

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

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



**Virtual Meeting  
December 6, 2020**

# Canadian Herpetological Society 2020

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## Welcome

On behalf of the CHS Meeting and Workshop Committee, welcome to the virtual meeting for the 7th Annual Meeting of the Canadian Herpetological Society/Société d'Herpétologie du Canada – Part 2. 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.

### **CHS Meetings and Workshops Committee**

- Pamela Rutherford (Chair)
- Amanda Bennett (Logo creator)
- Jonathan Choquette
- Scott Gillingwater
- Hannah M<sup>c</sup>Curdy-Adams
- Julia Riley

## 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:** Jacqueline Litzgus (Laurentian University, Sudbury, ON)

**Vice President:** Pamela Rutherford (Brandon University, Brandon, MB)

**Past President:** Joe Crowley (Ont. Ministry of Env., Conservation and Parks, Peterborough, ON)

**Treasurer:** John Urquhart (Blazing Star Environmental, Oshawa, ON)

**Secretary:** Amanda Bennett (Council of Canadian Academies, Ottawa, ON)

**Directors at Large:** Leslie Anthony, Christina Davy, Yohann Dubois, Scott Gillingwater, Stephen Hecnar, Patrick Moldowan

**Webmaster:** Drew Hoysak

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## ***Schedule Overview***

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*Sunday, December 6, 2020*

<b>1:00pm EST</b>	<b>Session 1</b>	
1:20pm	Questions	
<b>1:30pm</b>	<b>Keynote Speaker</b>	<b>Fred Schueler</b>
2:00pm	Questions	
<b>2:15pm</b>	<b>Break</b>	
<b>2:30pm</b>	<b>Session 2</b>	
2:50pm	Questions	
<b>3:00pm</b>	<b>Session 3</b>	
3:20pm	Questions	
3:30pm	Social	Wonder (formerly YoTribe)

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**Sunday, December 6, 2020**

<b>Session 1: Reptile behaviour and conservation (Chair: Jonathan Choquette)</b>	
1300-1305	<b>SCALING THE DRAKENSBERG MOUNTAINS TO STUDY THE SOCIAL BEHAVIOUR OF AFROMONTANE CRAG LIZARDS (<i>Pseudocordylus</i> spp.)</b>  Julia L. Riley* and James H. Baxter-Gilbert
1305-1310	<b>THE EFFECTS OF HABITAT LOSS AND ROADS ON REPTILE OCCUPANCY</b>  James E. Paterson*, Tanya Pulfer, Emma Horrigan, Smera Sukumar, Ryan Zimmerling, and Christina Davy
1310-1315	<b>THE CANADIAN SPECIES INITIATIVE: STRENGTHENING THE IMPACT OF SPECIES RECOVERY EFFORTS IN CANADA</b>  Stephanie A. Winton* and Jessica C. Steiner
1315-1320	<b>BOLSTERING THE EASTERN MASSASAUGA SPECIES SURVIVAL PLAN TO AID IN CONSERVATION EFFORTS</b>  Hannah L. McCurdy-Adams*, Rick Vos, Jeff Hathaway, Alanna G. Smolarz, Josh Porter, Anthony Amsel, Donnell Gasbarrini, and Cory L. Kozmik

