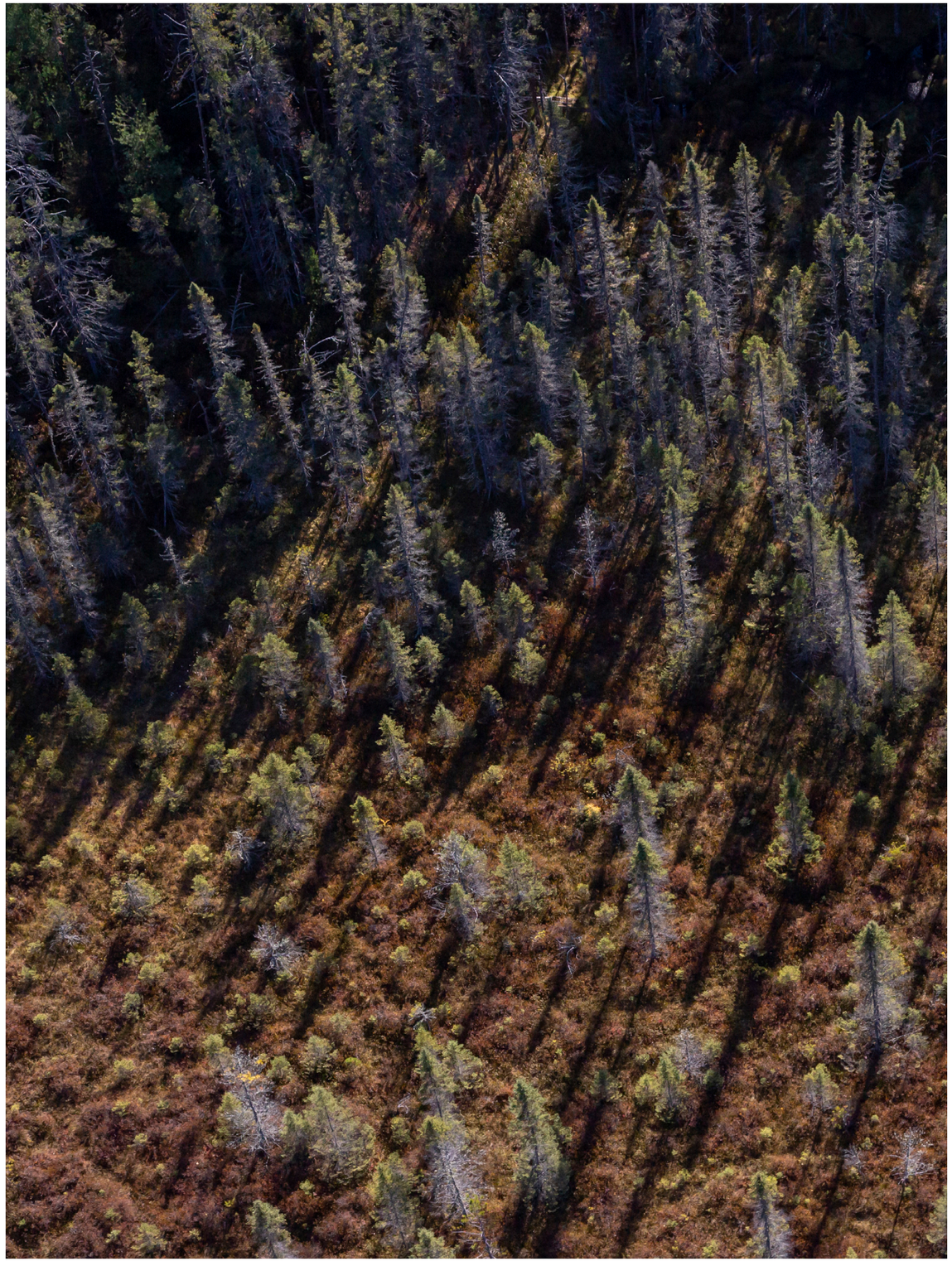
# ALGONQUIN WILDLIFE RESEARCH STATION

*2021*

RESEARCH REPORT



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AWRS

THE ALGONQUIN WILDLIFE RESEARCH STATION IS AN INDEPENDENT NOT-FOR-PROFIT FIELD STATION IN ALGONQUIN PROVINCIAL PARK ADMINISTERED BY A VOLUNTEER BOARD OF DIRECTORS AND A SMALL TEAM OF STAFF.

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*Images in this report are credited to Samantha Stephens, unless otherwise indicated.*

# A MESSAGE FROM THE CHAIR OF THE BOARD OF DIRECTORS

***Greetings friends of the Algonquin Wildlife Research Station!***

I am pleased to share with you the AWRS Research Report for the 2021 field season; this is our 14th annual report. With the second year of the COVID-19 pandemic, Station use was again limited, but the long-term projects continued to flourish, and we have stories and science from the field to share. Huge thanks again to Samantha Stephens, our AWRS Communications lead, for her photography, creativity and organization – our annual research report continues to be both highly informative and beautiful. And special thanks to our researchers for providing content to fill these pages.

