

Canadian Herpetological Society 2015

**2nd Annual Meeting of the
Canadian Herpetological Society**

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



Heather Button

**New Brunswick Museum
Saint John, New Brunswick, 2015**

Canadian Herpetological Society 2015

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- Shane Button

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Thanks to:

- David Green (Session Chair)
- Jackie Litzgus (Session Chair)
- Yohann Dubois (Session Chair)
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- Cedric Boone (volunteer)

Canadian Herpetological Society 2015

Friday September 18th, 2015

1800-2200 Registration

1900-2200 Wine and Cheese Reception at Saint John Ale House

Saturday September 19th, 2015

0730-0815 Registration

0815-0830 Opening Remarks

Session 1 (CONSERVATION & EVOLUTION) Chair: Connie Browne

0830-0940

*****Plenary Speaker*****

WHAT DO WE KNOW ABOUT GLOBAL AMPHIBIAN DECLINES?

Jeff Houlahan

0940-1000

CONSERVATION OF SPECIES: A TRANSBOUNDARY AFFAIR.

Chanel Pfahl, David Lesbarrères*

1000-1020

EVIDENCE OF ADAPTATION TO LOCAL CLIMATE ACCORDING TO LATITUDE AMONG POPULATIONS OF THE AMERICAN TOAD, *Anaxyrus americanus*.

David A.J.S. O'Connor*, and David M. Green

1020-1040

Break

Session 2 (DISPERSAL) Chair: David Lesbarrères

1040-1100

THE SCENT OF A HATCHLING: INTRA-SPECIES VARIATION IN THE USE OF CHEMOSENSORY CUES BY NEONATE FRESHWATER TURTLES.

Amelia K. Whitear*, Xiaotian Wan, Pauline Catling, Deborah McLennan, & Christina M. Davy

1100-1120

EVALUATING EXCLUSION FENCING AND USE OF CULVERTS BY IMPERILED FRESHWATER TURTLES IN LONG POINT, ONTARIO.

Chantel E. Markle* and Patricia Chow-Fraser

1120-1140

SEX BIAS IN JUVENILE DISPERSAL ASSESSED USING SEX-RATIOS OF JUVENILE TURTLES KILLED ON ROADS IN ONTARIO.

Natasha Noble*, Matthew Keevil, Sean Boyle, David Lesbarrères and Jacqueline Litzgus

1140-1200

CREATING BETTER AUTOMATED FROG CALL RECOGNIZERS.

Paul Crump* and Jeff Houlahan

1200-1340

Lunch

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Session 3 (GENETICS) Chair: Yohann Dubois

- 1340-1400 **TAXONOMY AND PHYLOGEOGRAPHY OF THE *Anolis pachypus* COMPLEX (SQUAMATA: IGUANIA: DACTYLOIDAE).**
Joe-Felix Bienentreu
- 1400-1420 **A POPULATION IN LIMBO: UNISEXUAL SALAMANDERS (GENUS *Ambystoma*) EXISTING WITH NO SPERM - DONATING SPECIES.**
James P. Bogart*, Jessica E. Linton, and Al Sandilands
- 1420-1440 **SEX CHROMOSOME TURNOVER, DUPLICATE GENE EVOLUTION AND PHYLOGENETIC ANALYSIS OF AFRICAN CLAWED FROGS, *XENOPUS*.**
Benjamin L. S. Furman*, Utkarsh Dang, Brian Golding, Ben Evans
- 1440-1500 **PRESENCE AND ABUNDANCE OF WOOD TURTLES – THE CORRELATION BETWEEN eDNA TECHNIQUES AND VISUAL SURVEY IS "OUT OF SIGHT".**
Anaïs Lacoursière-Roussel, Yohann Dubois* and Louis Bernatchez

1500-1520 **Break**

Session 4 (DISEASES) Chair: Maria Forzán

- 1520-1540 **INTER-SITE VARIATION IN THE SKIN MICROBIOME OF NORTHERN LEOPARD FROGS (*Lithobates pipiens*).**
Brandon J. Varela*, Kirsten McMillan, Nadia Mykytczuk, David Lesbarrères
- 1540-1600 **HEMATOLOGICAL REFERENCE INTERVALS FOR *Rana sylvatica* (*Lithobates sylvaticus*) AND ALTERATIONS DUE TO INFECTION WITH FROG VIRUS 3 (*Ranavirus* SP, IRIDOVIRIDAE).**
María J. Forzán*, Todd G. Smith, Raphaël V. Vanderstichel, Natacha S. Hogan, Cornelia V. Gilroy
- 1600-1700 **Annual General Meeting: Open to all members and guests.**
- 1700-1830 **Poster Session (Multi-purpose room)**
- 1700-1830 **Emerging Diseases Workshop (Theatre)**
- 1900-2300 **BANQUET:**
Travelogue by Leslie Anthony - "Snakebit Unplugged: Herpetologists and other ill-tempered creatures I have known."
Herp Quiz
Awards (Student Travel, Silver Salamander, Blue Racer, and Michael Rankin)

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Sunday September 20th, 2015

0800-0830 Registration

Session 5 (TURTLE ECOLOGY) Chair: Steve Mockford

0830-0940

*****Plenary 2*****

BIO-LOGGING LEATHERBACKS.

Mike James

0940-1000

NAVIGATING THE THERMAL LANDSCAPE: THERMAL ECOLOGY OF WOOD TURTLES (*Glyptemys insculpta*) IN THE NORTH.

Geoffrey N. Hughes* and Jacqueline D. Litzgus

1000-1020

TURTLES ON THE PLAINS: LIFE ON THE NORTHERN EDGE.

Kelsey A. Marchand*, Christopher M. Somers, and Ray G. Poulin

1020-1040

Break

Session 6 (POP. DYNAMICS) Chair: David Green

1040-1100

LESSONS LEARNED FROM A LONG-TERM STUDY OF THE DYNAMICS AND SPATIAL STRUCTURE OF AMPHIBIAN METAPOPOPULATIONS AND METACOMMUNITIES.

Stephen J. Hecnar*, Darlene R. Hecnar

1100-1120

BUILDING CONSENSUS: A SYSTEMATIC REVIEW OF HEADSTARTING PROGRAMS FOR FRESHWATER TURTLE CONSERVATION.

Amanda M. Bennett* and Jessica Steiner

1120-1140

TOWARDS BEST PRACTICES FOR INTERVENTION TECHNIQUES IN AMPHIBIAN AND REPTILE RECOVERY.

Christina M. Davy* & Jessica C. Steiner

1140-1200

POPULATION DECLINE RESULTS IN CHANGING ADULT AGE-STRUCTURE.

Jessica Middleton and David M. Green*

1200-1215

Group Photo

1215-1340

Lunch

Canadian Herpetological Society 2015

Monday September 21st, 2015

Field Trip Itinerary (tentative)

- | | |
|------|---|
| 845 | Pick-up at Hilton Saint John |
| 900 | Leave Hilton Saint John |
| 1000 | Arrive at Nerepis Wood turtle site for tour and lunch |
| 1300 | Arrive at UNB experimental wetland site at CDSB Gaagetown |
| 1500 | Arrive at Hyla Park in Fredericton |
| 1630 | Travel back to Saint John |
| 1800 | Arrive at Hilton Saint John |

Canadian Herpetological Society 2015

POSTERS

BUILDING CONSENSUS: A SYSTEMATIC REVIEW OF HEADSTARTING PROGRAMS FOR FRESHWATER TURTLE CONSERVATION

Amanda M. Bennett and Jessica Steiner

DISEASE DYNAMICS OF RANAVIRUSES AND CHYTRID FUNGUS IN NORTHERN CANADA

Joe-Felix Bienentreu, Danna Schock and David Lesbarrères

RECOVERY OF TALLGRASS PRAIRIE MASSASAUGAS IN SOUTHWESTERN ONTARIO

Jonathan D. Choquette

AN EVALUATION OF THE EFFECTIVENESS OF MITIGATION FOR REDUCING ROAD MORTALITY OF EASTERN MASSASAUGA RATTLESNAKES

Michael Colley, Stephen C. Lougheed, Kenton Otterbein and Jacqueline D. Litzgus

EVALUATION OF MASS MORTALITY EVENTS OF LONG-LIVED SPECIES

Donnell M.L. Gasbarrini, David Lesbarrères, Anna C. Sheppard, Edward Morris, Jacqueline D. Litzgus

THE THERMAL LANDSCAPE AS A PREDICTOR OF WOOD TURTLE (*Glyptemys insculpta*) NEST-SITE SELECTION

Geoffrey N. Hughes and Jacqueline D. Litzgus

BLANDING'S TURTLE (*Emydoidea blandingii*) RECOVERY AND HABITAT STEWARDSHIP IN THE FUTURE ROUGE NATIONAL URBAN PARK

Bob Johnson, Julia Phillips, Andrew Lentini, Shannon Ritchie, Paul Yannuzzi, Crystal Robertson, Maria Papoulias, Leonardo Cabrera, and Emma Followes, Nicholas Mandrak, Melinda Thompson and Karine Bériault

NEST-SITE FIDELITY, SEARCH TIME AND NEST PREDATION IN MIDLAND PAINTED TURTLES (*CHRYSEMYS PICTA MARGINATA*) IN ALGONQUIN PROVINCIAL PARK, ONTARIO.