<b>13:30</b>	<b>Keynote Speaker: Frederick Schueler and Aleta Karstad</b>  <b>SCIENCE IS A VERY INEXACT SCIENCE: FRANCIS COOK'S LONG TERM VISION OF CANADIAN HERPETOLOGY</b>
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<b>Session 2: Life History and Disease (Chair: Hannah M<sup>c</sup>Curdy-Adams)</b>	
1430-1435	<p><b>AN ACUTE MORTALITY EVENT OF PAINTED TURTLES (<i>Chrysemys picta</i>) AND BLANDING'S TURTLES (<i>Emydoidea blandingii</i>) IN SOUTHERN ONTARIO</b></p> <p>Donnell M. L. Gasbarrini*, Tharusha Wijewardena, Richard de Paulsen, Kevin C. R. Kerr, Jacqueline D. Litzgus, Nicholas E. Mandrak, and Megan Young</p>
1435-1440	<p><b>AGE BEFORE BEAUTY: WHAT REPTILE POPULATION MODELS REALLY NEED TO KNOW</b></p> <p>Anne. R. Yagi, Katharine T. Yagi*, and Glenn J. Tattersall</p>
1440-1445	<p><b>SUB-LETHAL EFFECTS OF WILD-TYPE AND A vIF-2<math>\alpha</math>-KNOCKOUT Frog virus 3 ON POST-METAMORPHIC WOOD FROGS (<i>Rana sylvatica</i>): POTENTIAL FOR A STAGE-SPECIFIC RESERVOIR</b></p> <p>Joe-Felix Bienentreu*, Leon Grayfer, Danna M. Schock, Matthew Guerreiro, Melanie Mehes-Smith, Stephanie J. DeWitte-Orr, Jacques Robert, Craig R. Brunetti and David Lesbarrères</p>
1445-1450	<p><b>ENERGY COSTS OF HIBERNATION IN NEONATAL SNAKES IN A VARIABLE ENVIRONMENT</b></p> <p>Anne. R. Yagi* and Glenn J. Tattersall</p>

<b>Session 3: Pelee Island and Peepers (Chair: Hannah M<sup>c</sup>Curdy-Adams)</b>	
1500-1505	<p><b>DISCORDANCE BY LAND AND TREES: THE SPRING PEEPER AS A "SPECIES"</b></p> <p>N.A. Cairns*, A.S. Cicchino, K.A. Stewart, J.D. Austin, and S.C. Loughheed</p>
1505-1510	<p><b>SEVERE DECLINES IN BLUE-SPOTTED SALAMANDERS ON PELEE ISLAND, ONTARIO MERIT FORMAL RISK ASSESSMENT AND PROTECTION</b></p> <p>Thomas J. Hossie*, Evan Bare, Tucker Cambridge, Graeme Smith, Kiefer Thalen, and Dennis L. Murray</p>
1510-1515	<p><b>DO EXISTING CONSTRUCTED PONDS ON PELEE ISLAND, ONTARIO MATCH THE HABITAT REQUIREMENTS OF ENDANGERED AMBYSTOMA LARVAE?</b></p> <p>Meghan J. Ward* and Thomas Hossie</p>
1515-1520	<p><b>HABITAT MANAGEMENT FOR THE ONLY REMAINING POPULATION OF BLUE RACER (<i>Coluber constrictor foxii</i>) IN CANADA</b></p> <p>Ryan M. Wolfe* and Njal Rollinson</p>

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BIENENTREU

## SUB-LETHAL EFFECTS OF WILD-TYPE AND A vIF-2 $\alpha$ -KNOCKOUT Frog virus 3 ON POST-METAMORPHIC WOOD FROGS (*Rana sylvatica*): POTENTIAL FOR A STAGE-SPECIFIC RESERVOIR

Joe-Felix Bienentreu<sup>1\*</sup>, Leon Grayfer<sup>2</sup>, Danna M. Schock<sup>3</sup>, Matthew Guerreiro<sup>4</sup>, Melanie Mehes-Smith<sup>1</sup>, Stephanie J. DeWitte-Orr<sup>4</sup>, Jacques Robert<sup>5</sup>, Craig R. Brunetti<sup>6</sup> and David Lesbarrères<sup>1</sup>