I want to welcome our newest addition to the Board of Directors, Leslie Anne St. Amour. I first met Leslie Anne in October 2020 when she interviewed me about the AWRS long-term turtle project for her Rebalancing Act podcast. At that time, she told me about her history with Algonquin Park and expressed an interest in helping the Station by offering her legal expertise. And so, with Leslie Anne at the Board table, we have formalized more of our operational policies with respect to workplace health and safety, and we have developed a land acknowledgement to be read at the outset of all meetings.

***Territory Acknowledgement:*** *We would like to pay our respects to the traditional stewards of the land on which the AWRS exists and of Algonquin Park in its whole. The Station and much of Algonquin Park are located within unceded Algonquin territory. Algonquin Park as a whole also contains territory of the Anishinaabeg, specifically the Chippewa, Ojibwa and Nippissing, and lands under the Robinson-Huron Treaty of 1850 and the Williams Treaties of 1923. This land has also been used by Metis and other Indigenous people as it includes major travel routes on its rivers and waterways. We are always open to learning and discussion.*

I continue to be extremely thankful for the hard work and dedication of Manager Kevin Kemmish, who again navigated a challenging pandemic year with foresight and planning. I want to also thank Assistant Manager James Pinto for his work to help Kevin keep things running smoothly. We received an NOHFC Internship Grant to support James' position for a full year, and that consistency in staff will make for productive operations. James was one of our first CWF-CCC Interns, and we are pleased to continue our partnership with CWF to host another intern this year. I am also extremely grateful for the advice, support, and activities of our volunteer Board of Directors, who freely offer their time to keep the Station running. As always, please feel free to reach out to any of us with questions or comments about matters pertaining to the Station; Board contact information can be found on the AWRS website.

We are excited for the 2022 field season! We have hired Cookhouse staff, we have several field courses booked, and the long-term projects are returning. Although we will host smaller numbers of users so as to keep everyone safe, we are looking forward to returning to closer-to-normal operations at the Station. We are looking forward to welcoming back students to learn while immersed in the magnificent natural classroom that is Algonquin Park.

This year we are planning to host our AGM in person at the Station, sometime in June 2022. I will keep you posted about the exact date and time via email and our electronic newsletter. I really look forward to connecting with our users and partners on the Station grounds, and sharing lunch with you at the Cookhouse after the meeting!

All the best for a successful and productive 2022 research season. I look forward to seeing you at the Cookhouse,

*Dr. Jacqueline Litzgus*
**AWRS Board Chair**

## OUR MISSION

TO INSPIRE
*Environmental stewardship, a community of collaboration, and a connection with nature through educational workshops, public events and social media.*

TO EDUCATE
*Scientists, the public, and policy makers by facilitating peer-reviewed publications, producing research reports, and hosting field courses and workshops.*

TO CONSERVE
*Biodiversity, ecological integrity, and a culture of field-based learning by providing facilities and logistical support for research projects, with an emphasis on long-term ecological studies.*

# FROM THE MANAGER'S DESK

The end of the 2021 field season marked the 78th year that the Algonquin Wildlife Research Station has been a leader in wildlife research and experiential learning. While COVID-19 prevented us from hosting larger groups, such as field courses and workshops, 2021 resembled a year that is more familiar to those that have called the AWRS home in the past. Long-term projects including the salamander project, turtle project and small mammal project were able to resume with a full team allowing for important data collection and student experience. Generous support from donors, our Patrons, and funding sources such as Canada Summer Jobs allowed the return of a larger staff team and provided us the ability to continue maintenance and renovation projects that had been put on hold.

I would like to thank The Portage Store for their support of the AWRS in 2021. The team at The Portage Store created and ran a turtle merchandise campaign to support the long-term turtle project. This included a beautifully designed custom t-shirt featuring a Snapping Turtle that was so popular, The Portage Store will be running the campaign again in 2022, both online and in-store! We were also excited to re-establish our partnership with the Canadian Wildlife Foundation (CWF) to host a Canadian Conservation Corp (CCC) participant. We look forward to continuing both partnerships in 2022.

The AWRS Research Report has been published annually for the past 14 years and has been an important tool for demonstrating the Station's high-quality research, public outreach efforts, and experiential learning opportunities to our members, supporters, and partner organizations. Our success in 2021 would not have been possible without the dedicated support of our volunteer Board of Directors, the

MNDMNRF and Ontario Parks. I would also like to thank everyone who has contributed to the Station this year, including our monthly supporters on Patreon and our various partners. A special thanks to this year's staff team Samantha Stephens, Amanda Semenuk, Delaney Kelm, James Pinto and CCC participant Brendan Cane. Without their dedication and hard work last year's successes would not have been possible. Lastly, thank you to the contributors of this report, who have taken the time to share their research.

I encourage you to visit our website, support us on Patreon or follow us on Facebook, Twitter and Instagram for news, updates, and reports from the field. If you are interested in becoming part of our community, please do not hesitate to contact us by email at algonquinwildliferesearch@gmail.com or by phone at 705-633-5621.

