

**4<sup>th</sup> Annual Meeting of the  
Canadian Herpetological Society**

**4<sup>ème</sup> Congrès Annual de la  
Société d'Herpétologie du Canada**



**Brandon University  
Brandon, Manitoba, 2017**

# Canadian Herpetological Society 2017

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## ***WELCOME***

On behalf of the Local Organizing Committee, welcome to Brandon University for the 4th Annual Meeting of the Canadian Herpetological Society/Société d'Herpétologie du Canada. This year's meeting continues a long-standing tradition of annual meetings to promote the study of biology and conservation of amphibians and reptiles in Canada. Thanks goes to the many organizations that sponsored this year's meeting and those that donated items for the Silent Auction. We hope that you enjoy the meeting and enjoy your time in southwestern Manitoba.

**The logo for this year's meeting celebrates the sandhills habitat in southwestern Manitoba, featuring the Northern Prairie Skink and the Plains Hog-nosed Snake.**

### ***Local Organizing Committee***

**Chair:** Pamela Rutherford

**Committee:** Shawna Philpott, Alyssa Eagle, Nick Cairns, Neil Gushulak, Allison Krause  
Danielsen, Sherry Punak-Murphy

## ***Canadian Herpetological Society***

The Canadian Herpetological Society ([canadianherpetology.ca](http://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:** Joe Crowley (Ont. Ministry of Natural Resources and Forestry, Peterborough, ON)

**Vice President:** Jacqueline Litzgus (Laurentian University, Sudbury, ON)

**Past President:** Scott Gillingwater (Upper Thames River Conservation Authority, London, ON)

**Treasurer:** Jose Lefebvre (Acadia University, Wolfville, NS)

**Secretary:** Jonathan Choquette (SCC Ecological, Guelph, ON)

**Director of Research:** Amanda Bennett (Trent University, Peterborough, ON)

**Director of Conservation:** Scott Gillingwater (Upper Thames River Cons. Auth., London, ON)

**Directors at Large:** Leslie Anthony, Christina Davy, Yohann Dubois, Jean-François Desroches, Stephen Hecnar, Patrick Moldowan

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## ACKNOWLEDGEMENTS AND SPONSORS

### CHS Meeting and Workshop Committee

- Jose Lefebvre
- Jonathan Choquette
- Joe Crowley
- Steve Hecnar
- Darlene Hecnar

### Thanks to:

- Joe Crowley, Leslie Anthony, Jackie Litzgus, Stephen Hecnar, Amanda Bennett, David Green, Pamela Rutherford, Jonathan Choquette (Session Chairs)
- Pamela Rutherford (Logo creator)
- Brett Long (tote bag and t-shirt production)
- Nick Cairns, Neil Gushulak, Allison Krause Danielsen, Pamela Rutherford (field trip leaders)
- Drew Hoysak (Webmaster and Group Photographer)
- Members of the COSEWIC Amphibians and Reptiles Specialist Subcommittee

### Thank you to Sponsors for funding the event:

- Brandon University:
  - Faculty of Science, Office of the Vice-President and Office of the President (Student Travel Awards)
  - Department of Geography and Department of Visual and Aboriginal Art (poster boards)
  - Student Services (pens)
- Manitoba Parks and Protected Spaces (Park Passes for Spruce Woods Provincial Park)
- Rite in the Rain (field books)

### Thank you to Silent Auction Contributors:

• Neil Gushulak	• Dominos Pizza
• Pamela Rutherford	• Direct Liquidation
• Adam and Shawna Philpott	• David's Tea
• Benny's Restaurant	• Nature Conservancy Canada
• Canadian Tire	



# Canadian Herpetological Society 2017

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## **Schedule Overview**

### **Friday, September 15, 2017**

6-10pm	Registration, Wine and Cheese	Prairie Firehouse (637 Princess Ave)
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### **Saturday, September 16, 2017**

8am	Registration	Rm 212 (Clark Hall)
8:45am	Opening Remarks	
<b>9:00am</b>	<b>Session 1</b>	
10:30am	Break	
<b>11am</b>	<b>Session 2</b>	Rm 212 (Clark Hall)
12pm	Lunch	
<b>2pm</b>	<b>Session 3</b>	Rm 212 (Clark Hall)
3pm	Break	
<b>3:30pm</b>	<b>Session 4</b>	Rm 212 (Clark Hall)
4pm	Annual General Meeting	
<b>5:30pm</b>	<b>Poster Session</b>	Gathering Space (John E. Robbins Library)
7pm	Banquet	Dining Hall (Harvest Hall)

### **Sunday, September 17, 2017**

8:30am	Registration	Rm 212 (Clark Hall)
9am	Opening Remarks	
<b>9:30am</b>	<b>Session 5</b>	
10:15am	Break	
<b>10:45am</b>	<b>Session 6</b>	Rm 212 (Clark Hall)
11:45pm	Group Photo	
12pm	Lunch	
<b>2pm</b>	<b>Session 7</b>	Rm 212 (Clark Hall)
2:45pm	Break	
<b>3:15pm</b>	<b>Session 8</b>	Rm 212 (Clark Hall)

### **Monday, September 18, 2017**

9am-5pm	Field Trip	Spruce Woods Provincial Park
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**Saturday, September 16, 2017**

## **Session 1 (Chair: Joe Crowley)**

0900-0945

**\*\*\*Plenary Speaker\*\*\***

**COLLABORATION, CREATIVITY AND COMPROMISE -  
RESEARCH AROUND THE "ROUGH EDGES" OF REPTILE  
CONSERVATION**

Christina M. Davy

0945-1000

**THE FIRST DECADE OF BLISS: POPULATION ECOLOGY AND  
SENSITIVITY TO ENVIRONMENTAL CHANGE OF THE SPOTTED  
SALAMANDER IN ALGONQUIN PROVINCIAL PARK (S)**

Patrick D. Moldowan\*, Glenn J. Tattersall, Njal Rollinson

1000-1015

**HYDROLOGICAL AND THERMAL DYNAMICS OF MOSS ON ROCK  
BARRENS: IMPLICATIONS FOR ENDANGERED REPTILE HABITAT (S)**

Alanna G. Smolarz\*, Paul A. Moore, and James M. Waddington

1015-1030

**THERMAL PERFORMANCE AND DEVELOPMENT RATE LIMITATIONS  
OF EMBRYONIC REPTILES IN SEASONAL ENVIRONMENTS (S)**

Carter J. Rouleau\*, Njal Rollinson

1030-1100

**Break**

## **Session 2 (Chair: Leslie Anthony)**

1100-1115

**NIGHT ON EARTH: OBSERVATIONS OF AN EXTRAORDINARY  
NESTING AGGREGATION OF EASTERN HOGNOSE SNAKES,  
*HETERODON PLATYRHINOS***

Leslie Anthony Lowcock

1115-1130

**MANAGING AN ECOLOGICAL TRAP ON AN ENDANGERED SPECIES  
MASSASAUGA (*SISTRURUS CATENATUS*) BY USING FORCED  
HIBERNATION**

Anne R. Yagi\* and Glenn J. Tattersall

1130-1145

**SOME DISCOVERIES FROM CANADA'S LARGEST SNAKE STUDY**

Steve Marks

1145-1200

**INFORMATIONAL SIGNAGE INCREASES AWARENESS AND SUPPORT  
FOR RECOVERY FOR AN ENDANGERED PIT-VIPER (*SISTRURUS  
CATENATUS*) IN AN URBAN PARK SYSTEM**

Jonathan D. Choquette\* and Alexis H. Hand

1200-1400

**Lunch**

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**Saturday, September 16, 2017**

## **Session 3 (Chair: Jackie Litzgus)**

- 1400-1415     **MICROHABITAT CHARACTERIZATION OF NATURAL AND ANTHROPOGENIC NEST SITES OF SNAPPING TURTLES (*CHELYDRA SERPENTINA*) (S)**  
Elizabeth Ann Francis\*, Patrick D. Moldowan, Njal Rollinson
- 1415-1430     **ROAD EFFECTS ON PAINTED AND SNAPPING TURTLE POPULATION DEMOGRAPHICS IN ALGONQUIN PARK, CANADA (S)**  
Steven J. Kell \*, Ronald J. Brooks and Jacqueline D. Litzgus
- 1430-1445     **YOU ARE WHERE YOU EAT: ISOTOPIC RESOURCE USE OF URBAN WESTERN PAINTED TURTLES IN REGINA, SASKATCHEWAN (S)**  
Kelsey A. Marchand\*, Christopher M. Somers, Ray G. Poulin
- 1445-1500     **COMPARISON OF BEHAVIOUR, GROWTH RATES, AND SURVIVORSHIP AMONG THREE COHORTS OF HEADSTARTED WOOD TURTLES (*GLYPTEMYS INSCULPTA*) POST-RELEASE (S)**  
Damien I. Mullin\*, Rachel C. White, Jory L. Mullen, and Jacqueline D. Litzgus
- 1500-1530     **Break**

## **Session 4 (Chair: David Green)**

- 1530-1545     **DOES SIZE-ASSORTATIVE MATING IN ANURAN AMPHIBIANS EXIST?**  
David M. Green
- 1545-1600     **WHERE TO DRAW THE LINE: TESTING FOR SIGNATURES OF REPRODUCTIVE ISOLATION ACROSS AN “INTRA-SPECIFIC” CONTACT ZONE (S)**  
Nicholas A. Cairns\*, Amanda S. Cicchino and Stephen C. Lougheed
- 1600-1730     **Annual General Meeting: Open to all members and guests.**
- 1730-1830     **Poster Session**
- 1900-2300     **Banquet**  
**Travelogue:** Sara Ashpole (When Walmart allows you to check off a species from your life-list)  
**Silver Salamander and Blue Racer Awards**  
**Student Scholarship and Travel Awards**  
**Herp Quiz**

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***Sunday, September 17, 2017***

## **Session 5 (Chair: Amanda Bennett)**

- 0930-0945     **MONITORING OF MEASURES TO MAINTAIN CONNECTIVITY FOR AMPHIBIANS IN AN URBANIZING LANDSCAPE**  
Samantha A. Hughes\*, Sarah K. Mainguy, and Salvatore P. Spitale
- 0945-1000     **ANATOMY AND CHARACTERIZATION OF AN IMPARA: THE PEMBERTON VALLEY, BRITISH COLUMBIA**  
Lowcock, Leslie Anthony\* and Veronica Woodruff
- 1000-1015     **PATTERNS OF GROWTH IN NATRICINE SNAKES: ONTOGENETIC TRAJECTORIES FOR *NATRIX NATRIX***  
Patrick T. Gregory
- 1015-1045     **Break**

## **Session 6 (Chair: Stephen Hecnar)**

- 1045-1100     **LONGTERM PHENOLOGICAL RESPONSE TO CLIMATE CHANGE IN A PRAIRIE – SAVANNA HERPETOLOGICAL COMMUNITY**  
Stephen J. Hecnar\*, Paul D. Pratt, Thomas Preney, Steve Marks, Jonathan D. Choquette, Darlene R. Hecnar
- 1100-1115     **CLARIFYING DISTRIBUTIONS OF FOUR SPECIES OF RANA IN SOUTHWESTERN BRITISH COLUMBIA USING eDNA METHODS**  
Kristiina Ovaska\*, Christian Engelstoft, and Lennart Sopuck, Jared Hobbs, Jessica Round, Nik Veldhoen, and Caren C. Helbing
- 1115-1130     **RE-INTRODUCTION OF THE NORTHERN LEOPARD FROG (*LITHOBATES PIFIENS*) IN BRITISH COLUMBIA AND ALBERTA**  
Lea Randall\*, Kris Kendell, Purnima Govindarajulu, Barb Houston, Penny Ohanjanian & Axel Moehrenschrager
- 1130-1145     **EFFECTS OF ENVIRONMENTAL VARIABLES ON THE CALLING BEHAVIOUR OF THE NORTHERN LEOPARD FROG (*LITHOBATES PIFIENS*) IN ALBERTA**  
Marcus D. Sommers\*, Lea A. Randall, and Robert M.R. Barclay
- 1145-1200     **Group Photo**
- 1200-1400     **Lunch**