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Ranaviruses have been associated with rising numbers of mass die-offs in amphibian populations around the globe. However, most lab- and field-studies of ranaviruses to date have focused on larval amphibians. To assess the role of post-metamorphic amphibians in the epidemiology of ranaviruses and to determine the role of viral immune-suppression genes, we performed a bath exposure study on post-metamorphic wood frogs (*Rana sylvatica*) using environmentally relevant concentrations of wild-type Frog virus 3 (WT FV3), and a gene-knockout mutant (KO FV3), deficient for the putative immune-suppression gene vIF-2 $\alpha$ . We observed a 42% infection rate and 5% mortality across the virus challenges, with infection rates and viral loads following a dose-dependent pattern. Individuals exposed to the KO FV3 variant exhibited significantly decreased growth and increased lethargy as compared to WT FV3 treatments. Although 85% of exposed individuals exhibited common signs of ranavirosis (edema of ventral body and extremities; dermal ulcerations and hemorrhages) throughout the experiment, most of these individuals did not exhibit signs of infection by 40 days post-exposure. Overall, we showed that even a single short time exposure to environmentally relevant concentrations of ranavirus may cause sub-lethal infections in post-metamorphic amphibians, highlighting the importance of this life stage in the epidemiology of ranaviruses. Our study also supports the importance of the vIF-2 $\alpha$  gene in immune-suppression in infected individuals.

## **DISCORDANCE BY LAND AND TREES: THE SPRING PEEPER AS A "SPECIES"**

N.A. Cairns<sup>1\*</sup>, A.S. Cicchino<sup>2</sup>, K.A. Stewart<sup>3</sup>, J.D. Austin<sup>4</sup>, and S.C. Loughheed<sup>1</sup>

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<sup>3</sup>Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam, Amsterdam, North Holland, NL, 904 Science Park, 1098XH.

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The reduction of gene flow is often associated with divergence and initial stages of speciation. However, the adaptability of organisms and the impermanence of ecological barriers can result in the opportunity for renewed gene flow. Under the biological species concept this is when species boundaries are tested. At the contact zones the permeability of some genomic regions may vary from others, representing selection and linkage. Such variable patterns of genetic exchange can leave complicated phylogenetic signals. Using reduced representation genomics, cline analysis and niche modeling, I investigated the spring peeper (*Pseudacris crucifer*), a frog with a massive geographic range and multiple parapatric lineages. My work revealed patterns of phylogenetic and geographic discordance between mitochondrial and nuclear DNA, driven by the apparent widespread introgression of nuclear DNA. I also observed narrow, generally coincident clines in call and genetic traits suggesting a tension zone at one contact zone that coincides with a distinct altitudinal and climatic ecotone. The patterns I observed in *P. crucifer* imply a complex relationship between environment, allopatry, divergence, and gene flow. Populations within one region (westernmost part of the species range) have diverged from populations across the remainder of species range, where gene flow appears to be homogenizing differences in zones of contact. *Pseudacris crucifer* provides a compelling example of the importance of range-wide genetic studies, the complicated evolutionary histories of species that occur in areas impacted by glaciation, and the consequences of gene flow on diversification to the level of incipient species.

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GASBARRINI

## AN ACUTE MORTALITY EVENT OF PAINTED TURTLES (*Chrysemys picta*) AND BLANDING'S TURTLES (*Emydoidea blandingii*) IN SOUTHERN ONTARIO

Donnell M. L. Gasbarrini<sup>1\*</sup>, Tharusha Wijewardena<sup>2</sup>, Richard de Paulsen<sup>3</sup>, Kevin C. R. Kerr<sup>1</sup>, Jacqueline D. Litzgus<sup>2</sup>, Nicholas E. Mandrak<sup>4</sup>, and Megan Young<sup>1</sup>

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Mass mortality events (MMEs) are underreported in the primary literature, limiting knowledge on the causes and consequences of such events. Similarly, there is a lack of guiding examples on how to mitigate the losses resulting from MMEs. Long-lived species, such as Chelonians, are particularly susceptible to additive mortality, as persistence of their populations relies on high adult survivorship and longevity, and they lack density-dependent responses to acute population declines. We observed a MME of 56 adult painted turtles (*Chrysemys picta*) and 40 juvenile Blanding's turtles (*Emydoidea blandingii*) in June-August 2020. This MME peaked during nesting season in Ontario, an especially vulnerable time for female turtles as they make their terrestrial migrations to nest sites. The majority of painted turtle carcasses were female, and ultimately represent a loss of 54% of the known painted turtle population in the study area. The juvenile Blanding's turtles were part of a long-term headstarting initiative to augment a historic population that was deemed non-viable after several years of surveys. The mortality appears to have been the result of predation by mammals, given the condition of the carcasses and images from motion-activated wildlife cameras, one of which was paired with a painted turtle decoy. Future work will include population viability analyses, for both the painted turtle and Blanding's turtle populations, to better realize long-term consequences and adaptively manage conservation planning. With this MME taking place at a long-term study site, additional data will be collected and used to verify predictions and update PVA models regularly. In addition to population-specific insights, this study will add to the field's limited understanding of MMEs.

