah McCurdy-Adams

Webmaster: Devin Martin

CHS / SHC Sidney 2024

Presentation Reminders

The annual CHS conference is a hybrid event, with all talks recorded and streamed via Zoom. Please follow the below guidelines to ensure the conference runs smoothly.

All talks must be uploaded to the conference Dropbox by **noon PDT Friday, September 20th**: <https://www.dropbox.com/request/Z5qNYOluRE6DfWIKyqQI>

You may wish to bring an electronic copy of the presentation file on a USB memory device as backup, but ensure the talk is uploaded to the above Dropbox link first. Please come to your presentation room **15 minutes before your session begins** to ensure your talk is available on the presentation computer with the tech team representative.

Online participants are encouraged to ask questions in the Zoom chat. There will be someone in person monitoring the chat and sharing questions with the speakers.

All Styles

Many reptiles and amphibians in Canada are at risk of poaching, so keep location information at a broader level than someone would be able to find publicly available online.

15-minute talks

Target 10-12 minutes for your presentation to leave a few minutes for questions.

5-minute lightning talks

Please use your full allotted time. There are no questions at the end of 5-minute talks, though they are scheduled immediately prior to a break.

Please Note: We are recording talks!

If you do not want your talk to be posted on the CHS YouTube channel, please contact Pam Rutherford as soon as possible at conference@canadianherpetology.ca.

CHS / SHC Sidney 2024

Schedule Overview

Friday 20 September 2024 (all times in PDT)

1300–1700	Conservation Genetics Workshop	Christina Davy, Stephen Lougheed, Hana Thompson	Mary Winspear Centre, Sidney; Activity Room 2
1830–2200	Friday Night Social* and Registration	Informal meet and greet and scavenger hunt	Shaw Centre for the Salish Sea, 9811 Seaport Place

* Pre-registration for the social is required (by Sept. 11th); bring ID and cash for the bar

Saturday 21 September 2024 – Mary Winspear Centre

0900–0930	Registration	Coffee/tea & light snacks	Mary Winspear Center, Sidney; Bodine Family Hall
0930–1000	Opening Address	Indigenous Welcome – Eric Pelkey (WSÁNEĆ Leadership Council)	Charlie White Theatre
1000–1100	Keynote Address	Sarah Jim & others (PEPAKEN HÁUTW)	Charlie White Theatre
1100–1115	Break (15 min) – not catered		
1115–1200	Session 1: Human Impacts	Chair: Leslie Anthony	Charlie White Theatre
	Session 2: Everything Turtle I	Chair: Andrea Gigeroff	Meeting Room 2
1200–1400	Lunch (<i>not provided</i>); (<i>pre-ordering at your chosen location/restaurant is recommended</i>)		
1200–1400	CHS Board of Directors Meeting (Lebetter Board Room; board members only)		
1400–1500	Session 3: Roads	Chair: Leigh Anne Isaac	Charlie White Theatre
	Session 4: Everything Turtle II	Chair: Hana Thompson	Meeting Room 2
1500–1530	Break (30 min)	Coffee/tea & light snacks	Bodine Family Hall
1530–1700	Annual General Meeting	Open to everyone	Charlie White Theatre
1700–1900	Poster Session		Bodine Family Hall
1900–2300	Banquet Awards Ceremony Great Canadian Herp Quiz	Travelogue (1930) Kristiina Ovaska	Bodine Family Hall

CHS / SHC Sidney 2024

Sunday 22 September 2024 – Mary Winspear Centre

0800	Bonus!	Self motivated, good morning swim & ocean dip	Tulista Park – water shoes & swim gear
0915–0945	Registration	Coffee/tea & light snacks	Mary Winspear Center, Sidney; Bodine Family Hall
0945–1000	Opening Address	Purnima Govindarajulu	Charlie White Theatre
1000–1100	Keynote Address	Dr. Karl Larsen	Charlie White Theatre
1100–1115	Break (15 min) – not catered		
1115-1200	Session 5: Roads & Fire	Chair: Kryisia Tuttle	Charlie White Theatre
	Session 6: Methods	Chair: Justine Keating	Meeting Room 2
1200–1400	Lunch (<i>not provided</i>) & Lunch with a Mentor (<i>pre-ordering at your chosen location/restaurant is recommended</i>)		
1400–1430	Group photo		
1430–1530	Session 7: Species at Risk I	Chair: Sara Ashpole	Charlie White Theatre
	Session 8: Changing Temperatures & Diet	Chair: Jacqueline Litzgus	Meeting Room 2
1530–1600	Break	Coffee/tea & light snacks	Bodine Family Hall
	Silent Auction (ends at 1540) & Live Book Raffle (1540-1600)		Bodine Family Hall
1600-1700	Session 9: Species at Risk II	Chair: Christina Davy	Charlie White Theatre
	Session 10: Invasions & Inventories	Chair: Kristiina Ovaska	Meeting Room 2
1700–1715	Closing Remarks	Purnima Govindarajulu Jolene Laverty	Charlie White Theatre
1800–2000	Sunday Dinner	Informal BYO dinner at the beach	Tulista Park (<i>weather dependent</i>)

CHS / SHC Sidney 2024

Monday 23 September 2024 – Field Trips

0900–1700	Field Trips				
0900	Pickup from Mary Winspear	<p>Option 1: Sharp-tailed Snake monitoring on Observatory Hill <i>Led by Rebecca Golat</i></p> <p>Urban Biodiversity Project – Wetland building for amphibians at Haliburton Farm <i>Led by Purnima Govindarajulu</i></p>	Victoria		
0930	Arrive at Observatory Hill OR Haliburton Farm				
1130	Depart site				
1200-1300	Lunch (<i>not provided but can be purchased at Thrifty Foods</i>)				
1300	Depart Thrifty Foods				
1315	Arrive at Haliburton Farm OR Observatory Hill				
1500	Depart site				
≈1530	Arrive at Mary Winspear				
0900	Pickup from Mary Winspear			<p>Option 2: Salamander monitoring in Goldstream Provincial Park <i>Led by Kristiina Ovaska</i></p> <p>Protecting Toad Migrations in Duncan <i>Led by Elke Wind</i></p>	Langford & Duncan
0945	Arrive at Goldstream Park				
1145	Back at parking lot				
1215-1300	Lunch (<i>not provided but can be purchased at Thrifty Foods</i>)				
1300	Depart for Duncan				
1330-1430	Road mitigation Duncan				
1430	Depart for Victoria				
≈1600	Back at Mary Winspear				
Tuesday, September 24th					
BONUS!!! Semi-self-guided Mainland (Fraser Valley) Field Trip (10 am start in Surrey/Langley) <i>Led by Briar Hunter</i>					

Friday 20 September 2024

1300–1700 PDT: Conservation Genetics Workshop

Location: Mary Winspear Centre Activity Room 2 (and virtually via Zoom)

Registration required!

The Conservation Genetics workshop will include an introduction, sessions covering techniques and eDNA conservation applications, and a Designatable Unit (DU) activity. Virtual workshop attendance is being offered at no cost, but in-person attendance requires registration and is full.

CHS / SHC Sidney 2024

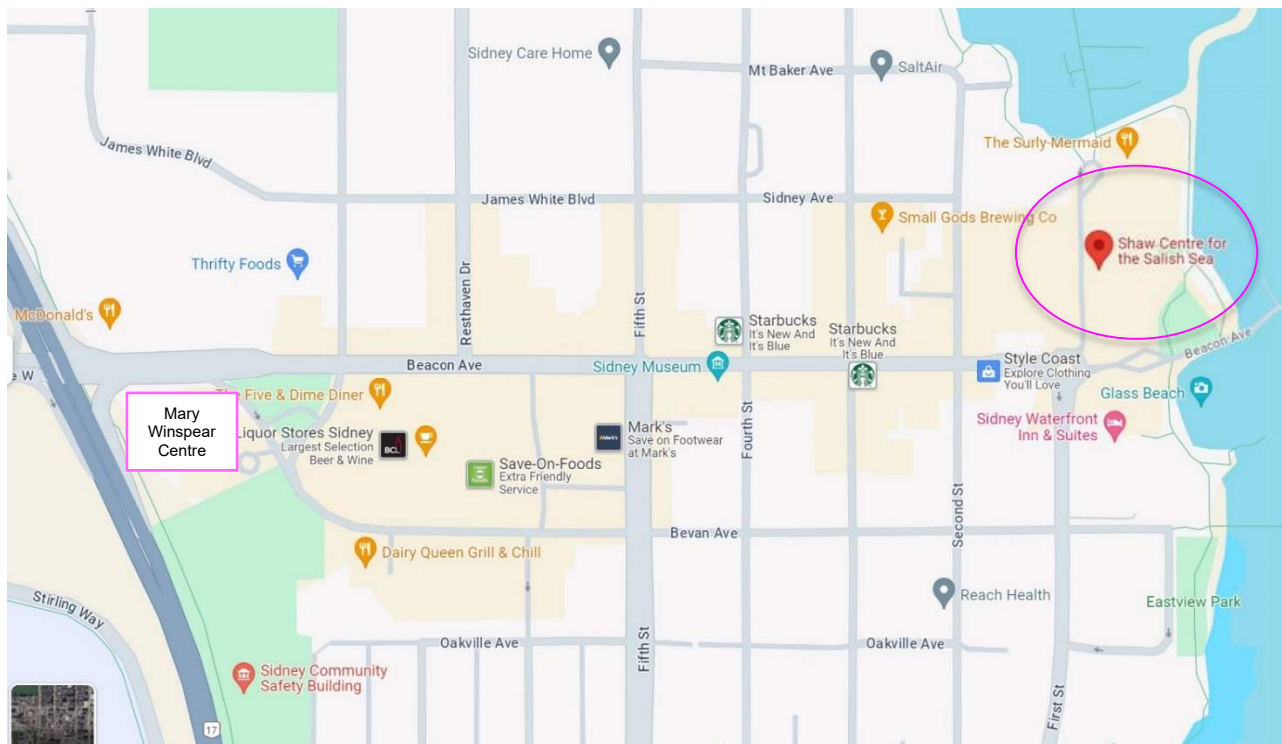
Friday Night Social (Sept. 20th)

1830–2200 PDT: Shaw Centre for the Salish Sea

Location: 9811 Seaport Pl., Sidney, BC

<https://www.salishseacentre.org/>

The CHS Local Organizing Committee has booked Shaw Centre for the Salish Sea for the evening for an informal social event. The **Centre's address is 9811 Seaport Place in Sidney, directly off Beacon Avenue in the Sidney Pier Hotel & Spa building complex**. *Tickets to the Friday night social will be sold until September 11th, after which time purchase will no longer be possible due to permitting requirements.* Dessert-type foods will be provided at the event (eat dinner beforehand as no outside food is allowed). Guests will be responsible for purchasing their own drinks at the bar (cash or tap card). Please bring ID (minors welcome). All CHS registrants are welcome to arrive at any time throughout the evening to meet up with friends new and old! BUT there will be a herpetologist-based Bingo game with highly coveted prizes. Limited onsite parking – please consider walking. Bring your own water bottle to avoid plastic waste.



CHS / SHC Sidney 2024

Saturday 21 September 2024

0930–1000 PDT: Open Address

Mary Winspear Centre: Charlie White Theatre



Indigenous Welcome

Eric Pelkey, Community Engagement Coordinator

Eric Pelkey brings 25 years experience working in First Nations administration. During his career, he has held the roles of Band Manager, Chief Executive Officer, Director of Operations as well as Lands Manager.

Additionally, Eric was Coordinator for the SENĆOTEN Alliance, representing Tsawout, Tsartlip, Pauquachin and Semiahmoo Nations on common Aboriginal and Douglas Treaty Rights and Title issues, a position he held for four years.

In addition to his administrative roles, he holds certification from AANDC for First Nations Lands Manager, a lifetime appointment for Commissioner of Oaths and Affidavits for First Nations, and a Degree in Indigenous Language Revitalization from the University of Victoria.

Saturday 21 September 2024

1000–1100 PDT: Keynote Address

Mary Winspear Centre: Charlie White Theatre

Physically decolonizing the land: Land-based healing at PEPAKEN HÁUTW

Sarah Jim, Judith Lyn Arney, Kyle Clarke, PEPAKIYE Ashley Cooper
PEPAKEN HÁUTW Foundation
(pepakenhautw.com)



Sarah Jim
Stewardship Coordinator

Sarah Jim (she/her) is a proud member of the W̱SÁNEĆ nation from the W̱SÍ, KEM village, along with Mexican, Russian-Jewish, and English ancestry. She is a visual artist in the community and received a Bachelor's Degree of Fine Arts from the University of Victoria in 2019. Sarah has been stewarding the land with the PEPAKEN HÁUTW Foundation since 2018.

Her role as Stewardship Coordinator with PEPAKEN HÁUTW has gifted Sarah the opportunity to connect to the culture, community, and the land in a meaningful and reciprocal way. Sharing the teachings that she has learned about native plant medicines, ecosystem restoration, and coastal traditions has allowed her to explore her indigeneity and advocate for the lands and waters that she calls home.

The public artwork she creates of ethnobotanical designs and themes related to W̱SÁNEĆ ways of being has been a valuable tool for her to share the important teachings of reciprocity and living within the laws of the land. With the vision of healing the land for our non-human kin and cultivating healthy and safe spaces for community to harvest, she created the W̱SÍ, KEM Ivy Project in 2021, utilizing the valuable skills and knowledge she has gained by working with PEPAKEN HÁUTW.

CHS / SHC Sidney 2024



Judith Lyn Arney
Ecosystems Director

Judith Lyn Arney (she/they) is an ethnoecologist of British ancestry raised here in the WSÁNEĆ homelands. In addition to her experience working in the food sovereignty movement and forestry sector in British Columbia, she has also worked internationally on the restoration of traditional food ecosystems in Japan, Italy, and Mexico. Judith founded the PEPAKEN HÁUTW program and SNIDŪEŁ Resiliency Project in 2011 during her graduate work with York University, and co-founded the PEPAKEN HÁUTW Foundation in 2016. Her passion for restoring ecosystems supports her work at PEPAKEN HÁUTW nurturing connection to the natural world for learners of all ages! Currently, Judith leads on the PEPAKEN HÁUTW restoration projects, teaches in the restoration based programs and works with partners to encourage the restoration of indigenous ecosystems in WSÁNEĆ territory and beyond.



Kyle Clarke
Environmental Education Director

Kyle, who is of Ukrainian, Irish, and Métis ancestry, grew up on the WSÁNEĆ homelands. At the University of Victoria, Kyle majored in Biology and Environmental Studies. He is excited about utilizing his skills and knowledge of science and the local environment to promote ecosystem restoration, protection, and stewardship as a way to heal the places that shaped his adoration for the natural world. Kyle has facilitated outdoor education programs with the PEPAKEN HÁUTW Native Plant and Garden Program since 2021; his work is rooted in developing strong relationships with the students in order to create safe spaces, so that everyone feels comfortable to learn and thrive. When Kyle isn't teaching students about native plants and conserving biodiversity, you can find him tending to native plant propagations and food security gardens, restoring native ecosystems, or helping facilitate the Living Labs Youth Ecostewardship camps around the ləkʷəŋən and WSÁNEĆ territories.

CHS / SHC Sidney 2024



PEPAᑖIYE Ashley Cooper
Program Director
(ŁÁU,WELNEW Tribal School)

PEPAᑖIYE Ashley Cooper (she/they) is a Plural-Spirit (Genderfluid/ Non-binary/Indigiqueer) Salish (ᑖSÁNEĆ, Ləkʷəŋən, Quw'utsun) and Nuuchah Nulth (Tlaoquiaht, Mowachaht, Hesquiaht) Mother/Parent. PEPAᑖIYE is proudly Neurodivergent (c-PTSD, AuDHD, Dyslexic). PEPAᑖIYE lives and works in their community of ᑖJOŁŁP where they are raising their child.