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## ***Sunday, September 17, 2017***

### **Session 7 (Chair: Pamela Rutherford)**

- 1400-1415     **POPULATION ECOLOGY OF AN ENDANGERED LIZARD SPECIES  
(*PLESTIODON SEPTENTRIONALIS*) IN CANADA**  
Pamela L. Rutherford
- 1415-1430     **IMAGING EARLY STAGE AXOLOTL SALAMANDER EMBRYOS INSIDE  
AND OUT**  
Susan J. Crawford-Young
- 1430-1445     **DEPLOYING THE TURTLE SHIELD: BLANDING'S TURTLES AS A  
WETLAND PROTECTION TOOL**  
David C. Seburn\*, James Page, Brandon Holden, and Holly J. Long
- 1445-1515     **Break**

### **Session 8 (Chair: Jonathan Choquette)**

- 1515-1530     **DETECTION PROBABILITIES FOR SPECIES AT RISK REPTILES, AND  
CHORUS FROGS SURVEYS, IN CENTRAL ONTARIO**  
Jeff Hathaway\*, Elizabeth Cubberley and Kelsey E. Bedard
- 1530-1545     **AN UPDATE FROM THE SAVING TURTLES AT RISK TODAY PROJECT  
IN MUSKOKA, ONTARIO**  
Kelsey E. Bedard\* and Jeff Hathaway
- 1545-1600     **ROAD MORTALITY MITIGATION: THE EFFECTIVENESS OF ANIMEX  
FENCE VERSUS MESH FENCE**  
Milburn-Rodríguez J.C., Hathaway J., Gunson K., Moffat D., Béga S.\* and  
Swensson D.

## ***Monday September 18th, 2017***

### **Field Trip Itinerary (tentative)**

- 0900-1000     Travel to Spruce Woods Provincial Park
- 1000-1200     Visit Prairie Skink research site at Shewfelts Pasture
- 1200-1300     Lunch at Spirits Sands, Spruce Woods Provincial Park
- 1300-1600     Spirit Sands hike to Punch Bowl or Dune face
- 1600-1700     Return to Brandon

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## **POSTERS**

1. **SUB-OPTIMAL HABITATS MIGHT MATTER TOO! A CALL FOR RESEARCH ON THE USE OF DISTURBED HABITAT BY FRESHWATER TURTLES**  
Siow Yan Jennifer Angoh\*, Christina M. Davy
2. **RESOLUTION OF SFD SYMPTOMS IN WILD SNAKES**  
Rachel M. Dillon\*, Kyle C. Ritchie, Christina M. Davy
3. **THE IMPACTS OF HABITAT FRAGMENTATION, ROADS, AND CONSTRUCTION ON AMPHIBIANS IN SOUTHWESTERN MANITOBA**  
Alyssa J. Eagle\* and Pamela L. Rutherford
4. **THE VALUE OF LONG-TERM MONITORING OF CRYPTIC ENDANGERED SPECIES TO LEARN ABOUT POPULATION TRENDS, MANAGEMENT NEEDS AND GENERAL BIOLOGY: CASE STUDY OF THE FIVE-LINED SKINK**  
Stephen J. Hecnar\* and Darlene R. Hecnar
5. **RACCOON (*PROCYON LOTOR*) DEPREDATION OF GRAVID FRESHWATER TURTLES IN RONDEAU PROVINCIAL PARK, ONTARIO**  
Alyson E. Karson\*, Siow Yan Jennifer Angoh, and Christina M. Davy
6. **NESTING IN CLOSE QUARTERS: CAUSES AND BENEFITS OF HIGH DENSITY NESTING IN PAINTED TURTLES**  
Steven J. Kell\*, Ronald J. Brooks and Jacqueline D. Litzgus
7. **IDENTIFYING DISPERSAL PATTERNS OF JUVENILE TURTLES IN RELATION TO MAJOR HIGHWAY SYSTEMS IN THE GEORGIAN BAY REGION: INFORMING FUTURE MITIGATION AND LAND-USE PLANNING**  
Cory L. Kozmik\* and Jacqueline D. Litzgus
8. **MOVEMENT ECOLOGY OF THE NORTHERN PACIFIC RATTLESNAKE (*CROTALUS OREGANUS OREGANUS*) IN RESPONSE TO DISTURBANCE**  
Emily V. Lomas, Christine A. Bishop, Jared R. Maida\*, and Karl W. Larsen
9. **EVALUATING THE EFFECTIVENESS OF HEADSTARTING FOR WOOD TURTLE (*GLYPTEMYS INSCULPTA*) RECOVERY FROM A SUSPECTED POACHING EVENT**  
Damien I. Mullin\*, Rachel C. White, Jory L. Mullen, and Jacqueline D. Litzgus
10. **LANDOWNER ATTITUDES AND IMPACTS OF LIVESTOCK GRAZING PRESSURES ON AMPHIBIAN REPRODUCTIVE SUCCESS**
  - a. Shawna C. Philpott\* and Pamela Rutherford

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**11. DOES RELATIVE ABUNDANCE PREDICT ROAD MORTALITY?**

Kyle C.W. Ritchie\*, Rachel M. Dillon, Christina M. Davy

**12. HYDROLOGICAL AND THERMAL DYNAMICS OF MOSS ON ROCK BARRENS: IMPLICATIONS FOR ENDANGERED REPTILE HABITAT**

Alanna G. Smolarz\*, Paul A. Moore, and James M. Waddington

**13. EASTERN TIGER SALAMANDER (*AMBYSTOMA TIGRINUM*) MOVEMENT AND HABITAT USE IN THE PRAIRIE POTHOLE REGION OF WEST-CENTRAL MINNESOTA**

Heather L. Waye\* and Katherine M. Novak

**14. FURTHER DOWN THE ROAD: PRE-MITIGATION ANALYSIS OF WESTERN RATTLESNAKE POPULATION VIABILITY UNDER DIFFERENT ROAD MORTALITY SCENARIOS**

Stephanie A. Winton\*, Karl W. Larsen, and Christine A. Bishop

**15. EXAMINING POPULATION AND SPATIAL ECOLOGIES OF BLANDING'S TURTLES *EMYDOIDEA BLANDINGII* TO INFORM MITIGATION PLANS FOR QUARRY DEVELOPMENT**

Gabriella M. Zagorski\*, James J. Trottier, Dr. Douglas R. Boreham, Dr. Jacqueline D. Litzgus

**16. FALL AMPHIBIAN OCCURRENCE AND THE RELATIONSHIP BETWEEN DETECTION AND THE LUNAR CYCLE (2014 TO 2016), CANTON, NY**

Isabella Caliandro, Jessica LaMay, Margaret Mauch, Gunnar Ohlson, Sara L. Ashpole\*

# Canadian Herpetological Society 2017

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\*Students to be judged for presentation and poster awards, in the following abstracts.

\*ANGOH

## **SUB-OPTIMAL HABITATS MIGHT MATTER TOO! A CALL FOR RESEARCH ON THE USE OF DISTURBED HABITAT BY FRESHWATER TURTLES**

Siow Yan Jennifer Angoh<sup>1\*</sup>, Christina M. Davy<sup>1,2</sup>

<sup>1</sup> Environmental and Life Sciences Program, Trent University, Peterborough, ON, K9J 7B8, siowyanangoh@trentu.ca

<sup>2</sup> Ontario Ministry of Natural Resources and Forestry, Wildlife Research and Monitoring Section, Peterborough, ON, K9J 7B8, christina.davy@ontario.ca

In southern Ontario, severe habitat degradation and loss occurred as a result of increased, intensive agricultural production and urban development. Despite the detrimental habitat disturbances inherent to agricultural development, its economic benefits are pervasive and are difficult to balance directly alongside ecosystem values. However, disturbed habitats, if properly managed, might provide refuges for members of one of the most threatened vertebrate clades: turtles. Most turtle research in Ontario has been done either in “natural”, unaltered habitats, or in severely modified (urban) landscapes. The response of turtles to intermediate landscape modification (for example, intensive agriculture) is not known. Yet much of southern Ontario is dominated by this habitat type. Generalist freshwater turtle species like snapping turtles (*Chelydra serpentina*) and spiny softshells (*Apalone spinifera*) have been shown to tolerate human activity and even thrive in altered environments. High snapping turtle abundance has been recorded in man-made impoundments that provided them with favourable microhabitat features (i.e. muddy shallows and stagnant waters). Although spiny softshells prefer rivers, streams and larger wetlands, they also persist in smaller wetlands, woody stems, and agricultural lands and urban areas adjacent to wetlands, suggesting flexibility in their habitat preferences. Agricultural lands can serve as open upland habitat for turtles to use as nesting grounds in early summer, and agricultural drains may provide habitat for a number of turtle species – but the relative survivorship of turtles in these habitats has not been robustly compared to turtles in intact wetlands. Here, we consider the potential for suboptimal or “unsuitable” habitats in southern Ontario to provide sustainable resources for at-risk turtles, and we outline a framework for testing the relative fitness of turtles in these sub-optimal habitats.

**Poster**

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ASHPOLE

## **FALL AMPHIBIAN OCCURRENCE AND THE RELATIONSHIP BETWEEN DETECTION AND THE LUNAR CYCLE (2014 TO 2016), CANTON, NY**

Isabella Caliandro, Jessica LaMay, Margaret Mauch, Gunnar Ohlson, Sara L. Ashpole \*

Environmental Studies, St. Lawrence University. Canton, NY, 13660, sashpole@stlawu.edu

Multiple environmental variables affect the timing and movement of amphibian species. Numerous studies exist that identify and explain the relationships between amphibians and environmental factors such as water temperature, cloud coverage, and precipitation levels. There are few studies and limited information on the effects of lunar cycle and amphibian movement activity. Because amphibians are a highly variable species, response to specific lunar phase cannot be generalized. Data collected must be species specific and relate directly to the species' ecology (Grant et al., 2012). The way in which lunar cycle acts as an environmental cue for amphibian activity is of growing interest. In this study, we present autumnal data on the number of amphibians quantified each night during a three-year period in relation to the lunar phase. We calculated the amount of lunar light emitted (determined by the lunar phase) by a percentage. (E.g. full moon=100%, new moon=0%, half moon=50%, ect.) With the percentages, we graphed the relationship by lunar light intensity with the number of amphibians found of certain nights. From our research, we discovered several connections, including a positive relationship between lunar phase and activity just before the full moon. Knowledge acquired from continuing and developing research on lunar cycle as an environmental condition that affects amphibian movement activity could potentially act as a guide for future conservation methods (Grant et al., 2012).