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HOSSIE

## SEVERE DECLINES IN BLUE-SPOTTED SALAMANDERS ON PEELEE ISLAND, ONTARIO MERIT FORMAL RISK ASSESSMENT AND PROTECTION

Thomas J. Hossie<sup>1,\*</sup>, Evan Bare<sup>2</sup>, Tucker Cambridge<sup>2</sup>, Graeme Smith<sup>2</sup>, Kiefer Thalen<sup>2</sup>, Dennis L. Murray<sup>1,2</sup>

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Pelee Island, Ontario is home to several rare species, including herpetofauna that occur nowhere else in Canada. The amphibians which occur there today are remnant populations isolated from the mainland when the island was formed ~4000 years ago, and have survived significant anthropogenic changes to the landscape since then. Pelee Island holds Canada's only population of Small-mouthed Salamanders (*Ambystoma texanum*), a unique unisexual *Ambystoma* population (Small-mouthed Salamander dependent population), and is the only island in Lake Erie with Blue-spotted Salamanders (*A. laterale*). The former two species are listed as Endangered by COSEWIC, but the latter (*A. laterale*) has no status because it is widespread and abundant on mainland Canada. Yet, recent evidence indicates a potentially severe decline in Blue-spotted Salamanders across Pelee Island over the last 30 years, and these salamanders play a keystone role in maintaining genetic diversity within the Endangered unisexual *Ambystoma* population that they live alongside. Genetic evidence indicates that the Blue-spotted salamanders on Pelee Island are not closely related to nearby populations on mainland Ontario. There is no chance of natural demographic or genetic rescue. In the > 2200 samples genotyped from across the island since 2015, only 3 adult *A. laterale* from 2 sites have been detected to date. The absence of Blue-spotted salamander larvae or juveniles detections suggests these sites may not hold viable *A. laterale* populations. Blue-spotted salamanders are now absent from two sites in the southern half of the island where they found historically. One additional site where *A. laterale* was historically abundant is on private land and has not been surveyed in over 30 years. We should take action now to protect this unique population of Blue-spotted Salamanders lest it suffer the same fate as the Blanchard's Cricket frog, leaving the Erie Islands further impoverished in herpetofauna biodiversity.

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MCCURDY-ADAMS

## **BOLSTERING THE EASTERN MASSASAUGA SPECIES SURVIVAL PLAN TO AID IN CONSERVATION EFFORTS**

Hannah L. McCurdy-Adams<sup>1\*</sup>, Rick Vos<sup>2</sup>, Jeff Hathaway<sup>3</sup>, Alanna G. Smolarz<sup>4</sup>, Josh Porter<sup>5</sup>, Anthony Amsel<sup>6</sup>, Donnell Gasbarrini<sup>2</sup>, and Cory L. Kozmik<sup>4</sup>

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Endangered species conservation requires a variety of collaborators and the use of several methods to effectively recover species. When integrated with species recovery planning and implementation in-situ, ex-situ management of species can and has contributed to species recovery. A Species Survival Plan (SSP) is a program cooperatively run by Association of Zoos and Aquariums (AZA) accredited zoos and aquariums to oversee population management of select species and enhance conservation efforts in-situ. The goals of an SSP are to contribute animals for reintroduction/augmentation efforts, research on the biology of the species, and increase outreach capacity and opportunities. The Eastern Massasauga Rattlesnake SSP is an example of the potential for these programs to have a real impact on species recovery. Currently the SSP is too small to be viable long term or to provide snakes for conservation translocations to the wild. With the collection of neonate snakes from a broad geographical range in Ontario, we will improve the conservation potential of the SSP. A healthy SSP population will facilitate a One Plan Approach for more effective conservation of the Eastern Massasauga rattlesnake.