PEPAᑖIYE is continuously learning about plants, plant medicines, food ecosystems, and the SENĆOᑖEN language through family, community members, and elders. PEPAᑖIYE graduated ᑖ,SENĆOᑖEN,IST in 2016 with a Diploma in Indigenous Language Revitalization through The University of Victoria.

She is the Program Director for the PEPAᑖEN HÁUTᑖ Native Plant and Garden Program and has been teaching weekly workshops since 2016 for the ŁÁUWELNEW Tribal School and ᑖSÁNEĆ Leadership Secondary School students. PEPAᑖIYE became a Co-Founder of the PEPAᑖEN HÁUTᑖ Foundation in 2016. PEPAᑖIYE has been on the Environment Committee for the ᑖSÁNEĆ Leadership Council since 2019. PEPAᑖIYE has helped advise with the Plant Relative signs at SMONEĆTEN Park, and will be a part of the restoration planning for ᑖIKEL (maber flats) Restoration. PEPAᑖIYE supported with her cultural knowledge with the development and planning for the ᑖSÁNEĆ Ethnobotany Trail at the Horticulture Center of the Pacific. She is also team member of University of Victoria's Living Lab.

CHS / SHC Sidney 2024

Saturday 21 September 2024

1115–1200 PDT: Sessions 1 & 2

Student / competition presentations are in *italics*.

Mary Winspear Centre: Charlie White Theatre

Session 1: Human Impacts (Chair: Leslie Anthony)	
1115–1130	Coastal Tailed Frog occurrence associated with run-of-river hydroelectric projects on the south coast of BC Leah Ballin
1130-1145	Forestry and frogs – a long-term study of small wetlands and amphibians on Vancouver Island Elke Wind
1145-1200	<i>Effects of 48 h sulfolane exposure on growth and behaviour of wood frog larvae (Lithobates sylvaticus)</i> Amanda Reside

Mary Winspear Centre: Meeting Room 2

Session 2: Everything Turtle I (Chair: Andrea Gigeroff)	
1115–1130	<i>Genetic diversity does not affect sex in a species with temperature-dependent sex determination</i> Robin Lloyd
1130-1145	<i>Sexual differences in acoustic response of snapping turtles to a perceived conspecific</i> Emile Watanabe
1145-1200	<i>Repeatability of social and locomotion behaviours in neonatal Spiny Softshell (Apalone spinifera) suggest innate personality in hatchling turtles</i> Charlotte Turenne

CHS / SHC Sidney 2024

Saturday 21 September 2024

1400–1500 PDT: Sessions 3 & 4

Student / competition presentations are in *italics*.

Mary Winspear Centre: Charlie White Theatre

Session 3: Roads (Chair: Leigh-Anne Isaac)	
1400–1415	<i>Preliminary results from a resurvey of Long-toed Salamander use of road underpasses in Waterton Lakes National Park</i> Christie Crews
1415–1430	Assessing the efficacy of a geospatial model to predict turtle road mortality along county roads in the United Counties of Leeds and Grenville Cayla Darling
1430-1445	South Okanagan before after control impact study: Observations a decade after mitigation Sara Ashpole
1445–1500	Conservation challenges and successes for amphibians during road construction on the west coast of Vancouver Island Kryisia Tuttle

Mary Winspear Centre: Meeting Room 2

Session 4: Everything Turtle II (Chair: Hana Thompson)	
1400–1415	<i>Effects of methodological and temporal factors on efficiency of sampling freshwater turtle communities</i> Brooke Carroll
1415–1430	<i>Population demography and spatial ecology of a central Ontario population of Spotted Turtles (Clemmys guttata)</i> Stephane Thibeault
1430-1445	Monitoring the response of turtles to <i>Phragmites australis</i> management at the Big Creek and Long Point National Wildlife Areas in Ontario Heather Fotherby
1445–1450	<i>Life in the third dimension: sexual size dimorphism in an endangered turtle</i> Tyler Ambeau
1450-1455	Sparks among the snakes? A potential genetic explanation for unusual colour morphs <i>Daboia russelii</i> (Shaw & Nodder, 1797) and <i>Lycodon aulicus</i> (Linnaeus, 1758) from India Hinrich Kaiser

CHS / SHC Sidney 2024

Annual General Meeting — Draft Agenda

20 September 2024 at 15:30–17:00 PDT

Charlie White Theatre

1. Welcome Remarks (President: Jolene Laverty)
 - a. Acknowledgements and attendance
 - b. Approve agenda
 - c. Approve 2023 AGM minutes
2. Introduction of the 2024 CHS Board of Directors
 - a. Board Members: Jolene Laverty (President), Amanda Bennett (Vice President), Pamela Rutherford (Past President), James Paterson (Secretary), Ori Urquhart (Treasurer), Megan Winand (Student Director), Jeffrey Ethier (Student Director), Directors-at-Large: Christina Davy, Claudia Lacroix, Hannah McCurdy-Adams
 - b. Board Departure: Megan Winand, Jeffrey Ethier, Ori Urquhart
3. Report from President (J. Laverty)
 - a. Success of CHS 2024 Sidney (40 talks, 19 posters, over 140 attendees)
4. Election for Board Position (A. Bennett)
 - a. Student Director (1)
 - b. Treasurer (1)
 - c. Director-at-Large (2)
 - d. Vice President (1)
5. Report from the Treasurer (O. Urquhart)
6. Committee Updates
 - a. Awards (J. Laverty – Chair)
 - b. IMPARA (S. Hecnar – Chair)
 - c. Membership (A. Bennett – Chair)
 - d. Publications and Website (J. Crowley – Chair)
 - e. Conservation (D. Seburn – Chair)
 - f. Meetings and Workshops (P. Rutherford – Co-Chair, H. McCurdy-Adams - Co-Chair)
 - i. February 2024 online conference
 - ii. Planning for 2025 conferences
 - g. Social Media (S. Gillingwater – Chair)
 - h. EDI Committee (B. Hunter - Co-Chair, C. Lacroix - Co-Chair, A. Gowland - Co-Chair)
7. Any other business
8. Adjournment

CHS / SHC Sidney 2024

Saturday 21 September 2024

1700–1900 PDT: Poster Session

Mary Winspear Centre: Bodine Family Hall

Student / competition presentations are in *italics*.

Poster Session	
What we know and don't know about Oregon Spotted Frogs and how YOU can help	Jennifer Barden
<i>Development of eDNA monitoring tools and protocols for assessment of Western Painted Turtles (<i>Chrysemys picta bellii</i>) in British Columbia</i>	Amanda Baxter
<i>A low-cost, high-quality solution to mitigating road mortality in turtles</i>	Michaela Bouffard
<i>Degrees of survival: Testing the fitness effects of incubation temperature in at-risk turtles</i>	Hossam Ehab
<i>Short-term storage of snake sperm</i>	Ginger Elliott
<i>Investigating the impacts of industrial seismic vibrations on the development of snapping turtle (<i>Chelydra serpentina</i>) eggs</i>	Charlotte Galloway
<i>Colour variation of invasive Common Gartersnakes (<i>Thamnophis sirtalis</i>) in Newfoundland</i>	Andrea Gigeroff
<i>Northern Map Turtles (<i>Graptemys geographica</i>) overwintering habitat selection in a fragmented waterway</i>	Samantha Howard
<i>Western Toad (<i>Anaxyrus boreas</i>) use of road habitats in Nak'azdli Whut'en territory, British Columbia</i>	Candyce Huxter
<i>Impact of landscape composition and agriculture on snake abundance</i>	Michelle LaFlamme
<i>Ecology of a newly described Four-toed Salamander population in New Brunswick</i>	Ashton Leal
Hatchling headstarting success in Western Painted Turtle populations	Maya Meron

CHS / SHC Sidney 2024

Saturday 21 September 2024

Poster Session cont'd	
Challenges and successes from installing ecopassages and wildlife fencing at a central Ontario industrial site.	Shannon Tallon
Revisiting historic Western Chorus Frog (<i>Pseudacris triseriata</i>) sites at their northern range limit to evaluate population persistence in Parry Sound district	Kyle Vincent
<i>Do urban heat islands impact the nest temperature of freshwater turtles?</i>	Tharusha Wijewardena
<i>Population ecology of Eastern Painted Turtles (Chrysemys picta picta) and Snapping Turtles (Chelydra serpentina) in New Brunswick</i>	Jordyn Williams
Surveying for snakes: Working hard, or just drifting?	Ryan Wolfe
<i>The island life of salamanders: The genetic origin and behavioural traits of introduced Eastern Red-Backed Salamanders (Plethodon cinereus) in Newfoundland, Canada</i>	Clare Yang
<i>Movement behaviour and long-term population assessment of Wood Turtles (Glyptemys insculpta) in central Ontario</i>	Mary Yu

Saturday 21 September 2024

1930–2030 PDT: Travelogue

Mary Winspear Centre: Bodin Family Hall

Photographing Frogs in the Amazon & Beyond – Herping in Peru & Ecuador



Kristiina Ovaska, PhD
(she/her)

Biolinx Environmental Research Ltd. and Royal
British Columbia Museum

Ever since I can remember, I've been fascinated by all things creepy, crawly and/or slimy, and I've been fortunate to spend most of my professional life studying these often-overlooked creatures with which we share this earth. After receiving a doctoral degree from the University of Victoria, I completed two post-doctoral studies in population biology and behavioural ecology of amphibians with the University of British Columbia and McGill University, respectively. Currently, I'm senior ecologist with Biolinx Environmental Research Ltd., a consulting company that I run with a couple of like-minded colleagues in Victoria, and research associate at the Royal British Columbia Museum. I started out as a curious observer, but conservation of the creatures I study and their habitats has become increasingly important in all my activities, including an 11-year stint as co-chair of Amphibians & Reptiles Species Specialist Committee of COSEWIC, as co-chair of IUCN's Amphibian Specialist Group Canada, and as a member of IUCN's global Amphibian and Mollusc specialist groups. I will be sharing photos with you of some of the exquisite and extraordinary creatures I've encountered in my travels over the past decade in the Amazon and beyond in South America, as part of photographic and research expeditions. I have a particular affinity to salamanders and frogs (but snakes are cool too)!

Sunday 22 September 2024

1000–1100 PDT: Keynote Address

Mary Winspear Centre: Charlie White Theatre

So Excellent a Serpent: BC's Northern Rattlesnake and Its Perplexing Peripheral Ecology



Dr. Karl Larsen, PhD

(he/him)

Professor, wildlife ecology & management
Department of Natural Resource Sciences
Thompson Rivers University
Kamloops, BC, Canada

Karl attended the University of Victoria for his undergraduate degree in Biology and Geography (a Double Major). There, by a fortunate twist of fate, he came under the mentorship of Pat Gregory, who convinced Karl he could turn his long-standing interest in snakes into an MSc thesis. That took him to the Northwest Territories where he studied the ecology of the northern champion of the reptile world, the Common Garter Snake. Following that, he continued on to a PhD at the University of Alberta, where as a Killam Fellowship holder he switched gears and focused on the reproductive success of female red squirrels in the Stan Boutin lab. This in turn was followed by an NSERC Industrial Post-Doc stint with Alberta-Pacific Forest Industries, where he developed a fire ecology program.

Karl started his academic career at Thompson Rivers University in 1997, where he currently is Professor in the Department of Natural Resource Sciences and Program Coordinator of the Master of Science Program. He has supervised over 40 graduate students (largely MSc) on a wide range of projects, ranging from the movement ecology of pillbugs, the nesting ecology of goshawks, and the use of habitat patches by Asian Elephants. However, reptiles have continued to be his long-standing interest, and in particular, a large proportion of projects in his lab have focused on the conservation biology of the Western Rattlesnake. His CHS presentation will showcase the work done by this group of outstanding young researchers, and how it reveals the challenges and opportunities facing the next generation of herpetologists.

CHS / SHC Sidney 2024

Sunday 22 September 2024

1115—1200 PDT: Sessions 5 & 6

Student / competition presentations are in *italics*.

Mary Winspear Centre: Charlie White Theatre

Session 5: Roads & Fire (Chair: Kryisia Tuttle)	
1115–1130	Snakes, fences and temperature extremes: Subsurface artificial refugia provide escape from heat Chloe Howarth
1130–1145	<i>In the wake of wildfire: unraveling the effects of wildfire on Western Rattlesnakes (Crotalus oreganus)</i> Lindsay Whitehead
1145–1150	<i>Snakes at the skate park: A novel half-pipe fence design for mitigating road mortality of Eastern Foxsnakes (Pantherophis vulpinus) in eastern Georgian Bay, Ontario</i> Sabrina Lounsbury
1150–1155	Re-occupation of rookery sites by female Western Rattlesnakes (<i>Crotalus oreganus</i>) post-wildfire Caroline Lafond
1155–1200	Testing the use of artificial nesting structures: A case study using Eastern Foxsnake (<i>Pantherophis gloydi</i>) and Blue Racer (<i>Coluber constrictor foxii</i>) Ryan Wolfe

Mary Winspear Centre: Meeting Room 2

Session 6: Methods (Chair: Justine Keating)	
1115–1130	<i>optiMander: a classifier neural network for individual identification in salamander species with low inter-individual visual differentiability</i> Christopher Boccia
1130-1145	<i>Needle in a haystack: Field methodologies for researching Canada's elusive Sharp-Tailed Snake.</i> Rebecca Golat
1145-1200	Automated PIT-tag readers elucidate habitat use by Sharp-tailed Snakes on Vancouver Island Kristiina Ovaska

CHS / SHC Sidney 2024

Sunday 22 September 2024

1430—1530 PDT: Sessions 7 & 8

Student / competition presentations are in *italics*.

Mary Winspear Centre: Charlie White Theatre

Session 7: Species at Risk I (Chair: Sara Ashpole)	
1430–1445	Status and conservation of a suburban population of Jefferson Salamanders (<i>Ambystoma jeffersonianum</i>) Meredith Swartwout
1445–1500	Where 25 years of species management have left us: 280 frogs and counting Briar Hunter
1500-1515	<i>Small mammal snacks: Long-term trends and risk factors for prey communities of at-risk snakes in BC's interior grasslands</i> Kara Atkinson
1515–1530	Identifying Eastern Foxsnake (<i>Pantherophis vulpinus</i>) critical habitat along the eastern coast of Georgian Bay at Shawanaga First Nation Kyle Vincent

Mary Winspear Centre: Meeting Room 2

Session 8: Changing Temperatures & Diet (Chair: Jacqueline Litzgus)	
1430–1445	<i>The impact of rising temperatures on development and brain size in larval American toads</i> Ella Parkinson
1445–1500	Increasing seasonal temperatures reduces chorus frog calling activity Jeffrey Ethier
1500-1515	<i>Ecohydrological controls on the resilience of snake overwintering habitat: Implications for climate change</i> Rachel Fallas
1515–1530	<i>Diet analysis of Alberta prairie amphibians</i> Jordan Vos

CHS / SHC Sidney 2024

Sunday 22 September 2024

1600—1700 PDT: Sessions 9 & 10

Student / competition presentations are in *italics*.