**Poster**

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BEDARD

## **AN UPDATE FROM THE SAVING TURTLES AT RISK TODAY PROJECT IN MUSKOKA, ONTARIO**

Kelsey E. Bedard\*<sup>1</sup> and Jeff Hathaway<sup>1</sup>

<sup>1</sup>Scales Nature Park, Oro-Medonte L3V8H9 startturtleproject@gmail.com

Muskoka has some of the best remaining habitat for Blanding's and spotted turtles in Ontario. Since 2013, the Saving Turtles at Risk Today project has aimed to protect remaining habitat, mitigate threats, and answer research questions relevant to turtle conservation in the region. Field technicians have surveyed for turtles in wetlands, water bodies and along roads each year between April and September. Captured Blanding's and spotted turtles were processed, and a blood sample was taken for future DNA analysis. This year, we have exceeded 300 Blanding's turtle observations. Select spotted turtles at two locations were affixed with a radio transmitter to enable preliminary habitat usage studies ahead of wider efforts by a future graduate student. We were able to identify 4 previously unknown locations for spotted turtles this year. Our turtle hotline, for public submissions of rare, nesting, injured or dead turtles gained traction, receiving over 350 calls this year. Nesting surveys were completed nightly in June, and nests laid in precarious locations were excavated for captive hatching. The project incubated over 8000 eggs this year. Previously identified road hotspots continued to be monitored and local municipalities are now supportive of mitigation measures.

### **Platform**

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\*CAIRNS

## **WHERE TO DRAW THE LINE: TESTING FOR SIGNATURES OF REPRODUCTIVE ISOLATION ACROSS AN “INTRA-SPECIFIC” CONTACT ZONE**

Nicholas A. Cairns\*, Amanda S. Cicchino and Stephen C. Loughheed

Department of Biology, Queen’s University, Kingston, Ontario, Canada, K7L 3N6,  
nacairns@gmail.com

Most sister species began as conspecific populations diverging in allopatry. Species and population boundaries can be fluid over evolutionary time, expanding and contracting as environmental conditions change. In these range shifts, formerly isolated populations can come into secondary contact. Such contact zones are “natural experiments” that allow us to test for the presence and nature of reproductive isolation. Secondary contact may result in interbreeding, introgression and subsequent homogenization of accrued differences between populations or, selection against hybridization, enhancement of reproductive barriers, and ultimately cessation of gene flow between them. The spring peeper is a small, hylid frog found from east-central Manitoba to the Maritimes, south to east Texas and northern Florida. Across this massive range this species is represented by 6 mitochondrial and 3 nuclear lineages likely representing a complex history of repeated bouts of isolation and contact. Two of these lineages meet between the interior highlands (Ozark and Ouachita Mountains) and the Mississippi River Valley. The Western lineage lies north and west of this zone, while the Southwestern lineage is south and east. In these areas over distances of only kilometres we find a dramatic shift in evolutionary legacies. Preliminary clinal analysis of genomic and phenotypic data imply little genetic exchange has occurred between lineages. In addition, the two lineages show significant differences in male advertisement call. These observations together suggest that these two lineages exhibit strong reproductive isolation and may represent incipient species.

### **Platform**

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CRAWFORD-YOUNG

## **IMAGING EARLY STAGE AXOLOTL SALAMANDER EMBRYOS INSIDE AND OUT**

Susan J. Crawford-Young

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scrawford-young@rrc.ca

To study the forces on cells in embryo tissue at early stage development, images of the entire surface need to be taken in time-lapse. These forces contribute to the cell differentiation that takes place throughout development. Preliminary imaging all sides of amphibian embryos using time-lapse microscopy during early stage development has been accomplished. Also, optical coherence tomography was successfully used to image the interior of a blastocoel stage embryo. Due to the yolk in amphibian eggs they cannot be viewed inside via confocal microscopy. The images from the exterior of the embryo and images of the interior of the eggs will be correlated to further the study of the forces that cells experience during early development, especially neural plate and early brain development. This will further the study of chordate and human brain development.

### **Platform**

## **INFORMATIONAL SIGNAGE INCREASES AWARENESS AND SUPPORT FOR RECOVERY FOR AN ENDANGERED PIT-VIPER (*SISTRURUS CATENATUS*) IN AN URBAN PARK SYSTEM**

Jonathan D. Choquette<sup>1\*</sup> and Alexis H. Hand<sup>2</sup>

<sup>1</sup>SCC Ecological, Windsor, ON, N9A 6K1, jchoquet@alumni.uoguelph.ca; <sup>2</sup>Wildlife Preservation Canada, Guelph, ON, N1H 6J2, ahand1@antioch.edu

The potential for human-snake conflict (HSC) is relatively high where venomous snakes persist in urban park systems. HSC can result in undesirable outcomes for people, pets and snakes (e.g., snakebites, snake death, and/or ineffective translocations) and, if left unmanaged, could undermine conservation efforts. The Ojibway Prairie Complex and Greater Park Ecosystem (OPCGPE) is an urban park system in Southern Ontario that supports a small population of Massasauga Rattlesnakes (*Sistrurus catenatus*). As part of a broader Massasauga recovery program, one of our public outreach goals was to install informational signage at the OPCGPE in an attempt to increase awareness and encourage positive behaviours (i.e., those that reduce risk of HSC) among park users. To evaluate sign effectiveness, we asked the following question: Does awareness of Massasauga range, status and threats, ways to prevent snakebite, and support for recovery increase among park users after sign installation? In August 2016 we installed one 'Massasauga Habitat' informational sign (23 x 30 cm) at major trailheads (n=6) at a park occupied by Massasaugas. We conducted a random questionnaire survey of park users during a three week period before (N= 51) and after (N=54) signs were installed (July-Aug. 2016 and Sept.-Oct. 2016, respectfully). Awareness that the park contained Massasauga habitat increased among park users from 56% to 83% after the signs were installed (p=0.0004). Also, support for Massasauga recovery increased from 65% to 87% following sign installation (p=0.008). Awareness of snakebite prevention methods, although high, did not increase post-installation. Our results will allow us to improve future public outreach in the study landscape, and more broadly, they could help others develop effective outreach for pit-viper conservation elsewhere. Massasauga recovery at the OPCGPE will require sustained implementation of effective methods to manage HSC and maintain public support; informational signage could play an important role in this endeavor.

### **Platform**

# Canadian Herpetological Society 2017

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DAVY (Plenary)

## **COLLABORATION, CREATIVITY AND COMPROMISE - RESEARCH AROUND THE “ROUGH EDGES” OF REPTILE CONSERVATION**

Christina M. Davy

Wildlife Research and Monitoring Section, Ontario Ministry of Natural Resources and Forestry,  
Peterborough, Ontario, Canada; Environmental and Life Sciences Program, Trent University,  
Peterborough, Ontario, Canada

Wildlife conservation is still a relatively young field of study, and despite our best intentions as conservation scientists we sometimes become stuck in paradigms that apply well to some species, but not to others. Long-lived, iteroparous species (such as turtles) are a group that does not always benefit fully from current environmental assessment approaches or conservation efforts, in part because their life history strategy makes them challenging to study within the timeframe of a typical academic or organizational project. I will illustrate this disconnect using several recent or ongoing studies, and suggest ways in which we may be able to improve our conservation effectiveness by making a stronger link between the ecological information we already have about turtles (or other long-lived species) and our applied approaches to recovering threatened populations.

### **Platform**

## RESOLUTION OF SFD SYMPTOMS IN WILD SNAKES

Rachel M. Dillon<sup>1,2\*</sup>, Kyle C. Ritchie<sup>2,3</sup>, Christina M. Davy<sup>1,3</sup>

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Snake Fungal Disease (SFD) was recently categorized as an emerging wildlife disease caused by infection with the fungus *Ophidiomyces ophiodiicola*. SFD affects snakes in North America and Europe, with the majority of current reports emerging from the eastern United States. SFD is also present across southern Ontario, and is enzootic in the eastern foxsnake (*Pantherophis gloydi*) population at Rondeau Provincial Park (Chatham-Kent, ON). SFD symptoms include epidermal and dermal lesions characterized by crusty scales, superficial pustules, and subcutaneous nodules, though symptoms are highly variable in appearance and severity. It has been suggested that SFD symptoms may be more common in snakes directly after they emerge from hibernation in the early spring, possibly because the snakes are unable to mount an effective response to the fungus during hibernation. To directly test the hypothesis that SFD develops over the winter and is resolved by some infected snakes over the summer, we quantified the prevalence of lesions in *P. gloydii* at Rondeau Provincial Park. For each *P. gloydii* captured in May-Oct. of 2013 – 2016, we recorded any skin abnormalities potentially indicative of SFD. We took biopsies of lesions whenever possible to confirm the diagnosis through histology and qPCR. Logistic regression revealed that the prevalence of lesions on snakes decreased significantly from April to October ( $p < 0.001$ ,  $df=287$ ,  $SE= 0.005$ ). This result supports the hypothesis that the snake-SFD system varies seasonally. We also documented the resolution of SFD in wild snakes. The next steps will be to use swabs to quantify the presence of the pathogen on symptomatic and asymptomatic snakes to determine the pathogen's prevalence and how it affects different species of snake. It is important to understand the mechanics of this pathogen and how it affects wild snake populations so that we can assess its potential implications for snake conservation.

**Poster**

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\*EAGLE

## **THE IMPACTS OF HABITAT FRAGMENTATION, ROADS, AND CONSTRUCTION ON AMPHIBIANS IN SOUTHWESTERN MANITOBA**

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The goal of this project is to assess the impacts of habitat fragmentation caused by roads, as well as the impacts of road construction on wetlands and amphibians. Two of the study species are listed Special Concern by the Species at Risk Act: Northern Leopard Frog and Great Plains Toad. The study took place in southwestern Manitoba within the Prairie Pothole region, in an area with a high density of wetlands of various size and type. Data collection began in April 2017 and will continue to the fall of 2017. My methods include timed visual encounter, auditory, mortality, funnel-trap, and dipnet surveys to examine the populations of amphibians in wetlands within my study area. Habitat was characterized using size rankings, vegetation classification, adjacent land-use categories, and hydroperiod. Water quality parameters were measured, including pH, salinity, resistivity, mV, conductivity, and total dissolved solutes. The project will assess the impacts of habitat fragmentation and roads on amphibian habitats and populations and will contribute to a Before-After-Control-Impact study to assess impacts related to resurfacing of a highway.

**Poster**

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\*FRANCIS

## **MICROHABITAT CHARACTERIZATION OF NATURAL AND ANTHROPOGENIC NEST SITES OF SNAPPING TURTLES (*CHELYDRA SERPENTINA*)**

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For oviparous organisms, nest habitat plays an important role in embryonic development, offspring phenotype, and population recruitment, among other critical aspects of life history. Despite the breadth of research conducted on Snapping Turtles (*Chelydra serpentina*) there is little available literature on the characteristics of natural nest habitats. Rather, most studies report on (snapping) turtle nesting biology in human-altered landscapes. Thus, understanding the preferred natural nest microhabitats of Snapping Turtles represents a knowledge gap and has important implications for this species at risk in Canada. The objective of our study was to characterize and compare the microhabitat of natural (e.g., sand dune, river embankment, beaver lodge and dam, island and peninsular rocky outcrop) and anthropogenic (e.g., unpaved roadway and road shoulder, railway embankment, and manmade dam) nest sites of Snapping Turtles in the boreal-shield region of Ontario. Using nest sites across a range of anthropogenic disturbance in Algonquin Provincial Park we measured multiple microhabitat characters: understory vegetation, canopy cover, aspect, slope, distance to water, substrate composition, and thermal profile. Variation in microhabitat characters was consistently higher in natural than anthropogenic nest sites, likely because of limited availability and opportunistic use of the former. Approximately 70% of natural and 50% of anthropogenic nest sites demonstrated a southeastern orientation, maximizing exposure to incoming solar radiation and promoting favourable incubation temperatures, especially in this thermally constrained northern population. Similarly, substrate from natural nest sites was high in organic content, which may promote moisture retention and greater incubation temperatures due to dark substrate colouration relative to the typical sand-gravel composition of anthropogenic sites. Overall, anthropogenic nest sites closely mimic natural nests in their microhabitat characteristics. Given that natural nest sites are limited and patchy, especially in northern regions, and that they are comparable to anthropogenic nest sites in their microhabitats, it is not surprising that Snapping Turtles utilize human-altered sites for nesting. However, use of anthropogenic nest sites often places turtles at a greater risk, threatening the survival of the reproductive female and/or her offspring.