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PATERSON

## THE EFFECTS OF HABITAT LOSS AND ROADS ON REPTILE OCCUPANCY

James E. Paterson<sup>1\*</sup>, Tanya Pulfer<sup>2</sup>, Emma Horrigan<sup>2</sup>, Smera Sukumar<sup>2</sup>, Ryan Zimmerling<sup>3</sup>, and Christina Davy<sup>1,4</sup>

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Road mortality and habitat loss both pose severe threats to reptiles in North America. Habitat is lost through expanding urban areas and the clearing of land for agriculture, forestry, and energy development, which reduces areas suitable for foraging, reproduction, and other life history requirements. Collisions on roads increase mortality rates, which populations of long-lived species are especially sensitive to, and roads also fragment habitat into smaller patches. Multiple threats, such as habitat loss and road mortality, may interact to increase extinction risks. Understanding how several threats can act alone and together to affect reptile species is key to promoting recovery of threatened species. Using a large community science data set, we tested how habitat loss and road density affect occupancy probability, and how these factors interact, while accounting for the effects of climate on habitat suitability. We built occupancy models using verified observations of squamates (29,833 observations of 15 species) and turtles (39,925 observations of 7 species) between 2009 and 2018 from the Ontario Reptile and Amphibian Atlas. We predicted that habitat loss and road density would amplify each other and negatively affect occupancy probability. Habitat loss negatively affected occupancy probability for most species (18 of 22), but the magnitude varied considerably between species. Road density did not affect occupancy of most reptile species but had a negative effect on Eastern Foxsnake occupancy. Four species had significant interaction effects between habitat loss and road density on occupancy. The interaction effects had strong predictive power for Gray Ratsnake, but had weak predictive power for Milksnake, Red-bellied Snake, and Spotted Turtle. Our results highlight the importance of protecting and restoring habitat for reptiles in Ontario, and we identified sites for future surveys where species likely occur but have not yet been reported from.

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RILEY

## SCALING THE DRAKENSBERG MOUNTAINS TO STUDY THE SOCIAL BEHAVIOUR OF AFROMONTANE CRAG LIZARDS (*Pseudocordylus* spp.)

Julia L. Riley<sup>1,2\*</sup> and James H. Baxter-Gilbert<sup>1</sup>

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Understanding the evolution of vertebrate sociality requires comparative data on social associations in a broad spectrum of lineages. In the case of group-living lizards, most work has focused on the Australian Egernia-group of skinks, resulting in a taxonomic and geographic skew to our understanding of reptile sociality. The African cordylid lizards (Cordylidae) are also a promising system to study the evolution of sociality because grouping behaviour varies across the clade. Here, we quantified social and spatial patterns to establish whether two Crag Lizards, *Pseudocordylus langi* and *Pseudocordylus melanotus subviridis* that dwell at high elevations in the Drakensberg Mountains of South Africa, exhibit grouping behaviour, and follow-up on early anecdotal reports describing their sociality. To better understand their social organisation and mating system, we also quantified sexual dimorphism, bite force, and spatial distribution. Both *Pseudocordylus* spp. were sexually dimorphic in morphology (males had larger heads than females of similar body size), colouration (males were more colourful), and female *P. langi* had a weaker bite force than males. Both *P. langi* and *P. m. subviridis* were associated with rocky habitat on the mountainside (e.g., cliffs, rock buttresses, and rock outcrops); and both were spaced apart and rarely in groups (79% of *P. langi* and 90% of *P. m. subviridis* were observed alone). Based on our findings, we hypothesize that both *Pseudocordylus* spp. have a territorial social structure, and a polygynous mating system. As these two lizards are basal species within Cordylidae, this suggests group-living may have evolved multiple times in this group. This knowledge is important for understanding the evolution of sociality in Cordylidae, and demonstrates the potential this group of lizards has as a model system for testing hypotheses about the evolutionary origins of sociality.