Steven Kell, Jacqueline Litzgus, John Fryxell, Ron Brooks

QUANTIFYING CHANGES IN THE SPATIAL ECOLOGY OF WOOD TURTLES (*GLYPTEMYS INSCULPTA*) TO INFORM FOREST MANAGEMENT PLANS

Damien Mullin-Semeniuk and Jacqueline D. Litzgus

COMPARING MALE AND FEMALE BREEDING PHENOLOGY IN GRAY TREEFROGS

Hayley J. Roberts, Marc J. Mazerolle and Stephen C. Lougheed

FLOODING INCREASES HOME RANGE SIZE IN COMMON SNAPPING TURTLES

Pamela L. Rutherford, Christopher D. Malcolm, Kali Meadows, Morgen Burke, Shane Pratt

LOCATION, LOCATION LOCATION: SITE- AND SPECIES-SPECIFIC VARIATION IN BOAT PROPELLER INJURIES ON FRESHWATER TURTLES.

Juliana Skuza, Kyle Ritchie and Christina Davy

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LANDSCAPE GENETICS OF BUTLER'S GARTERSNAKE (*Thamnophis butleri*) IN ONTARIO

Megan Snetsinger, Jeffery R. Row, Megan E. Hazell, and Stephen C. Loughheed

THE EFFECT OF LARVAL DENSITY ON ACTIVITY LEVEL IN TADPOLES AND TOADLETS

Katharine T. Yagi and David M. Green

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

CONFERENCE ABSTRACTS 2015

BENNETT

BUILDING CONSENSUS: A SYSTEMATIC REVIEW OF HEADSTARTING PROGRAMS FOR FRESHWATER TURTLE CONSERVATION

Amanda M. Bennett^{1*} and Jessica Steiner²

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²Wildlife Preservation Canada, Guelph, ON, N1H 6J2, jessica@wildlifepreservation.ca

Freshwater turtles are declining globally, facing numerous threats from habitat loss to subsidized predation, poaching, and disease. Turtles rely on a long life coupled with many reproductive events to maximized fitness, as survivorship of turtle nests and hatchlings is naturally low. One conservation tool used to offset population declines is headstarting – the removal of eggs or hatchlings from the wild and the subsequent rearing of those young in captivity until they reach a large body size. The effectiveness of headstarting as a tool for increasing populations had long been debated in the literature, and modelling exercises have demonstrated the limited power of headstarting to counter declines caused by increased adult mortality in turtle populations. Furthermore, following up with headstarted individuals after release is an expensive and time-consuming effort, and gathering empirical evidence of population trends often requires over a decade of annual, intensive field research. Thus, while headstarting is a widely used conservation tool, information regarding the outcomes from headstarting projects is sparse and scattered among personal expertise, technical reports, and the primary literature. The goal of this project is to consolidate information on headstarting outcomes through systematic review and an online survey. The results of this systematic review and survey will be made available through publication in the primary literature and freely accessible online through a living document. Ultimately, our purpose is to create a knowledge bank of headstarting research, and to identify areas of data deficiency where further information is required, thus facilitating current and future freshwater turtle conservation projects.

PLATFORM & POSTER

CONFERENCE ABSTRACTS 2015

*BIENENTREU

DISEASE DYNAMICS OF RANAVIRUSES AND CHYTRID FUNGUS IN NORTHERN CANADA

Joe-Felix Bienentreu^{1*}, Danna Schock² and David Lesbarrères¹

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²Keyano College, Fort McMurray, AB T9H 2H7, danna.schock@keyano.ca

For the last three decades, the scientific community has been alarmed by declines in amphibian populations all over the world. Important factors like climate change, anthropogenic influences, and invasive species could be associated with amphibian declines, but emerging infectious diseases (EID) are now recognized as one of the main threat to the biodiversity of this freshwater community. Canada presents a diversity of ecosystems under various climatic conditions with a range of threats to its amphibian diversity. Several morbidity and mortality events in Canadian amphibian populations have been linked to ranaviruses and the chytrid fungus *Batrachochytrium dendrobatidis* (Bd), but the true dimension of pathogen associated declines and die-offs is likely underreported. Unfortunately, there have been only few studies that assessed the dynamics and possible origin of these EIDs in Canada. Through extensive field and lab work, my research will address significant questions regarding pathogen associated amphibian population declines in a community ecology framework. My work will also assess the spread of the pathogens in Northern Canada, and advance the development of disease control strategies. At a time where EIDs are a serious threat to biodiversity, the low amphibian diversity in northern Canadian ecosystems, provides an ideal framework to investigate the spatio-temporal patterns and transmission dynamics of ranaviruses and Bd. Ultimately, Amphibian-EIDs are an excellent system for investigating evolutionary and ecological processes. My project is expected to increase our knowledge about the ecology and evolution of these pathogens.

POSTER

CONFERENCE ABSTRACTS 2015

*BIENENTREU

TAXONOMY AND PHYLOGEOGRAPHY OF THE *Anolis pachypus* COMPLEX (SQUAMATA: IGUANIA: DACTYLOIDAE)

Joe-Felix Bienentreu^{1, 2, 3}

¹Senckenberg Research Institute and Natural History Museum, 60325 Frankfurt am Main, Germany; ²Institute for Ecology, Evolution & Diversity, Goethe-University, 60438 Frankfurt am Main, Germany; ³Department of Biology, Laurentian University, Sudbury, ON P3E2C6, Canada, fbienentreu@laurentian.ca

The monophyletic genus *Anolis* is a highly diverse lizard group, and with 399 described species the largest vertebrate genus in the world. The members of the *A. pachypus* complex are extremely similar to each other in terms of general appearance, coloration, habitat, and probably also in behavior and ecology. They inhabit premontane and montane elevations along both the Caribbean and the Pacific versants of the Costa Rican and/or Panamanian highlands. In this study, I performed a thorough phylogeographic analysis of the complex. Male specimens were classified into Operational Taxonomic Units, according to their dewlap coloration, and in case of identical dewlap coloration among geographically widely separated samples also according to sampling location. Females were assigned depending on their head scalation, and sampling localtion relative to nearest assigned male. I compared 14 morphometric, and 26 pholidotic characters for 192 specimens (109 ♂, 83 ♀) and examined the 16S and CO1 gene for 53 specimens. Integrating these different lines of evidence, my results allow the most comprehensive view on the taxonomy and phylogeography of the *A. pachypus* complex so far. I confirm the validity of the four nominal species *A. pachypus*, *A. tropidolepis*, *A. magnaphallus*, *A. pseudopachypus* and described a new species *A. benedikti*. In conclusion, within the *A. pachypus* complex, the male dewlap is the only morphological character that allows, in combination with geographic data, the reliable assignment of a given male individual to one of the nominal species. Other morphological characters, for example head scalation, appear less diagnostic, allowing at most the differentiation between certain pairs of species.

PLATFORM

CONFERENCE ABSTRACTS 2015

BOGART

A POPULATION IN LIMBO: UNISEXUAL SALAMANDERS (GENUS *Ambystoma*) EXISTING WITH NO SPERM - DONATING SPECIES

James P. Bogart^{1*}, Jessica E. Linton², and Al Sandilands³

¹Department of Integrative Biology, University of Guelph, Guelph, ON, N1G 2W1, jbogart@uoguelph.ca; ²Natural Resources Solutions Inc., 225 Labrador Drive, Unit 1, Waterloo, ON, N2K 4M8, jlinton@nrsl.on.ca; ³Gray Owl Environmental Inc., 1356 Lockie Road, Branchton, ON N0B 1L0, grayowlenvironmental@sympatico.ca.