### **Platform**

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GREEN

## DOES SIZE-ASSORTATIVE MATING IN ANURAN AMPHIBIANS EXIST?

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Assortative mating and sexual selection are central to the process of speciation and imply that individuals choose their mates based on some heritable attribute. Size-assortative mating among anuran amphibians has been reported many times, yet its strength and significance has been unclear. I performed a comprehensive meta-analysis starting with 282 studies in 68 species reported in 101 publications dating back to 1976. Studies based on data pooled over 2 or more years were highly likely to report biased results and were significantly more likely to yield a positive relationship between male and female body size than single season data. There was also reporting bias in the literature as findings of positive assortative mating were always accompanied by statistics but there were many instances of non-significant results without any statistical information at all. Based on meta-analysis of the subset of 129 weighted, z-transformed correlation coefficients, as the effect sizes, and single season data, as the scale-of-choice, there is a significant difference between species exhibiting intense, density-dependent competition among males for possession of mates (scramblers) and those that do not (sitters). Where non-random mating by size does occur, it is largely the secondary by-product of such scramble competition rather than the primary product of mate choice behaviour by either sex. As such, the evidence for size-assortative mating among anuran amphibians is negligible.

**Platform**

## **PATTERNS OF GROWTH IN NATRICINE SNAKES: ONTOGENETIC TRAJECTORIES FOR *NATRIX NATRIX***

Patrick T. Gregory

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Body size, growth rate, and age of maturity are key characters that influence other life-history traits and thereby demographic performance. There are multiple ways of estimating growth curves, each with its own weaknesses and/or critical assumptions. Here, I use mark-recapture records to estimate growth curves for grass snakes (*Natrix natrix*) in a population in southeast England and compare the results with those for other populations of the same species and for other natricines. Grass snakes at this site are typical sexually dimorphic natricines – females are larger than males and have relatively larger heads, but relatively shorter tails; ontogenetic change in head size with respect to body size is negatively allometric, but growth in tail length is isometric. Here, I show that von Bertalanffy and logistic growth models are equally appropriate models for describing growth in length in this species. Females mature at about 600 mm SVL when they are several years old. Delayed maturity is consistent with other studies of this wide-ranging species and contrasts with life histories of some other natricine snakes such as *Thamnophis*. Both *Natrix* and *Thamnophis* range quite far north, but do not generally exhibit slower growth and later maturity at higher latitudes. Variation in growth patterns between species and between conspecific populations presumably is partly influenced by phylogenetic effects, but expression of growth parameters is also phenotypically plastic and subject to natural selection. Because they are abundant, widespread, and ecologically diverse, natricine snakes are well-suited for distinguishing between these influences and thereby contributing to our understanding of factors determining growth patterns in ectotherms. Two areas worthy of further study are individual variation of growth trajectories within populations and the role of temporal (e.g. year-to-year) variation in shaping lifetime patterns of growth.

### **Platform**

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HATHAWAY

## **DETECTION PROBABILITIES FOR SPECIES AT RISK REPTILES, AND CHORUS FROG SURVEYS, IN CENTRAL ONTARIO**

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Preliminary results will be presented from the Georgian Bay Reptile Survey and Central Ontario Chorus Frog projects. Detection probability surveys for five species at risk reptiles were conducted in prime habitat along the Georgian Bay coastline south of Parry Sound. The results confirm quantitatively that some species are difficult to observe even where significant populations are known to exist. Landowner interviews may be a better approach for selected species. Historic chorus frog locations in the Lake Simcoe-Muskoka area were mapped and surveyed. Locations east of Lakes Simcoe and Couchiching are presently occupied, however locations to the west are not. Efforts to defragment the landscape and reconnect habitat patches may be stymied by the urban development of Orillia at the narrows between the lakes. Translocation may be the only option to restore these populations in the future.

### **Platform**

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HECNAR

## **THE VALUE OF LONG-TERM MONITORING OF CRYPTIC ENDANGERED SPECIES TO LEARN ABOUT POPULATION TRENDS, MANAGEMENT NEEDS AND GENERAL BIOLOGY: CASE STUDY OF THE FIVE-LINED SKINK**

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Field studies of cryptic species are difficult but long-term monitoring can provide insight on population status and trends, critical habitat needs, and general biology. We studied population ecology of the endangered Five-lined Skink for the past three decades in the Carolinian zone of Ontario. Our monitoring initially revealed a precipitous decline of abundance so we focused on determining critical habitat needs, threats, and developing effective management practices. Our research revealed preference for open dune habitats and a critical need of woody debris for refuge cover but we also found evidence of human disturbance (poaching, removal of debris). Increased enforcement, education, and active habitat management resulted in recovery. Annual surveys during the peak activity season allowed us to continue monitoring trends. This work also increased our knowledge of the species' phenology, habitat selection, nesting and social behaviour, dietary preferences, hibernation, and movements. We also found skink abundance to be highly effected by lake level, coastal erosion, forest succession, and avian predation but they can easily coexist with humans. Monitoring can reveal trends in cryptic species populations and create knowledge of their critical habitat needs, identify threats, and can increase management efficacy. It also revealed that skinks dominate relative abundance and biomass in Great Lake coastal dune herpetofaunal communities.

**Poster**

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HECNAR

## **LONGTERM PHENOLOGICAL RESPONSE TO CLIMATE CHANGE IN A PRAIRIE – SAVANNA HERPETOLOGICAL COMMUNITY**

Stephen J. Hecnar<sup>1\*</sup>, Paul D. Pratt<sup>2</sup>, Thomas Preney<sup>2</sup>, Steve Marks<sup>3</sup>, Jonathan D. Choquette<sup>4</sup>, Darlene R. Hecnar<sup>1</sup>

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Phenology of amphibians and reptiles in temperate regions is strongly influenced by temperature and precipitation. There is interest and concern regarding how species and communities will cope with currently changing climate. We examined first call dates for amphibians (4 species) and date of emergence from hibernation for reptiles (7 species) from the Ojibway Prairie Complex, Windsor, Ontario, over 40 years to determine if trends were occurring. Time series analyses revealed that three species became active earlier, two species later, and five species showed no trend in first activity dates. Activity was significantly earlier for Western Chorus Frogs (-19 d), Common Gartersnakes (-24 d), and Dekay's Brownsnakes (-26 d), significantly later for Snapping Turtles (+46 d) and marginally later for Green Frogs (+22 d). Northern Leopard Frogs, American Toads, Painted Turtles, Butler's Gartersnakes, Eastern Foxsnakes, and Blanding's Turtles showed no temporal trend. Local temperatures increased (mean 1.6 °C, extreme minimum 2.6 °C) and total precipitation increased (112 mm) from 1976 to 2016. All three species with earlier activity hibernate on land and species with later activity hibernate underwater. These activity changes are consistent with differential heating of terrestrial versus aquatic habitats and because of the high specific heat of water with increased precipitation. Differentially shifting phenologies change temporal overlap among species and may thus alter interspecific interactions and structure of this herpetofaunal community. Although these activity shifts are plastic phenotypic responses, they may have important evolutionary implications over longer time scales.

### **Platform**

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HUGHES

## **MONITORING OF MEASURES TO MAINTAIN CONNECTIVITY FOR AMPHIBIANS IN AN URBANIZING LANDSCAPE**

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In an ever urbanizing landscape the need for habitat connectivity, as well as collaboration with planning authorities, is paramount. A unique opportunity arose in 2012 when City Council approved a Draft Plan of Subdivision to permit the development of 409 residential units within a 23 ha property in the City of Guelph, Ontario. The Draft Plan of Subdivision included a 75m wide wildlife corridor and two wildlife crossing structures beneath the extension of Poppy Drive East. These measures are intended as mitigation to support amphibian movement between the north and south wetlands on the property. The proponent is required to implement a comprehensive monitoring program. The monitoring program was initiated in April 2013 and will continue for two years post-construction. Methodology includes drift fence and pitfall traps, capture-mark-recapture surveys utilizing Visual Implant Elastomer (VIE), visual encounter surveys, road mortality surveys, and extensive amphibian call surveys. Between 2013 and 2016 over 15,700 Anura captures have been made. The monitoring program provides an excellent opportunity to document the impacts of urbanization on the existing amphibian populations and to assess the effectiveness of the mitigation measures in maintaining landscape connectivity. This project also provides the opportunity to work with the City of Guelph and other municipalities, and engage the community in exploring avenues for habitat connectivity in the urban landscape.

### **Platform**

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\*KARSON

## **RACCOON (*PROCYON LOTOR*) DEPREDATION OF GRAVID FRESHWATER TURTLES IN RONDEAU PROVINCIAL PARK, ONTARIO**

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Adult survival and reproductive rates in vertebrate species with delayed sexual maturity and extended adult longevity are integral to species persistence, and are often the focus of conservation efforts aimed at sustaining populations. Depredation of adult turtles is considered a relatively rare occurrence, but can have disproportionate impacts on a population. Gravid reptiles may be more susceptible to predation due to decreased movement speed, extended movements to nesting sites, and nest site selection. During June and July 2017, we found 10 depredated common snapping turtles (*Chelydra serpentina*), 7 northern map turtles (*Graptemys geographica*), and 1 Blanding's turtle (*Emydoidea blandingii*) on a heavily-used nesting ground at Rondeau Provincial Park, Ontario. All individuals were mature females found flipped onto their carapace, with one or several holes measuring between 5 and 8 cm in diameter through their hind legs or the cloaca, providing access to the body cavity. Some specimens' internal organs (i.e. intestines, oviduct) were removed, and eggs were removed from those who were gravid at the time of depredation and eaten. The injuries observed on the recorded turtles were consistent with known instances of raccoon (*Procyon lotor*) depredation. Raccoon tracks were recorded adjacent to the carcasses, and on several occasions a raccoon was witnessed approaching or dragging gravid northern map turtles. Our observation is of interest because turtle populations cannot recover quickly from pulses of increased adult mortality. This predation event specifically targeted reproductive females, the most critical element of a population. Not only were reproductively active females removed, but potential recruitment of juveniles for the 2017 cohort was greatly reduced as a result of simultaneous egg consumption.