Mary Winspear Centre: Charlie White Theatre

Session 9: Species at Risk II (Chair: Christina Davy)	
1600–1615	Best practices for replicable surveillance of <i>Ophidiomyces ophidiicola</i> and a cross-Canadian call to action Rachel Dillon
1615–1630	Understanding trends in abundance, survival and behaviour of Canada's only population of Blue Racer (<i>Coluber constrictor foxii</i>) Ryan Wolfe
1630-1645	Genetics of the Eastern Massasauga Rattlesnake conservation breeding program Hana Thompson
1645–1700	<i>Validation of non-invasive sex steroid analysis for Eastern Massasauga Rattlesnake (Sistrurus catenatus)</i> Ginger Elliott

Mary Winspear Centre: Meeting Room 2

Session 10: Invasions & Inventories (Chair: Kristiina Ovaska)	
1600–1615	<i>Update on the invasion of Common Gartersnakes (Thamnophis sirtalis) in Newfoundland</i> Andrea Gigeroff
1615–1630	<i>In the belly of the beast: Is the invasion success of a domestic amphibian linked to its diet?</i> Maya Williams
1630-1645	Refining distributions and adding richness: un/under-documented species in Alberta Nick Cairns
1645–1700	Introducing the philosophy of abduction to conservation science for the assessment of amphibian populations in the western Cordillera and the territory of Nak'azdli Whut'en First Nations. Mark Thompson

End of Contributed Talks

Abstracts

Underlined name indicates speaker
Student award competitors are indicated by “Student” below

Life in the third dimension: Sexual size dimorphism in an endangered Turtle

Tyler Ambeau¹, James Baxter-Gilbert², Jacqueline Litzgus³, Megan Rasmussen⁴, Julia Riley², David Seburn⁵, Alanna Smolarz⁴, Anne Yagi⁶, Katharine Yagi⁶, Christina Davy¹
¹Department of Biology, Carleton University, Ottawa, Canada. ²Department of Biology, Mount Allison University, Sackville, Canada. ³School of Natural Sciences, Laurentian University, Sudbury, Canada. ⁴No Affiliation, NA, Canada. ⁵Canadian Wildlife Federation, Ottawa, Canada. ⁶8 Trees Inc, Fonthill, Canada

Abstract

Body size can be influenced by intrinsic factors (e.g., genetics) and extrinsic environmental conditions (e.g., temperature and productivity). Understanding how environmental factors influence adult body size within and among populations can provide insight into demographic trends. In species with sexual size dimorphism (SSD), comparing the degree of SSD across environmental gradients can also elucidate different selective pressures between the sexes. In turtles, many studies of body size and SSD consider only a single, straight-line measurement – but turtles are three-dimensional. Here, we used straight carapace length (SCL) and carapace height (CH) of Spotted Turtles (*Clemmys guttata*) to test for SSD and explore the environmental drivers of body size. We hypothesized that if increased thermal inertia increases fitness in cold environments, then selection should favour larger turtles in colder environments. Differences in SCL between sexes approached statistical significance (linear mixed-effects model; $p = 0.06$), but the sex with the longer carapace, on average, varied among populations (SDI 0.04 to -0.05). In contrast, CH (scaled by SCL) of females was greater than males and this difference was statistically significant in 7 of 11 populations after Bonferroni correction, illustrating that turtles require a three-dimensional approach to quantifying SSD. Mean annual temperature did not predict body size. However, site ID explained 18% of the variation in the data, suggesting that another, untested environmental variable causes varying body size across the landscape. The next step in this study will test other likely predictors of body size, including growth rate, productivity and potential effects of climate change.

Oral – 5 minutes

Student

CHS / SHC Sidney 2024

South Okanagan before after control impact study: Observations a decade after mitigation

Ashpole Sara¹, Leigh Anne Issac²

¹St. Lawrence University, Canton, USA. ²Conservation Science Section, Ministry of Water, Land & Resource Stewardship, Cranbrook, Canada

Abstract

A before after control impact (BACI) approach was to assess amphibian movement along a three kilometer four-lane highway expansion project north of Osoyoos, BC. Amphibian road and auditory surveys (i.e. breeding locations) were conducted along highway 97 passing lane (2010) to determine the location of mitigation fencing and culverts (2011-2012). Eight culverts (900 - 1200 mm) were placed in areas of higher amphibian road concentrations and 2.6 lineal km of amphibian-specific ACO drift fencing was installed. Five species of amphibians were observed over three survey years (4051 road incidences; 657 road survey hours) with Great Basin Spadefoots being disproportionately impacted (N = 3542, (1894 live). Amphibian mortality within the passing lanes transect were significantly reduced with the implementation of mitigation structures. Reconyx camera traps (N = 3) captured 800 amphibian culvert events (Great Basin Spadefoots $n_{2011}= 345$, $n_{2012}= 473$). Since 2012, management and maintenance of the fencing has proven challenging with expenditures ranging from \$2000 to 10,000 annually since installation. Incidental surveys suggest that the fencing continues to successfully mitigate road mortality. Yet, camera traps installed in 2023 yielded only 12 Great Basin Spadefoots among 21,771 images captured (2024 data yet to be assessed) raising concerns regarding habitat permeability and population connectivity. Research needs should focus on assessing population level effects as a result of mitigation isolation and possible subsequent mitigations.

Oral – 15 minutes

CHS / SHC Sidney 2024

Small mammal snacks: Long-term trends and risk factors for prey communities of at-risk snakes in BC's interior grasslands

Kara Atkinson

Thompson Rivers University, Kamloops, Canada

Abstract

Climate change is known to affect the carrying capacity of ecosystems, causing shifts in ecological community structure. In British Columbia's grasslands, a highly threatened ecosystem, this may have significant consequences for at-risk grassland predators. Three at-risk snakes in the BC interior semi-arid grasslands, the Western Rattlesnake (*Crotalus oreganus*), the Great Basin Gophersnake (*Pituophis catenifer*), and the Yellow-bellied Racer (*Coluber constrictor*), all predate on small mammals. A long-term study, spanning 2000-2024 in the Thompson valley, on prey populations of these snakes provides the means to examine trends over the past two decades, and the implications for this region's community. Hot summers lead to a marked reduction in deer mouse (*Peromyscus sonoriensis*) abundance ($p < 0.001$), the dominant small mammal prey species in this ecosystem. A decrease in the peak abundance in deer mouse density has been observed. Thus, increasingly hot and dry summers have the potential to lower the carrying capacity of this grassland habitat, given the current small mammal community assemblage in this area, resulting in a much lower prey base than this area has historically seen. Projected prey numbers are expected to display a decreasing trend in the next 100 years when modeled using climate predictions from Climate BC (UBC). As a habitat "island", the Thompson-Nicola grassland is isolated from other grasslands in the province, and small mammal species with higher heat tolerance, such as the Great Basin Pocket Mouse (*Perognathus parvus*), may be unable to migrate into the area to fill this ecological niche.

Oral – 15 minutes

Student

CHS / SHC Sidney 2024

Coastal Tailed Frog occurrence associated with run-of-river hydroelectric projects on the south coast of BC

Leah Ballin

Ecofish Research Ltd, Cumberland, Canada

Abstract

Fifteen years ago, British Columbia's power authority, put out a call to power, soliciting applications for independent producers to develop projects that would supply electric power to BC's grid. Industry responded by submitting applications to develop run-of-river hydroelectric projects on small steep streams on BC's south coast. Most of these streams are home to Coastal Tailed Frog (*Ascaphus truei*), a species at risk, thus permitting requirements included monitoring potential impacts to the species. With seven Coastal Tailed Frog long-term monitoring projects recently ending, we will share our learnings from 15 years of monitoring their occurrence in relation to run-of-river hydroelectric projects.

The focus of our presentation will be a case study on a stream located on the south coast of BC in a region known as 'the sunshine coast'. Ecofish monitored this stream for two years pre-construction and five-years post-construction through a before-after-control-impact (BACI) design to identify changes in abundance, distribution, age class, and habitat characteristics that may be attributable to the project. Through the post-construction monitoring period, there were changes to operations, extreme weather events and logging, confounding monitoring program results. Nonetheless, statistically significant results were generated, and trends observed, including a change in the distribution of Coastal Tailed Frogs among sites. Specifically, high numbers of tadpoles were documented immediately above dams, and low numbers below dams, indicating that tadpoles are concentrating above these barriers, supporting observations made in similar studies. We will explore these trends as they relate to monitoring, interpretation of monitoring data and potential biological effects.

Oral – 15 minutes

CHS / SHC Sidney 2024

What we know and don't know about Oregon Spotted Frogs and how YOU can help

Jennifer Barden¹, Briar Hunter²

¹Fraser Valley Conservancy, Abbotsford, Canada. ²Ministry of Water, Land and Resource Stewardship, Surrey, Canada

Abstract

After decades of mucking around in wetlands and boots-on-the-ground recovery efforts, the Oregon Spotted Frog Recovery Team has learned a lot about the Oregon Spotted Frog (*Rana pretiosa*), the most endangered frog in Canada. However, everything we have learned about monitoring this elusive frog shows us how little we know about this species, especially our Canadian populations. While we have been surveying and monitoring this species during their breeding season for years, we still don't know where they hang out outside the breeding window. We can look at habitat and make predictions, but at some of our main sites, we don't know where they go for most of the year. We also know that our native frogs in the Fraser Valley, including Oregon Spotted Frogs, are threatened by invasive fauna like American Bullfrogs, but we don't know the extent of the threat or how these invaders are impacting species like Oregon Spotted Frogs. Community education and professional training have increased public awareness and perception of this species within British Columbia, but there is a long way to go for this controversial ditch-dweller. How can YOU help protect and conserve this endangered species? Come find out.

Poster

CHS / SHC Sidney 2024

Development of eDNA monitoring tools and protocols for assessment of Western Painted Turtles (*Chrysemys picta bellii*) in British Columbia

Amanda Baxter¹, Brent Murray²

¹University of Northern British Columbia, Prince George, Canada. ²University of Northern British Columbia, Prince George, Canada

Abstract

The Pacific Coast population of Western Painted Turtle (WPT), *Chrysemys picta bellii*, located on Vancouver Island, BC is threatened (COSEWIC 2016) due to anthropogenic effects such as wetland habitat loss. As this species is difficult to detect using traditional methods, the objective of this study is to develop a standardized sampling procedure that reliably detects WPT via environmental DNA (eDNA). In order to determine an effective monitoring protocol, various water sampling methods (filtration and precipitation) are being compared. Environmental variables and temporal data will also be assessed in an attempt to uncover the effect of seasonal variance on detection. To better understand detection probability, water samples were collected from red-eared sliders and goldfish in an experimental setting. This illustrated a complex interaction between eDNA accumulation and degradation rates. The eDNA signal persisted longer in the turtle system than the goldfish, which may be correlated to the amount of biological activity within the system. The results from this project yield information on best practices to increase the probability of detection and baseline data on the minimal eDNA concentration required to detect WPT, leading to better conservation and management planning of WPT. This project is a collaborative effort using resources from UNBC, BC FLNRORD and Mitacs.

Poster

Student

CHS / SHC Sidney 2024

optiMander: a classifier neural network for individual identification in salamander species with low inter-individual visual differentiability

Christopher Boccia¹, Shreeram Senthivasan², Meredith Swartwout³

¹Queen's University, Kingston, Canada. ²Independent, Toronto, Canada. ³University of Toronto, Mississauga, Canada

Abstract

Being able to identify individuals within endangered reptile and amphibian populations is a critical requirement for conservation efforts, as it enables accurate population size and vital rate estimates. However, individual identification is challenging when individuals lack distinctive markings, as is the case with Federally endangered Jefferson Salamanders, *Ambystoma jeffersonianum* (and their unisexual dependents).

Jefferson Salamanders have dark dorsal colouration and a light venter, sometimes with blue spotting, but without the colourful and distinctive dorsal markings that enable individual identification in other Ambystomatids, such as Spotted, Marbled, and Ringed Salamanders. Since individual recognition based on *A. jeffersonianum* integument alone is not feasible, researchers currently inject visible-implant elastomer (VIE) tags at set locations under the salamanders' skin—a set of small neon tattoos that fluoresce brightly under ultraviolet light. This approach works well, but is time consuming and requires long handling periods for captured salamanders; it would be ideal for both researchers and salamanders if an easier identification approach was possible.

We photographed all individual salamanders captured as part of a population study to test whether it was possible to create a neural network model that could identify individuals. We discovered that the ventral surface of the salamanders' chins had blue blotching and venation patterns that were unique to each individual. We generated a convolutional neural network classifier model to enable speedy identification of re-captures using chin images and tested its accuracy and efficacy; we hope to create a publicly-accessible model that may also be of use to other salamander population researchers.

Oral – 15

Student

CHS / SHC Sidney 2024

A low-cost, high-quality solution to mitigating road mortality in turtles

Michaela Bouffard, Leora Berman
The Land Between, Haliburton, Canada

Abstract

Road mortality is a major threat to wildlife in Canada. Turtles, a globally declining taxa, are especially vulnerable to being struck by vehicles because of their slow movement and tendency to nest on gravel road shoulders. In order to allow turtles to coexist harmoniously with roads and increasing development, early and effective mitigation strategies must be put in place to prevent them from entering the roadway, and to make roads permeable to turtles. Previous initiatives have successfully reduced the risk of road-associated turtle mortality, however these systems are costly and cumbersome, and therefore not well suited for arterial county roads. Using high quality, low cost materials, we have created an effective roadside barrier design consisting of half-cut stainless steel barrels coated in drinking water standard polymer to increase longevity. This design works in combination with pre-existing culverts to form ecopassages, allowing the turtles to cross the road under the pavement and away from vehicles. Furthermore, the design ensures that jump out solutions are integrated, reducing risk of failure. The designs are easy to maneuver and manipulate, and are affordable to install independent of road works, within the boundaries of municipal budgets. As arterial county roads carry high volumes of traffic and often occur in wetland-dense regions, it is important to have an affordable and effective method of mitigating harm and fragmentation of species-at-risk turtle populations.

Poster

Student

CHS / SHC Sidney 2024

Refining distributions and adding richness: un/under-documented species in Alberta

Nick Cairns, Sean McFadden
Royal Alberta Museum, Edmonton, Canada

Abstract

Finding “new” species is extraordinarily rare but documenting overlooked ones is surprisingly common. Alberta is a well explored region, with a long history of armies of researchers and consultant biologists combing the prairies and forests armed with lists of species risk. Despite and because of this effort and the efforts of non-professional naturalists, additional richness is added to the provinces’ record books annually. Most of this is representative of hard to find or hard to differentiate insects but vertebrates too have been added recently as well. The inclusion of eastern yellow-bellied racer into Alberta’s native fauna in 2014 shows that even large, diurnal vertebrates can be overlooked by those of us that keep the records but do not live in these more pristine regions. We aim to document rare species of snakes and frogs adding to our knowledge of their current distributions in Alberta. We also aim to find species which could plausibly occur within Alberta based on their presence in contiguous regions. With the help of local knowledge we hope to explore Southeastern and Southwestern Alberta targeting regions which are known to be rich but are under documented. We will discuss our targets, why we think they could possibly occur in Alberta and our efforts to date.

Oral – 15 minutes

CHS / SHC Sidney 2024

Effects of methodological and temporal factors on efficiency of sampling freshwater turtle communities

Brooke Carroll¹, Samantha Noganosh², Jacqueline Litzgus¹

¹Laurentian University, Sudbury, Canada. ²Lands and Resources Department, Magnetawan First Nation, Canada

Abstract

In the face of worldwide biodiversity losses, identifying optimal methods to conduct population monitoring is pivotal to inform management strategies for species at risk. Herpetofauna highly imperiled, often have low detection probabilities, and are lacking research to identify efficient sampling designs for population monitoring. For freshwater turtles, aquatic traps are common sampling methods used to monitor populations; however, turtles are often hard to detect, and research shows varying results in the efficiency of these sampling methods. Temporal factors also affect the efficiency of survey methods, and therefore should be considered when designing sampling protocols. I examined the effects of methodological and temporal factors on sampling efficiency of freshwater turtle communities in Eastern Georgian Bay, Ontario. I used 3 different live trap designs to test methodological differences in sampling efficiency of painted turtles (*Chrysemys picta*), snapping turtles (*Chelydra serpentina*), and Blanding's turtles (*Emydoidea blandingii*) across 15 wetlands in 3 locations. I used generalized linear mixed modeling to assess what factors impacted likelihood of turtle capture. Temporal factors had significant impacts on capture for all species, with all survey methods having highest catch per unit effort in spring. I found that trap type significantly impacted capture efficiency, with traps designed for smaller turtles having higher catch per unit effort for painted turtles, and larger traps having higher catch per unit effort for snapping and Blanding's turtles. Overall, my study fills knowledge gaps about common methods used for sampling freshwater turtles and provides suggestions for sampling designs in future research.