Unisexual, all-female, salamanders in the genus *Ambystoma* require sperm from an acceptable sperm donor for recruitment. The sperm is normally used only for initiating unisexual egg development by gynogenesis but, rarely, the sperm is incorporated, which gives rise to triploid and tetraploid offspring derived from individual triploid females. Unisexuales are normally more abundant than their sperm-donating species over the range of unisexual salamanders in eastern North America so a random sample of salamanders in a breeding pond may not capture potential sperm donors. What happens when a sperm donor is lost in a population? Theoretically, the unisexuales will also be lost but it has been speculated that some unisexual individuals might reproduce parthenogenetically (no sperm required) or sperm can be obtained from other species such as the Spotted Salamander (*A. maculatum*). An *Ambystoma* salamander breeding pond was sampled in 2009 using drift fences that did not encircle the entire pond. Microsatellite analyses of 45 individuals documented 37 triploid *A. laterale* - (2) *jeffersonianum* (LJJ), 8 tetraploids (6 LJJJ, 2 LLJJ) and one pentaploid LJJJJ. In 2015, the survey was repeated but the pond was entirely encircled with drift fences and pit-fall traps. Neither survey recovered Blue-spotted (*A. laterale*) or Jefferson (*A. jeffersonianum*) salamanders, the possible sperm donors for the unisexuales in this pond. The unisexual population declined to 21 individuals in 2015 (20 LJJ, 1 LLJJ). Even though the pond has a large breeding population of Spotted Salamanders, that species was not used as a sperm donor. Unisexuales left the pond without laying eggs and proved negative when tested for the presence of sperm in their cloacae. Our study rejects speculations that unisexual salamanders can use Spotted Salamanders as a sperm donor, or that they may reproduce parthenogenetically when sperm donors are not available. Microsatellite Multilocus Genotypes (MLGs) are used to compare "clones" in the two surveys.

PLATFORM

CONFERENCE ABSTRACTS 2015

CHOQUETTE

RECOVERY OF TALLGRASS PRAIRIE MASSASAUGAS IN SOUTHWESTERN ONTARIO

Jonathan D. Choquette

SCC Ecological, Guelph ON, N1H 6J6; jchoquet@alumni.uoguelph.ca

The Ojibway Prairie population of Massasaugas (*Sistrurus catenatus*) is one of only two populations of this species remaining in Canada's Carolinian zone. It is geographically isolated from its Canadian counterparts by over 300 km, is genetically unique, and is the only representative of a tallgrass prairie population of Massasaugas in Canada. Unfortunately, the extent of occurrence (EOO) of this population has contracted by an estimated 75% over the past 40 years to the point where abundance is now estimated to be critically low. Although hundreds of hectares of suitable habitat have been protected, much of this remains unoccupied by Massasaugas, and natural recolonization is hindered by roads, development and small population size. In order to forestall extirpation of the Ojibway Prairie population, and the ensuing collapse in distribution and genetic variation of Canadian Massasaugas, intensive recovery work is of great necessity. Since 2013, our goal has been to implement strategic recovery and monitoring actions recommended in the Recovery Strategy for the Massasauga in Canada (and other guiding documents). These include long-term monitoring of occupancy, demographics, and microhabitat use, threat assessment and mitigation, habitat protection and enhancement, and public outreach. Interim results will be presented for a subset of recovery actions. For example, based on repeated and standardized visual encounter and cover-object surveys across multiple study sites, current distribution is estimated at 32 to 54 hectares, based on EOO and biological area of occupancy, respectively. Also, four unique gestation areas (1000 m² each) were enhanced in 2014/15 via woody vegetation removal and creation of woody debris piles for shelter and gestation. In 2015, Massasaugas were observed using three of these structures. Much work remains in the short and long-term to secure the recovery of this ecologically and genetically unique component of Canadian herpetofauna.

POSTER

CONFERENCE ABSTRACTS 2015

COLLEY

AN EVALUATION OF THE EFFECTIVENESS OF MITIGATION FOR REDUCING ROAD MORTALITY OF EASTERN MASSASAUGA RATTLESNAKES

Michael Colley¹, Stephen C. Loughheed², Kenton Otterbein³ and Jacqueline D. Litzgus^{1*}

¹ Department of Biology, Laurentian University, Sudbury, ON, P3E 2C6, mcolley@laurentian.ca, jlitzgus@laurentian.ca; ² Department of Biology, Queens University, Kingston, ON, K7L 3N6, lough@queensu.ca; ³ Natural Heritage, Killbear Provincial Park, Nobel, ON, P0G 1G0, kenton.otterbein@ontario.ca

Reducing road mortality is essential to reptile conservation. The Georgian Bay, Ontario population of the Eastern Massasauga rattlesnake (*Sistrurus catenatus*) is designated as Threatened by COSEWIC, in part because of high road mortality. Killbear Provincial Park has taken steps to reduce reptile road mortality through construction of four ecopassages and barrier fencing along three busy park roads. Although mitigation has been widely recommended, its effectiveness has rarely been quantitatively evaluated. Park roads were monitored twice daily on bicycles, and again at night by car to document locations of both living and dead Massasaugas and other reptile species in 2013 and 2014. Road mortality rates were compared among pre-mitigation, during mitigation construction, and post-mitigation time periods. Automated PIT tag readers and trail cameras were installed at each ecopassage to monitor snake activity. A “willingness to utilize” (WTU) experiment was conducted to further explore the effectiveness of the ecopassages. We found a significant decrease in road mortality of Massasaugas on park roads over time as mitigation was constructed. Monitoring techniques showed that Massasaugas and other reptiles used the ecopassages, observations that were further supported by the WTU experiment. Our evaluation of the mitigation structures determined that they are successful at reducing road mortality and connecting bisected habitat, provided that intense annual maintenance of the fencing is conducted. This project provides a template for construction of similar mitigation in other key locations where road mortality of reptiles is prevalent.

POSTER

CONFERENCE ABSTRACTS 2015

COLLEY

PVA REVEALS IMPORTANCE OF ROAD MORTALITY MITIGATION FOR PREVENTING EXTIRPATION OF A MASSASAUGA POPULATION IN A PROTECTED AREA

Michael Colley¹, Stephen C. Loughheed², Kenton Otterbein³ and Jacqueline D. Litzgus^{1*}

¹ Department of Biology, Laurentian University, Sudbury, ON, P3E 2C6, mcolley@laurentian.ca, jlitzgus@laurentian.ca; ² Department of Biology, Queens University, Kingston, ON, K7L 3N6, lough@queensu.ca; ³ Natural Heritage, Killbear Provincial Park, Nobel, ON, P0G 1G0, kenton.otterbein@ontario.ca

Snake populations worldwide are declining, in part because of road mortality. Post-construction monitoring of road mortality mitigation measures has become more common, but few of these assessments look at the overall effect of mitigation on population viability. Killbear Provincial Park, Ontario recognized the damaging effects of road mortality on local snakes and began monitoring populations of the threatened Eastern Massasauga rattlesnake (*Sistrurus catenatus*) in 1992. To address concerns about declining populations, Killbear installed barrier fencing and four ecopassages along three busy park roads between 2007 and 2013. A population viability analysis (Vortex) was done using local demographic data and road mortality rates to determine if mitigation installed in Killbear will allow Massasauga populations to persist into the future with low risk of extinction. We found that the post-mitigation road mortality levels corresponded with a low probability of extinction, suggesting that the mitigation is effective at promoting a sustainable population. That being said, the population is highly sensitive to female mortalities, and the death of more than 2 females/year could result in an extinction risk greater than 85%. Furthermore, we found that had mitigation not been constructed, the study population would have experienced an almost 100% probability of extinction over 100 years. Analyzing the effects of road mortality at the population level ensures stakeholders are adequately informed about the status of populations, ensuring proper management can be taken for their long-term viability.

PLATFORM

CONFERENCE ABSTRACTS 2015

CRUMP

CREATING BETTER AUTOMATED FROG CALL RECOGNIZERS

Paul Crump* and Jeff Houlahan

Biology Department, University of New Brunswick-Saint John, Saint John, New Brunswick, Canada, E2L 4L5

Advances in bioacoustic technology, such as the use of automatic recording devices, allow wildlife monitoring at large spatial scales. However, such technology can produce enormous amounts of audio data that must be processed and analyzed. One potential solution to this problem is the use of automated sound recognition tools, but we lack a general frame work for developing and validating these tools. Recognizers are computer models of an animal sound assembled from “training data” (i.e. actual samples of vocalizations). We used Song Scope (by Wildlife Acoustics) to build recognizers for this study. The settings of variables used to create recognizers can impact performance. Therefore, the use of different settings can result in large differences in error rates. We used vocalizations of the Wood frog (*Lithobates sylvaticus*) to test how different settings and amounts of training data influence recognizer performance. Performance was evaluated using positive predictive values (the probability of a recognizer match being a true match) and true positive rates (the number of vocalizations detected). Evaluations were conducted using vocalizations not used to build the recognizer. Wood frog recognizer performance was sensitive to setting changes in 4 out of 9 variables and was improved by using training data from different ponds, but not from multiple dates and times from the same pond. Additionally, by testing the performance of the recognizer on vocalizations not used to build the recognizer, we were able to get a more reliable indicator of its value when used at new places and times.