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SCHUELER

## SCIENCE IS A VERY INEXACT SCIENCE: FRANCIS COOK'S LONG TERM VISION OF CANADIAN HERPETOLOGY

Frederick W. Schueler and Aleta Karstad

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Beginning in the 1960s and into this century, Francis Cook was the central figure in Canadian herpetology. In addition to the exploration of much of the country with his wife Joyce, his editing of reams of publications, service as chairman of the COSEWIC Amphibian and Reptiles Subcommittee, authoring myriad publications, and mentoring generations of Canadian herpetologists, Francis was working throughout his career on a 'Reptiles and Amphibians of Canada' book (of which his 1984 volume was an abstract), and from 1970 on he actively studied populations of herps around his and Joyce's Maplestone Farm near Bishops Mills, Ontario. When Francis died in January, Joyce began the heroic task of sorting through his effects, and has condensed the hard-copy herpetological material into 13 Rubbermaid bins of papers. She has passed responsibility for making the best use of these to me, and while at the time of composing this abstract I have not had time to look through them, the herpetological community is hereby notified that it is my plan to seek co-authors for species accounts for the book, and to seek students and others to analyse various bodies of long-term data. Following in Francis' footsteps, I have also gathered decades of long-term data about populations near Bishops Mills, and I hope that a synthesis of the 'Herpetology of Grenville County' can throw light on the factors affecting populations through a half century of study.

## DO EXISTING CONSTRUCTED PONDS ON PELEE ISLAND, ONTARIO MATCH THE HABITAT REQUIREMENTS OF ENDANGERED AMBYSTOMA LARVAE?

Meghan J. Ward<sup>1\*</sup> and Thomas Hossie<sup>2,3</sup>

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Global loss of wetlands has significantly reduced the habitat available for amphibians. Various organizations now regularly construct wetlands to provide areas for amphibian reproduction and larval development. To support wetland taxa, including federally-endangered salamanders, numerous ponds have been constructed in Southern Ontario. Yet, the degree to which these ponds provide suitable habitat conditions for reproduction and recruitment, and thereby contribute meaningfully to the conservation of these animals, remains unclear. We therefore examined natural and constructed ponds on Pelee Island to address three questions: 1) What environmental variables govern the presence of salamander larvae in ponds?, 2) What environmental variables predict relative abundance (CPUE) of salamander larvae?, and 3) Do constructed ponds match the habitat needs for salamander larvae as observed in natural ponds? Presence of larvae was associated with high canopy cover and crayfish burrow presence, whereas catch-per-unit-effort increased with the amount of leaf litter in the substrate and presence of submergent vegetation. This may suggest that aspects of the terrestrial habitat promote breeding in specific wetlands, whereas relative abundance of larvae is related more directly to factors that influence their survival. Constructed ponds had less canopy cover, less leaf litter in the substrate, warmer water, and fewer contained submergent vegetation. Larvae were caught in only 33% of constructed ponds, and catch-per-unit-effort was ~4-10x lower than in natural ponds. The constructed ponds on Pelee Island therefore require additional restoration support or naturalization before they provide substantial conservation value to salamanders. While constructing new ponds should benefit amphibian populations over time, our results caution against the presumption that the loss of natural ponds can be offset by building new ponds. Constructed ponds often remain unsuitable for 15–20+ years, and even then may not adequately alleviate the loss of natural habitat. Protecting natural breeding sites therefore remains critical for amphibian conservation.