Oral – 15 minutes

Student

CHS / SHC Sidney 2024

Preliminary results from a resurvey of Long-toed Salamander use of road underpasses in Waterton Lakes National Park

Christie Crews¹, Ashley Smith¹, Matthew Adams², Kim Pearson³, Cynthia Paszkowski², Sean Boyle⁴, Julie Lee-Yaw¹

¹University of Ottawa, Ottawa, Canada. ²University of Alberta, Edmonton, Canada.

³Waterton Lakes National Park, Parks Canada, Waterton, Canada. ⁴Memorial University of Newfoundland, St. John's, Canada

Abstract

Roads are one of the most pervasive threats facing amphibians, prompting the installation of road underpasses and exclusion fencing in many places. Although such systems have demonstrated significant reductions in road mortality immediately after installation, questions remain as to long-term outcomes, especially in the face of landscape change. In 2008, four road underpasses were installed in Waterton Lakes National Park (Alberta) in response to reports of substantial road mortality of Long-toed Salamanders along the park entrance road. Road mortality decreased following the installation of the tunnels. However, a mark-recapture study in 2013/2014 pointed to continued declines of this population. Despite these declines and massive landscape change resulting from the 2017 Kenow wildfire, the Linnet Lake population and use of the road underpasses has not been assessed since this earlier study. Here we report initial observations from the first formal survey of tunnel use by salamanders in over ten years. Surveys took place during the spring migration period of 2024. and involved pitfall traps, cover object searches, and nightly road surveys. Only 20 individuals, represented by 15 females, three males, and two juveniles, were captured during the height of spring migration. Unexpectedly, six of these individuals were tagged individuals from the 2013/2014 survey, extending the reported lifespan of the species. These observations suggest an aging and declining population despite road mitigation efforts. However, long-lived individuals with demonstrated resistance to several recent stressors raise questions as to the potential conservation value of these individual genotypes in the face of continuing environmental change.

Oral – 15 minutes

Student

CHS / SHC Sidney 2024

Assessing the efficacy of a geospatial model to predict turtle road mortality along county roads in the United Counties of Leeds and Grenville

Cayla Darling, Richard Burger, Katherine Black
Blazing Star Environmental, Oshawa, Canada

Abstract

In 2023, the United Counties of Leeds and Grenville (UCLG), an upper-tier municipality in southeastern Ontario, initiated a road mortality study in response to community concerns. Blazing Star Environmental (BSE), in collaboration with the Algonquin to Adirondacks Collaborative, conducted this study using recent and historical data, field studies, and a geospatial model to identify turtle road mortality hotspots along UCLG roads. The model combined two geospatial techniques: a least-cost raster analysis to identify potential dispersal corridors and a habitat suitability analysis to evaluate turtle habitat near roads. The resulting map highlighted areas of high potential turtle road mortality and recommended further validation of the model.

In 2024, with support from UCLG, BSE tested and refined the model by verifying habitat data and gathering road mortality observations throughout the turtle nesting season. These observations were compared to the model's predictions to assess its accuracy. Although the model effectively identified many high-risk areas, further adjustments are needed to improve its predictive power. With additional testing, this multi-faceted approach could match the success of established tools like Circuitscape in forecasting road mortality.

Oral – 15 minutes

CHS / SHC Sidney 2024

Best practices for replicable surveillance of *Ophidiomyces ophidiicola* and a cross-Canadian call to action

Rachel Dillon, Erin Allen, Christina Davy
Carleton University, Ottawa, Canada

Abstract

Ophidiomycosis, caused by the fungal pathogen *Ophidiomyces ophidiicola* (Oo), is a disease that can cause mortality of individual snakes under some circumstances, but is typically characterized by superficial lesions that develop during overwintering, and can resolve over the active season. Fortunately, the available evidence indicate that this disease does not have population-level impacts on wild snakes. Nevertheless, disease surveillance is a key component of threat assessments and recovery planning for at-risk species. The distribution of the pathogen and disease across Canada are unclear, so we collaborated with Environment Climate Change Canada (ECCC) to create a tool for standardized, cross-Canada sampling that can generate comparable estimates of prevalence among sampling sites and species. The pathogen can be detected via non-harmful swabbing of snake's skin, and we reviewed all relevant, published literature (n = 102 studies published since 2013) to summarize methods used to detect the fungus in wild snakes. We identified variation in sample collection, storage, and analysis methods that affect the amount and quality of fungal DNA reaching the analysis phase (i.e., qPCR). We developed a best practices protocol to standardize swabbing of live, wild snakes, and refined it in consultation with the Herp Health Working Group and through a workshop with end-users. This protocol will enable a cross-Canada sampling blitz in Spring 2025 – for which we are still looking for collaborators!

Oral – 15 minutes

CHS / SHC Sidney 2024

Degrees of survival: Testing the fitness effects of incubation temperature in at-risk turtles

Hossam Ehab, Brandon Lee, Christina Davy
Carleton University, Ottawa, Canada

Abstract

Incubation temperature influences the growth, development, and phenotype of embryos in oviparous animals, including hatching rates and juvenile fitness. Ex-situ incubation is often used as a conservation tool for freshwater turtles, but it is unclear what temperature regimes best support hatchling health and their chances of surviving to the next age-class in the wild. Here, we tested hatching outcomes in two at-risk turtles, the eastern spiny softshell (*Apalone spinifera*) and the Blanding's turtle (*Emydoidea blandingii*). We collected 36 clutches from *A. spinifera* (n = 839 eggs) and 7 clutches from *E. blandingii* (n = 68 eggs) during 2024 field season. We tested the effects of five viable incubation temperatures (26-30°C) on hatchling incubation duration, hatching success, mass, incidence of developmental abnormalities, corticosteroid production, and performance (righting time). Incubation duration was highest for clutches incubated at 26°C and lowest at 30°C, but hatchlings incubated at warmer temperatures were, on average, smaller and took longer to right themselves than those incubated at cooler temperatures. This is the second year of a three-year study. Full, final results and recommendations for ex-situ incubation will be shared with CHS and other stakeholders after the 2025 field season. Alongside the direct applications of this research to turtle incubation and headstarting projects, understanding how hatchlings fitness may be impacted by rising ambient temperatures associated with climate change will also help inform future recovery planning for these and other freshwater turtle species.

Poster

Student

CHS / SHC Sidney 2024

Validation of non-invasive sex steroid analysis for Eastern Massasauga Rattlesnake (*Sistrurus catenatus*)

Ginger Elliott^{1,2}, Jeff Hathaway³, Sarah Jane Stanger-Guy³, Kelsey Moxley^{3,4}, Cheryl Sheridan⁵, Amy Chabot^{2,1}, Stephen Lougheed¹

¹Queen's University, Kingston, Canada. ²African Lion Safari, Cambridge, Canada.

³Scales Nature Park, Oro-Medonte, Canada. ⁴Amphibian & Reptile Conservation Canada, NA, Canada. ⁵Little Ray's Nature Center, Hamilton, Canada

Abstract

Effective breeding for conservation requires understanding how and when species reproduce. However, variation in the phenology among species means that we must quantify patterns of reproduction and fertility to effectively breed species under human care. The Eastern Massasauga Rattlesnake (*Sistrurus catenatus*) is threatened across its North American range. Recovery efforts include coordinated in situ (natural/wild) and ex situ (under human care) management. However, ex situ populations exhibit low fecundity, a challenge that must be addressed for the program to meet its goals. We used enzyme linked immunosorbent assays (ELISA) to determine whether endogenously secreted fecal hormone metabolites of testosterone (males) and progesterone (females) can be used to quantify reproductive events in Eastern Massasauga Rattlesnake. We hypothesized that excreted reproductive hormone metabolites will peak during key reproductive periods including mating, spermatogenesis in males, and during the gravid state in females. A total of 788 fecal samples were collected throughout the year during routine care of the ex situ population between 2021 and 2024. We used commercial ELISA kits to develop male testosterone and female progesterone metabolite profiles. We will present preliminary results and discuss implications for management activities to improve fecundity in the ex situ population.

Oral – 15

Student

CHS / SHC Sidney 2024

Short-term storage of snake sperm

Ginger Elliott^{1,2}, Drew Sauve^{2,3}, Hana Thompson^{1,2}, Sarah Jane Stanger-Guy⁴, Jeff Hathaway⁴, Kelsey Moxley^{4,5}, Jenny Pearce^{6,5}, Cheryl Sheridan⁷, Rick Vos⁸, Amy Chabot^{2,1}, Stephen Loughheed¹

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⁶Sciensational Ssnakes!!, Guelph, Canada. ⁷Little Ray's Nature Center, Hamilton, Canada. ⁸Toronto Zoo, Toronto, Canada

Abstract

Assisted reproductive technology (ART) is increasingly incorporated into ex situ conservation initiatives to address loss of genetic diversity and improve fecundity of breeding populations. As reproduction among even closely-related individuals can be highly variable, development of ART species-by-species is usually required. In Ontario, the Eastern Massasauga Rattlesnake (*Sistrurus catenatus*) and Grey Ratsnake (*Pantherophis spiloides*) are experiencing population declines due to habitat fragmentation and persecution, among other factors. The two species exhibit alternative reproductive strategies (oviparous vs. ovoviviparous). We hypothesize that male reproductive cyclicity will differ between the two species and ART would need to be optimized differently. We collected sperm samples from individuals of each species monthly, from May through October and assessed sperm viability and the impact of short-term cold storage on sperm survival. Seminal quantity and quality, including concentration, percent sample motility, rapid forward progressive movement, and percent sample viable were assessed for 22 Grey Ratsnakes and 14 Eastern Massasauga Rattlesnakes. We identified variation in the quality of Grey Ratsnake sperm collected from individual snakes throughout the active season. We also developed a method for storage of Grey Ratsnake sperm that maintains fertility potential for over 24 hours, facilitating the collection of sperm samples in situ. Our research will be instrumental in development of ART for use in our focal species, providing new tools for recovery of Grey Ratsnake and Eastern Massasauga Rattlesnake in Canada.

Poster

Student

CHS / SHC Sidney 2024

Increasing seasonal temperatures reduces chorus frog calling activity

Jeffrey Ethier¹, Nionta Habib¹, Marc Mazerolle², Vance Trudeau¹

¹University of Ottawa, Ottawa, Canada. ²Université Laval, Québec, Canada

Abstract

Climate change has been associated with negative impacts on amphibians, including population declines and local extinctions. The impacts can be species-specific and vary within a species distribution. We examined the seasonal and diel patterns in calling behaviour of boreal chorus frogs (*Pseudacris maculata*), a federally and provincially listed species at risk. We used acoustic recording units deployed at breeding locations in the Ottawa, Ontario region during the early spring of 2022–2024. Using ordinal logistic regression models, we uncovered diel and seasonal patterns in calling activity and calling intensity based on time of year, hour of day, and hourly air temperature. Patterns were similar in 2022 and 2023 but differed significantly in 2024. We found that calling activity was highest in the late evening/early night and increased with increasing temperature in all years. However, overall calling activity in 2024 was reduced (29–44% lower predicted probability of calling) and peaked earlier (day 98) compared to 2022 (day 108) and 2023 (day 110). Mean daily temperature was 1.5°C and 1.7°C degrees warmer in 2024 compared to 2022 and 2023, respectively ($F_{2,267} = 4.25$, $p = 0.015$). Since calling activity is directly linked to reproductive events, early but reduced calling intensity suggests temperature-related impacts on the local chorus frog population. As 2024 is on track to be hottest year on record, changing climate regimes may represent more challenges to the species as temperatures in Canada are expected to increase by more than 2°C by 2050.

Oral – 15 minutes

CHS / SHC Sidney 2024

Ecohydrological controls on the resilience of snake overwintering habitat: Implications for climate change

Rachel Fallas¹, Chantel Markle², Paul Moore¹, Mike Waddington¹

¹McMaster University, Hamilton, Canada. ²University of Waterloo, Waterloo, Canada

Abstract

Herpetofauna at their northern range limit must seek refuge from harsh Canadian winters by selecting suitable overwintering habitat. The Eastern Massasauga Rattlesnake (*Sistrurus catenatus*) overwinters in habitats that avoid prolonged flooded conditions and remain at temperatures above 0°C to promote overwintering survival. In peatland ecosystems, snakes frequently use raised peat hummocks as hibernacula because they have great insulating and moisture retention properties. However, climate change may threaten the persistence of suitable overwintering conditions in these hummock hibernacula due to increasingly variable winter temperatures that drive major freeze-thaw events and water table fluctuations. To explore the spatiotemporal availability of suitable overwintering conditions, we have instrumented hummocks in ten peatlands distributed along a 60 km stretch of the eastern Georgian Bay region for five winters (2019–2024) to measure hummock temperature, water table position, snow depth, and micrometeorological conditions. We have also collected ecohydrological characteristics at hummock, wetland and watershed scales to identify features linked to resilient overwintering habitat. This presentation will discuss the outlook of suitable overwintering habitat availability under projected climate change scenarios as well as metrics that conservation practitioners can use for assessing the suitability and resilience of overwintering habitat.

Oral – 15 minutes

Student

CHS / SHC Sidney 2024

Monitoring the response of turtles to *Phragmites australis* management at the Big Creek and Long Point National Wildlife Areas in Ontario

Heather Fotherby¹, Dylan Buche², Scott Gillingwater³, Nathan Grant¹, Jeff Hathaway², Jennifer McCarter⁴, Kelsey Moxley², Madeline Sutton⁵, Stephen Van Drunen⁶

¹Natural Resource Solutions Inc., Waterloo, Canada. ²Scales Nature Park, Oro-Medonte, Canada. ³Upper Thames River Conservation Authority, London, Canada.

⁴Parks Canada, Guelph, Canada. ⁵Environment and Climate Change Canada - Canadian Wildlife Service, North York, Canada. ⁶Independent Ecologist, Shelburne, Canada

Abstract

The Long Point Peninsula, internationally recognized as a significant ecosystem and a World Biosphere Reserve, is threatened by the non-native, invasive perennial wetland grass, Common Reed (*Phragmites australis subsp. australis*; herein referred to as *Phragmites*), which first colonized the area in the early to mid-1990s and has quickly spread. Environment and Climate Change Canada - Canadian Wildlife Service (ECCC-CWS) has been managing *Phragmites* in the Big Creek National Wildlife Area and Long Point National Wildlife Area since 2019. Treatment and management of *Phragmites* is a multi-year process involving herbicide application and mechanical management (i.e., mowing, rolling, and/or cutting), and the impacts of such a process on species at risk (SAR) and their habitats is not well known in published literature. To evaluate the effects of *Phragmites* management on the relative abundance and habitat use of SAR turtles, a Before-After-Control-Impact (BACI) study was initiated in the spring of 2019 by ECCC-CWS and continued in collaboration with Natural Resource Solutions Inc. and Scales Nature Park in 2021, 2022 and 2023. In conjunction with the BACI study, a radio-telemetry study was also conducted between 2021 and 2023. This study provides contradictory results on the short-term impact of *Phragmites* management on turtle abundance, richness and habitat use. The reported dissimilarities are complex, and likely influenced by sample size and a broad range of dynamic environmental variables. Any subsequent effects of *Phragmites* management on reptile communities may therefore not be apparent without long-term monitoring.