PLATFORM

CONFERENCE ABSTRACTS 2015

DAVY

TOWARDS BEST PRACTICES FOR INTERVENTION TECHNIQUES IN AMPHIBIAN AND REPTILE RECOVERY

Christina M. Davy* & Jessica C. Steiner

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Amphibian and reptile populations face multiple threats, which are exacerbated by their generally low dispersal ability. The long-term persistence of many isolated populations may require or at least benefit from some degree of human intervention. Tools for direct species management, such as translocations, captive propagation, and head-starting, are increasingly being considered and applied to herpetofauna, and recovery strategies for about a third of Canadian herpetofauna identified as at-risk by COSEWIC recommend some form of direct intervention. However, in most cases, the long-term conservation impact of these techniques has not been scientifically proven, and their use remains controversial. With limited conservation dollars, there is a real need to evaluate these techniques in order to determine their effectiveness and ensure their appropriate use. Wildlife Preservation Canada (WPC) is a charitable non-government organization working to save endangered Canadian wildlife through hands-on applied conservation with species that require direct intervention to ensure their persistence. Herptiles currently represent over 40% of our portfolio, with projects in multiple provinces. Given the growing need for the types of intervention programs in which we specialize, we are launching a national, collaborative research program focused on rigorously evaluating the consequences of specific conservation interventions on management and recovery of herptile populations. We will use examples from our existing portfolio to outline the structure of this program and identify opportunities for new partnerships with CHS members. The program will build on our existing strengths and work collaboratively with new and existing partners to improve representation of the Canadian context in global initiatives to summarize science-based evidence on the effectiveness of these tools in reptile and amphibian conservation.

PLATFORM

CONFERENCE ABSTRACTS 2015

FORZÁN

HEMATOLOGICAL REFERENCE INTERVALS FOR *Rana sylvatica* (*Lithobates sylvaticus*) AND ALTERATIONS DUE TO INFECTION WITH FROG VIRUS 3 (*Ranavirus* SP, IRIDOVIRIDAE)

María J. Forzán^{1,3*}, Todd G. Smith², Raphaël V. Vanderstichel³, Natacha S. Hogan⁴, Cornelia V. Gilroy³

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Hematological profiles, routinely used in human and domestic animal medicine, could prove a valuable tool in assessing amphibian health and provide an insight into the way their immune system responds to a specific infectious agent. Woods frogs, *Rana sylvatica* (*Lithobates sylvaticus*), have been used in research on ranavirus infection for several years, but reference intervals (RI) for routine hematological parameters have not been established. Neither has the effect of infection with *Ranavirus* sp on their hematological profile been studied. Our objectives were to: 1) Establish hematologic RI for adult wood frogs maintained in the laboratory following guidelines from the American Society for Veterinary Clinical Pathology, 2) Determine whether an automated particle counter could be reliably used as a partial substitute to the hemocytometer counting technique, and 3) Determine whether oral infection with Frog Virus 3 (FV3) would result in significant alterations in the hematic profile 4, 9 and 14 days post-infection (dpi). Forty adult *Rana sylvatica* were caught and maintained in captivity for 6 months prior to sampling. Blood was collected with heparinized capillary tubes via puncture of the facial vein and diluted in Natt-Herrick solution. Complete blood cell counts, differential white blood cell (WBC) counts, packed-cell volume (PCV) and automated total cell counts were calculated. Thirteen of those frogs were infected with $10^{4.43}$ plaque forming units of FV3 and euthanized 4 (n=5), 9 (n=5), and 14 (n=3) days post-infection. Leukocyte morphology was similar to other amphibians and mammals. Lymphocytes were the most numerous WBC. PCV was similar to other frogs. High agreement was found between hemocytometry and automated total cell counts (concordance correlation coefficient = 0.879). Infection with FV3 resulted in neutrophilia, initial lymphopenia followed by lymphocytosis, and intracytoplasmic inclusion bodies first evident 9 dpi and common 13-14 dpi.

PLATFORM

CONFERENCE ABSTRACTS 2015

*FURMAN

SEX CHROMOSOME TURNOVER, DUPLICATE GENE EVOLUTION AND PHYLOGENETIC ANALYSIS OF AFRICAN CLAWED FROGS, *Xenopus*.

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Phylogenetic analyses provide context to evolutionary change. African clawed frogs, genus *Xenopus*, are primarily aquatic frogs occurring across sub-Saharan Africa. Despite their longstanding medical and scientific use, relationships among several clades remain unresolved. Almost all clawed frogs are polyploid, which makes analysis of gene sequences a substantial challenge. Gene copies resulting from speciation events (orthologs) need to be distinguished from those copies resulting from genome duplication (paralogs). In order to provide further resolution of these relationships, we sequenced the complete liver transcriptome of representative species from each of the 5 major *Xenopus* lineages. Using tree building methods, we separated orthologous and paralogous sequences and used these data to estimate a phylogeny. Using the tree, we sought to understand two themes of *Xenopus* evolution: 1. sex chromosome change and 2. duplicate gene evolution. In most clawed frogs, a female specific gene, *DM-W*, controls sexual development, but this gene is not present in *X. borealis* and its close relatives. Our phylogenetic estimate supports *X. borealis* as being nested within the *DM-W* containing clades, implying a change in the sex determining system along the lineage leading to *X. borealis*. Then, using reduced genome and targeted gene sequencing on the *X. borealis* cross, we were able to locate the genomic region controlling sex, confirming its novelty. To address theme 2, we modeled the rate of duplicate gene loss (pseudogenization) in a phylogenetic context. The rate of gene loss was substantially higher soon after polyploidization compared to more recently, but gene loss is still occurring at a high rate. This means that *Xenopus* species are still experiencing widespread genomic remodeling following whole genome duplication.

PLATFORM

CONFERENCE ABSTRACTS 2015

*GASBARRINI

AN INVESTIGATION INTO THE CAUSE OF A MASS MORTALITY EVENT OF BLANDING'S TURTLES (*Emydoidea blandingii*) IN MISERY BAY PROVINCIAL PARK, ONTARIO

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Mass mortality events (MMEs) can devastate populations by removing up to 90% of individuals, which is especially damaging in long-lived species. While MMEs are being documented with increased frequency, a limited understanding of the causes and consequences of MMEs remains. This study aims to determine the causes of a MME of Blanding's turtles (*Emydoidea blandingii*), a species at risk, in a relatively pristine habitat in Misery Bay Provincial Park (MBPP), Ontario. The typical anthropogenic threats to turtles are minor or virtually absent in the MBPP setting, and yet 59 turtles (49 Blanding's turtles and 10 painted turtles) were found dead without obvious cause in 2013. The potential causes of death under consideration include predation in the active season and failed overwintering through either metabolic/respiratory acidosis, freezing, and winter predation. Telemetry and mark-recapture studies are being used to determine areas of importance within MBPP and to generate a population size estimate, respectively. Motion-sensor activated trail cameras have been paired with Blanding's turtle decoys, as a novel strategy to identify predators within the park. Overwintering sites have been located through telemetry, and characteristics such as temperature and dissolved oxygen content of water are being measured to determine differences between known overwintering sites and sites which yielded carcasses. The results of this study will be informative for the conservation of this population, and for the management of future MMEs.

PLATFORM

CONFERENCE ABSTRACTS 2015

*GASBARRINI

EVALUATION OF MASS MORTALITY EVENTS OF LONG-LIVED SPECIES

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Mass mortality events (MMEs) are rapidly-occurring events that can remove up to 90% of individuals in a population over a short time. These events can result from many causes and are most often associated with human perturbation, disease, biotoxicity, and climate change. MMEs are especially damaging to populations of long-lived species, such as chelonians, that lack the density-dependent responses to fluctuations in demographics necessary to recover a population after a mortality event. Although MMEs are being documented with increased frequency, a limited understanding of the causes and consequences of these events remains. Previous studies have found that long-lived species exhibit life history traits that limit the ability of such populations to recover from large-scale disturbances. The present study aims to use population viability modeling and sensitivity analyses to determine the long-term consequences of MMEs on turtles, and to determine which life history traits are most important when considering a population's likelihood of survival after a MME. In Misery Bay Provincial Park, Ontario, 54 dead Blanding's (*Emydoidea blandingii*) turtles (at least half of the adult population) were found dead in 2013 and 2014. Our study will evaluate the present state of the remaining Blanding's turtle population through telemetry and mark-recapture studies in an effort to determine the most appropriate course of recovery action. Our study will also examine the role that additional stressors, such as anthropogenic threats, play during the recovery stage after a MME. For example, many turtle species are threatened by the removal of valuable individuals from populations (i.e. adults, most notably reproducing females) through road mortality and nest predation. Altogether, these results will be useful for designing effective conservation initiatives to aid in the recovery of populations of long-lived species at risk in an era where more and more of them are affected by MMEs.

