Algonquin Provincial Park Loon Survey

PETER FERGUSON

The haunting calls of the Common Loon symbolize Algonquin's wild country for many people. Nearly every small lake has a breeding pair and there are multiple pairs on the larger lakes. Unfortunately, there are environmental threats to loons throughout their range that could potentially affect numbers here in the Park, including reduced reproductive success caused by acid precipitation, and loons dying during migration due to avian botulism.

In 1981, we began the Loon Survey to help determine how well loons were doing in Algonquin. Visitors and staff report the lakes where they see adult loons, their nests and young. On average, nests or young were observed on 40% of lakes where loons were reported during the 38 years from 1981 to 2018. Reports from 152 lakes in 2018 included observations of nests or young on 63 lakes (41%), just above the average. Only a long-term monitoring program can distinguish real trends from normal yearly fluctuations. We need observations from as many lakes as possible.

Loon Reproduction in Algonquin

Year	# of lakes surveyed	% with nest/young
1981	121	38
1982	184	28
1983	237	21
1984	298	34
1985	210	37
1986	216	35
1987	261	43
1988	260	40
1989	240	41
1990	248	40
1991	201	50
1992	203	39
1993	232	43
1994	183	46
1995	223	45
1996	219	42
1997	173	45
1998	175	42
1999	190	33
2000	216	44
2001	168	39
2002	143	41
2003	120	46
2004	144	41
2005	156	40
2006	147	41
2007	138	43
2008	169	39
2009	146	40
2010	138	36
2011	134	51
2012	128	48
2013	120	52
2014	152	41
2015	129	40
2016	117	44
2017	164	33
2018	152	41

ALGONQUIN VISITOR CENTRE
HOURS OF OPERATION

Open Daily
9 am - 7 pm

Museum • Bookstore & Nature Shop • Café WiFi June 15 to October 14, 2019

Algonquin Logging Museum - *Open 9 am - 5 pm June 15 to October 20, 2019.*
The 1.3 km trail with outdoor exhibits is available year-round.

A Turtle Grows Up!

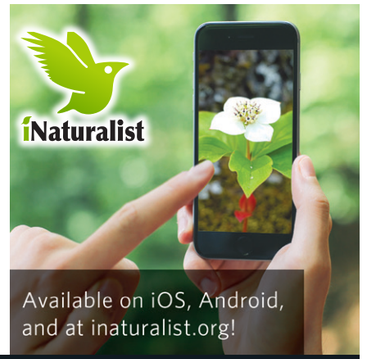
Blanding's Turtles are rare in Algonquin's Highway 60 corridor, so we are always excited to receive reports of these beautiful reptiles. This excitement doubles if the turtle reported is one with a backstory. Earlier this spring researchers re-encountered a female Blanding's Turtle (number 001) who is easily recognized by a unique notch in her shell. This turtle was first captured in 1991 when she was estimated to be six years old based on her size and a series of growth rings on her shell. Assuming this to be accurate, that would make Blanding's Turtle 001 34 years old—a mere spring chicken. According to research in Michigan, this means she may continue to reproduce for at least another fifty years! Plod on, Blanding's Turtle 001—cheers to your success so far, and here's to many more.


Blanding's Turtle 001 was first found by researchers in 1991 and is currently presumed to be 34 years old. She was observed searching for a nest site on June 28, 2019. LYNDSEY FRIESEN

CONTRIBUTE TO CITIZEN SCIENCE!

By submitting your observations and photos to Citizen Science platforms like iNaturalist.ca, you can help park staff document biodiversity in the Park and even protect habitat. For more information join iNaturalist.ca, and check out Algonquin Provincial Park under projects.

- Upload a picture of any wild plant, animal, or fungus
- iNaturalist's community and image recognition software will help you identify it
- Help out other naturalists by identifying their observations
- Every observation becomes part of a growing record of Earth's biodiversity



iNaturalist Canada is run by the Canadian Wildlife Federation, the Royal Ontario Museum, and iNaturalist.org at the California Academy of Sciences.

Over 7000 observations of over 2600 species in Algonquin Provincial Park in 2018

3.5K P.R. 08 01 2019 | ISSN 0701-6972 (print) ISSN 1927-8624 (online)

algonquinpark.on.ca

ONTARIO PARKS Algonquin
The Raven
A Natural and Cultural History Digest
Vol. 60, No. 3 • August 1, 2019

Echoes from the 80's – Algonquin's Turtles Tell a Story

by Matt Keevil

Having a spectacularly long life means you have likely survived more than a few close calls. For Snapping Turtles in our part of the world, living to a ripe old age isn't just a nice story, it is a necessity. Luckily, if a turtle can survive the risky incubation period to hatch into the world, it has already beaten the odds and surviving just a few years more is like winning the lottery. Few animals prey on adult Snapping Turtles, but on rare occasion, a clever creature gets good at it.