Oral – 15 minutes

CHS / SHC Sidney 2024

Investigating the impacts of industrial seismic vibrations on the development of snapping turtle (*Chelydra serpentina*) eggs

Charlotte M. Galloway¹, Amanda Martin^{1,2}, Christina M. Davy¹

¹Carleton University, Ottawa, Canada. ²Environment and Climate Change Canada, Ottawa, Canada

Abstract

Turtle populations are heavily impacted by obvious anthropogenic landscape changes such as habitat loss, and road densification leading to increased mortality. However, human activities may also have more cryptic effects that may limit recruitment. For example, turtle eggs laid near human development are exposed to industrial seismic vibrations (ISV) from construction, traffic, and energy infrastructure that could potentially impact development. To test whether ISV may pose a threat to turtle populations, we investigated the effects of ambient seismic vibrations on the development of snapping turtle (*Chelydra serpentina*) eggs. In this pilot study, we tested whether eggs were affected by the strongest vibrations nests are likely to experience by building custom vibration tables to simulate a range of vibrations. Nine snapping turtle nests were collected from the wild and each clutch was equally divided into four groups, which were incubated under controlled conditions in four different vibrational treatments: 1) simulated freight trains (30–35 Hz, 0.5 g) as constant stimuli, 2) freight trains as intermittent stimuli (12h with vehicles distributed normally, 12h off), 3) heavy traffic (20Hz, 0.05 g) as intermittent stimuli, and 4) a no-vibrations control treatment. We compared hatch success, incubation duration, hatchling body characteristics, and physical abnormality rates among the treatments. Our results will clarify whether ISV is a potential threat to turtle populations and will help inform future experiments exploring the effects of ISV on developing turtles and other herptiles.

Poster

Student

Colour variation of invasive Common Gartersnakes (*Thamnophis sirtalis*) in Newfoundland

Andrea E.S. Gigeroff^{1,2}, James Baxter-Gilbert², Jacqueline D. Litzgus¹, Julia L. Riley²
¹Laurentian University, Sudbury, ON, Canada. ²Mount Allison University, Sackville, NB, Canada

Abstract

Common Gartersnakes (*Thamnophis sirtalis*) display striking colour variation across their geographic range. Their colour patterns are not simply indicative of geographic location, because patterns are also variable within subspecies and populations. In 2023 and 2024, we collected gartersnakes from three introduced populations on the island of Newfoundland. The origin of these snakes on the island is not known, yet through parsimony one could assume the subspecies to be the Maritime Gartersnake (*T. s. pallidulus*), although this has yet to be confirmed with genetic analysis. Our objective is to examine colour variation in Newfoundland gartersnakes, and gartersnakes in their native range, to supplement genetic analyses to determine the origin of gartersnakes in Newfoundland. We will qualitatively compare the colour variation in Newfoundland gartersnakes using photographs taken during fieldwork in 2023 and 2024, and in native range Maritime and Eastern Gartersnakes (*T. s. sirtalis*) using iNaturalist observations. Phenotypic variation in colour patterns may provide a supplement to genetic analysis to determine the origin and degree of genetic exchange between populations of gartersnakes in Newfoundland, which will help guide management practices for this introduced species on the island.

Poster

Student

CHS / SHC Sidney 2024

Update on the invasion of Common Gartersnakes (*Thamnophis sirtalis*) in Newfoundland

Andrea E.S. Gigeroff^{1,2}, Julia L. Riley², James Baxter-Gilbert², Jacqueline D. Litzgus¹
¹Laurentian University, Sudbury, ON, Canada. ²Mount Allison University, Sackville, NB, Canada

Abstract

Common Gartersnakes (*Thamnophis sirtalis*) are an introduced species on the island of Newfoundland. Official reports of snakes in Newfoundland date back to 2010, when a gravid female was captured in a community on the western coast of the island. However, anecdotal observations of snakes have been made across the island and as far back as the 1950s. During fieldwork in 2023, we confirmed the presence of gartersnakes in three areas of Newfoundland. In 2024, we returned to these areas to collect snakes for later genetic and diet analyses. We have found evidence of sustaining populations with gravid females and juveniles in the Bay St. George South region of Western Newfoundland and the Baie Verte Peninsula in North-Central Newfoundland, and adult snakes in the town of Trout River near Gros Morne National Park. We also received recent, anecdotal reports, photographic evidence, and roadkill from towns across the island where snakes had not previously been documented. These sightings suggest that gartersnakes occur at low density across the island, and in high density in at least three locations. This project aims to determine the origin, extent, and ecological impact of gartersnakes in Newfoundland, which will help to determine whether a local management plan is necessary for this species, and what management actions should be taken. More broadly, this work represents the first comprehensive study of an established, non-native population of Common Gartersnakes, which provides a unique opportunity to test theory about the contribution of ecological and behavioural traits to their invasion success.

Oral – 15 minutes

Student

CHS / SHC Sidney 2024

Needle in a haystack: Field methodologies for researching Canada's elusive Sharp-Tailed Snake

Rebecca Golat

Biolinx Environmental Research Ltd., North Saanich, Canada

Abstract

Sharp-tailed Snakes present significant challenges for field studies due to their small size, nocturnal behavior, and semi-fossorial lifestyle, making conventional radio-telemetry impractical. To address this, innovative methodologies, including the use of Passive Integrated Transponder (PIT) tags with automatic readers were developed. Networks were set up in various microhabitats at two study sites on southern Vancouver Island. To capture Sharp-tailed Snakes for tagging, surveys use artificial cover objects. Although this method effectively helps locate new snakes for tagging, it provides limited information on their broader habitat use. Handheld readers and a tendril antenna system are used to further track tagged snakes. Ground scanning is conducted systematically from the snake's last known location, and if the snake is not found, suitable microhabitats are spot-checked within and beyond the search area. For each captured snake, size measurements and sex are recorded. Additionally, photographs of the underside of the chin and tail for each individual are used for identification through pattern mapping. This photographic method aids in recapture efforts when PIT tagging is not feasible and provides fundamental data on longevity and snake movements. Snakes that meet the weight/length requirements are transported to the field laboratory for tag implantation. Because of the small body size and thinness of Sharp-tailed Snakes, PIT-tag must be surgically inserted into the body cavity, rather than applied subcutaneously. These approaches have significantly enhanced our understanding of the Sharp-tailed Snake's habitat preferences and movement patterns, providing valuable data for conservation efforts.

Oral – 15 minutes

Student

CHS / SHC Sidney 2024

Northern Map Turtles (*Graptemys geographica*) overwintering habitat selection in a fragmented waterway

Samantha Howard^{1,2}, Valerie Von Zuben², Michelle DiLeo^{2,1}, Christina M. Davy^{1,3}

¹Trent University, Peterborough, Canada. ²Ministry of Natural Resources Wildlife Research and Monitoring Section, Peterborough, Canada. ³Carleton University, Ottawa, Canada

Abstract

Northern map turtles are a freshwater turtle species that aggregates in the winter at communal overwintering sites, where they remain active. This species occurs in the Trent Severn Waterway, which spans from Georgian Bay to Lake Ontario and consists of 42 locks and more than 100 dams. With increased shoreline development and climate change, water levels across the system vary significantly throughout the year, particularly in fragmented areas between control structures where access to ideal overwintering habitat may be limited. Using a combination of VFH and GPS tags we will compare habitat selection by turtles in sites fragmented by locks and dams where access to deep water is limited, to control sites where turtles have access to larger bodies of water with more variation in depth. This information will help us understand if turtles in fragmented sites select different overwintering habitat, potentially due to limited choice. Throughout the winter, we will also monitor changes in water level, flow, temperature, dissolved oxygen, substrate composition, and macrophyte density at overwintering sites. We expect selected overwintering sites in fragmented areas to be significantly shallower, have higher water flow, and more dissolved oxygen than control sites. Our results will provide a better understanding of how water level management may impact northern map turtles.

Poster

Student

CHS / SHC Sidney 2024

Snakes, fences and temperature extremes: Subsurface artificial refugia provide escape from heat

Chloe Howarth¹, Lindsay Whitehead¹, Shayleen Gray¹, Julia Burkart¹, Valerie Law¹, Christine Bishop², Karl Larsen¹

¹Thompson Rivers University, Kamloops, Canada. ²Environment and Climate Change Canada, Delta, Canada

Abstract

Human-modified landscapes can negatively impact wildlife; mitigation measures, such as over- and under-passes and exclusion fencing, often are employed to counteract these impacts. Despite this, mitigation structures can create their own negative impacts. In the case of snake exclusion fencing, the goal to exclude snakes from anthropogenic landscapes may result in exposure-related stress and even mortality to the animals. Here, we design and report on snake use and environmental temperatures within low-cost artificial refugia structures installed in a xeric ecosystem in southern British Columbia, Canada. Using dataloggers and trail cameras, we monitored the refugia (n = 10) over four years. All told, we documented 807 total uses of the refugia by three at-risk species in the snake community, namely, the Western Rattlesnake (*Crotalus oreganus*), Great Basin Gopher Snake (*Pituophis catenifer deserticola*), and Western Yellow-Bellied Racer (*Coluber constrictor mormon*). The camera data included numerous occurrences of co-occupancy (both conspecifics and multi-species) and an observed range of behaviors. The refugia created a suitable thermal microenvironment and buffered the animals against extreme heat, including the 2021 Heat Dome event when the structures may have offered life-saving thermal refuge by remaining below critical maximum temperatures for our target species. Artificial refugia, as employed in this study, offer a promising approach for conservationists and land managers to mitigate exposure stress for snakes in human-altered landscapes.

Oral – 15 minutes

CHS / SHC Sidney 2024

Where 25 years of species management have left us: 280 frogs and counting

Briar Hunter

BC Ministry of Water, Land and Resource Stewardship, Surrey, Canada

Abstract

An emergency designation in 1999 left the Oregon Spotted Frog forever labelled “Endangered” in Canada. Perhaps “forever” sounds self-defeating, but it is hard to come back from an estimated 90% decline in historic range. At the publishing of the Recovery Strategy in 2015, there were four known populations of Oregon Spotted Frog in Canada, all within the Fraser Valley of British Columbia. Now in 2024, one of those populations has been extirpated while three more populations have been discovered; one of which is on its own brink of extirpation now. In addition, three conservation breeding populations have been established, a reintroduction site created, and over 50,000 tadpoles and metamorphs released into select floodplain marshes and sloughs in BC. Yet the estimated adult population across all of British Columbia, and by extension Canada, was less than 300 this year. Journey with us through 25 years of recovery, conservation and management of the Oregon Spotted Frog in search of answers, clarity and hope in the face of immense challenges and threats. Spoiler alert: they are still the most endangered anuran in Canada.

Oral – 15 minutes

CHS / SHC Sidney 2024

Western Toad (*Anaxyrus boreas*) use of road habitats in Nak'azdli Whut'en territory, British Columbia

Candyce Huxter¹, Mark Thompson², Heather Bryan¹

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Abstract

Western Toads (*Anaxyrus boreas*) are culturally and ecologically important, but many populations are declining due to human disturbances such as forest harvesting and roads. Despite this, few studies have investigated these impacts on amphibians in north-central BC. This graduate research investigates the effects of disturbance on toad populations in Nak'azdli Whut'en territory. Construction and use of resource roads can result in depressions on road surfaces and along roadsides. These depressions fill with rainwater, resulting in shallow, warm ponds that are initially attractive to amphibians, particularly for oviposition. However, when temperatures increase rapidly (i.e., heat wave), these ponds are prone to drying and may serve as population sinks as eggs and larvae become trapped. In June 2024, crews including Indigenous Land Guardians drove resource roads during the day searching for road ponds and roadside wetlands, surveying for amphibian use. We noted species, life stage, water and air temperature, relative humidity, stand age, and general habitat type at 73 sites. Toads were detected at 29 of these sites. Where possible, we measured maximum length, width, and depth of ponds. One month later, following two weeks of extremely high temperatures, we revisited select sites to document mortality and changes in the ponds. In this poster, we describe the road habitats used by Western Toads in Nak'azdli territory. Radiotelemetry tracking of Western Toads is also planned for August 2024 and summer 2025. Findings from this work may be useful for Nak'azdli Land Stewardship planning and forestry operations seeking to prioritize amphibian conservation.

Poster

Student

CHS / SHC Sidney 2024

Sparks among the snakes? A potential genetic explanation for unusual colour morphs *Daboia russelii* (Shaw & Nodder, 1797) and *Lycodon aulicus* (Linnaeus, 1758) from India

Dikansh Parmar^{1,2}, Hinrich Kaiser^{2,3}

¹Veer Namad South Gujarat University, Surat, Gujarat, India. ²Leibniz Institut zur Analyse des Biodiversitätswandels, Bonn, Germany. ³Victor Valley College, Victorville, California, USA

Abstract

Along with the well-documented color polymorphisms of various snakes bred in the pet trade, more and more reports of color aberrations in snakes encountered in the wild are being published. This is likely a consequence of the increased activities of snake rescue teams around the globe and the resultant higher level of snake awareness among local human populations. We found unusual color morphs in two vipers, *Daboia russelii*, and a wolfsnake, *Lycodon aulicus*, in India. These snakes display a strongly abnormal coloration, with near-leucistic and unpatterned vipers and a nearly unpatterned wolfsnake. Yet each of these snakes possesses striking vertebral lines. The uniformly brown *L. aulicus* has a normal neck band but the expected transverse banding pattern is missing. The coloration of the vertebral scale row and its two adjacent scales creates a longitudinal pattern of a dark brown vertebral line framed in a cream color, beginning 11 scales beyond the parietals and extending two thirds the body length. In contrast, the line pattern in the vipers begins at the neck and consists of three un- or lightly pigmented scales along the vertebral line, framed by a single row of dark scales on either side and extending more faintly onto the posterior part of the body. While the primarily white viper from Gujarat retains the dark lateral rings that typically offset different shades of brown in normal phenotypes, the body of the subadult from Goa is a patternless light brown. The patterning is strongly reminiscent of a genetic modification in the pathway controlling chromatophore development that has been called spark/spark in ball pythons (*Python regius*). Detailed genetic studies of this phenomenon would be ideal, but the uniqueness of these color aberrations in these two species makes such work impractical – but it reveals nature as a sometimes-eccentric painter of lines.

Oral – 5 minutes

CHS / SHC Sidney 2024

Impact of landscape composition and agriculture on snake abundance

Michelle LaFlamme

University of Ottawa, Ottawa, Canada

Abstract

Habitat loss and fragmentation are the main causes of biodiversity loss in terrestrial ecosystems, with agriculture being one of the leading sources. Reptiles are particularly sensitive to the impacts of land use change and fragmentation, yet are relatively understudied. I aim to investigate the effect of landscape composition and agriculture on snake abundance in wetlands in Eastern Ontario and Southern Québec. I will evaluate the abundance of garter snakes (*Thamnophis sirtalis*) and red-bellied snakes (*Storeria occipitomaculata*) in wetlands embedded in an agricultural matrix versus wetlands in natural landscapes. I will examine 33 wetlands across a gradient of agricultural versus natural areas. Surrounding land cover within 100 – 1000 m buffers around each wetland will be assessed. Plywood cover boards will be used to sample snakes along 100 - 200 m transects along the edge of each wetland (10 - 20 cover boards per site), and abundance will be estimated by surveying each site about every week, from May to September. Snakes will be identified to species, sexed, measured for snout-to-vent length, and marked for capture-mark-recapture population size estimation. The relationship between the proportion of agriculture and snake abundance will be modelled alongside potentially confounding effects such as other land cover types within the buffer (i.e. urban land, forest, and wetland cover) as well as vegetation cover for finer-scale site variation. This research will provide further insight into species' responses to anthropogenic land use and habitat degradation/fragmentation for an understudied and globally threatened taxon.