POSTER

CONFERENCE ABSTRACTS 2015

HECNAR

LESSONS LEARNED FROM A LONG-TERM STUDY OF THE DYNAMICS AND SPATIAL STRUCTURE OF AMPHIBIAN METAPOPOPULATIONS AND METACOMMUNITIES

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Most contemporary ecologists recognize the importance of both spatial and temporal scale to explain patterns and processes and realize that ecological and evolutionary change can only be revealed by studies of sufficient duration at multiple sites for any species. Despite numerous pleas for expanded perspectives, reductionist approaches and short-term studies in small arenas prevail. We used repeated surveys and multiple methods to study the dynamics of the amphibian fauna in the Stratford Plain region of Ontario for nearly a quarter century. Local populations and communities remained dynamic throughout but significant trends only emerged at the larger scale over decades. In the long-term, regional incidence of two species increased, four declined, and five species showed no trend. Although species richness increased and species turnover decreased slightly over time, species such as the Pickerel Frog and Eastern Newt seem to be on a march to regional extirpation. The trends we detected could be partially explained by the natural histories of individual species as the regional environment changed over time. The Stratford Plain region has become warmer, more forested, and breeding ponds have become shallower. Close examination of species incidence and how it changes among sites over time may help to reveal the spatial structures and drivers of metapopulations and metacommunities. Incidence patterns for all but one species suggested an important role of species-sorting in metacommunities. For most species a combination of sites that were always occupied along with sites having high turnover is consistent with source-sink metacommunities. Patterns of variable incidence and recolonization of sites showed the importance of patch dynamics with sites functioning as metapopulations but not in a classical sense. The 'ubiquitous' Green Frog and Spring Peeper appear to have dynamics resembling panmictic populations. Determining the status of individual species and targeting 'species at risk' for recovery may be futile if their spatial structure is not understood and trends are not considered within the broad context of regional change.

PLATFORM

CONFERENCE ABSTRACTS 2015

*HUGUES

NAVIGATING THE THERMAL LANDSCAPE: THERMAL ECOLOGY OF WOOD TURTLES (*Glyptemys insculpta*) IN THE NORTH

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The features of a physical landscape (geology, geography, biota) generate a dynamic thermal landscape when exposed to sunlight over daily and seasonal cycles. For ectotherms like turtles, this thermal landscape may be of greater relative importance for fitness than the physical landscape. Previous thermal ecology studies have focused on thermal selection at the organism and site levels, but not the landscape level, and the thermal landscape concept has primarily been applied in an urban planning context, rather than for ecology. Our project explores the thermal landscape as a biological concept, and its implications for research and conservation of the wood turtle (*Glyptemys insculpta*), a species that uses a wide variety of terrestrial and aquatic habitats during its active season. Using temperature dataloggers attached to radio-tagged turtles and to thermal models placed throughout the study area, we examine the relative importance of the thermal landscape compared to the physical landscape on wood turtle spatial selection and movements. We also placed operative thermal models within nearby forestry sites and aggregate pits; comparisons to the thermal model data from the primary turtle study site will allow us to examine the thermal impact of resource development on wood turtle habitat. This study will further our understanding of the thermal ecology of ectotherms in general, and wood turtles in particular, in addition to providing data for informing conservation practices for this Endangered species. Preliminary data will be presented.

PLATFORM

CONFERENCE ABSTRACTS 2015

*HUGUES

THE THERMAL LANDSCAPE AS A PREDICTOR OF WOOD TURTLE (*Glyptemys insculpta*) NEST-SITE SELECTION

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For oviparous species with no parental care, like wood turtles (*Glyptemys insculpta*), nest-site selection represents the only point at which a mother may behaviourally invest in her offspring. Previous studies in the Sudbury District determined that wood turtle females select nest sites for high-but-variable nest temperatures; lab studies have shown that variable incubation temperatures speed development of wood turtle embryos. By studying both the thermal and physical properties of known nesting beaches at the study site, and comparing them to the specific thermal and physical selections made by nesting wood turtle females, we will determine whether wood turtles navigate a thermal landscape on the microhabitat scale, and if this thermal landscape is more important in determining their behaviour than the physical landscape. Thermal imaging cameras will be placed on three known nesting beaches to measure their thermal characteristics. These beaches will be divided into 1m² grids; soil samples will be collected from each grid prior to the commencement of nesting activity to measure soil organic content and grain size distribution, to measure the physical characteristics of the beaches; we will also take daily soil moisture measurements during the nesting period. When we observe a female nesting on a beach, we will compare the thermal and physical characteristics to assess relative importance in the female's nest-site selection. This study will improve our knowledge of the surface cues used by female wood turtles in nest-site selection, and can lead to new techniques for surveying nesting habitat. Preliminary data will be presented.

POSTER

CONFERENCE ABSTRACTS 2015

JOHNSON

BLANDING'S TURTLE (*Emydoidea blandingii*) RECOVERY AND HABITAT STEWARDSHIP IN THE FUTURE ROUGE NATIONAL URBAN PARK

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Staff from the Toronto Zoo's Adopt-A-Pond Wetland Conservation Programme have conducted turtle research in what will become the future Rouge National Urban Park (RNUP) since 1999, including intensive surveys for Blanding's turtles since 2005. In that time, only five adults and one juvenile have been discovered; the remaining extant population is considered to be functionally extinct and supplementation is considered to be the only method available for full recovery of this species. Working with partners at Parks Canada, Toronto and Region Conservation Authority, University of Toronto (Scarborough) and the Ontario Ministry of Natural Resources and Forestry, Toronto Zoo has developed a 'headstart' program that will reintroduce Blanding's turtles into the Rouge Valley, create new habitats for wildlife, and promote public engagement in species at risk recovery. Turtle eggs are collected from at-risk nest sites and brought to the Zoo; juveniles are then raised in a secure zoo environment for just under two years until they reach a critical size where they are less likely to be consumed by predators. The headstart turtles are released into restored wetland areas in the wilds of RNUP and monitored using radio-telemetry to track survival, movement and habitat use. This recovery program also focuses on community engagement and habitat restoration to ensure the sustainability of populations in the future. To date, 31 headstart turtles have been released into wetlands in the future RNUP. Between 2016 and 2017 an additional 86 turtles will be released. Of the 31 turtles that were monitored via radio-telemetry in the first two years of the project, 68% (n = 21) have survived to late summer of 2015. Since 2009, more than 23 ha of wetland habitat and 7 km of shoreline habitat has been restored, and 21 nesting and basking areas have been installed. Over 26,000 people in nearby communities have been involved in habitat restoration activities, shoreline clean ups, wetland hikes, turtle conservation events, landowner stewardship workshops and citizen science projects related to Blanding's turtles. This is a long-term project that will use adaptive management to improve husbandry, field research, habitat restoration and community outreach as the project progresses. Results from the project will help park managers and species recovery experts implement conservation projects for turtles in Ontario, across Canada and around the world. The project will also serve to bolster community support for wildlife preservation by recognizing and celebrating the critical role humans have to play in the protection and recovery of biodiversity in Canada's first national urban park.

POSTER

CONFERENCE ABSTRACTS 2015

*KELL

NEST-SITE FIDELITY, SEARCH TIME AND NEST PREDATION IN MIDLAND PAINTED TURTLES (*CHRYSEMYS PICTA MARGINATA*) IN ALGONQUIN PROVINCIAL PARK, ONTARIO.

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Nest-site fidelity is the tendency of an individual female to return repeatedly to a given nest location or microhabitat. We hypothesize that prior nesting experience and nest site fidelity decrease the search time required by females to select and excavate nests because minimizing search time decreases exposure time to terrestrial predators. Furthermore, it should be advantageous for female turtles to nest close to water because short nesting migrations reduce time spent on land for both themselves and their offspring when they exit the nest, but this can lead to high densities of nests at these favoured sites. In some species of turtle, nest predation rates increase as density of nests increases, and high predation may counteract the potential benefits of fidelity to preferred nesting areas. We are studying nest-site fidelity and nest predation in Midland Painted Turtles (*Chrysemys picta marginata*) at three sites in Algonquin Provincial Park, Ontario, near the species' northern range limit. We are testing the effect of nest density on nest predation rates, and we are quantifying search time by recording time spent on land and number of nesting attempts in order to compare search time among age classes of females using data from our long term data base. We predict that nest predation rate will be higher near water where nest densities are highest. If fidelity decreases search time through repeated experience at site, then search time should decrease with age. Currently 210 nests are being monitored and >10 female search times have been logged from video. Preliminary results will be presented. Quantifying nest predation and search time data will help to understand nesting behaviour, survival, and life history strategies of turtles.