**Poster**

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\*KELL

## **NESTING IN CLOSE QUARTERS: CAUSES AND BENEFITS OF HIGH DENSITY NESTING IN PAINTED TURTLES**

Steven J. Kell<sup>1\*</sup>, Ronald J. Brooks<sup>2</sup> and Jacqueline D. Litzgus<sup>1</sup>

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Nesting is a costly time for female turtles, both energetically and from threat of predation. Although predation rates of eggs and juveniles are often high, ensuring maximum survival of offspring is crucial for population stability and individual fitness. Therefore, females should try to maximize offspring fitness while also minimizing risk to themselves. Our past observations indicate that female painted turtles at our study site in Algonquin Park are nesting at higher densities than random, suggesting some benefit to themselves and/or their offspring. Our goals are to determine if females are choosing to nest at high densities, what cues they use to locate nest sites, and what benefits the offspring might accrue from incubating at high nest densities. We will use ArcGIS to perform a spatial analysis on nest locations using data from 2015-2017 to determine if nest density is non-random or a product of abiotic nesting conditions. Why a female may choose a nesting location will be determined based on olfaction and visual cues provided by other females. Artificial nests scented with either turtle urine or water will be randomly distributed across the nesting site, allowing females to potentially choose to nest near or avoid other nests. Turtle models will be placed at the nest site in 3 densities, rotating locations each day to determine if nest site choice and nest density are driven by visual cues. Nests will be caged to prevent predation and spatial analyses conducted using ArcGIS to determine if incubation duration differs based on nearest neighbor distances. Our study will expand the knowledge of turtle reproductive biology and will also help in conservation as this information could be used to make artificial nesting mounds more attractive to female turtles.

**Poster**

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\*KELL

## ROAD EFFECTS ON PAINTED AND SNAPPING TURTLE POPULATION DEMOGRAPHICS IN ALGONQUIN PARK, CANADA

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Road mortality is a significant threat to turtle populations and has contributed to potentially deleterious changes in population demography. Road mortality can occur during annual nesting migrations of females, dispersal of juveniles, movements to escape unfavorable habitat conditions or find suitable habitat, or to find mates. We hypothesize that proximity to roads will decrease the health and fitness of turtle populations due to an increase in mortality from vehicle collisions, leading to changes in demography. To test this hypothesis, we are surveying turtle populations in 8 impact sites (wetlands along the major highway corridor) and 8 non-impact sites (wetlands >4 km from roads) in Algonquin Park. Snapping turtles and painted turtles from these wetlands will be captured in spring by canoe and dip net and in late summer by trapping; to compare body sizes and conditions, injury rates, chronic stress through cortisol levels in toe nail clippings, population age structure and sex ratio, and population density between impacted and non-impacted sites. We predict that non-impact sites will contain populations with larger body sizes, fewer injuries and lower stress, older aged individuals, and an equal sex ratio. Age of turtles will be estimated through a novel method using Pentosidine assays. We know that roads cause direct mortality of turtles; our study will quantitatively determine whether roads negatively influence turtle populations in more subtle indirect ways. Our findings can be used to inform future implementation of road mortality mitigation such as barrier fencing, ecopassages, and nest caging on roadways.

### Platform

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\*KOZMIK

## **IDENTIFYING DISPERSAL PATTERNS OF JUVENILE TURTLES IN RELATION TO MAJOR HIGHWAY SYSTEMS IN THE GEORGIAN BAY REGION: INFORMING FUTURE MITIGATION AND LAND-USE PLANNING**

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Habitat fragmentation, destruction, and degradation of wetland systems that provide Critical Habitat are key threats that have contributed to declines in Species At Risk (SAR) reptile populations. Magnetawan First Nation (MFN) in Eastern Georgian Bay, Ontario is home to several SAR reptile species and is fragmented by three linear anthropogenic structures consisting of one rail system and two highways, including Trans-Canada Hwy 69, which is planned to expand within MFN and the surrounding area. This relatively pristine landscape includes several contiguous wetland matrices consisting of marsh, swamp, fen, bog, and peatlands, many of which occur adjacent to the current rail and road structures such that Hwy 69 has become a documented mortality “hotspot” for reptiles. Much of this mortality includes migrating gravid females, and adults have generally been the focus of road ecology studies; however, alive and dead sub-adult and juvenile turtles have also been documented on the 6 km stretch of highway throughout MFN. Many knowledge gaps remain regarding the dispersal patterns of younger age-classes in relation to highway infrastructure, and about the impacts of highways on recruitment. The purpose of our study is to examine the dispersal patterns of juvenile age classes of multiple turtle species in relation to ecological drivers and the highway. We will use radio-telemetry, GPS tracking and mark-recapture data to quantify the spatial ecology and population ecology of juvenile turtles adjacent to the highway. These data will inform the mitigation design of the planned highway expansion to improve recruitment, movement corridors and habitat protection for SAR reptiles. Knowledge of the relationship between roadways and dispersal ecology could inform better methods of highway mitigation design in the future to protect and sustain reptile populations.

**Poster**

## **NIGHT ON EARTH: OBSERVATIONS OF AN EXTRAORDINARY NESTING AGGREGATION OF EASTERN HOGNOSE SNAKES, *HETERODON PLATYRHINOS***

Leslie Anthony Lowcock

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Aggregations of snakes are most often observed around den sites, both pre- and post-hibernation. The latter case may also serve as a mating aggregation. Though non-hibernating snakes can also form groups for breeding purposes, such aggregations are much smaller, typically involving a single female and several males. With regard to birthing or nesting aggregations, some live-bearing snakes (e.g. *Thamnophis ordinoides*) have been observed to form parturition “balls” in which several females bask together to raise collective body temperatures, while many egg-laying snakes use communal nest sites for oviposition—some even involving multiple species. Though more than one individual egg-laying snake may occasionally be observed to oviposit in the same site within a similar time frame, mass synchronous nesting among snakes has not been described. Here I report on an extraordinarily high (i.e., assumed to be non-random) number of eastern hognose snakes simultaneously nesting in the same small sand plot on two successive nights, in many cases using communal nests. While it is unclear whether this synchronicity is typical or fortuitous, reasons could involve elements of philopatry, phenology, weather, availability of high-quality nesting sites, and the benefits of egg clustering. Regardless of which factors may or may not be operative, this behaviour has clear implications for conservation and protection of known high-quality nesting sites for this threatened species.

### **Platform**

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LOWCOCK

## **ANATOMY AND CHARACTERIZATION OF AN IMPARA: THE PEMBERTON VALLEY, BRITISH COLUMBIA**

Lowcock, Leslie Anthony<sup>1\*</sup> and Veronica Woodruff<sup>2</sup>

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The Pemberton Valley in southwest British Columbia is a highly agrarian post-glacial floodplain of the Lillooet River hemmed by high mountains. Although hydrographically part of the Fraser River drainage communicating directly with the Pacific coast through the Lower Fraser Valley, the 150-km long corridor is transitional between coastal and interior biogeoclimatic zones. As such, it is an area in which floral and faunal elements of both are found. A minimum 13 species of reptile and amphibian occur in one part or another of the valley, an assemblage found nowhere else in the province or country. Some populations comprise the most northern record for a species and/or represent relict disjuncts of a broader distribution during a recent post-Pleistocene warm period; the taxonomic status of lithobatid frogs in the valley remains confusing and may include more than one species. The most important physiographic site within the valley is the Mackenzie Ridge complex, on whose extensive south-facing component all five currently known reptile species den and breed. Included in these are federally threatened rubber boas and federally endangered sharp-tailed snakes—the only known mainland population of this enigmatic species. Much of the ridge is under severe and rapidly growing recreation and development pressure, requiring proactive protection measures. Thus, an IMPARA designation could bring positive public attention to help focus conservation measures and oversight.

### **Platform**

# Canadian Herpetological Society 2017

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\*MAIDA

## **MOVEMENT ECOLOGY OF THE NORTHERN PACIFIC RATTLESNAKE (*CROTALUS OREGANUS OREGANUS*) IN RESPONSE TO DISTURBANCE**

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We examined the effects of disturbance and habitat fragmentation on the movement of the Northern Pacific Rattlesnake (*Crotalus oregonus oregonus*) from 2006–2012 in southern British Columbia, Canada. Previous work at this site revealed a reduction in body characteristics (body condition, weight) in rattlesnakes in association with increasing intensity of disturbance in their home range. In the present study, we determine if there are similar associations with rattlesnake movement and spatial ecology, based on the degree and intensity of disturbance in the habitat individuals utilize during the active foraging season. We radio-tracked 44 adult male rattlesnakes through shrub-steppe, grassland and dry forest habitats that varied from highly disturbed and fragmented to near-pristine with little human intervention. Disturbance was mainly associated with tourism (golf course, campground, hiking trails, roads, parking lots, vineyards, condominium complex). After accounting for inter-year variation and daily temperature, rattlesnakes in disturbed sites tended to have smaller core areas, shorter range lengths and lower movement rates. However, snakes in highly disturbed sites did not move greater total distances, had elevated movement frequencies, higher movement rates and/or more convoluted movement patterns. Based on these body characteristic trends previously reported, the subtle behavioural and movement changes in rattlesnake ecology found within the disturbed sites may be of biological and conservation importance.

**Poster**

# Canadian Herpetological Society 2017

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\*MARCHAND

## **YOU ARE WHERE YOU EAT: ISOTOPIC RESOURCE USE OF URBAN WESTERN PAINTED TURTLES IN REGINA, SASKATCHEWAN**

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Stable isotope analyses enable unprecedented insight into the ecology of aquatic species using only a small tissue sample. Recently developed Bayesian statistical methods also generate a unique quantitative perspective on niche and resource use. In this study, we used stable isotopes of carbon ( $\delta^{13}\text{C}$ ) and nitrogen ( $\delta^{15}\text{N}$ ) in nail samples from western painted turtles ( $n = 77$ ) in Regina, Saskatchewan to examine resource-use variation within and among individuals in an urban population. Western painted turtles are known to be generalist omnivores, so we predicted that there would be little systematic isotopic variation by sex, location, or age class. In contrast to our predictions, standard isotopic ellipses varied by habitat and sex, and isotopic niche overlap between sexes ranged from 26-77%, with the least overlap between males and females. Mixing models for source apportionment in MixSIAR revealed that the documented isotopic variation was influenced by a variety of factors, including sex, body size, habitat, and primary diet items. For example, adult female turtles in the marsh habitat consume substantially more crayfish than adult males. To our knowledge, this is the first application of stable isotopes derived from nail samples to examine resource use in western painted turtles.

### **Platform**

# Canadian Herpetological Society 2017

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MARKS

## **SOME DISCOVERIES FROM CANADA'S LARGEST SNAKE STUDY**

Steve Marks

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The Rt. Hon. Herb Gray Parkway project in Windsor ON has resulted in the largest study of Canadian snakes ever undertaken. Beginning in 2006, and continuing until 2020, both Butler's Gartersnakes and Eastern Foxsnakes have been intensely studied, leading to a number of discoveries, and reminders for fieldwork practices that are too easily forgotten. Record litter sizes in BUGA (23), dystocia (egg binding) in EAFO, startling movement records that are pertinent to front line conservation of snakes regarding future relocation efforts, and site fidelity in EAFO are discussed, along with sensitivity reminders for prairie, meadow and old-field research.

**Platform**

# Canadian Herpetological Society 2017

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MILBURN-RODRIGUEZ

## **ROAD MORTALITY MITIGATION: THE EFFECTIVENESS OF ANIMEX FENCE VERSUS MESH FENCE**

Milburn-Rodríguez J.C.<sup>1</sup>, Hathaway J.<sup>3</sup>, Gunson K.<sup>2</sup>, Moffat D.<sup>1</sup>, Béga S.<sup>1\*</sup> and Swensson D.<sup>1</sup>

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It is important to understand the impact from human development and infrastructure, such as roads in wildlife populations. Road-kill could be contributing to the global amphibian and reptile decline. To reduce this, many types of exclusion structures exist; fencing is the most efficient mitigation measure, however little research is known about what fencing types work best to exclude herpetofauna from roads and there are a lot of concerns with the safety and effectiveness of mesh fencing. Hence, this research tries to fill that gap of knowledge and evaluate the effectiveness of mesh fencing and a solid hard plastic Animex fencing and its application for conservation of the herpetofauna.