Over the winter of 1987/1988, and repeating over the following two winters, a catastrophe befell the Snapping Turtles of Lake Sasajewun. One or more River Otters discovered how to find and kill adult Snapping Turtles under the ice when these otherwise formidable beasts are slow and stiff with cold. We know about this event because the Wildlife Research Station (WRS) sits at the shore of Lake Sasajewun and the Snapping Turtles there are the subject of a long-term population study that began in 1972. By the end of nesting and trapping surveys in the summer of 1990, it was clear that the Snapper population had been cut in half.

The following year (1991), Dr. Ron Brooks and his graduate students who had been studying the Snapping Turtles published a paper documenting the abrupt decline and predicting an exquisitely slow and uncertain recovery after

Long-term studies are needed to understand turtle populations. PATRICK MOLDOWAN

the disaster was over. Why were the authors of the 1991 study so concerned for the fate of the Sasajewun Snapping Turtle population? Dr. Brooks had other studies running at the WRS at the time, and one of these was tracking small mammal populations, which fluctuate dramatically from year to year and even from one season to another. If some populations, like small mammals, can recover easily from even more drastic declines why would turtles be any different? At that time, long-term studies, such as those in Algonquin Park, were beginning to show that populations of late-maturing, long-lived species such as turtles function quite differently than populations of animals with faster life-histories (such as small mammals).

Now, nearly 30 years later, I had the opportunity, as part of my PhD dissertation, to look at the data gathered over the decades as we have continued to monitor the population, to see what happened to the Sasajewun Snappers. Along with Dr. Brooks and my supervisor Dr. Jacqueline Litzgus, I tested whether the predictions made in 1991 were accurate. Would the population recover and at what rate?

Predators, like foxes, eat many eggs and few end up hatching. MATT KEEVIL

Life is unpredictable—so much so that animals and plants have evolved many adaptations to cope with this uncertainty. In a sense, they predict it. Snapping Turtles have a collection of adaptations built into their overall way of life. This suite of characteristics is called the "bet-hedging" life history strategy, because it insulates against chance events (i.e., hedging their bets against having a bad year). For example, the probability that a mother turtle's carefully buried eggs will survive even the first week is low because nest predators such as foxes, raccoons, and ravens search out nests with great skill. Even if eggs survive the entire summer, it is likely that a nest might not be warm enough for the embryos to finish development with enough time to hatch, emerge from the nest, and find suitable overwintering habitat before the weather becomes too cold. Many summers in Algonquin are too cool to produce any surviving hatchlings at all.

In many species this sort of complete reproductive failure would devastate a population, and a string of such events could easily result in local extinction. In Wood Frogs, for example, if drought dries the breeding pools before the tadpoles complete their metamorphosis, meaning that no new animals enter the population, then the number of adults available for subsequent breeding seasons can crash by over 80% the following spring. This is because most Wood Frogs don't survive to get a second breeding season; the population depends mostly on each year's crop of eggs and their success rate graduating from tadpole to hopping froglet to explosively breeding adults. Wood Frogs take big risks and expend huge amounts of energy on their first breeding season because the odds are that they will not get a second. This strategy can allow huge returns in good years, producing a surplus of new juveniles that can colonize once-empty pools, but it does entail big risks in bad years.

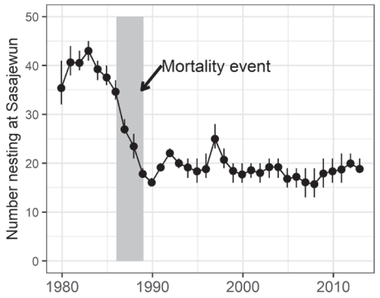
Snapping Turtles, on the other hand, have evolved to spread their reproductive effort over many decades—they hedge their bets. The key to this strategy is high adult survival. In a typical year, an adult Snapping Turtle nesting at the Wildlife Research Station has around a 94 - 98% chance to be around to nest the next year too. As she gets older she might get bigger, which means she can lay more and bigger eggs and her chances of survival get even better. Altogether, high adult survival combined with a low rate of successful reproduction and juveniles that take a long time (about 20 years) to reach sexual maturity results in an extremely stable adult population that typically doesn't change much from one year to the next. If the populations of animals such as Wood Frogs are like rubber dinghies that speed to the top of each cresting wave only to plunge into the trough that follows, then turtle populations are like steel ocean liners that slowly and steadily cut through the rough seas of random yearly fluctuations in weather, food, and predators.

This turtle, A7 has been part of the study since its beginning. PATRICK MOLDOWAN

However, even the steadiest ships can be vulnerable to unexpected disasters such as icebergs. Ecologists call unforeseeable events that devastate populations "random natural catastrophes" and they might be caused by disease, extreme weather, fire, or a several compounding factors. Although catastrophes are, by definition, rare and unpredictable, over a sufficiently long time, they seem to be inevitable. Add in climate change and other human-caused disturbances, such as road mortality or human harvest and the chances of a catastrophe creep higher.