POSTER

CONFERENCE ABSTRACTS 2015

KEEVIL

ABUNDANCE, RECRUITMENT AND SURVIVAL OF SNAPPING TURTLES BEFORE AND AFTER A POPULATION CATASTROPHE

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Population catastrophes are widespread but unpredictable phenomena that have important, yet frequently underappreciated, consequences for persistence of natural populations. As human impacts on ecosystems increase globally, the frequency of catastrophes is likely to rise while increasingly fragmented and depleted populations become more vulnerable. Species with long life histories are expected to recover slowly from catastrophes because of their longer generation times, and assessing their population recovery requires data spanning long periods. We report results from a long-term mark-recapture study of a population of Snapping Turtles (*Chelydra serpentina*) in Algonquin Provincial Park, Ontario, that experienced a major mortality event. We estimated abundance and survival of nesting females before, during, and 23 years following the catastrophe. We used a Bayesian approach to build multistate mark-recapture models incorporating movement between sites, temporary emigration, and behavioural response. We found that nesting female abundance declined by 39% overall, and by 49% at our focal nesting area during three winters of high mortality. Apparent survivorship during this period fell from 0.94 before the mortality event to 0.76 and 0.86 at each of two sampling areas, respectively. Survivorship over the following 23-year period averaged 0.972 and 0.94 at the two sampling areas except during a flooding event in one interval when it was lower. Despite high post-catastrophe survivorship and connectivity with other populations, the population failed to recover, with overall abundances remaining similar across the 23 post-catastrophe years. We discuss the relationship between life history attributes and the causes and consequences of local catastrophes and conservation implications.

PLATFORM

CONFERENCE ABSTRACTS 2015

*MARCHAND

TURTLES ON THE PLAINS: LIFE ON THE NORTHERN EDGE

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Reptiles in Saskatchewan live on the edge; the environment is extreme, and the anthropogenic influence on their habitats is extensive. The western painted turtle (*Chrysemys picta bellii*) is one of the most widely distributed subspecies of the painted turtle in North America, reaching the northern limit of its natural range in western Canada. The western painted turtle is not considered at risk of extinction in Saskatchewan; however, populations throughout the western portion of the range are in decline. As a result, the Pacific Coast population is currently listed as Endangered, and the Intermountain-Rocky Mountain population is listed as Special Concern. Despite their status, little is known about the ecology or population biology of western painted turtles in Saskatchewan. Turtles on this part of the Great Plains are near the northern limit of their range, where they face climatic extremes and extensive anthropogenic influences on watersheds. One population in southern Saskatchewan resides in the Wascana Marsh complex, which is a waterway that runs through the city of Regina. Over the course of the next two years, we are conducting a study on turtles living in Regina to begin understanding what resources are required to survive in this urban environment. The primary goals of the project are to determine population size and demography, home range size, habitat use, nesting locations, and overwintering locations. This will be accomplished through mark-recapture and radio-telemetry tracking, genetic analysis, and stable isotopes analyses. In June of 2015 our sampling documented a female western painted turtle with a straight line carapace length of 26.6 cm, the largest on record. Our work will continue to provide information on important aspects of the ecology of western painted turtles in this area of the species range.

PLATFORM

CONFERENCE ABSTRACTS 2015

*MARKLE

EVALUATING EXCLUSION FENCING AND USE OF CULVERTS BY IMPERILED FRESHWATER TURTLES IN LONG POINT, ONTARIO

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The Long Point Causeway, constructed in 1927, is the 5th deadliest road in North America for freshwater turtles, because it separates Big Creek Marsh from Long Point Inner Bay and fragments critical habitat for several species at risk, including the Blanding's turtle and the spotted turtle. To reduce road mortality, complete exclusion fencing was installed along the west side of the road, and partial fencing along the east side in 2008 and 2009 while safe passage across the road for species is provided by 8 culverts (3 installed in 2012 and 5 in 2014). We first determined if exclusion fencing reduced road mortality for the two turtle species by comparing survey data collected 5 years before and after fencing installation. Secondly, we determined if turtles use the culverts when traveling between the marsh and bay. For this component, we installed stationary antennas at the outflow of 3 culverts to monitor the movements of 98 PIT-tagged turtles (68 Blanding's turtles, 30 spotted turtles). We also acquired photos by motion-activated cameras at culvert entrances to identify occasions when any turtle attempted to move through a culvert. Lastly, we radio tracked 30 Blanding's turtle to examine movements and habitat use before and after culvert use. Only the fully fenced road sections were associated with a significant decrease in mortality of both turtle species; the partially fenced road sections showed no significant difference compared to unfenced sections. We confirmed usage of culverts by the Blanding's turtles, painted turtles and snapping turtles, and conclude that this is a viable option to reconnect fragmented habitat. Through radio tracking, we determined that Blanding's turtles used culverts to access open-water habitat, before returning to the marsh. In summary, the combination of exclusion fencing and eco-passages has significantly reduced road mortality and successfully provided safe passage and habitat reconnection.

PLATFORM

CONFERENCE ABSTRACTS 2015

McCULLUM

WOOD TURTLE MORTALITY: CORVIDAE PREDATION?

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14 dead wood turtles were discovered at Base Gagetown between June 10th and August 6th 2011. 31 additional dead or in an advanced fatally injured state have been found within a one square kilometre area over the past four years. The majority of the individuals are found on their backs on roads. The shells are intact and the flesh is dehydrated. Necropsies were performed on any individuals with enough remaining material with no conclusive or obvious cause of death.

Many hypotheses were examined in attempts to discover the cause of death and most have been ruled out with further investigation. The site is an active military range within the impact area which restricts typical field investigations due to potential presence of unexploded ordnance.

The current belief is that the turtles are being predated by ravens. A few of the potential factors considered were severe weather events leading to overwintering death; Vegetation management (burning, manual and mechanical removal, and herbicide application); Range usage timeframes, intensity, and duration; Target placement; Weapon use, munition type and makeup; and impacts of concussion. All of these items plus more were examined with little to no connection to potential cause of death.

In the summer of 2014 three turtles were found alive but compromised in the immediate proximity to a crow or raven. The wounds on the fatally injured turtles are consistent with those of the dehydrated turtles. 6 trail cameras were deployed at hotspots around the range for the summer as well as two cameras on a decoy turtle to see if crows or ravens displayed interest. The decoy turtle was approached by a raven within seven hours of placement and was approached an additional four times within approximately 26 hours.

PLATFORM

CONFERENCE ABSTRACTS 2015

*MULLIN

QUANTIFYING CHANGES IN THE SPATIAL ECOLOGY OF WOOD TURTLES (*GLYPTEMYS INSCULPTA*) TO INFORM FOREST MANAGEMENT PLANS

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Wood Turtles occur in areas of important natural resources, including aggregates and forest, and this co-occurrence has led to tension between resource extraction industries and conservation agencies. Current Forest Management Plans (FMPs) include Areas of Concern (AOCs) demarcated by provincial habitat regulations for Wood Turtles and some of the restrictions on activities within these AOCs are deemed too restrictive by the forestry industry. Our goal is to quantitatively assess changes in the spatial ecology of Wood Turtles in the presence of forestry activities to scientifically inform the development of FMPs. Our project will address the question: Do the spatial and thermal ecologies of Wood Turtles differ among unharvested forest (control) sites and logging sites harvested using uniform shelterwood and clearcut methods? These 3 treatments will allow us to assess the effects of different forest-size openings on Wood Turtle spatial ecology. We will also collect data on fall movements and temperatures as these data can inform timing restrictions and AOC buffers around Wood Turtle overwintering sites (i.e., rivers) and nesting sites. Ultimately, we are planning to undertake a long-term a BACI (before, after, control, impact) study with radio telemetry, GPS, and thermal data collected from Wood Turtles and their habitats in replicate sites in Algonquin Park before and after tree harvest. The project is a partnership with the Algonquin Forest Authority (AFA) and the Park. To date we have captured 29 Wood Turtles (19 RCs, 10 NCs): 12 at control sites, 17 in logging areas. Eight adults are outfitted with GPS dataloggers at 3 sites: 4 at a control site and 4 across 2 logging sites. Preliminary results will be presented. Using a BACI experimental approach will result in solid and defensible data regarding habitat restrictions and other SARA and ESA-mandated actions for Wood Turtles in Ontario.