The study was undertaken in Canada. Each trial period was comprised of placing an individual in an enclosure with two sides composed of steel mesh fence (1/4 inch), and two sides composed of plastic solid Animex fence.

The results showed that all the studied animals spent a greater proportion of time along the mesh fence or trying to escape it, possibly because they were able to see or smell through the mesh fence. All species except Midland Painted Turtles successfully escaped the mesh fence; however none escaped the Animex fence. Based on behaviours exhibited by animals during the trials, mesh fencing could result in injury to some herpetofauna. This study recommends using plastic solid fence as the most appropriate road mitigation measure for the species studied, as the goal of exclusion fencing is not only to keep animals off the road, but also to funnel animals safely to wildlife crossing structures. Mesh fence will not direct as easily animals towards the wildlife crossings due to additional risk of injury, escape and delay, causing as well an increase of the potential risks from roads.

### **Platform**

# Canadian Herpetological Society 2017

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\*MOLDOWAN

## THE FIRST DECADE OF *BLISS*: POPULATION ECOLOGY AND SENSITIVITY TO ENVIRONMENTAL CHANGE OF THE SPOTTED SALAMANDER IN ALGONQUIN PROVINCIAL PARK

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This presentation will highlight findings from one decade of mark-recapture study and two decades of reproductive monitoring of Spotted Salamanders (*Ambystoma maculatum*) in Algonquin Provincial Park (APP), Ontario. Data has been collected on breeding phenology, reproductive effort, population vital rates, and local pond use patterns. During the past decade of monitoring, the onset of breeding activity has varied over a three-week period and a three-fold variance in population-level reproductive effort has been observed. Since 1992, the timing of breeding of APP salamanders has been advancing, and preliminary analyses demonstrate a strong negative correlation between reproductive effort and temperature during the pre-breeding period, suggesting that warmer spring temperatures discourage breeding activity. Relatedly, body condition and reproductive effort correlate negatively to previous summer temperatures, also suggesting that warmer temperatures curtail reproduction. Given notable changes in temperature, precipitation, and seasonality in APP in recent decades, and preliminary evidence of a seasonal shift in the reproductive cycle of APP salamanders, we are interested in quantifying the relationship between changes in environmental conditions and changes in both population-level and individual-level characteristics. This will allow us to assess which life stages are most sensitive to environmental change, and how the differential sensitivity of these features cumulatively impact population ecology and viability. Future research will address comparative population sampling methods (minnow trap, cover board, and drift fence), skeletochronology, and the construction of an Integrated Population Model as a tool to jointly analyze data on population size and demographic parameters.

### Platform

# Canadian Herpetological Society 2017

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\*MULLIN

## COMPARISON OF BEHAVIOUR, GROWTH RATES, AND SURVIVORSHIP AMONG THREE COHORTS OF HEADSTARTED WOOD TURTLES (*GLYPTEMYS INSCULPTA*) POST-RELEASE

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A population of endangered Wood Turtles (*Glyptemys insculpta*) has been augmented by an intensive headstarting program for 14 years. By definition, headstarted turtles have a larger body size compared to non-headstarted wild turtles, which should increase survivorship of headstarted turtles (i.e. “bigger is better” hypothesis). Our goal was to quantitatively test the assumption of “bigger is better” by comparing growth rates and survivorship of three groups of turtles: (1) 15 turtles headstarted for 2 years (C-2014), (2) 15 turtles headstarted for 1 year (C-2015), and (3) 15 turtles hatched in captivity then released (i.e. no headstarting; C-2016). We measured somatic growth rates of headstarted turtles while in captivity, and then all three cohorts of turtles were radio-tracked weekly during the active season and monthly during the winter to monitor movements, growth, and survivorship in the wild post-release. C-2014s and C-2015s were tracked for one year, from June 2016 until June 2017. C-2016s hatched in late July 2016, were released on 2 August 2016, and tracked for one month. Home range sizes differed significantly among cohorts ( $H=28.65$ ,  $df=2$ ,  $p<0.001$ ), with the largest turtles having the largest home ranges. The non-headstarted C-2016s had the smallest home ranges (0.006 ha); mean home range size for C-2015s was 1.28 ha; and for C-2014s was 4.45 ha. All cohorts exhibited positive growth post-release from captivity. C-2016s had 73% confirmed survivorship during their one month of tracking in late summer, and two of these turtles were confirmed to have survived the winter. C-2014s had 73% confirmed survivorship and C-2015s had 33% confirmed survivorship, indicating that two years of headstarting provides a survivorship advantage over one year of headstarting. Given the growing number of turtle headstarting projects globally, our study will provide data that can aid in improving the practice.

### Platform

# Canadian Herpetological Society 2017

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\*MULLIN

## **EVALUATING THE EFFECTIVENESS OF HEADSTARTING FOR WOOD TURTLE (*GLYPTEMYS INSCULPTA*) RECOVERY FROM A SUSPECTED POACHING EVENT**

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A population of endangered Wood Turtles (*Glyptemys insculpta*) was studied extensively beginning in 1988. By the mid 1990s, a suspected poaching event resulted in the removal of approximately 70% of the population. A population viability analysis determined that extirpation was inevitable if no intervention was undertaken and so a headstarting project was initiated in 2003 and the first cohort was released in 2005. Our objective is to quantitatively assess the effectiveness of the 14-year headstarting program by modeling population demographic parameters to evaluate recovery efforts to date, and determine the next phase of recovery. To date, a total of 537 headstarted turtles have been released back into their maternal streams. At present, the population bears the hallmarks of a heavily managed system: headstarted turtles constitute a larger proportion of the population than non-headstarted wild turtles (149:25), and sexually immature juveniles outnumber sexually mature adults (139:35). The persistence of the population will likely require a demographic shift to a more natural situation in which the population is made up mostly of reproducing adults. Headstarted turtles from the first release groups are just now beginning to reproduce, indicating that the population may become self-sustaining. Initial modeling suggests population recovery has been slow, even with intensive management. Recovery has been hindered by low survivorship (44%) of headstarted turtles in their 1<sup>st</sup> year post-release, which suggests revising our protocol, perhaps initiating “soft-releases”. Modeling population recovery scenarios with comprehensive long-term data is essential for evaluating the effectiveness of headstarting projects, while continuously improving recovery efforts.

**Poster**

# Canadian Herpetological Society 2017

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OVASKA

## CLARIFYING DISTRIBUTIONS OF FOUR SPECIES OF *RANA* IN SOUTHWESTERN BRITISH COLUMBIA USING eDNA METHODS

Kristiina Ovaska<sup>1\*</sup>, Christian Engelstoff<sup>1</sup>, and Lennart Sopuck<sup>1</sup>, Jared Hobbs<sup>2</sup>, Jessica Round<sup>3</sup>, Nik Veldhoen<sup>3</sup>, and Caren C. Helbing<sup>3</sup>, chelbing@uvic.ca

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We investigated the distribution of four ranid frogs (*Rana aurora* - Northern Red-legged Frog, *R. cascadae* - Cascades Frog, *R. luteiventris* - Columbia Spotted Frog, *R. pretiosa* - Oregon Spotted Frog), focusing primarily on the endangered Oregon Spotted Frog. During the 2016 and 2017 field seasons, we collected 1-litre water samples from the Pitt River in the Lower Fraser Valley eastward to Manning Provincial Park. Water samples were collected and filtered using BC Standard eDNA Collection Protocols. Isolated DNA was analysed with stringent polymerase chain reaction (qPCR) methods that included a test for amplifiable DNA. To date, 215 samples from 2016, representing 74 sites in 50 water bodies, have been analyzed. In the Lower Fraser Valley, Oregon Spotted Frog DNA was detected or suspected in ten water bodies (36% of 28 tested), including two with only historical records and four with no previous records. The detection of this species' DNA in six water bodies in higher elevation habitats in the Skagit Valley and Manning Park is enigmatic and under further investigation. Columbia Spotted Frog DNA was detected or suspected in 11 water bodies (22% of 50 tested) including ten water bodies from Skagit east to Manning Park, where the species is widespread, and one in the Lower Fraser Valley. Northern Red-legged Frog DNA was detected or suspected in nine water bodies (33% of 27 tested) in the Lower Fraser Valley within the species' known range. The detection of Cascades Frog DNA in six (21% of 27 tested) higher elevation (505 – 1719 m asl) water bodies in Skagit Valley and Manning Park is of particular interest, as the species has not been previously reported to occur in BC. Water samples and skin swabs from 2017 are yet to be analyzed and are hoped to confirm new sites and resolve ambiguous detections.

### Platform

# Canadian Herpetological Society 2017

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\*PHILPOTT

## LANDOWNER ATTITUDES AND IMPACTS OF LIVESTOCK GRAZING PRESSURES ON AMPHIBIAN REPRODUCTIVE SUCCESS

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In southeastern Manitoba, wetland alteration and drainage has left ~2% of wetlands in their natural state. Despite mounting livestock and agricultural pressures, southeastern Manitoba has been classified as an amphibian hotspot (Getis-Ord Gi\*) in a preliminary analysis. This region is home to a rich diversity of amphibian species including the only Canadian population of the Eastern Tiger Salamander (*Ambystoma Tigrinum*), designated endangered by COSEWIC. At the Northern extent of its range, the prairie population of *Ambystoma Tigrinum* breeds solely upon privately owned agricultural lands. Our study is applying both a qualitative and quantitative approach in assessing landowner attitudes towards wetlands and their obligate species, as well as the impacts of livestock grazing upon water chemistry and amphibian reproductive success. Landowner attitudes were assessed through surveys administered at community events over the summer of 2017 and will continue into the summer of 2018. To determine the impacts of livestock grazing, habitat was first characterized into three treatments: protected area, unrestricted livestock grazing and restricted access livestock grazing. Wetland sites were then monitored over the summers of 2017 and will continue into the summer of 2018 through weekly auditory calling surveys, visual surveys, dip-net surveys, funnel-trapping and water chemistry analysis. Preliminary analysis has found a negative correlation between heavily grazed sites and amphibian reproductive success. Secondly, it seems protected areas in the region do not provide adequate breeding refuge for amphibians. The majority of wetlands in protected areas included in our study are inhabited by predatory fish, harboring few signs of sustained amphibian reproductive success. This information will provide a basis for future investigations in amphibian conservation in landscapes dominated by livestock. The overall goal of the project is to predict amphibian reproductive success in livestock ponds based on physical characteristics in order to inform effective landowner management practices.

**Poster**

# Canadian Herpetological Society 2017

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RANDALL

## **RE-INTRODUCTION OF THE NORTHERN LEOPARD FROG (*LITHOBATES PIPIENS*) IN BRITISH COLUMBIA AND ALBERTA**

Lea Randall<sup>1\*</sup>, Kris Kendell<sup>2</sup>, Purnima Govindarajulu<sup>3</sup>, Barb Houston<sup>4</sup>, Penny Ohanjanian<sup>5</sup> & Axel Moehrenschrager<sup>1</sup>

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Once widespread and abundant, northern leopard frogs began to disappear from many wetlands in western North America in the 1970s and '80s, likely due habitat loss and fragmentation, reduced water quality and quantity, introduced fish, and disease. Reductions in range, number of populations, and abundance have led to the designation of 'endangered' for the Rocky Mountain population in British Columbia and 'special concern' for the Western Boreal/Prairie populations. In British Columbia, there is a single extant population of northern leopard frogs located in the Creston Valley Wildlife Management Area. The northern leopard frog is 'threatened' in Alberta, and remaining populations are isolated resulting in reduced gene flow and hampering re-colonization. Re-introduction is identified as a key strategy to recover northern leopard frogs in both provinces. We summarize some of the reintroduction efforts in British Columbia and Alberta over the last 35 years and evaluate whether the goals were achieved based upon success indicators. We elaborate on difficulties faced and lessons learned.