*Kevin Kemmish*
**Station Manager**





**Night sky over Lake Sasajewun [Nicholas Ypelaar]**

# SMALL MAMMAL PROJECT

Written by Bryan Hughes

*With increased safety measures amidst the ongoing COVID-19 pandemic, the small mammal team is proud to have continued with a full season of data collection for its 70th year of the long-term monitoring project.*

## ANOTHER SM'MAMMAL YEAR

This year, data for the long-term project was collected by Bryan Hughes and Nicholas Paroshy. This continuing project contributes to our knowledge of small mammal populations. The long-term data is also currently being utilized for various projects, including studies on trap capture rates and shrew genomics. Despite being a low population year mixed with irregular weather patterns, the small mammal project managed to record 153 Deer Mice, 34 Eastern Chipmunks, four Northern Flying Squirrels, one Southern Flying Squirrel, 53 Jumping Mice, 40 Red-backed Voles and 20 Red Squirrels. While this year's observation of a Southern Flying Squirrel within Algonquin Park is not the first, the presence of Southern Flying Squirrels in this location remains relatively rare. As climate warming continues, the range of the Southern Flying Squirrel is continually pushing northwards. Also of note this year was the higher than usual abundance of Jumping Mice.

## A SHIFT TO ANIMAL BEHAVIOUR

Current graduate students on this project are developing a study to help measure animal behaviour, physiology, and life history to determine important evolutionary and functional ecological roles. This year, fecal and hair samples were collected to help aid a future project that will evaluate stress in relation to animal temperament.

> "WHILE THIS YEAR'S OBSERVATION OF A SOUTHERN FLYING SQUIRREL WITHIN ALGONQUIN PARK IS NOT THE FIRST, THE PRESENCE OF SOUTHERN FLYING SQUIRRELS IN THIS LOCATION REMAINS RELATIVELY RARE"

## IN CONCLUSION

The 2021 season marked the 70th anniversary of the small mammal project. This project continues to be instrumental in monitoring small mammal populations. We are grateful to everyone who helped with the small mammal project this year, including the Ontario Ministry of Development, Mines, Natural Resources and Forestry, and field assistants Nicholas Paroshy and Dr. Simon Tapper. This project is co-supervised by Dr. Jeff Bowman (NDMNRF/Trent University) and Dr. Albrecht Schulte-Hostedde (Laurentian University). ♦



# GETTING UP CLOSE WITH SALAMANDER-EATING PITCHER PLANTS

Written by Amanda Semenuk

*It is hard to believe it has been four years since researchers revealed the secret, slimy diet of Algonquin's pitcher plants (*Sarracenia purpurea*). On top of their typical insect diet, these carnivorous plants are among the first recorded in North America to catch salamanders, and the first that we know of to capture Spotted Salamanders (*Ambystoma maculatum*). The salamander/pitcher plant project studies the impacts of this interaction on both salamander and pitcher plant populations.*

## A STORY UNFOLDS

When I began learning about Northern Pitcher Plants, what became immediately apparent was how different their physical appearance can be between populations, even just between populations within Algonquin Park. The size, shape, and colour of the plants vary widely, and together these characteristics tell a story about the plant's experience within their environment. While the redness of a pitcher indicates how much sunlight it receives, its size and shape can tell us whether it is getting the nutrients it needs to grow and thrive.

Now having several years of data to work with, we can begin to make connections between the characteristics of a plant (heath, size, reproductive effort, etc.) and what they've been 'eating' during their past few growing seasons. If pitcher plants incorporate nutrient-dense salamanders into their diet, do these extra nutrients translate into improved growth and reproductive success? This summer, the focus of my fieldwork was to investigate how plant size and reproductive effort compare between pitcher plants known to have captured salamanders versus those that have not.