POSTER

CONFERENCE ABSTRACTS 2015

*NOBLE

SEX BIAS IN JUVENILE DISPERSAL ASSESSED USING SEX-RATIOS OF JUVENILE TURTLES KILLED ON ROADS IN ONTARIO.

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Dispersal is a risky, costly behaviour undertaken by individuals for uncertain and deferred inclusive fitness benefits. Hypotheses about the evolutionary causes of dispersal make differing predictions about sex-biases among dispersers. In addition, the importance of dispersal and dispersal mortality for conservation are poorly known. Sex-biases in juvenile dispersal are largely unknown for freshwater turtles. Juveniles encountering roads are likely a subset of individuals dispersing between suitable habitats and can therefore be a source of information on dispersers. We tested predictions that juvenile dispersal is sex-biased in Snapping Turtles (*Chelydra serpentina*) and Painted Turtles (*Chrysemys picta*) by examining sex ratios of juveniles killed on roads in south and central Ontario. Sex was determined by inspecting gonads of dissected turtles. In total, 19 male and 19 female Snapping Turtles, and 9 male and 2 female Painted Turtles were identified. There was no bias in the sex ratio for Snapping Turtles, indicating dispersal is not biased. In Painted Turtles there was a trend toward a male-biased sex ratio, possibly indicating male-biased juvenile dispersal. Male biased dispersal in Painted Turtles could be favoured by the avoidance of kin competition for mates or inbreeding avoidance. Unbiased juvenile dispersal in Snapping Turtles suggests that dispersal in this species functions to lessen kin competition for resources. The sex ratio of disperser mortality is critical for understanding how roads and other threats affect populations because the sexes differ in their contribution to population growth and viability.

PLATFORM

CONFERENCE ABSTRACTS 2015

PATERSON

DETERMINING HOW MUCH SURVEY EFFORT IS REQUIRED TO DETECT RARE SNAKES USING CITIZEN SCIENCE DATA

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Many citizen science programs have a goal of measuring changes in abundance or distribution of species but have challenges distinguishing whether a species is truly absent or is present but undetected. Although standardizing effort can increase the ability of large programs to detect changes in populations, using incidental reporting allows many more participants from a wider geographic area to submit data. We tested whether incidental observations can be used to determine whether absence of rare species is due to true absence or simply no detection (pseudo-absence). We used 11,375 snake observations submitted to the Ontario Reptile and Amphibian Atlas up to 2013 and tested several metrics to estimate when an area (10 x 10 km) had been sufficiently surveyed for five snake species at risk. We used the total number of snake observations, the number of reports of a widespread species (Eastern Gartersnake; *Thamnophis sirtalis*), and snake diversity as indicators of survey effort in an area. Using the total number of snake observations as an indicator of sufficient survey effort, less than 10% of the historical range of each species-at-risk has been adequately surveyed to confirm absence. Despite a large number of observations, most areas did not have sufficient survey effort to distinguish true absence from pseudo-absence. In the future, we hope to direct volunteers to areas that have low survey effort but have historic records of species at risk. In order to detect changes in abundance and distribution it may be beneficial to direct a large amount of effort to a few high priority areas rather than a small amount of effort spread out over a larger area.

PLATFORM

CONFERENCE ABSTRACTS 2015

PFAHL

CONSERVATION OF SPECIES: A TRANSBOUNDARY AFFAIR

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About 41% of amphibians and 35% of reptiles are at risk of extinction worldwide and there is a clear shortage of available resources to curtail this dramatic loss of biodiversity. Such resources are very often associated with government priorities and may change across political boundaries, thus affecting the efficiency of conservation action for species of transboundary distributions. We conducted a review of the impact of political borders on transboundary amphibians and reptiles ranging range across the United States and in Canada and found that all 22 amphibian species at-risk in Canada are transboundary, but only the Oregon Spotted Frog (*Rana pretiosa*) conserves its at-risk status in the USA. Likewise, 34 out of the 35 reptile species at-risk in Canada are transboundary, but only 3 conserve the at-risk status in the USA (Loggerhead Sea Turtle [*Caretta caretta*], Leatherback Sea Turtle [*Dermochelys coriacea*] and Massasauga [*Sistrurus catenatus*]). Considering that the limits to a government's jurisdiction are an entirely imagined and arbitrary construction, we evaluated whether protecting these species in a small part of their range (i.e. in Canada) may be a waste of resources if, for example, the species is secure in the USA. However, because peripheral populations present particular evolutionary and conservation values due to their unique genetic characteristics stemming from specific adaptations to range margins, we argue that the level of protection should be influenced by the likelihood of the population serving as a source for a northward geographical shift. By reviewing the literature and examining the status and protection for particular species on either side of the border, we suggest that heightening the level of international cooperation in conservation could result in more successful outcomes for at-risk species and ultimately assist in fostering biodiversity.

PLATFORM

CONFERENCE ABSTRACTS 2015

PICARD

BEAVER AND HOUSING DEVELOPMENTS AS THREATS FOR CHORUS FROG (*PSEUDACRIS MACULATA*) POPULATIONS IN SOUTHERN QUEBEC : 2004-2014 SURVEYS

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In 2004, 774 breeding ponds were documented during a complete survey of Chorus Frog (*Pseudacris maculata*) population in southern Quebec, Monteregie region. Decline was estimated to be between 5 to 10% per year and destruction by housing was pointed as the principal cause of decline. Federal designation and conservation measures followed. In 2014, a ten year follow-up was done in the same area with similar methods to precisely document pond occupancy. More than 1523 ponds were visited including 99% of 2004 ponds. A total of 705 ponds were active (with calling males). Only 28,7% of 2004 ponds were still occupied in 2014. Majority of frog populations were using « new » breeding ponds within short distance of « old » ones, showing metapopulation dynamics of breeding ponds for that species. Complete destruction was documented for 28% of ponds between 2004 to 2014, but majority were abandoned without destruction. Net decline of number of breeding ponds was estimated to be between 15 to 20% in ten years. Decline of singing index was also documented and net decline of bigger choruses was estimated to be 45%. Of the 9 metapopulations documented in 2004, only 6 were estimated in 2014 to still have a substantial number of ponds to support long-term survival of populations. Only one metapopulation experienced a net population increase. Declines were documented to be caused mostly by destruction of habitat for housing and floodings of natural territories by beavers. That last factor is a major concern for at least 2 metapopulations presumed « safe » in precedent reports. Surveys should be done more regularly inside metapopulations to detect earlier potential conflict of use between beavers and Chorus Frogs and takes measures to control beaver floodings. More generally, beavers should be added as a potential threat to temporary pond breeders amphibian species.

PLATFORM

CONFERENCE ABSTRACTS 2015

ROBERTS

COMPARING MALE AND FEMALE BREEDING PHENOLOGY IN GRAY TREEFROGS

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Phenology is a key facet of organismal response to environmental variation, both in terms of seasonality and, over the longer term, climate change. Breeding phenology has obvious implications for individual fitness, local adaptation and population persistence. Despite its importance, many aspects of breeding phenology are poorly known in many temperate frogs, specifically for females. In this project, we investigated differences in terms of temporal trends in attendance at the breeding site between male and female Gray Treefrogs (*Hyla versicolor*). We considered two hypotheses. The first predicted an asynchronous chorus attendance, with males arriving first and showing peak numbers early but with a sustained chorus, followed by female arrival and quick diminution in numbers after breeding. The other hypothesis was based on abiotic factors, which predicted that both sexes arrive, peak and depart at the same time. To test these hypotheses, we conducted nightly transect censuses at two wetland breeding sites at the Queen's University Biological Station in eastern Ontario, Canada during the breeding season of 2014. We used models accounting for imperfect detection probabilities to estimate the abundance of male and female Gray Treefrogs throughout the season. We found that the sexes have synchronous peaks suggesting that males and females respond to similar environmental conditions. However, we also found that there were different arrival and departure dates implying that females also respond to male chorusing. Our research highlights the importance of detailed studies of phenology both to increase our understanding of mating systems and how individual populations might vary in response to environmental change.