Poster

Student

CHS / SHC Sidney 2024

Re-Occupation of rookery sites by female Western Rattlesnakes (*Crotalus oregonus*) post-wildfire

Caroline Lafond, Lindsay Whitehead, Karl Larsen, Dana Eye
Thompson Rivers University, Kamloops, Canada

Abstract

Wildfires significantly impact ecosystems by altering landscape heterogeneity, plant succession, biodiversity, understory structure, wildlife response, and species survival. These effects are particularly profound in ecosystems like grasslands, which historically experienced frequent low-intensity burns but now face more severe wildfires after 150 years of fire suppression. The 2021 NK'Mip Creek wildfire in southern British Columbia, Canada, affected ecologically significant grassland habitats that supports a large number of threatened species including the Western Rattlesnake (*Crotalus oregonus*). Long-term research at this site examined the wildfire's impact on gravid female rattlesnakes. Two years post-fire, 19 rookeries out of 25 continued to be occupied by gravid females, with no significant difference in reoccupation rates between burned and unburned locations. Vegetation cover appeared to have recovered, both grass and shrub cover had undergone recovery, as there were no significant decreases in vegetation cover compared to pre-wildfire conditions. However, this vegetation change did not influence rookery occupancy. Eleven gravid females detected at the rookeries before the fire returned to the same rookeries post-fire, showing fidelity to their rookery sites. No gravid rattlesnakes were recaptured at different rookery sites two years after the wildfire. Gravid females exhibited a significant decrease in body condition compared to pre-wildfire captures, a trend also observed at a reference site, suggesting the decrease was not linked to the wildfire. These results indicated that gravid female Western Rattlesnakes showed resilience to natural disturbances like wildfires.

Oral – 5 minutes

CHS / SHC Sidney 2024

Ecology of a newly described Four-toed Salamander population in New Brunswick

Ashton Leal, Georgia Christie, James Baxter-Gilbert*, Julia Riley*
Mount Allison University, Sackville, Canada

Abstract

Urbanization can negatively impact biodiversity globally, often resulting in smaller and more isolated wildlife populations in cities. Species that have specific habitat requirements are particularly vulnerable to these consequences of urbanization. One such rare amphibian in New Brunswick, which has specific habitat requirements, is the Four-toed Salamander (*Hemidactylium scutatum*). These critically imperilled salamanders – previously found at only one site in NB - have a cryptic ecology, and require a bog or fen habitat for nesting, adjacent to upland forests for breeding and feeding. Our research aims to describe the ecology of a newly described, second population in Riverview, New Brunswick, the first population in an urban area provincially. We are conducting a mark-recapture study to gain insight into this population's health and size. We are also studying microhabitat preferences within both fen and forest habitats by measuring an array of environmental factors (e.g., temperature, relative humidity, vegetation composition, canopy cover) where a salamander has chosen to be and at a random location without a salamander. We will compare environmental conditions between these locations, which will provide an understanding of the habitat preferences of these salamanders at this newfound urban site. Fieldwork is ongoing and preliminary results will be presented. This research will provide insights into whether these salamanders are being challenged by anthropogenic pressures in their urban habitat. Our work significantly expands our understanding of this species in New Brunswick and will facilitate effective management of our province's smallest vertebrate.

*These authors contributed equally as supervisors to this research.

Poster

Student

CHS / SHC Sidney 2024

Genetic diversity does not affect sex in a species with temperature-dependent sex determination

Robin Lloyd, Melanie Massey, Njal Rollinson
University of Toronto, Toronto, Canada

Abstract

At least two major hypotheses for the adaptive significance of temperature-dependent sex determination assume that TSD evolved because the fitness of one sex is relatively sensitive to condition (general health vigor). A simple proposition under these hypotheses is that incubation temperature is a dominant stressor that impacts lifetime condition of individuals. We extend this reasoning and propose that any selectively relevant agent that affects condition might also impact sex. Given that inbreeding generates stress at the cellular level, we test whether the inbreeding coefficient of an embryo influences sex when incubation temperature is held at a value that should otherwise produce an even sex ratio (TPiv). We incubated Midland Painted Turtle eggs from Algonquin Provincial Park at the TPiv, then we sexed each hatchling, and we ultimately genotyped each hatchling along with adults from the wild population to estimate inbreeding coefficients of each hatchling. We found no support for our hypothesis. The population had a considerable amount of outbreeding with a mean observed heterozygosity of 0.236 and a mean inbreeding near zero. Male hatchlings from the incubation experiment had higher levels of genetic diversity compared to females, albeit these differences by sex were not statistically significant. Our findings do not provide evidence to support the hypothesis that genetic diversity affects sex ratio, however the extensive outbreeding observed in our population made it difficult to test our hypothesis.

Oral – 15 minutes

Student

CHS / SHC Sidney 2024

Snakes at the skate park: A novel half-pipe fence design for mitigating road mortality of Eastern Foxsnakes (*Pantherophis vulpinus*) in eastern Georgian Bay, Ontario

Sabrina Lounsbury¹, Tianna Burke², Jacqueline Litzgus¹

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Abstract

Effective mitigation efforts for reducing reptile road mortality are crucial for the conservation of many Species-At-Risk. The Eastern Foxsnake (*Pantherophis vulpinus*) is listed as threatened in Canada, largely due to road mortality. Because of their large size and strong climbing ability, commonly-used reptile exclusion fencing may not be effective at preventing Eastern Foxsnakes from accessing roads. We are investigating the efficacy of a novel mitigation design consisting of a concave half-pipe barrier fence with curved ends to redirect snakes away from the road surface. We are conducting in-situ behavioural trials with Eastern Foxsnakes to assess their climbing ability on the concave fence and supporting rebar. Preliminary results suggest that Eastern Foxsnakes are not able to climb the concave barrier but will utilize the supporting rebar to climb the mitigation. We have tested 21 individual Eastern Foxsnakes in 27 total trials on the mitigation. All snakes were unable to navigate past the fence over-hang at the top of the rebar except for one very large individual. If successful for Eastern Foxsnakes, this barrier design would also be effective for other local reptiles, amphibians, and small mammals, thus protecting animal biodiversity on a broader scale. The results of our research will contribute to Ontario's Recovery Strategy for Eastern Foxsnakes which states that developing and evaluating road mortality mitigation is of critical priority.

Oral – 5 minutes

Student

CHS / SHC Sidney 2024

Hatchling headstarting success in Western Painted Turtle populations

Aimee Mitchell, Maya Meron, Jasmine Carlin, Miranda Epp
Coastal Painted Turtle Project, Port Coquitlam, Canada

Abstract

The Coastal Painted Turtle Project (CPTP) has been working with Coastal Western Painted Turtles (WPT) since 2008. This program incorporates monitoring, habitat restoration and enhancement, and captive headstarting of wild nests. During headstarting wild turtle nests are incubated, and the hatchlings are raised in captivity until they reach 30 g in weight. They are then given a unique passive integrated transponder (PIT) tag. Juvenile recruitment is often the limiting factor in WPT population recovery. Wild female WPT will only produce 1-2 turtles in their lifetime (~25 years of breeding). Headstarting changes those odds from 99.9% failure to 50% failure. In the first year of headstarting telemetry studies showed 75-100% survival success of 30 g hatchlings when tracked in their first year. Keeping records of the hatchling's unique plastrons and PIT tag IDs has allowed us to track growth and genetic lineage as these turtles mature. When the project began WPT were listed as endangered and through the combined efforts of the CPTP they are now listed as threatened.

Poster

CHS / SHC Sidney 2024

Automated PIT-tag readers elucidate habitat use by Sharp-tailed Snakes on Vancouver Island

Lennart Sopuck, Kristiina Ovaska, Christian Engelstoff, Rebecca Golat
Biolinx Environmental Research Ltd., North Saanich, BC, Canada

Abstract

Recovery strategy for Sharp-tailed Snake in Canada calls for the clarification of habitat use to help identify critical habitat, including the extent to which the snakes use closed canopy forest adjacent to warm openings. Artificial cover-objects that provide thermoregulation sites have been the primary method for detecting these elusive snakes, but their effectiveness in closed canopy habitats is questionable. We deployed automated readers with 60 cm-diameter loop antennas set around natural microhabitats along transects and with 20 m long-cord antennas to detect PIT-tagged snakes. At the primary study site (Observatory Hill), there were 4 replicate systems, set up from May 2023 to April 2024, each with three transects: forest edge in openings with scattered Garry Oak and Arbutus, transitional forest surrounding the openings, and deeper coniferous forest at least 50 m from the edge (12 reader units in total). Preliminary results of 227 detections by 22 snakes show that the vast majority of detections were along the edge (55%) and in the transitional forest (41%) but that the snakes were also occasionally detected in the coniferous forest (4%) (current up to July 2024). The majority of detections occurred during evening and night (20:00 – 02:00 h) in spring and summer with a slight shift to earlier evening activity in fall. A second automated detection site with two readers (Heals Rifle Range) has been less productive with 12 detection events by 6 snakes since its deployment in September 2022. Expansion of the set-up to match treatments on Observatory Hill is in progress.

Oral – 15 minutes

The impact of rising temperatures on development and brain size in larval American toads

Ella Parkinson, Frédéric Laberge
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Abstract

Temperature has a strong influence on the development and physiology of ectothermic animals. Previous work suggests that increased temperature during anuran larval development increases relative brain size, which may have fitness benefits through enhanced cognitive capacity and behavioural abilities.

This study investigated the effect of four temperature treatments on developmental rate, body size and brain size in larval American Toads (*Anaxyrus americanus*) hatched from eggs collected in Southern Ontario, Canada. Temperature treatments were chosen to represent pre-industrial temperatures at the egg collection site (16-19°C night-day cycle with 9:15 h D:L photoperiod), present conditions (18-21°C), projected global warming (22-25°C) and extreme warming (22-30°C) scenarios. Temperature cycled daily between the two temperatures for the duration of larval development. The larvae were sampled upon reaching the late larval Gosner stage 42, and measurements of body size (snout-vent length) and brain size (mass) were taken.

Our findings indicate that larvae raised at higher temperatures developed faster and were smaller at stage 42 than those raised at lower temperatures. There was no effect of developmental temperature on relative brain size. This suggests that increased developmental temperatures driven by anthropogenic climate change may affect American Toad developmental rate and body size at metamorphosis without influencing neural investment.

Future work will aim to confirm these results by increasing sample size and using more environmentally relevant temperature regimes.

Oral – 15 minutes

Student

CHS / SHC Sidney 2024

Effects of 48 h sulfolane exposure on growth and behaviour of wood frog larvae (*Lithobates sylvaticus*)

Amanda Reside, Frédéric Laberge, Ryan Prosser
University of Guelph, Guelph, Canada

Abstract

Sulfolane is a chemical used in many industrial processes, notably in the refinement (or “sweetening”) of sour natural gas. Sulfolane has been released into the environment, including into ground water at industrial sites, and is an emerging contaminant of concern due to its high solubility in water. As part of a collaboration investigating the ecological risk of sulfolane exposure, this work evaluates the effects of acute sulfolane exposure on the behaviour and growth of developing Wood Frogs (*Lithobates sylvaticus*). Six Wood Frog egg masses were collected from a natural area and divided into smaller groups, which were randomly assigned to one of two experiments. Each experiment consisted of a single 48h exposure to either control, 0.1, 1, 10, 100, or 1000 mg/L sulfolane, either during embryonic development (Gosner stage 6-9) or early larval development (Gosner stage 22-25). For both experiments, animals were then raised in clean water until behavioural testing at approximately 7-8 weeks post-fertilization. Free-swimming tadpoles (Gosner stage 25) were placed in a novel environment (the well of a six-well plate) and recorded for baseline locomotor behaviours (distance travelled, time spent swimming, and average velocity), thigmotaxis (the tendency for prey animals to avoid the centre of a novel environment), and response to a startle stimulus. After behavioural tests, tadpoles were euthanized, fixed in formalin, and their total body length was measured. These parameters will be used to gain insight on potential sub-lethal effects of sulfolane exposure on the growth and behaviour of larval Wood Frogs.

Oral – 15 minutes

Student

CHS / SHC Sidney 2024

Status and conservation of a suburban population of Jefferson Salamanders (*Ambystoma jeffersonianum*)

Meredith Swartwout¹, Rosalind Murray²

¹University of Toronto, Mississauga, Canada. ²University of Toronto, MISSISSAUGA, Canada

Abstract

Jefferson Salamander (*Ambystoma jeffersonianum*) populations in Ontario have declined by 90% over the last 3 decades and the species is Endangered in Canada due to habitat loss. In this study, we revisit a population in the Peel region that was last comprehensively assessed 40 years ago. The surrounding area has experienced rapid urbanization and there have been changes to breeding pool hydrology that could affect the population. Our study's objectives are to assess breeding adult numbers and identify current threats to salamander populations at the study site. We replicated the previous study's design by using a drift fence with pitfall traps to capture and mark individual Jefferson Salamanders. To assess potential threats, we monitored vertebrate predators, water quality, hydrology of the breeding pools relative to salamander development, and road mortality. Our first year of data suggests that salamander populations at the site have not declined, but one of the primary threats facing this population may be a loss of males. Across 40 years, the sex ratio went from approximately 7% of the population being male to 0.8%. Additional threats identified include depredation of eggs by human-subsidized waterfowl, depredation of adults by human-subsidized mesocarnivores (e.g., raccoons, skunks), and road mortality. Our study informs conservation actions, such as habitat remediation and education, to enhance this population's long-term survival.

Oral – 15 minutes

CHS / SHC Sidney 2024

Challenges and successes from installing ecopassages and wildlife fencing at a central Ontario industrial site.

Shannon Tallon, Craig Cochrane
Canadian Nuclear Laboratories, Chalk River, Canada

Abstract

Blanding's Turtles have been studied at the Chalk River Laboratories (CRL) site since 2010. As part of a long-term mitigation strategy to prevent road mortality, seven ecopassage systems were installed in recent years (2020, 2021, and 2023) on the main access road and a major haul route.

Installation followed Ontario industry best practices and design. Meeting the objectives of wildlife exclusion and animal passage was challenging and at many times at odds against design for roads and drainage. Some aspects of which would not have been possible to overcome in a traditional provincial or municipal setting. These challenges included:

- Size restrictions of culverts versus openness ratio requirements
- Location of fencing with respect to waterbodies and rock outcrops
- Damage from grading, erosion, and snow removal activities
- Vegetation control
- Escalated costs for installation.

However, the ecopassages have also yielded apparent benefits to the species since installation. Trail cameras have been installed at each passage and key locations nearby. Some key successes include:

- Observation of multiple turtle species and other incidental species using the ecopassages
- Reduced incidence of road mortality
- Research opportunities for habitat fragmentation and predation on the species with local universities.
- Opportunity to observe nesting and deploy nest protections in a timely manner

A lot of information continues to be analyzed from the installations. The hope is that lessons learned from these installations will be incorporated into future works planned to begin this year. Feedback to federal and provincial regulatory bodies may influence future guidance and policy documents across the country.

Poster

CHS / SHC Sidney 2024

Population demography and spatial ecology of a central Ontario population of Spotted Turtles (*Clemmys guttata*)

Steph Thibeault¹, Kelsey Moxley², Jeff Hathaway², Jacqueline D. Litzgus¹

¹Laurentian University, Sudbury, ON, Canada. ²Scales Nature Park, Oro-Medonte, ON, Canada

Abstract

Spotted turtles (*Clemmys guttata*) are a globally endangered species of freshwater turtle endemic to eastern North America. Canadian populations exist only in Ontario and current literature has focused on coastal populations; little is known about inland populations in central Ontario. Conspecific populations with varying distributions are exposed to different environmental conditions and can vary in natural- and life-history traits; managing and conserving this endangered species may require site-specific information. We partnered with the *Saving Turtles at Risk Today (S.T.A.R.T.) Project*, used 10 years of mark-recapture data, and conducted a 2-year radiotelemetry study (2022-24) on an inland population in central Ontario to describe its demography and spatial ecology. This population exhibited some distinct differences in ecology from coastal populations. The population displayed a skewed sex ratio towards males (1.5 male: 1 female) and slight sexual dimorphism in carapace length (males larger). Males occupied larger home ranges (5.23 ± 0.97 ha) and core areas (0.60 ± 0.15 ha), as well as travelled greater mean daily distances (11.80 ± 0.76 m/day), than females (2.95 ± 1.41 ha; 0.27 ± 0.049 ha; 8.17 ± 0.74 m/day, respectively). Seasonal use of aquatic habitats differed than those in coastal populations; individuals in the inland site were found in the deepest available water during aestivation. Future research on inland populations should focus on female nesting behaviours, as site logistics prevented us from locating nesting females. More research should also be conducted on aestivation in this species, as the proximate factors influencing late summer behaviours have yet to be quantified and understood.