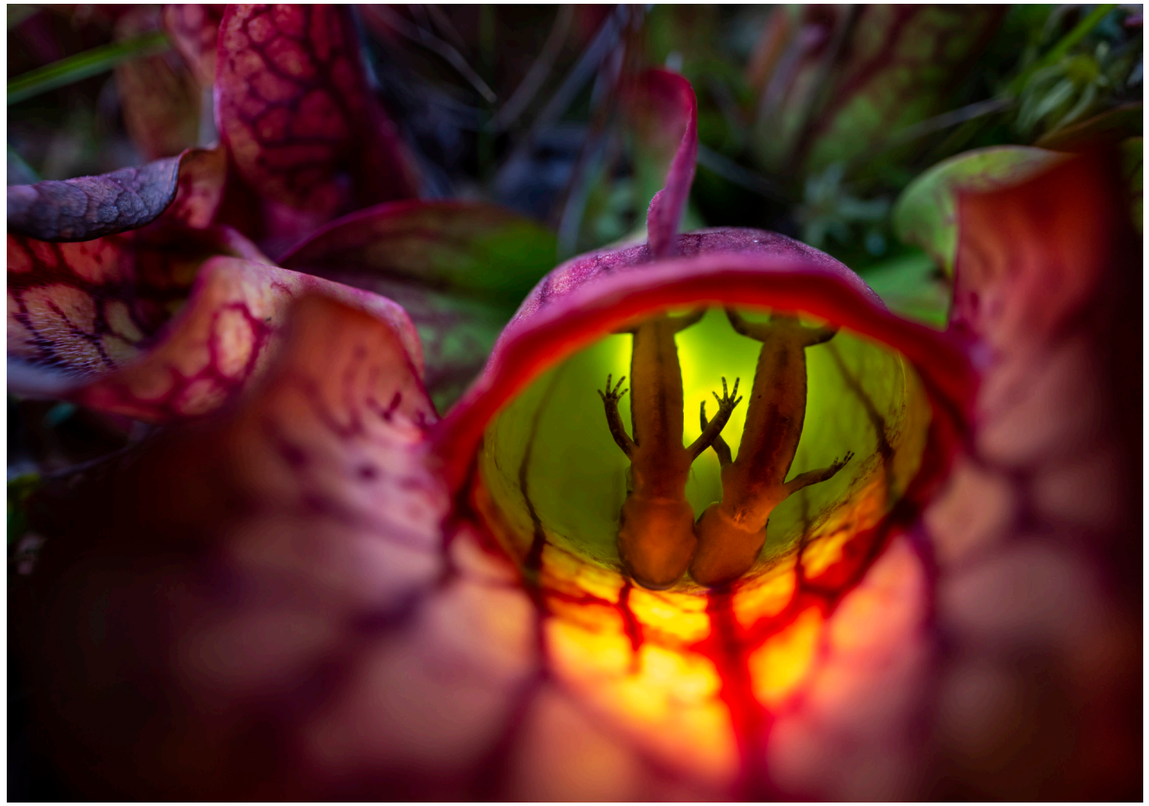
## BIGGER, TALLER, STRONGER

Data collection was particularly fun this summer as accessing plants from new sites involved balancing on decaying logs, walking alongside wolf prints, and enjoying afternoon paddles. After 800+ measurements collected from pitcher plants across five sites, the data suggested salamander-eating plants do have a size advantage. These plants boast larger leaves for prey capture and flower stalks averaging 10 centimeters taller than plants that have not consumed salamander prey! However, more research is needed (stay tuned!) to confirm this extra growth is truly a result of their unique diet.

While pitcher plants aren't hard to come by, studying ones that regularly consume salamanders confines us to the only site we know this to be occurring. Though limiting, it emphasizes how special it is to see this interaction so close to home!

## ACKNOWLEDGEMENTS

Science doesn't happen alone, and this project is by far no exception. Thank you to our collaborator Dr. Aaron Fisk at Windsor University for his contribution to the stable isotope analyses. Big thanks to our undergraduate volunteers Alex Walmsley and Emily Thouless for their enthusiasm and efforts given in the lab and field. Thank you to Samantha Stephens for her beautiful photographs of the project as well as Arc'teryx Toronto for their support when creating a project-themed sticker. We would also like to thank the National Science Engineering Council of Canada, and the German Carnivorous Plants Society for their financial support. This project is supervised by Dr. M. Alex Smith (University of Guelph), Dr. Shoshanah Jacobs (University of Guelph) and Patrick Moldowan (University of Toronto). ♦





# CATCHING UP WITH THE TURTLES

## AN UPDATE ON THE LONG-TERM STUDY

Written by Jessica Leivesley & Rachel Fallas

*The 2021 field season marked the 50th consecutive year of turtle research at the Algonquin Wildlife Research Station. Since the tagging of our first Snapping Turtles in 1972, turtle researchers have worked tirelessly for half a century exploring the lives of these enigmatic reptiles. Being incredibly long-lived and unique animals, our turtles have proven to be both frustrating and highly rewarding study subjects for nearly 100 students who have spent time on the project.*

### MEET THE TEAM

After a reduced field season in 2020 due to COVID-19, we were itching to get back into full-time fieldwork in 2021. Three graduate students from the University of Toronto led the efforts, Jessica Leivesley (PhD candidate), Mariel Terebiznik (MSc student), and Claudia Lacroix (MSc student). In addition to collecting the regular long-term data, we were each running experiments and collecting data for our own graduate research projects. We had a wonderful team of three undergraduate students who helped make this busy season possible: Nicholas Ypelaar, Jacqueline McLean, and Rachel Fallas. Each student also conducted their own projects on amphibians (Jacqueline), salamanders (Nicholas) and turtles (Rachel). Finally, Patrick Moldowan (PhD Candidate) was never far away to offer help and advice.

### SNAPPING TURTLE TALLY

This year we caught a total of 26 individual Snapping Turtles and observed eight more. This includes three hatchlings we caught and released unmarked–hopefully, we will see them again in 17–20 years when they reach maturity! The snapper nesting season started on the 7th of June and continued until the 21st of June with a total of 16 nests being recorded and 444 eggs being measured by our researchers. Unfortunately, we lost two known snappers from the study this year to mortality and found another four unknown individuals dead on the road. However, we also welcomed two new juveniles to the study as well as three new young females who were observed laying what may have been among their first clutches of eggs. We look forward to following them in the years ahead.

> "THIS YEAR WE CAUGHT A TOTAL OF 26 INDIVIDUAL SNAPPING TURTLES AND OBSERVED EIGHT MORE"

### PAINTED TURTLE TALLY

We caught a total of 404 Painted Turtles over this season, welcoming 44 new individuals into our study population. We had a boom in new juveniles, with 36 of the 44 being newly marked juveniles. The remainder of the new additions were four adult females and four adult males. We found two individuals deceased from our long-term study, B07 and C48. B07 was first caught in 1980 making her at least 42 years old, and C48 was first caught in 1990, making her a minimum of 32 years old. In addition to this, we found seven individuals that had been killed by road strikes.