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WINTON

## THE CANADIAN SPECIES INITIATIVE: STRENGTHENING THE IMPACT OF SPECIES RECOVERY EFFORTS IN CANADA

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As habitats and ecosystems become increasingly altered and impacted by human activities, a growing number of species will require more intensive human intervention to ensure their survival. When used strategically, ex situ conservation can be a key tool for species recovery that complements field-based efforts. The range of ex situ tools is diverse and can play many roles and varied purposes. An integrated approach to conservation planning ensures that, whenever appropriate, ex situ conservation is used to support in situ conservation in a One Plan Approach. Workshop processes developed by the IUCN Conservation Planning Specialist Group (CPSG) bring in-situ and ex-situ communities together to apply the logical and transparent decision-making process of the IUCN Guidelines for the Use of Ex Situ Management for Species Conservation. The goal is to develop recommendations for ex situ activities based upon species' conservation needs and practical constraints to better serve the conservation of wild populations. The Canadian Species Initiative (CSI) will address the ex-situ management needs of Canadian species at risk by supporting the development of integrated conservation plans adhering to the One Plan Approach. CSI will facilitate collaboration between members of Canada's Accredited Zoos and Aquariums, the in-situ community and academia, to identify priority ex-situ needs and incorporate those into species recovery plans and zoo collection planning, using established CPSG tools. Opportunities to partner on this initiative, including our first inaugural workshop focused on Canadian snakes, will be discussed. By mobilizing the full suite of skills and resources available to species at-risk, we give them a better chance at a future in the wild.

## HABITAT MANAGEMENT FOR THE ONLY REMAINING POPULATION OF BLUE RACER (*Coluber constrictor foxii*) IN CANADA

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In Canada, the Blue Racer (*Coluber constrictor foxii*) is designated as endangered, with a singular, isolated population remaining on Pelee Island. Approximately 20% of Pelee Island is comprised of conservation lands, however there is little suitable habitat remaining for this species as intense succession of open savanna and grassland habitat has taken place in the last few decades. The preservation of Blue Racers in Canada depends heavily on appropriate management of habitat across the species' range. Currently, prescribed burns and mechanical removal of vegetation are among the most popular management methods for open ecosystems as they restore and maintain the pre-successional vegetative community. Studies in other locations have shown that reptiles use areas managed by both prescribed burn and mechanical removal but how each technique influences the thermal quality and vegetative structure of the landscape is largely unknown. The subsequent use of restored habitat via either method by Blue Racer is completely unknown. This study aims to address this knowledge gap by comparing both management strategies and their influences on Blue Racers. To compare the effects of prescribed burning and mechanical removal, vegetation and physical snake surveys are being completed and thermal data collected over the course of the study in a series of control and treatment sites. The results from snake surveys will determine changes in relative abundance of snakes across all sites, after disturbance occurs. Vegetation surveys will identify the resulting effects on the vegetative community structure and identify micro habitat availability. Lastly, temperature data collected by placing data loggers within copper snake models will determine thermal property changes of macro and microhabitats from each management strategy. Compiled together, our goal is to have this data identify which human-induced disturbance method is the best practice to use for maintaining critical habitat for the Blue Racer in Canada so that it can be implemented to greater extents.

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YAGI

## AGE BEFORE BEAUTY: WHAT REPTILE POPULATION MODELS REALLY NEED TO KNOW

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Age at first maturity, fecundity, polygamy and longevity are parameters used in many population models. Since latitude, altitude and habitat quality affect model parameters, population specific models are necessary. Beginning with twenty years of biological data collected from the Niagara Massasauga population, we examined other Ontario population viability models and challenge their assumptions.

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YAGI

## ENERGY COSTS OF HIBERNATION IN NEONATAL SNAKES IN A VARIABLE ENVIRONMENT

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Snakes begin hibernation with finite energy stores and remain sequestered within the hibernacula they selected during the fall season and remain there until spring. Neonatal snakes have the added factor of small size and depending upon when they were born, limited feeding opportunities to increase energy stores before hibernation. Neonatal snakes are also naïve hibernators and may select hibernation sites that flood. Therefore, their survival depends on their ability to manage changes in water level. I measured the metabolic rate of three species of snakes Red-bellied, Eastern Gartersnake and Massasauga at constant cold temperatures (5°C) and varied the amount of water (0%, 50% and 100%). I convert metabolic rate to energy costs and developed a model that relates energy use per day and the habitat conditions of my study site which is experiencing variation in water levels during winter. Energy depletion may explain low survival results of small neonatal snakes during hibernation.