Oral – 15 minutes

Student

CHS / SHC Sidney 2024

Introducing the philosophy of abduction to conservation science for the assessment of amphibian populations in the western Cordillera and the territory of Nak'azdli Whut'en First Nations.

Mark Thompson

EcoLogic Consultants, Prince George, Canada. University of Northern British Columbia, Prince George, Canada

Abstract

A conservation assessment of amphibian populations in the montane, boreal, and taiga ecoregions is presented. The assessment is to be published in an upcoming and co-authored book chapter within the Amphibian Biology series. Indigenous authors from Nak'azdli Whut'en shared their views in contributing to its development. The chapter begins with a description of the geography and physiography that was significantly shaped by the Western Cordilleran ice-sheet throughout the Pleistocene. Amphibian movements, the spatial structure of their ranges, and present day distributions were greatly influenced by the complex mountainous terrain. Distributions shifted northward, split, spread, and reconnected during post-glacial infiltration to occupy dry plateau and mesic forest habitats. The history of the migratory pathways followed has left evidential traces in the traits, genes, and locations of present-day amphibians.

Amphibian species and habitat distribution models are described. They spatially isolate where populations are more likely to be structured into a landscape. The models provide clues on where to systematically sample today, including counts and measures of organisms and their habitats, to infer the ecological past. The assessment also introduces the logic of abductive reasoning in conservation science. Abduction is critically relevant to an understanding of amphibian declines and the potential solutions available. Despite its absence from the conservation literature and discourse, abduction underpins why we are conservation scientists and how we understand the world around us. Knowledge of abduction when paired with ecological theory can enhance scientific relations and partnerships with First Nations people to conserve amphibians in modern landscapes.

Oral – 15 minutes

CHS / SHC Sidney 2024

Genetics of the Eastern Massasauga Rattlesnake conservation breeding program

Hana Thompson^{1,2}, Meg Britt³, Rick Vos⁴, Sarah Jane Stanger-Guy⁵, Sreeja Leelakumari¹, Steven Jones¹, Stephen Loughheed³, Amy Chabot^{2,1}

¹Canada BioGenome Project, Vancouver, Canada. ²African Lion Safari, Cambridge, Canada. ³Queen's University, Kingston, Canada. ⁴Toronto Zoo, Toronto, Canada.

⁵Scales Nature Park, Orillia, Canada

Abstract

Conservation breeding programs are an ex-situ conservation strategy to reintroduce wild populations that have been lost, or reinforce populations in decline. In most breeding programs mean kinship based on pedigree data is used to create breeding pairs to minimize inbreeding. Some breeding programs are starting to incorporate genetic data to obtain more accurate relatedness measures and monitor genetic diversity. The Eastern Massasauga Rattlesnake (EMR) is Ontario's only remaining venomous snake, native to Ontario and northeastern United States. EMR populations are split into two COSEWIC designatable units, which are considered threatened and endangered in Ontario. Conservation efforts for this species include a conservation breeding and reintroduction program. The EMR is also a focal species of the Canada BioGenome Project (CBP), which aims to produce annotated reference genomes for approximately 400 Canadian species. As part of the CBP, we are doing a genetic assessment of the EMR conservation breeding population to help inform their management and assist in recovery efforts. We are using whole genome assays of Eastern Massasauga rattlesnakes, including representation from both in- and ex-situ populations. We will analyze genetic diversity and relatedness between individual snakes in the conservation breeding population, as well as genetic differentiation between snakes within the ex-situ population that are from different geographic locations, and between the in-situ and ex-situ populations. Results will be used to inform conservation breeding management, by developing breeding pair recommendations to maintain genetic diversity, ensure sustainability of the ex-situ population, and to help identify the most suitable individuals for release.

Oral – 15 minutes

Repeatability of social and locomotion behaviours in neonatal Spiny Softshell (*Apalone spinifera*) suggest innate personality in hatchling turtles

Charlotte Turenne¹, Sean Boyle^{2,1}, Caitlin Menzies¹, Christina Davy¹

¹Carleton University, Ottawa, Canada. ²Memorial University of Newfoundland and Labrador, Corner Brook, Canada

Abstract

Animal personality describes behaviours that vary among individuals, but are consistent within individuals across contexts. Some behaviours associated with personality can be learned in response to the environment over time. However, measurable personality traits in neonates should reflect heritable variation, particularly in taxa such as turtles that do not provide neonatal parental care. To explore whether hatchling freshwater turtles exhibit measurable personality traits, we conducted repeated behavioural trials with small groups of neonatal Spiny Softshells (*Apalone spinifera*) placed into a controlled environment. We scored their behaviours using an ethogram, and quantified intra-individual repeatability of behaviours among trials. We focused on behaviours associated with sociality, and activity. Sex was not a predictor of behaviour repeatability. Within individuals, behaviours related to sociality showed varying repeatability, from moderate to low ($R = 0.12-0.59$), while behaviours related to activity had good repeatability ($R = 0.66 - 0.68$). The higher repeatability of activity-related traits suggests that selection on these traits may be stronger than on traits associated with sociality. Our results support the hypothesis that freshwater turtles exhibit measurable personality at hatching, reflecting innate and presumably heritable personality traits. Future research should investigate the adaptive significance of personality variation in turtles and explore what factors might influence turtle personality traits over time.

Oral – 15 minutes

Student

CHS / SHC Sidney 2024

Conservation challenges and successes for amphibians during road construction on the west coast of Vancouver Island

Kryisia Tuttle¹, Barb Beasley², Katie Turner³

¹LGL Limited, Sidney, Canada. ²Association of Wetland Stewards for Clayoquot & Barkley Sounds, Ucluelet, Canada. ³Huu-ay-aht First Nation, Bamfield, Canada

Abstract

The need to find effective ways to mitigate the adverse effects of roads on wildlife is paramount as global biodiversity continues to decline and road networks expand. A road upgrading project on the west coast of Vancouver Island presented the opportunity to use various mitigation approaches aimed at increasing the survival of amphibians during construction and over the long-term. In collaboration with the Huu-ay-aht First Nations and industry, we put work windows and temporary road closures in place to protect amphibians dispersing/migrating across the road en route to and from an important breeding site. This resulted in a two-month closure that allowed tens of thousands of post-metamorphic Western Toads (*Anaxyrus boreas*) to disperse. We organized pre-construction salvage of amphibians that included sweeps of ponded and dry roadsides before ditching, grubbing, and replacing culverts. Over 2000 individuals from seven species of amphibian were relocated. After collecting three seasons of data on the location of amphibian crossings, we were able to direct the repair/replacement of drainage culverts and the installation of new box culverts and fences to provide underpasses to reduce road mortality of Western Toads. Post-mitigation road surveys and images from wildlife cameras placed inside the culverts show that the underpasses have been used by over 100 adult toads during each breeding migration in 2023/2024, as well as tens of thousands of post-metamorphic juveniles. Having these tunnels in place is important for long-term habitat connectivity and population persistence as traffic volume is expected to increase with these road improvements.

Oral – 15 minutes

CHS / SHC Sidney 2024

Identifying Eastern Foxsnake (*Pantherophis vulpinus*) critical habitat along the eastern coast of Georgian Bay at Shawanaga First Nation

Kyle Vincent, Steven Kell, Jay Dertinger, Delaney Griffiths
Shawanaga First Nation, Nobel, Canada

Abstract

Shawanaga First Nation (SFN) is home to many species at risk reptiles, including the endangered Eastern Foxsnake (*Pantherophis vulpinus*). Since 2019, the Lands department at SFN has worked to understand species-at-risk reptile population sizes, spatial ecologies, threats, and to develop effective management and mitigation strategies. Yearly mark-recapture surveys, along with opportunistic community observations have begun to reveal Eastern Foxsnake population distributions at SFN, however, the locations of critical overwintering, oviposition, and movement corridors are still poorly understood. As these habitat features are critical to population persistence, we aim to augment conservation efforts by creating and monitoring artificial oviposition sites, continuing mark-recapture surveys, and conducting a radio telemetry study of Eastern Foxsnakes at SFN. Understanding seasonal habitat use will be critical to preventing further population declines, and will allow the SFN lands department to make informed land-use decisions to protect critical habitats and movement corridors. Preliminary results of mark-recapture surveys and future research methods and goals will be presented.

Oral – 15 minutes

CHS / SHC Sidney 2024

Revisiting historic Western Chorus Frog (*Pseudacris triseriata*) sites at their northern range limit to evaluate population persistence in Parry Sound district

Steven Kell, Kyle Vincent, Jay Dertinger, Delaney Griffiths
Shawanaga First Nation, Nobel, Canada

Abstract

Western Chorus Frogs (*Pseudacris triseriata*) are a small cryptic species that can be difficult to detect outside their short calling period in early spring. Although a topic of some debate, the northern range limit of the Western Chorus Frog is generally accepted to be in Parry Sound district near Shawanaga First Nation. The extent of this range limit is primarily based on aural surveys conducted in the area at sites established in the 1970's. In collaboration with the Georgian Bay Biosphere we revisited several of these northern sites in an attempt to "re-discover" these populations in the Parry Sound area. In spring 2024, we were able to revisit 9 of the historic sites with previously confirmed detections, but unfortunately we did not detect any Western Chorus Frogs. We will present results from this years surveys along with historic data, and plans for future survey efforts. Overall, this project suggests Western Chorus Frog populations are likely declining at their northern range limit, highlighting the need for augmented detection surveys and conservation efforts in the region.

Poster

CHS / SHC Sidney 2024

Diet analysis of Alberta prairie amphibians

Jordan Vos, Dan Johnson

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Abstract

Amphibians play vital roles in the Canadian prairie ecosystem, contributing to intricate food web dynamics. Despite their importance, the dietary interactions of prairie amphibians remain understudied, creating a critical knowledge gap. The study aims to understand the dietary habits of prairie amphibians, utilizing stomach flushing for more detailed assessments. Integrated hypotheses explore dietary preferences, morphological adaptations, and the influence of habitat on prey items. The overarching goal is to identify and analyze the dietary preferences and ecological roles of amphibians in the Alberta prairies. Specific objectives include identifying diet diversity, exploring the relationship between morphology and prey size, and comparing habitat types of insects through GIS analysis. While aiming for comprehensive insights, the study acknowledges limitations such as potential seasonal influences on amphibian behavior and constraints in capturing a representative sample. Generalization to other regions may be limited, but the methodologies employed could prove useful for future studies in southern Alberta. Despite the absence of conclusive results, currently, the research anticipates a significant contribution to herpetological studies by providing a base knowledge for multiple ecological and conservation applications.

Oral – 15 minutes

Student

Sexual differences in acoustic response of snapping turtles to a perceived conspecific

Emile Watanabe, Robin Lloyd, Claudia Lacroix, Njal Rollinson
University of Toronto, Toronto, Canada

Abstract

Acoustic communication plays a fundamental role in social structure and behaviour across animal taxa. While mammals and birds are well-studied, interest in other taxa has arisen to better understand the evolutionary role of vertebrate communication. Two non-avian reptile clades, turtles (Chelonia) and crocodiles (Crocodylia), have been documented to vocalize from embryonic to adult life stages. The adult vocal repertoire of the Snapping Turtle (*Chelydra serpentina*), and its function, remain to be tested. Here we document an adult vocal repertoire of the Snapping Turtle and discuss potential functions in the form of sexual selection. We quantified four distinct vocalizations including frequent hissing (Type 1), faint whistling (Type 2), paired sharp puffing (Type 3), and sharp growling (Type 4). In response to the presence of a 3-D printed model turtle, we found that adult males vocalize more, and females vocalize less, than when exposed to controls. The sex-by-treatment interaction we observed may be because males are advertising to females to test receptivity to mating or because males are exploring whether the model is another male in their home range, while females may be perceiving the model as male and are avoiding harassment by males seeking to mate, or they perceive the model as another female and are uninterested. This study contributes to our growing understanding of the more complex social structures and behavioural patterns in chelonians.

Oral – 15 minutes

Student

CHS / SHC Sidney 2024

In the wake of wildfire: Unraveling the effects of wildfire on Western Rattlesnakes (*Crotalus oreganus*)

Lindsay Whitehead¹, Karl Larsen¹, Christine Bishop²

¹Thompson Rivers University, Kamloops, Canada. ²Environment and Climate Change Canada, Delta, Canada

Abstract

As climate change drives trends towards warmer and drier environments, wildfire is increasingly prominent. Western Rattlesnake (*Crotalus oreganus*) faces heightened vulnerability in British Columbia as its habitat, located at the northern periphery of its range, consists predominantly of dry, fire-prone ecosystems. Near Osoyoos, BC, the population biology and movement ecology of rattlesnakes has been studied since 2002. In 2021, the NK'Mip Creek wildfire engulfed nearly 200 km², impacting a significant portion of the study population's habitat, altering vegetation cover at denning, foraging and birthing locations.

Our two-decade mark-recapture study suggests substantial population growth, from 190 ± 39 in 2003 to 674 ± 45 in 2021, with pre-disturbance $\lambda 1.17$ and mean survivorship of 0.76. Remarkably, post-wildfire observations show no significant decline in survivorship (0.77), or abundance (697 ± 61 in 2022, 592 ± 60 in 2023, 532 ± 75 in 2024,). Although some individuals exhibit burn scars, overall body condition remains comparable. Post-fire radio-tracking data of 41 snakes reveals that the majority of snakes ($n=36$) migrated to unburnt valleys during summer months, potentially indicating increased mortality or habitat fidelity shifts among snakes previously migrating to now-burnt areas. This research provides valuable insights into the impacts of wildfires on Western Rattlesnakes and, by extension, other snake species in northern latitudes.

Oral – 15 minutes

Student

Do urban heat islands impact the nest temperature of freshwater turtles?

Tharusha Wijewardena¹, Jeff Hathaway², Rosalind Murray¹, Julia Riley³

¹University of Toronto Mississauga, Mississauga, Canada. ²Scales Nature Park, Oro-Medonte, Canada. ³Mount Allison University, Sackville, Canada

Abstract

Urbanization can directly and indirectly affect wildlife. One consequence of urbanization is the urban heat island (UHI) effect where urban infrastructure creates environments that are warmer than surrounding natural environments. This is largely mediated through an abundance of heat-absorbing surfaces and a lack of vegetation cover in urban areas. Ectotherms rely on external temperatures to regulate their internal temperature and biology, thus, the effects of UHI on ectotherms can be significant. UHI effect may also impact the physical environment that eggs and young are exposed to, altering their survival, body size, condition, behaviour, and sex (i.e., developmental plasticity). Freshwater turtles provide an excellent model to study the impact of UHI, because they are ectotherms commonly found in urban and rural habitats, and their nests are easy to locate. To explore the impacts of UHI on the nest conditions of freshwater turtles, we collaborated with community-led nest-protection programs of Blanding's (*Emydoidea blandingii*), Painted (*Chrysemys picta*), and Snapping (*Chelydra serpentina*) turtles in the Toronto, Peel, and Halton regions in Ontario, Canada. We expect nest conditions to be warmer with greater fluctuations in urban areas compared to non-urban areas. Our study is ongoing and we provide preliminary results. Findings from our study would provide a greater understanding of the nesting ecology of urban turtles and support conservation actions that improve the nesting success of at-risk species.