During the Painted Turtle nesting season, which ran from 3rd June to 27th June, we only recorded 77 nests. This is a huge dip from previous years. For example, 205 Painted Turtle nests were recorded in 2020. What happened? We can't be sure, but we think that an extended period of hot weather at the end of May and beginning of June coupled with very lit-

tle rainfall over the same period led to extremely low water levels. We canoed around Wolf Howl Pond to investigate and found very few locations where turtles would be able to leave the pond to get to their usual nesting sites. We believe that turtles either nested elsewhere or abandoned nesting in 2021. This phenomenon wasn't just restricted to Algonquin. Researchers noticed a similar trend in Parry Sound.

## HATCHLING SURVIVAL

This summer marked the start of a multi-year experiment led by Jessica Leivesley to investigate how incubation temperature influences hatchling turtle survival. For this, we collected over 200 Painted Turtle eggs and incubated them in the AWRS labs. These eggs hatched in August and the hatchlings are currently in overwintering conditions at the University of Toronto. Come spring, they will be released into Wolf Howl Pond and researchers will attempt to catch them all summer to estimate juvenile survival.

## PREDICTORS OF NESTING DURATION IN SNAPPING TURTLES

In addition to contributions towards the long-term study, we explored many other aspects of turtle biology in 2021. Snapping Turtle nesting behaviour was the focus of one of the projects conducted during the summer. Sightings of Snapping Turtles making terrestrial migrations near busy roads are not uncommon during nesting season as gravid females embark on their search for an ideal nest site. However, it remains unclear what key attributes these females are searching for, and this is reflected in the high degree of variation between nests in characteristics such as substrate coarseness. For example, this year one turtle nested on a slope of fine sand while another nested in the middle of a gravel road. This raises the question of whether different biotic and abiotic factors may affect the amount of time and effort required by females to construct their nests.

Though larger substrate particle size was loosely associated with longer nesting duration, temperature emerged as the most significant predictor of nesting duration. However, the expectation that warmer temperatures would accelerate nesting activity was subverted; though turtles were faster to lay their eggs and cover their nests in warmer temperatures, turtles were also slower to dig their nests under these conditions. This raises a host of new questions about the role that temperature plays in turtle nesting behaviour. Consequently, it is possible that new insights on nesting behaviour may further inform predictions about how turtle populations will respond to climate change.

## HATCHLING TURTLE VOCALISATIONS IN THE WILD (Written by Claudia Lacroix)

Fall is a time when many hatchling turtles emerge from their nest and, in most years, we bring eggs back to the lab to perform experiments offsite. In the fall of 2019, through lab experiments and eggs collected from the AWRS, we found that Snapping Turtle hatchlings vocalise in their nest upon emergence. To date, we still do not have a good understanding of why hatchlings vocalise in the nest, but we suspect that this behaviour is especially useful during nest emergence. As a result, in fall 2021, we were excited to revisit this mysterious turtle behaviour and investigate Snapping Turtle hatchling vocalisations in the wild. Specifically, we set up field experiments on the Lake Sasajewun dam, buried microphones in 14 Snapping Turtle nests and placed camera traps to monitor turtle emergence. This year was a particularly cool summer, and we saw a delayed nest emergence. Out of the 14 nests, six nests emerged successfully between September 27 and November 1st. This is especially surprising as some nests continued to emerge after the first snowfall and during nighttime temperatures that reached below zero degrees Celsius. Overall, using the data we collected from audio recorders and camera traps, we hope to disentangle the factors that cue hatchling emergence and the role that vocalisations may play in this behaviour.

**Hatchling Snapping Turtles after nest emergence in fall 2021 [Claudia Lacroix]**

## INVESTIGATING PATERNITY (Written by Mariel Terebiznik)

Turtle nesting season is always a chaotically busy time of year, and this year was no different. Along with our typical nesting surveys along the Mizzy Lake Trail and several satellite sites within and near the AWRS, we were busy with another mission: collecting and incubating as many turtle eggs as possible.

Over the course of the nesting season, we collected 269 Painted Turtle eggs from 42 different mothers as part of our experiments. The eggs were incubated at the AWRS for over a month, kept safe and warm through multiple power outages by a generator and a dedicated team keeping it running until power returned. We then transported the eggs to the University of Toronto where they remained until hatching in early August. Every hatchling was weighed and measured, and is currently being kept under simulated winter conditions waiting to be released next spring.

Soon after hatching, we also collected a small blood sample from each hatchling to conduct genetic analyses. These samples will allow us to confidently identify the fathers of a cohort of hatchlings for the first time in the turtle project's history. This information will help us understand aspects of turtle life history, such as what characteristics make successful fathers, how often does multiple paternity occur, what is the degree of inbreeding in the population, are deformities heritable, or any other possible questions that you could answer when combining 50+ years of data from a turtle population with their genetic relatedness.