POSTER

CONFERENCE ABSTRACTS 2015

RUTHERFORD

FLOODING INCREASES HOME RANGE SIZE IN COMMON SNAPPING TURTLES

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Given the expectation of an increase in flood events with climate change it is important to evaluate its impacts on animals' habitat use. Few studies have examined the impacts of flooding on movement patterns and habitat selection in turtles. The objectives of this study are to compare the habitat use and movement of Common Snapping Turtles (*Chelydra serpentina*) in southwestern Manitoba during non-flood (2010 and 2012) and flood (2011) years. Ten turtles (May 14 to June 15, 2010, N = 9; June 9, 2011, N = 1) were located, and captured by hand or net. We recorded weight (kg), carapace width and length (cm), plastron length (cm), pre- and post-cloacal tail length (cm), capture site location (UTM within 5 m), water temperature (°C), and air temperature (°C) for each turtle. A VHF radio transmitter (Advanced Telemetry Systems, transmitter model R1930, 24 g) was attached to the lower right side of the carapace. We tracked animals by foot and canoe using an ATS R410 VHF receiver, once a week, during the summers of 2010 (May 14 to October 21), 2011 (April 19 - September 11), and 2012 (March 22 to August 6). We recorded the date, time, location (UTM within 5 m), habitat, and behaviour of each located turtle (when observed by eye). The average mass of the turtles was 8.6 ± 0.75 kg (range 6.4 – 12.5 kg). We calculated home range sizes (ha) using the minimum convex polygon (95% of points). Females had significantly larger home range sizes than males. Home range sizes were significantly larger in 2011 (flood year) compared to 2010, but there was no difference between home range sizes in 2010 and 2012 (non-flood years). An increase in home range size during the flood year may reflect their use of new aquatic habitat created by the flood.

POSTER

CONFERENCE ABSTRACTS 2015

SKUZA

LOCATION, LOCATION, LOCATION: SITE- AND SPECIES-SPECIFIC VARIATION IN BOAT PROPELLER INJURIES ON FRESHWATER TURTLES.

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Our appetite for motorized transport is increasingly fragmenting terrestrial and aquatic habitats. The emerging field of road ecology has demonstrated that roads are the “sleeping giant of conservation biology”, but the impact of motorized vehicles on aquatic wildlife are less well studied. Strikes by boat propellers may represent a significant threat to several Canadian turtle species, but data on the incidence of these strikes is currently limited to a few sites. In this study we exploited a large capture-recapture dataset for a suite of seven turtle species monitored at three sites in south-western Ontario to test whether more aquatic turtle species experience a higher incidence of propeller injuries. We predicted that propeller injuries would be most common in species that exhibit aquatic surface basking (*A. spinifera*, *G. geographica* and *C. serpentina*) and the least in species that avoid open, deep aquatic habitats or use deeper areas rather than floating at the surface (*C. guttata* and *S. odoratus*). We also tested for age- and sex-biased incidence of propeller injuries in all species. Such differences could indicate either age- or sex-biased encounters with boat propellers (for example due to differences in juvenile and adult or male and female habitat use) or age- or sex-biased survival of boat propeller collisions related to their differences in size. Our data, combined with previous, similar studies, contribute to our growing understanding of interactions between turtles and boats.

POSTER

CONFERENCE ABSTRACTS 2015

*SNETSINGER

LANDSCAPE GENETICS OF BUTLER'S GARTERSNAKE (*Thamnophis butleri*) IN ONTARIO

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The Endangered Butler's Gartersnake (*Thamnophis butleri*) has seen a decrease in its Canadian range due to habitat loss and fragmentation, through agricultural land conversion and road construction. Little is known about the resulting diminished distribution, population isolation, and reduced connectivity among populations in Southwestern Ontario, nor have their specific habitat preferences been well-described. DNA samples and geographical coordinates were obtained from 141 *T. butleri*. We genotyped the samples for 14 microsatellite loci (developed in existing studies) using PCR duplex reactions. Bayesian clustering revealed three genetic clusters, one in Luther Marsh Wildlife Management Area, one around Windsor, and one encompassing Sarnia and Aamjiwnaang, the adjacent First Nations reserve. We found departures from Hardy-Weinberg equilibrium at two of three locations with $n > 20$, Windsor (for 4 loci) and Aamjiwnaang (for 3 loci), potentially caused by undiagnosed population substructures. There were no departures in Sarnia. Preliminary characterization of habitat preferences (using NHIC-supplemented samples) predicts higher *T. butleri* occurrence in larger expanses of open undeveloped habitat; further analyses will eliminate inaccuracies and incorporate additional landscape variables for greater predictive power. Further sampling of *T. butleri* will augment the genetics. Sampling of the common *T. sirtalis* gartersnake will also be carried out across the *T. butleri* range for comparison purposes. We plan to use our findings to make recommendations on *T. butleri* conservation, to increase its likelihood of persistence in Ontario.

POSTER

CONFERENCE ABSTRACTS 2015

*VARELA

INTER-SITE VARIATION IN THE SKIN MICROBIOME OF NORTHERN LEOPARD FROGS (*Lithobates pipiens*)

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Over the last forty years, amphibians have been declining due to climate change, habitat loss and emerging infectious diseases (EID). One of the main EID, chytridiomycosis is caused by the fungal pathogen *Batrachochytrium dendrobatidis* (Bd) that grows within the skin of amphibians. However, certain bacteria taxa producing compounds that have been found to deter Bd infection are present on the amphibian skin, acting as a protective barrier against EID. Understanding the role that the skin microbiome plays in disease dynamics is therefore critical when assessing variation in Bd prevalence among amphibian populations. Even though the Northern Leopard Frog (*Lithobates pipiens*) is not considered as a Species at Risk in Ontario, this species is experiencing a Canada-wide decline. The main hypothesis for this decline is linked to EID. In our study, we sampled *L. pipiens* (n= 38) from eight sites in Southern Ontario and characterized the frogs' skin microbiome using 454 sequencing to assess the relationship between microbiome composition and environmental characteristics of the sites. This unique study creates the foundations that will enable us to further understand which bacteria taxa may be protecting Canadian amphibians against EID.

PLATFORM

CONFERENCE ABSTRACTS 2015

WHITEAR

THE SCENT OF A HATCHLING: INTRA-SPECIES VARIATION IN THE USE OF CHEMOSENSORY CUES BY NEONATE FRESHWATER TURTLES.

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Chemosensory cues play important roles in the social systems of many vertebrates, transmitting information about the sender's species, gender, reproductive status and health. Chemosensory communication has been demonstrated in adult turtles, but has not been studied in hatchlings or juveniles. Hatchling turtles are typically considered to be solitary, but recent studies highlight important social aspects of adult turtle behavior that may extend to the juvenile life stages. Here, we tested the hypothesis that chemosensory cues may influence formation or maintenance of social groups in hatchling Testudines. To test this hypothesis, we asked three questions: (i) Are hatchlings attracted to the scent of conspecifics? If so, (ii) are they more attracted to the scent of close kin versus more distantly related conspecifics? We investigated these first two questions using hatchling Blanding's turtles (*Emydoidea blandingii*), Map turtles (*Graptemys geographica*) and Spiny Softshells (*Apalone spinifera*) as test subjects, which allowed us to ask: (iii) does the importance of chemical cues to hatchling social behaviour vary among different Testudines? To our knowledge, our data represent the first evidence that hatchling turtles may use chemosensory cues to detect conspecifics, and the first to suggest chemosensory kin recognition in the Testudines. Chemosensory preferences differed among the three tested species, possibly reflecting their different use of terrestrial and aquatic habitats. Our findings highlight a potential new conservation threat to freshwater turtles, as pollution of wetland habitats can significantly alter their "smell-scape" and may significantly disrupt chemosensory communication among individual turtles.

PLATFORM

CONFERENCE ABSTRACTS 2015

YAGI

THE EFFECT OF LARVAL DENSITY ON ACTIVITY LEVEL IN TADPOLES AND TOADLETS

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Dispersal is a necessary process for any species living in a fragmented landscape and therefore the dispersal strategies of endangered amphibians are important considerations for population recovery and effective management. Fowler's toads, *Anaxyrus fowleri*, exist in three remnant populations in Canada, one of which is at Long Point, Ontario. Although adult body size in this population negatively correlates with density, it is unknown precisely how body size is related to dispersal. If dispersal is in some way size-dependent, then by manipulating larval density conditions to produce toads of varying sizes in the field, we should see a correlation between movement and body size among individuals. To address this, we reared Fowler's toad tadpoles in eight density treatments within four ponds located in the Long Point National Wildlife Area. A random sample of eighteen tadpoles at stage 40 were placed alone in a dish of water and filmed for one hour to assess activity level. A similar test was conducted on the same treatment groups as toadlets. Six individuals were filmed in a terrestrial enclosure for 6 hours and activity was scored based on whether the subject changed positions every 1 minute. We predicted tadpole activity level will correlate positively with density because crowded conditions can cause increased competitive behaviour, and we predicted a negative relationship for toadlets because high density toadlets emerge at small sizes suggesting smaller energy stores will be allocated towards movement. These results will be a component in predicting the effect of larval density on amphibian dispersal.

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