Poster

Student

CHS / SHC Sidney 2024

Population ecology of Eastern Painted Turtles (*Chrysemys picta picta*) and Snapping Turtles (*Chelydra serpentina*) in New Brunswick

Jordyn Williams, Julia Riley
Mount Allison University, Sackville, Canada

Abstract

There are large knowledge gaps regarding the ecology of the two most abundant turtle species in New Brunswick (NB): Eastern Painted Turtles (*Chrysemys picta picta*) and Snapping Turtles (*Chelydra serpentina*). My research aims to understand the population ecology of these two species in Grand Lake, NB. During their active season in 2024, we conducted a mark-recapture study wherein we trapped turtles at four sites, collected data on their morphology, and marked individuals over multiple surveys. We will use these data to summarize their density, demographics and generate estimates of population size. We will also investigate possible threats to these two turtles. Common threats to turtles include (1) road mortality of adult females during migrations to nesting sites and (2) elevated nest predation levels reducing or eliminating recruitment. If the two study species are suffering these threats in NB, I expect that (1) there will be significantly more male turtles captured, and (2) that the number of juvenile turtles will be substantially less than adults. Both will differ from reported levels in other, protected, areas. I will present preliminary data about these species' abundance, demographics, and observations of threats at our study sites. The Eastern Painted Turtle and the Snapping Turtle represent 2/3 of the turtle species that occur in NB, of which all are listed as at-risk by COSEWIC. This research will have a significant, positive impact on their conservation by increasing foundational knowledge about these species' ecology and the possible threats they may face in the Maritime provinces.

Poster

Student

In the belly of the beast: Is the invasion success of a domestic amphibian linked to its diet?

Maya J. Williams, Julia L. Riley, James Baxter-Gilbert
Mount Allison University, Sackville, Canada

Abstract

The island of Newfoundland, Canada, has no native amphibians or reptiles, however since colonization six species have been introduced. The Eastern Red-backed Salamander (*Plethodon cinereus*) is the most recently described non-native herptile with a self-sustaining population occurring in Conception Bay South. Successful introduction of a species outside its native range is often only possible if the invading population can overcome the barriers and challenges present within the novel ecosystem. We posit that this salamander's establishment and proliferation may have been bolstered by dietary shifts that allowed them to feed on a wider variety of local prey (i.e., Niche Breadth Invasion Success hypothesis), as well as capitalising on pre-existing invasive prey communities (i.e., Invasional Meltdown hypothesis). To test these hypotheses, we examined *P. cinereus* stomach contents from Newfoundland and identified their prey items to the lowest possible taxonomic level. We then compared the composition of the invasive diet to the native range, using data generated from a systematic literature review. As expected, the invasive population's diet became more generalised and diverse. Furthermore, invasive prey comprised a substantial proportion of what was eaten (~67% of the volume of prey items and ~36% of the total individual prey items consumed). Our research provides foundational knowledge on what native prey are being consumed by this introduced predator and provide insights into some of the conditions that may have allowed this population to colonise a previously salamander-free landscape.

Oral – 15 minutes

Students

CHS / SHC Sidney 2024

Forestry and frogs – a long-term study of small wetlands and amphibians on Vancouver Island

Elke Wind

E. Wind Consulting, Nanaimo, Canada

Abstract

Small wetlands (i.e., < 0.5 ha) are utilized for breeding by a number of amphibian species along coastal British Columbia, but they do not receive protection (e.g., riparian buffers) under the *Forest and Range Practices Act*. We initiated a long-term study in 2004 of approximately 60+ small wetlands at three study sites in the Nanaimo Lakes area of Vancouver Island to investigate the potential effects of retention forest harvesting on amphibian populations. Data was collected on amphibian breeding and hydroperiod both pre (2004-2005) and post (2006, 2007, 2020) timber harvest. Breeding occurrence increased post harvest at all three study sites for Pacific Treefrog (*Pseudacris regilla*), and at two sites for Red-legged Frog (*Rana aurora*) and Long-toed Salamander (*Ambystoma macrodactylum*). The wetlands retained water longer post harvest in relation to deeper water levels, conditions that were independent of precipitation levels. As such, in-pond conditions were suitable for reproductive success, with metamorphosis commonly observed at the majority of wetlands where breeding occurred. No effect of tree retention was detected for amphibian breeding, hydroperiod, or water depth. Additional research is needed to determine whether potential increased productivity as a result of amphibians selecting small wetlands in harvested areas for breeding is offset by relatively high mortality rates experienced by newly emerged metamorphs in harvested areas (e.g., via predation).

Oral – 15 minutes

CHS / SHC Sidney 2024

Testing the use of artificial nesting structures: A case study using Eastern Foxsnake (*Pantherophis gloydi*) and Blue Racer (*Coluber constrictor foxii*)

Ryan Wolfe¹, Heather Fotherby¹, Jennifer McCarter²

¹Natural Resource Solutions Inc., Waterloo, Canada. ²Parks Canada, Gatineau, Canada

Abstract

The Ontario Ministry of Natural Resources and Forestry's *Best Management Practices* (BMP) for *Identifying, Managing and Creating Habitat for Ontario's Species at Risk Snakes* document recommends the installation and maintenance of artificial nesting habitat (i.e., cages and boxes) to create and enhance habitat for the species, Eastern Foxsnake (*Pantherophis vulpinus*), Gray Ratsnake (*Pantherophis spiloides*) and Blue Racer (*Coluber constrictor foxii*). To assess the effectiveness of the BMP's recommendations, artificial nesting structures were installed following the BMP's guidelines across a series of conservation and privately owned lands in Norfolk County and on Pelee Island, in Essex County, to support the recovery of local populations of Eastern Foxsnake and Blue Racer. A total number of 39 nesting structures were installed between 2019 and 2020 and were monitored annually in Norfolk County until 2022 and on Pelee Island until 2023. Monitoring of environmental temperatures and humidity levels within the nesting structures identified that they provided suitable conditions for egg development throughout the incubation period in both regions. Evidence of occupation of the nesting structures by Eastern Foxsnake and Blue Racer was confirmed based on the observation of shed skins and live individuals within the structures. However, no evidence of nesting was observed over the duration of these studies, suggesting that the current design may not provide suitable nesting opportunities for these species. A new design is being tested on Pelee Island in 2024 and 2025 to investigate alternative options for creating artificial nesting habitat for Blue Racer and Eastern Foxsnake.

Oral – 5 minutes

CHS / SHC Sidney 2024

Surveying for snakes: Working hard, or just drifting?

Natasha Sawatzky¹, Cara Braun¹, Mitchell Duchene¹, Heather Fotherby¹, Teagan Netten², Jenna Quinn², Ryan Wolfe¹

¹Natural Resource Solutions Inc., Waterloo, Canada. ²Ontario Nature, Toronto, Canada

Abstract

The use of the combination of drift fences and funnel traps to survey for snakes is a common practice across much of North America and is regarded as a highly successful method for documenting and capturing cryptic species. However, studies implementing this survey method in Ontario appear to be limited to using drift fences and funnel traps to capture individual snakes emerging from known overwintering sites. Instead, visual encounter surveys (VES) and artificial cover object (ACO) surveys are the predominant methods used in Ontario to capture snakes, or to determine the presence of a species in an area during their active season. The purpose of this study is to investigate the effectiveness and financial investment required to monitor local snake populations with the use of passive drift fence surveys in comparison to VES and ACO surveys in Ontario. To do this, we are comparing results from drift fence arrays installed and monitored by Natural Resources Solutions Inc. in 2023 to the results of VES and ACO surveys conducted by Ontario Nature on managed tallgrass prairie sites in Norfolk County, Ontario. Our preliminary results indicate that drift fence surveys have mixed results when compared to VES and ACO surveys. However, differences in the effectiveness of drift fence surveys may be a result of site-related differences in snake assemblages. Continued data collection and analysis is being completed in 2024.

Poster

CHS / SHC Sidney 2024

Understanding trends in abundance, survival and behaviour of Canada's only population of Blue Racer (*Coluber constrictor foxii*)

Ryan Wolfe

Natural Resource Solutions Inc., Waterloo, Canada

Abstract

A mark-recapture study has been ongoing for the last remaining population of Blue Racer in Canada since 2020. With over four years of data, we have been able to produce accurate estimates of abundance as well as both annual and seasonal survival estimates for the population. We are now looking at abundance trends to investigate stability of the population over the short term and will be conducting a Population Viability Analysis in 2025 to investigate the likelihood of the population surviving over the long term. Through the completion of intense field surveys every spring and fall to inform the abundance and survival estimates, we have also witnessed an assortment of noteworthy behavioural changes in individuals of the population, such as shifts from terrestrial to aerial basking habits or the abandonment of previously occupied sites within areas that are succeeding from open-canopy habitats to shrub thickets. We have also observed the success of restoration efforts in creating suitable habitats that are now heavily used by the species, documented a potential range extension for the Blue Racer population and may have found an additional two large hibernation complexes for the species that were previously unknown. Future investigations of the relationship between habitat succession and restoration and their impacts on the Blue Racer population are recommended.

Oral – 15 minutes

The island life of salamanders: the genetic origin and behavioural traits of introduced Eastern Red-Backed Salamanders (*Plethodon cinereus*) in Newfoundland, Canada

Clare Yang, James Baxter-Gilbert, Julia Riley
Mount Allison University, Sackville, Canada

Abstract

Biological invasions can be dramatic, overt, and ecologically harmful, while others may be cryptic and the impact of the introduced species on the native ecosystem uncertain. Nevertheless, it is important that research gain insights in an invasion's history and ecology so that appropriate management steps can be taken. Recently, a population of the Eastern Red-backed Salamander (*Plethodon cinereus*) was documented in Conception Bay South, Newfoundland, in multiple residential yards. This introduction is well outside of this species' native range, with the closest native population residing > 500 km southeast and across a significant water barrier. This is the first recorded instance of an introduced salamander (order Urodela) on the island of Newfoundland, which has no native herpetofauna. Our work will examine this newfound population of salamander's genetics and behaviour in the field to address two fundamental questions: 1) where did they come from and 2) how were they successful at establishing their population? Molecular analysis will be used to establish the genetic origin of the population in Conception Bay South and to examine its population structure. This will provide insight into their source population(s) on the mainland, as well as how and when they first arrived. Our behavioural assays on salamanders will test their boldness, exploration, and aggression and compare this to mainland populations to determine if phenotypic changes in behaviour may have bolstered their invasive potential. Taken together our study will advance our understanding of the biology of this novel invasion.

Poster

Student

CHS / SHC Sidney 2024

Movement behaviour and long-term population assessment of Wood Turtles (*Glyptemys insculpta*) in central Ontario.

Mary Yu^{1,2}, Sonje Bols², Jim Troitter³, Jacqueline Litzgus¹

¹Laurentian University, Sudbury, Canada. ²Ministry of Environment, Conservation, and Parks, Sudbury, Canada. ³Ministry of Natural Resources, Blind River, Canada

Abstract

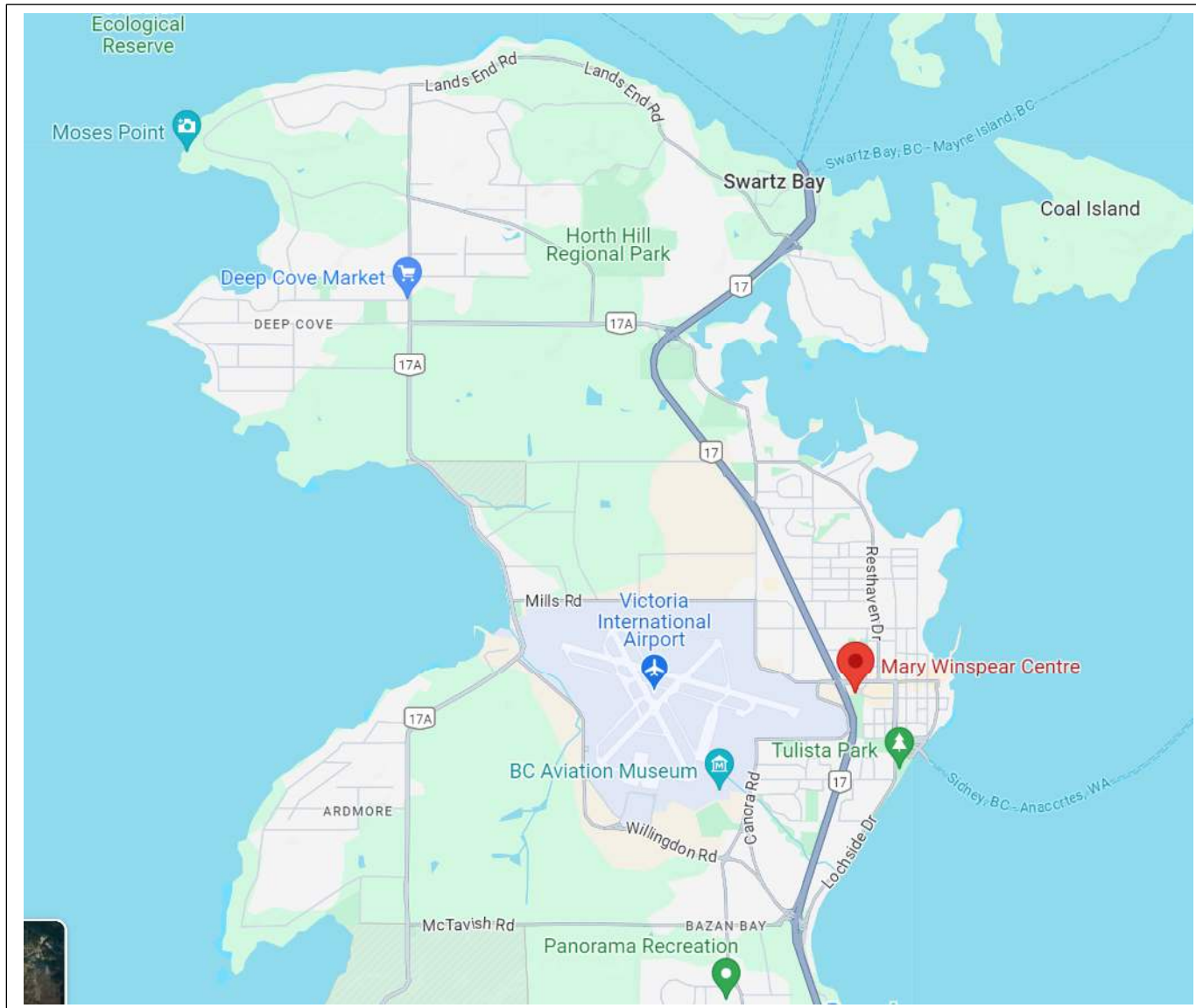
All 8 turtle species in Ontario are considered at risk, and their protection requires knowledge of population demography and spatial ecology. The “slow” life history of turtles, coupled with rapidly-increasing anthropogenic impacts, make long-term monitoring essential for assessing population viability. A wood turtle (*Glyptemys insculpta*) population in central Ontario has been studied using mark-recapture since 2000. The objectives of our study are to assess population demography and viability, as well as movement behaviours related to microhabitat use. The population will be assessed using the historical mark-recapture data and new data collected during visual encounter surveys; population modelling will be used to examine patterns and future trajectories. Microhabitat use will be assessed using radio-telemetry and temperature dataloggers. During the 2024 active season, 21 turtles (13 females, 8 males) were outfitted with radio-transmitters and tracked 2-3 times a week. Wood turtle movements are influenced by resource availability and temperature. In 2025 and 2026, temperature loggers will be deployed in the river and within the forest to track environmental conditions, and on turtles to continuously record temperature within their microenvironments. Preliminary assessment indicates that the study population includes over 300 turtles and has a female bias. Turtles have been tracked up to 400 m from the river, in high elevation terrestrial sites. The next two field seasons, we will examine correlations between movements and resource selection, and potential threats to turtles as they make these movements. This research will provide valuable information about population viability and habitat use that can inform conservation efforts.

Poster

Student

CHS / SHC Sidney 2024

Location of the Mary Winspear Centre in Sidney, BC at 2243 Beacon Ave east of Hwy 17.



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Room layout at the Mary Winspear Centre