## ACKNOWLEDGEMENTS

We are incredibly thankful to everyone who made the 2021 field season possible! The long-term project is co-supervised by Dr. Njal Rollinson (University of Toronto) and Dr. Jackie Litzgus (Laurentian University). We are thankful to the AWRS and to Ontario Parks staff for their support. We appreciate everyone who helped us out with data collection. Lastly, thank you to Arc'teryx Toronto for outfitting us for the 2021 season. ♦



# AMPHIBIANS ABOUND

## REFLECTIONS FROM THE LAKE TO THE LAPTOP SCREEN

Written by Patrick Moldowan

*Thirteen thousand six hundred and sixty-four. All those frogs and salamanders do not inventory themselves. Catch, measure, weigh, and count. Rinse, lather, repeat, and get a little sleep, sometimes.*

### A SPRING FLING

In spring 2021, the amphibians arrived early, and they came in waves. The ice receded from the surface of Bat Lake with haste, nearly setting an early season ice-off record on 12 April (day of year 102). The first Spotted Salamander egg mass followed shortly thereafter on 14 April (day 104) and away we went. As expected, the Spotted Salamanders marched in lockstep with rainfall (Figure 1), but an interruptive snowstorm put the migration on ice and slowed inbound migration to a literal crawl (April 21–27, days 111–117). Not ones to be delayed for long, the salamanders quickly made up for lost time and their activity surged. The few peak days of the salamander breeding season are hectic and humbling. It does your head good to remind yourself that you just saw more of these glorious creatures in a matter of minutes than most people would see in several lifetimes. The student saviours arrived just as the post-breeding amphibian exodus approached fever pitch of salamander activity and personal sleeplessness. You see, the weather had delivered spring before the end of exam season so helping hands had to wait. It was a great relief when they arrived. The beaming smiles and all the excitement around salamanders were a pick-me-up during the remaining cool and rainy nocturnal surveys that closed out the season. Despite being one of the longest breeding seasons recorded to date (Figure 2), my time spent among the amphibians whizzed by in 2021. As the dust began to settle and the salamanders cozied back into burrows, I was once again left thinking, "did that really just happen?" My weary eyes, throbbing lower back, and hands encrusted with dried salamander slime told me that it must be so, and that it was so worth it. It was another spring for the field books.

### BEHIND THE KEYBOARD

The high of spring is sometimes tempered by the computer work that follows shortly thereafter. Back at the desk, there was a lot of number crunching throughout the past summer, autumn, and winter. All the data about who's who, when, where, and why came together from the past decade or so. Following the capture histories of salamanders that I have known and reliving field seasons past via spreadsheets was exciting in its own way. For instance, male Salamander 0076 has an impressive capture streak: 2008, 2009, 2010, 2011, 2016, and 2017. Is he still out there?

> "THE ICE RECEDED FROM THE SURFACE OF BAT LAKE WITH HASTE, NEARLY SETTING AN EARLY SEASON ICE-OFF RECORD ON 12 APRIL"

What did Salamander 1648 get up to during her capture gap between 2009 and 2016? Despite my good fortune of crossing paths with some salamanders many times, most are only seen once (Figure 3). Do we need to look harder for salamanders that have gone missing in action? Did a low year for small mammals affect burrow availability and survival of the salamanders? Are they transient? Were the shrews and Barred Owls well-fed on salamanders last year? Many questions will go unanswered, but I am happy to say that after much screen time, the spreadsheets are complete, statistical models are humming away, results are trickling out, and data





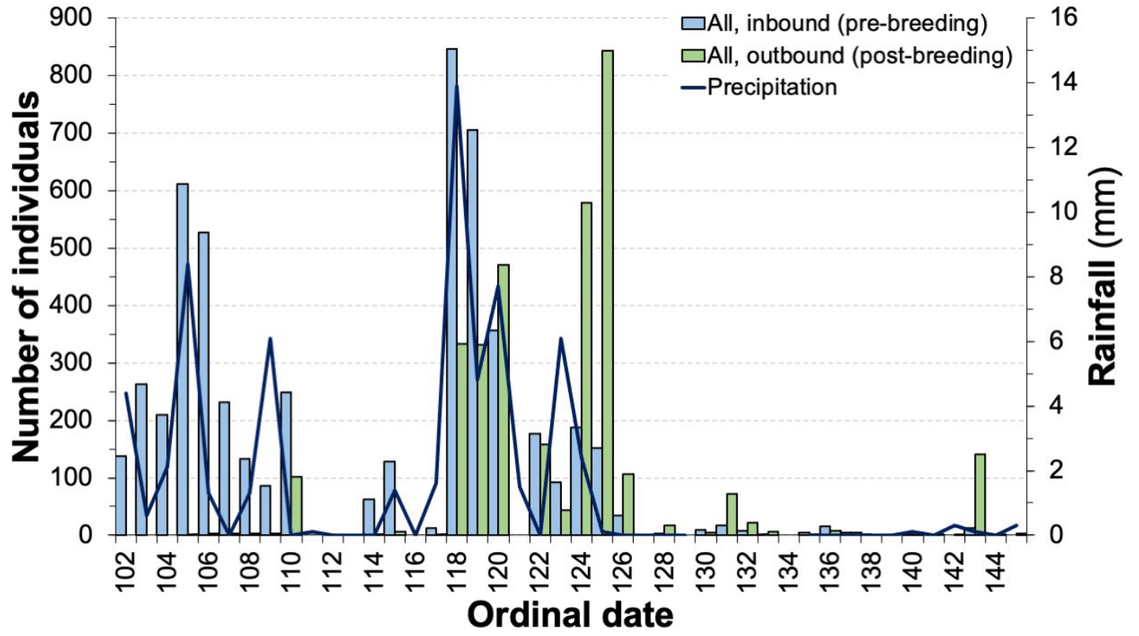



**Figure 1.** Timing of inbound (pre-breeding) and outbound (post-breeding) activity of adult Spotted Salamanders at Bat Lake (2021). Note the synchrony between rainfall and salamander activity.

interpretation is entering the late stages. The histories of salamanders like 0076 and 1648 are coming together to generate estimates of abundance and survival of the salamanders at Bat Lake. Reams of data related to salamander reproduction, age, longevity, and spatial ecology, among other topics, wait for my next eager teammates. Nearly 15 years on, we are pulling back the veil on the biology of salamanders at Bat Lake.