### **Platform**

# Canadian Herpetological Society 2017

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\*RITCHIE

## DOES RELATIVE ABUNDANCE PREDICT ROAD MORTALITY?

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Road ecologists, planners and governments are devoting increasing effort to mitigating road mortality of wildlife, and understanding the deterministic variables that predict the frequency of road mortality can optimize these efforts. Herpetofauna are particularly affected by direct mortality on roads. Roads represent ecological traps to snakes, because the attractive thermal qualities of pavement lead them to bask in areas with high risk of mortality. Here we explore the relationship between road mortality and relative abundance of snakes based on three years of field data (2013 – 2016) from Rondeau Provincial Park (Chatham-Kent, Ontario). We tested the hypothesis that road mortality is affected by background abundance of snakes, predicting that high road-side abundance is associated with high road mortality. We estimated relative abundance of snakes from coverboard surveys, and tabulated road mortality on road segments adjacent to cover boards, then explored relationships between these two datasets using a generalized linear model. Local abundance of snakes under coverboards was not significantly associated with the local number of snakes killed on the road ( $se < 0.01$ ,  $df = 8$ ,  $p\text{-value} = 0.25$ ). This result supports the potential role of habitat composition in predicting road mortality, rather than simply the background density of snakes. We also detected a positive relationship between road mortality and the distance of each tested road segment to intersections, when controlling for traffic volume ( $se < 0.01$ ,  $p\text{-value} < 0.01$ ). This result suggests that the lower speeds and higher attentiveness of drivers approaching intersections may allow drivers and wildlife to more effectively avoid collisions. Our results indicate that the behaviour of drivers, is an important variable when considering road-mortality mitigation strategies and that by reducing speed limits in areas where wildlife abundance is high we can minimize vehicle-wildlife collisions.

**Poster**

## THERMAL PERFORMANCE AND DEVELOPMENT RATE LIMITATIONS OF EMBRYONIC REPTILES IN SEASONAL ENVIRONMENTS

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Thermal performance curves (TPCs) characterize the relationship between performance and temperature. Biochemical constraints on the shape of TPCs dictate that performance decreases precipitously when optimal temperature for performance ( $T_{rmax}$ ) is exceeded. For this reason, theory predicts that mean body temperature ( $T_o$ ) should be lower than  $T_{rmax}$ , particularly in seasonal environments and when thermoregulatory opportunities are limited. We test this prediction for reptilian embryos and explore its ecological consequences. First, we develop and validate a broadly-applicable method of quantifying development which allows estimation of development rate between arbitrary embryonic stages. Using this new method, we estimated the TPCs for embryonic development rates of populations of Common Snapping Turtles (*Chelydra serpentina*) and Midland Painted Turtles (*Chrysemys picta marginata*) in Ontario's Algonquin Provincial Park. We find that incubation temperatures experienced in wild nests over 17 years rarely achieved or exceeded  $T_{rmax}$ , and that the thermal safety margins (i.e.,  $T_{rmax} - T_o$ ) were very large. This supports a key prediction of thermal performance theory, which is that optimal temperature for thermal performance is greater than mean environmental temperature. We suggest that, among embryonic reptiles, variance in body temperature should become increasingly extreme as latitude increases. Given that the thermal safety margin is optimized as a function of mean body temperature and its variance, optimal performance is achieved in seasonal environments by increasing the thermal performance breadth and thermal safety margin. The overall goals of our study were to validate a new method of estimating developmental progression of ectotherms and to explore the prediction that TPCs characterized by large thermal safety margins and relatively symmetric shapes should evolve under strong seasonality.

### Platform

# Canadian Herpetological Society 2017

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RUTHERFORD

## **POPULATION ECOLOGY OF AN ENDANGERED LIZARD SPECIES (*PLESTIODON SEPTENTRIONALIS*) IN CANADA**

Pamela L. Rutherford

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The Northern Prairie Skink (*Plestiodon septentrionalis septentrionalis*) is an Endangered lizard species that inhabits the mixed-grass prairie in southwestern Manitoba, Canada. They are separated from southern populations by more than 200 km, and their existing habitat is declining due to aspen encroachment, conversion of mixed-grass prairie into cropland, and all-terrain vehicle use. In this paper, we present data on morphology, breeding size and age, population estimates, and survivorship, based on a mark-recapture study of populations from 2007-2015. Adult Northern Prairie Skinks in Canadian populations are larger, lay fewer eggs, have higher rates of tail loss, and have lower population densities, compared to populations from Minnesota and Nebraska. This data provides important ecological data to assist in the recovery of this Endangered species. Current recovery efforts are targeted at the following areas: active management of suitable habitat, long-term monitoring of key populations, collection of data on their distribution, and genetic analysis to identify the relationships among Canadian populations.

### **Platform**

# Canadian Herpetological Society 2017

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SEBURN

## DEPLOYING THE TURTLE SHIELD: BLANDING'S TURTLES AS A WETLAND PROTECTION TOOL

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The Blanding's Turtle (*Emydoidea blandingii*) is listed as a threatened species under the Ontario Endangered Species Act (ESA). The ESA provides habitat protection to threatened or endangered species through the process of habitat regulation. For the Blanding's Turtle, habitat regulation applies to wetlands within 2 km of all valid observations of the species. Observations can be of individuals in wetlands or even dead on the road. Finding new areas where the Blanding's Turtle occurs provides additional protection for the species but also for wetlands in general. As part of Canadian Wildlife Federation's Help the Turtles program, we undertook wetland and road surveys in eastern Ontario to locate previously undocumented Blanding's Turtle sites. Blanding's Turtles were detected during only approximately 10% of wetland surveys, but almost 70% of road surveys. In addition, up to 5 Blanding's Turtles were encountered during a road survey, usually in multiple locations, making this the most successful survey method. Over 480 turtles were found on roads, with the Midland Painted Turtle making up greater than 60% of all turtles. More than 50 Blanding's Turtles were found on roads, 90% of which were dead. Data from the road surveys will be used to identify roadkill hotspots and to work with relevant agencies to implement road mitigation.

### Platform

# Canadian Herpetological Society 2017

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\*SMOLARZ

## **HYDROLOGICAL AND THERMAL DYNAMICS OF MOSS ON ROCK BARRENS: IMPLICATIONS FOR ENDANGERED REPTILE HABITAT**

Alanna G. Smolarz\*, Paul A. Moore, and James M. Waddington

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Climatic limitations and landscape constraints of Ontario's near-north habitat restrict the existence of several reptile species, a challenge likely to worsen by the effects of climate change. Specifically, the COSEWIC designated threatened Blanding's Turtle (*Emydoidea blandingii*) and Massasauga Rattlesnake (*Sistrurus catenatus*) are likely to face additional pressures in the form of highway construction and urbanization. Despite a lack of focus on habitat use in most studies, recent research in the eastern Georgian Bay region has shown that these at risk reptiles select moss dominated habitat for critical life stages, including hibernation and nesting, as the hydrophysical properties of the moss provide stabilized moisture and temperature conditions conducive to their thermoregulatory needs. Our research combines the valuable knowledge from past radio-telemetry studies as well as our developed understanding of representative habitat to identify critical hibernation and nesting locations. Atmospheric conditions and sub-surficial temperature and moisture dynamics are then assessed using automatic and manual measurements. The distribution, vegetative composition, and depth of organic matter of all sites are also surveyed to provide valuable information on specific habitat features which may dictate a locations' suitability for reptile use. By studying this habitat that occupies bedrock depressions on a variety of scales, from small organic filled depressions to large bogs, we can gain an integrative understanding of the factors which control the resilience of these network systems. As such, the aim for this research is to ultimately facilitate the generation of reptile conservation strategies along eastern Georgian Bay to ensure the sustained existence of these reptile Species at Risk despite expected impacts of climate change and anthropogenic land development on their habitat.

**Platform and Poster**

# Canadian Herpetological Society 2017

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SOMMERS

## EFFECTS OF ENVIRONMENTAL VARIABLES ON THE CALLING BEHAVIOUR OF THE NORTHERN LEOPARD FROG (*LITHOBATES PIFIENS*) IN ALBERTA

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Breeding behaviour of temperate-zone amphibians is influenced by environmental variables, but the initiation of calling (phenology) and influences on calling activity may vary with species and region. We investigated the influence of the timing of ice melt, water temperature, and photoperiod on the breeding phenology of *Lithobates pipiens* (Schreber 1782) in southern Alberta, using automated recording units. We also examined the influence of wind speed, relative humidity, water temperature and time of day on calling activity. The initiation of calling varied by 13 days at our three sites, suggesting that calling was influenced more by water temperature and timing of ice melt than photoperiod. Calling was first observed 8-11 days after ice melt at water temperatures of 7.5 - 8 °C at our sites. No calling was detected at water temperature < 5 °C. We recorded nocturnal and diurnal calling at all sites; > 50 % of calling was diurnal, even on days with warm overnight temperatures. Calling activity was influenced by time of day, water temperature, wind, and relative humidity. Our results suggest that date of initiation of calling varies considerably among breeding ponds and that the time of day of peak calling varies with both site and water temperature.

**Platform**

# Canadian Herpetological Society 2017

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WAYE

## **EASTERN TIGER SALAMANDER (*AMBYSTOMA TIGRINUM*) MOVEMENT AND HABITAT USE IN THE PRAIRIE POTHOLE REGION OF WEST-CENTRAL MINNESOTA**

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Most of the wetlands of the tallgrass prairie in the Prairie Pothole Region have been lost due to drainage for agriculture. Management and conservation efforts in these productive and highly fragmented habitats depend on a better understanding of the requirements of the species that rely on these potholes for survival. Tiger salamanders, due to their aquatic larval and terrestrial adult stages, appear to play an important role in the energy budgets of both aquatic and terrestrial communities. However, little is known about tiger salamander habitat requirements in prairie environments, especially for the terrestrial stage. Given that this is the stage responsible for dispersal and reproduction, we need more information on how these individuals use their environment, which habitats are important to them throughout the year, and potential barriers to movement between these habitats. We used radio telemetry to track adult Eastern Tiger Salamanders (*Ambystoma tigrinum*) between May and October 2016. We also collected data on weather and habitat features. We found that while Eastern Tiger Salamanders in a variety of other locations have been reported to leave their breeding ponds for upland habitats and appear to spend much of the summer underground, the salamanders in this study made extensive use of aquatic habitats for months after breeding. Repetition of this study will be necessary to determine whether this behavior was unique to 2016; however, our results suggest that tiger salamanders in prairie potholes depend on suitable ponds not only for successful reproduction.