The River Otter mortality event was evidently out of the ordinary because nothing else that is similar has occurred in the other 40+ years of the Snapping Turtle study. To the best of anyone's knowledge, it wasn't tied to the number of River Otters around, which are seen in the study area most years, and there was no known decrease in any of the animals that otters typically prey upon. It seems that killing big, hibernating Snapping Turtles was a behaviour honed by one individual or group of otters, and the mortality event only lasted as long as that particular otter was around. To be sure, otters in Algonquin and elsewhere have been observed to prey upon hibernating Snapping Turtles before, but it is rare for it to happen to such an extent in any one place. While the particulars of this event are fascinating and enigmatic, from the perspective of our broader research questions the important fact is just that it occurred and that it made for a natural experiment that reveals processes that apply to catastrophes by any cause, both natural and human-induced.

We focused on turtles nesting at Sasajewun as well as some surrounding nest areas. We found that during the catastrophe (the Otter mortality years), annual survival for Sasajewun turtles dropped to about 75% for three years before returning to high levels again. For many animals, 75% annual survival would be great but for Snapping Turtles it was drastically unsustainable and the population decreased by half.



For the next 23 years, the population fluctuated a little bit but for the most part it has remained stable at its new, smaller size. There may be an increasing trend over the last ten to fifteen years—at least if you squint real hard at the data—but the population in the most recent year we studied is the same size as the first year after the catastrophe. The predictions that were made back then appear to have held up; if there is a recovery it is slow. Very slow.

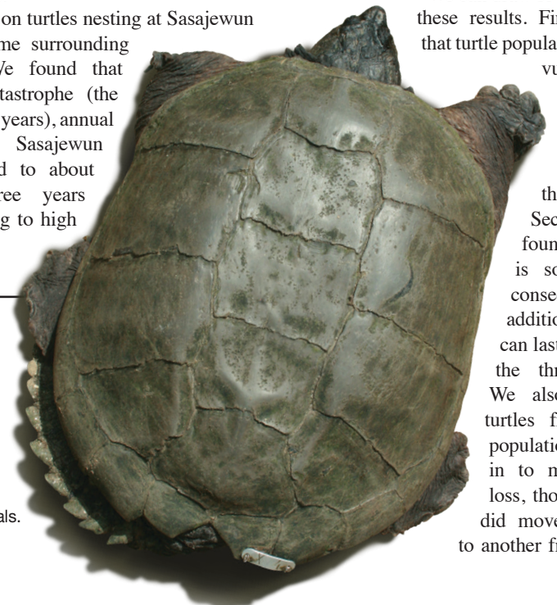
We can draw several lessons from these results. First, they confirm that turtle populations are just as vulnerable to adult female mortality as predicted by analyzing their life history. Secondly, we found that recovery is so slow that the consequences of additional adult deaths can last for decades after the threat has ended. We also observed that turtles from surrounding populations did not flow in to make up for the loss, though a few turtles did move from one area to another from time to time. This means that we cannot rely on outside populations for rescue in the event of local disasters the way that wildlife managers can do for other species that are more adapted to fluctuating populations.

The mortality event itself demonstrates that unpredictable random catastrophes can befall populations of any species, even those specifically adapted to take environmental fluctuations in stride. How then can wildlife managers and conservationists engineer policies and protections in the face of such unpredictability?

The Snapping Turtles in Lake Sasajewun did suffer a catastrophe nearly 30 years ago and have yet to recover. These turtles live in a protected area and are generally not threatened by human activities. Most turtles in Ontario are not so lucky. There are now fewer places for turtles to live in much of southern Ontario due to draining and filling of their wetland habitats. Cars driving on roads built near the wetlands kill many more turtles, further decreasing the population. The loss of even one or two adult animals a year can send the population into a slow-motion nose dive. We know that turtle populations do not recover quickly from one-time catastrophes, and it is even harder to recover from the regular catastrophe of human activities.

Snapping Turtle Facts:

- Males and females average different sizes; males 12 kg (26.5 lbs) and females 6 kg (13.3 lbs) and our biggest research animal was "Henry" weighing in at 19.2 kg (42.3 lbs) and a shell length of 41.15 cm!
- In many years, well over 90% of eggs do not hatch, due to predators and poor incubation temperatures and few hatchlings survive.
- It is thought that Snapping Turtles may live longer than a century, but humans don't live long enough to study turtles well.
- Adult Snapping Turtles eat a great deal of aquatic vegetation, but also eat snails, crayfish and other invertebrates, plus dead and dying animals. They rarely catch game fish.



Congratulations AWRS!

The Algonquin Wildlife Research Station (AWRS), where the research presented here took place, is turning 75 years old this year! The Station was established in 1944 by the Department of Lands and Forests to study a variety of wildlife (from moose to their parasites, ferns to mushrooms, mice to turtles—you name it!) and their ecological interactions with other species and the landscape. Today, the Station operates as a non-profit organization in the heart of Algonquin Provincial Park. The research conducted here has been very valuable to biologists in Algonquin, across Canada and around the world. In addition to the amazing research, thousands of students have trained here in the environmental and ecological sciences and gone on to make innumerable contributions to science and education.