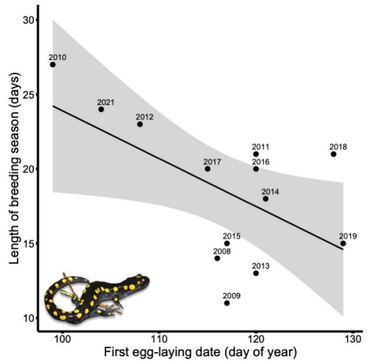



**Figure 2.** The earlier the onset of the breeding season, the longer the duration of the breeding season.

### ACKNOWLEDGEMENTS

Sincere thanks to Samantha Stephens, Mariel Terebiznik, and stellar summer students Nicholas Ypelaar, Rachel Fallas, and Jacqueline McLean for their boundless enthusiasm for amphibians and resilient lower backs! A very big thanks to Aidan Wouters, Alex Walmsley and Brendan Cane for their assistance with the late summer and early autumn salamander roundup.

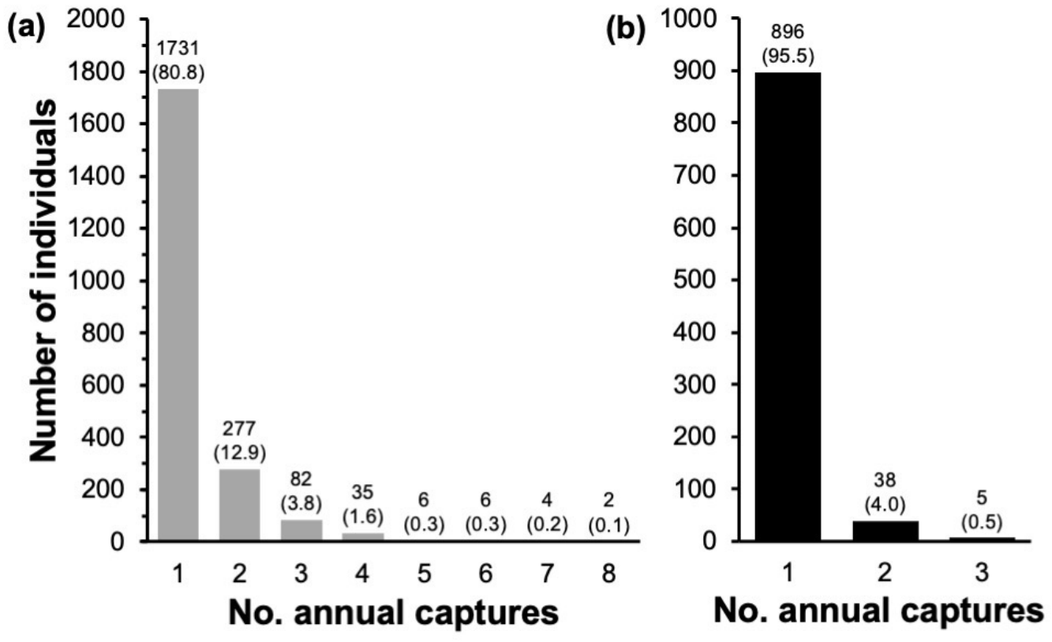



**Figure 3.** Distribution of capture histories of Spotted Salamanders from aquatic trapping at Bat Lake (2008–2019): Number of captures of **(a)** individual males and **(b)** individual females based on annual sampling. Data labels include raw counts of individuals and (percentages of individuals).

## VARIATION IN HEAD SPOT COLOUR
(Written by Nicholas Ypelaar)

The sharply contrasting yellow spots on the blackish-grey bodies of Spotted Salamanders are unmistakable, yet their polka-dotted appearance is more complex and varied than what meets the eye. The head spots of the Spotted Salamander can vary in colour from various hues of yellow to a brilliant orange. Using field data from 2018 and 2019, we examined the frequency of orange head spots observed on Spotted Salamanders breeding at Bat Lake. This project sought to determine whether there was a sex-specific bias for orange head spots. Were males or females more likely to demonstrate orange head spotting and might this be related in some way to their biology (e.g., mate choice, diet, genetics)? Additionally, we used community science data from iNaturalist Canada to analyze potential latitudinal variation in the occurrence of orange head spots in Spotted Salamanders across Ontario.