**Poster**

# Canadian Herpetological Society 2017

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\*WINTON

## **FURTHER DOWN THE ROAD: PRE-MITIGATION ANALYSIS OF WESTERN RATTLESNAKE POPULATION VIABILITY UNDER DIFFERENT ROAD MORTALITY SCENARIOS**

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Arguably the greatest adverse effect of roads on wildlife populations is direct mortality which reduces the size of populations beyond natural causes. Effective conservation methods require proper baseline research on the impact of road mortality to target populations, especially species-at-risk (SAR), as well as particularly problematic sites for roadkill. The south Okanagan region of British Columbia provides habitat for over 30 federally listed SAR, including the Northern Pacific Rattlesnake (*Crotalus oreganus oreganus*), but is an area that is experiencing tremendous human population growth and concomitant development of transportation corridors. We examined a population of rattlesnakes in a protected area traversed by a highway, to determine how rapidly the population is declining under the current rate of road mortality, and to assess whether proposed mitigation will be sufficient to maintain a stable population. From April to October, 2015 and 2016, the population was sampled using mark-recapture methods and roadkill was monitored through an average of three road surveys per week. Demographic data from this and other local studies were used to create a model of the population which was analyzed in *Vortex*. Results indicated that due to the intensity of road mortality, the population was declining and facing extirpation if no measures were taken. Road mortality data were further analyzed using a sliding window method to identify roadkill hotspots. The installation of ecopassages coupled with fences at these locations will potentially reduce road mortality by up to 60%. This research has revealed the current rate of mortality due to roads and identified important hotspot locations for rattlesnakes, showing it is essential that mitigation be implemented. It further shows that population viability analyses can be used as pre-planning tools to inform management decisions.

**Poster**

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YAGI

## **MANAGING AN ECOLOGICAL TRAP ON AN ENDANGERED SPECIES MASSASAUGA (*SISTRURUS CATENATUS*) BY USING FORCED HIBERNATION**

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Reptiles require cues such as temperature and moisture gradients to locate suitable habitats to complete their annual life cycle. Anthropogenically altered habitats such as previously mined peatland mimic these cues and attract animals. However habitat quality is not maintained for the duration of the animal or progeny's life span and animals die. Ecological trap theory suggests that the continued presence of a trap will drive populations to extinction. Declining neonates and gravid females followed a flood event of a small but viable hibernation area which lends support that a partially mined peatland is acting as an ecological trap on an endangered Massasauga rattlesnake population. "Forced hibernation" is a conservation biology technique tested during the last 3 winters. This term refers to the method of placing neonatal snakes into enclosed artificial burrows located in ideal subterranean habitat for the duration of their hibernation period. This prime habitat must meet the criteria of maintaining an annual "Life Zone", which is a subterranean space that does not freeze or flood completely during winter. The purpose of this experiment is to test whether the forced hibernation technique is a suitable strategy for headstarting neonatal massasaugas. Results indicate a favorable outcome with 100% survival of neonatal Eastern gartersnakes and 90% survival of neonatal massasaugas. However sample size was small (n=10 for each species) and Winter 2016-17 was dry and mild. Winter 2014-15 and 2015-16 were studied using neonatal and juvenile gartersnakes (n= 11 and 10) with 95% overall survival. Forced hibernation will directly manage the ecological trap effect by eliminating a neonate's naïve selection of a potentially lethal burrow and ensure over winter survival in areas where the life zone is annually maintained. Hibernation site fidelity will then ensure winter survivors return to hibernation sites with an annual life zone and the population should increase.

### **Platform**

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\*ZAGORSKI

## **EXAMINING POPULATION AND SPATIAL ECOLOGIES OF BLANDING'S TURTLES *EMYDOIDEA BLANDINGII* TO INFORM MITIGATION PLANS FOR QUARRY DEVELOPMENT**

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The SARA Recovery Strategy for Blanding's Turtles identifies quarrying as an activity likely to destroy Critical Habitat. A quarry is proposed in known Blanding's turtle habitat in Algoma District, Ontario where the species is listed as Threatened, meaning that under the provincial Endangered Species Act, an Overall Benefit Permit and mitigation plan are required for the development to proceed. The purpose of our study is to provide data to inform mitigation plans for this quarry development, and to provide baseline data that can serve as the "before" sampling period in a long-term BACI study. Mark recapture surveys will be conducted to gather population ecology data, and radio telemetry and GPS tracking will be used to measure spatial ecology at impact and control sites. Movements, home range size, habitat use and temperature selection will be quantified, and nesting and overwintering sites will be identified. Thermal environment will be quantified using temperature data loggers and aerial imagery. Drones and field surveys will be used to identify vegetation type and cover at all sites. Preliminary data indicate that turtles are using wetlands and lakes in all study areas at the impact site, and a nesting site was discovered on a rock outcrop more than 30 m from the closest wetland; this is significant because the quarry proponent has proposed a 30-metre setback to protect surrounding provincially significant wetlands but no setbacks have been created for nesting sites. Our study is significant because not only will it provide data to inform mitigation for the Algoma quarry site, it will also provide population and community ecology data from a previously unstudied location near the northern range limit for the Blanding's turtle, and will provide data applicable to other proposed quarry sites in Northern Ontario or areas where the species occurs in similar habitats.

**Poster**

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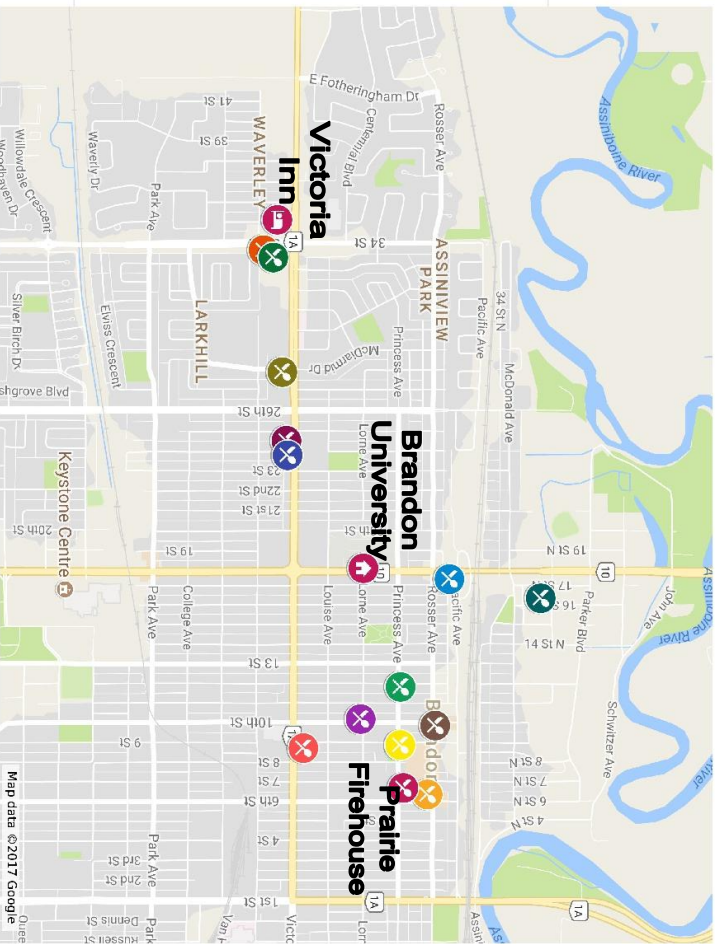
# CHS 2017 Brandon

## CHS Events

- Brandon University
- Prairie Firehouse
- Victoria Inn Hotel

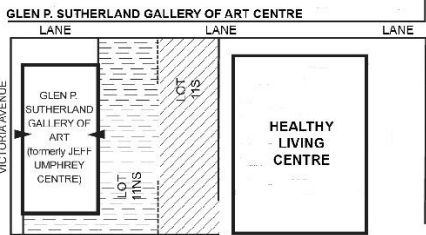
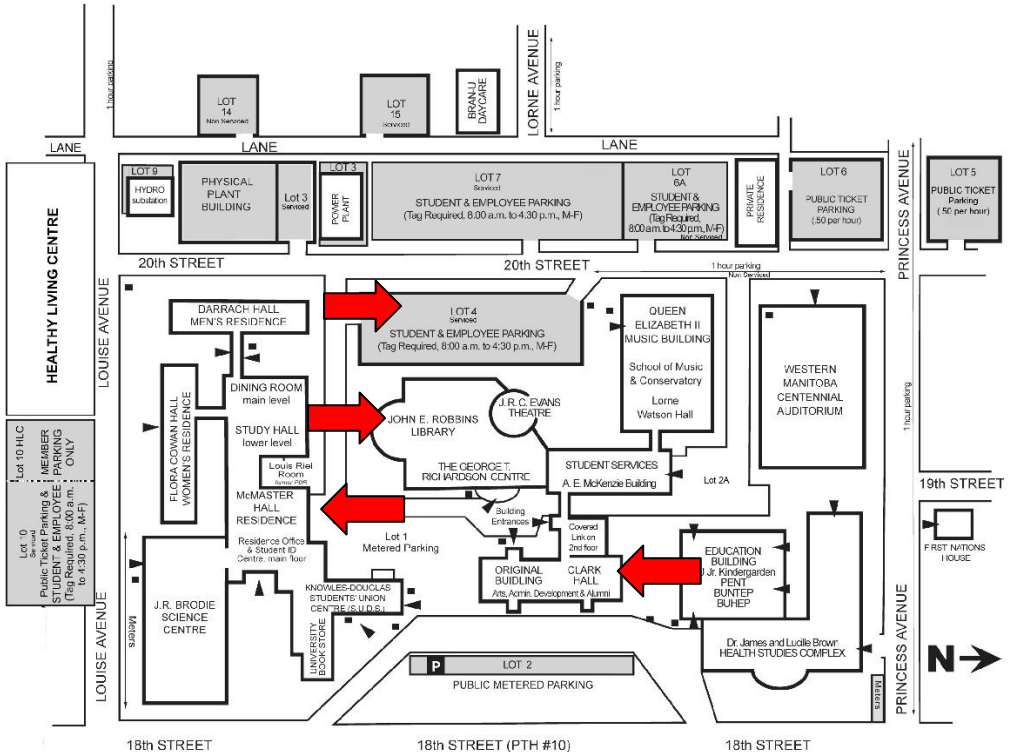
## Restaurants

- Tokyo Zone
- The Dock On Princess
- Tana Ethiopian Cuisine
- Double Decker
- The Komfort Kitchen
- Sabor Latino
- Lady of the Lake
- Benny's Restaurant
- Sushi Hut
- The Chill! Chutney
- Fried Pizzaria
- Murn's Family Restaurant
- Pupuseria Bendicion de Dios





*Campus Building and Parking Directory*



**IMPORTANT PARKING NOTES**

- ▲ BUILDING ENTRANCES
- ▲ RAMP ACCESS / WHEELCHAIR ACCESSIBLE CURBING
- P WHEELCHAIR ACCESSIBLE PARKING (requires valid tag)
- PARKING: Areas listed as "Student and Employee Parking" require a valid parking tag between 8:00 a.m. and 4:30 p.m. from Monday to Friday. There is no charge to park on any of these lots after 4:30 p.m. or on weekends. Vehicles without a valid tag will be ticketed and can be towed during the day.
- TO BUY A PARKING PASS: Call the Ancillary Services Office at (204) 727-9751. Ancillary Services is located on the main level of the McMaster Hall Residence.
- METERED PARKING: Cost: 0.01 per minute (\$1 per 100 minutes). Maximum of 1 hr & 40 mins.
- HOURLY TICKET PARKING: 50 PER HOUR to a maximum of 8 hours (Lots 5 & 6, located west of and north-west of the Western Manitoba Centennial Auditorium on the corner of Princess Avenue and 20th Street.) .60 PER HOUR Lot 10
- STREET PARKING: There is a one or two-hour time limit on parking on surrounding residential streets. One hour zones are as indicated on Campus map. Two hour zone is from 10th Street to 22nd Street between Rosser Avenue and Victoria Avenue. Signs and time limits are posted. Vehicles without a valid homeowner's pass will be ticketed and can be towed.