Our analyses found no significant relationship between sex or latitude and the occurrence of orange head spots on Ontario Spotted Salamanders. Further studies with a greater sampling of Spotted Salamanders from across their North American range may yet shed more light on the mystery behind the marvelous colour variation in Spotted Salamander head spots. ♦

> "OUR ANALYSES FOUND NO SIGNIFICANT RELATIONSHIP BETWEEN SEX OR LATITUDE & THE OCCURRENCE OF ORANGE HEAD SPOTS ON ONTARIO SPOTTED SALAMANDERS"

# PUBLICATIONS

## 2021 PEER-REVIEWED RESEARCH PAPERS

Denomme-Brown ST, K Cottenie, JB Falls, EA Falls, RJ Brooks & AG McAdam. 2021. **Examining the effects of heterospecific abundance on dispersal in forest small mammals.** Journal of Mammalogy 102(6): 1484–1496.

Greenhorn JE, J Bowman, ST Denomme-Brown & DM Ethier. 2021. **Bottom-up trophic effects on fisher *Pekania pennanti* harvast age structure: associations with mast, voles and owls.** Wildlife Biology 2021: wlb.00873.

Keevil MG, DP Armstrong, RJ Brooks & JD Litzgus. 2021. **A model of seasonal variation in somatic growth rates applied to two temperate turtle species**. Ecological Modelling 443: 109454.

LeGros DL, D Lesbarrères & B Steinberg. 2021. **Terrestrial dispersal of juvenile Mink Frog (*Lithobates septentrionalis*) in Algonquin Provincial Park, Ontario.** Canadian Field-Naturalist 135: 47–51.

Leivesley JA & N Rollinson. 2021. **Maternal provisioning and fluctuating thermal regimes enhance immune response in a reptile with temperature-dependent sex determination.** Journal of Experimental Biology 224: jeb237016.

Léveillé AN, EG Zeldenrust & JR Barta. 2021. **Multilocus genotyping of sympatric *Hepatozoon* species infecting the blood of Ontario ranid frogs reinforces species differentiation and identifies an unnamed *Hepatozoon* species.** Journal of Parasitology 107: 246–261.

Veitch JSM, J Bowman, G. Mastromonaco & AI Schulte-Hostedde. 2021. **Corticosterone response by *Peromyscus* mice to parasites, reproductive season, and age.** General and Comparative Endocrinology 300: 113640.

# MEDIA

## 2021 MEDIA APPEARANCES

### GENERAL

**Arc'teryx Toronto.** Gallery event. December 2021. Featuring images of Station research and a talk by Samantha Stephens.

**Photo Life Magazine.** March 2021. Beyond Facts & Figures: Collaborating with scientists to communicate research through visual storytelling. [Print] Written and photographed by Samantha Stephens, featuring images of Station research.

### TURTLES

**Cottage Life.** January 2021. Snapping turtle vocalizations and nest emergence. [*Online*] Featuring Claudia Lacroix.

**Conservation Stories.** January 2021. Why did the turtle cross the road? [*Online*] Featuring Dr. Jackie Litzgus.

**CBC Docs: Wild Canadian Weather.** Sun: the driving force behind all weather. February 2021. [*Online*] Filmed at the Station; with cinematography by Station alumni Steven Kell and Hugo Kitching.

**Canadian Herptological Society Blog: The Drift Fence.** May 2021. Investigating the Enduring Mystery of Temperature-dependent Sex Determination. [*Online*] Written by Jessica Leivesley.

**Canadian Herptological Society Blog: The Drift Fence.** March 2021. Buried Away: Vocalising Turtles and Cooperative Hatching Behaviour. [*Online*] Written by Claudia Lacroix.

**Arc'teryx Toronto.** Instagram take-over and virtual Q&A event. July 2021. Featuring the turtle team with images and writing by Samantha Stephens.

### SALAMANDERS

**IFLS.** February 2021. Carnivorous Pitcher Plants Can Dissolve Anything From Bugs to Salamanders. [*Online*] Featuring Amanda Semenuk.

**Apple TV: Tiny World Series.** Pond episode. April 2021. [*Online*] Filmed at the Station.

**'Save his skin'** Image by Léa Fieschi-Méric a finalist in Radio-Canada's Proof of Image contest. [*Online*]

**'Nature's Pitfall'** Image by Samantha Stephens awarded Runner-Up in the 'Small World' category, Nature TTL Photographer of the Year 2021. [Online]

**National Wildlife Magazine.** October/November 2021. Nature's Witness: Trapped Twins. [Print] Image by Samantha Stephens.

# DEFENDED THESES & STUDENT PROJECTS

*The AWRS has been a host to many graduate students since its inception in 1944. We continue to provide exceptional opportunities for students to gain invaluable knowledge in field biology. Listed here are the student projects that were completed in 2021.*

## GRADUATE

**Angell, C.** 2021. Plasticity of senescence in the Antler Fly *(Protopiophila litigata)*. ***Ph.D. Thesis***, Department of Biology, University of Ottawa.



# SUPPORTERS & MAJOR USERS

As a not-for-profit, the AWRS and the long-term projects we host rely on the financial and logistical support of many individuals, institutions and organizations. We would like to thank all of our users, supporters and contributors for their generosity. We are truly grateful for your belief in the mission of the AWRS. In spring 2020, we launched a new way to support the Station—our Patreon membership community. We now have over 50 members in this community who support the Station with a monthly contribution. Our Patrons have been a life-line for the Station 2021 as COVID continued to affect our operations.

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