CHAPTER 12 – SPECIES AT RISK IN MUSKOKA

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In 2018, the Muskoka Watershed Council (MWC) Report Card reported species at risk as an indicator of watershed health. Species at risk are plants and animals that that have been judged to be threatened with extinction, extirpation, or endangerment in a region, so the number of species at risk should reflect the risk of declining biodiversity in the watershed. Loss of biodiversity is significant to the health of the watershed.

It all seems straightforward, however, the data on species at risk are incomplete for several reasons and the results may be misleading. To begin with, the number of species at risk is a poor index of biodiversity loss. Biodiversity is not just the number of species but also the diversity within species and the variation in species present from one place to another within the region. There can be substantial loss of biodiversity in an ecosystem without any species being at risk of extinction. In addition, the process by which a species is determined to be a species at risk does not result from an unbiased assessment of the status of all species present. And yet, the existence of species at risk is another message that our environment is less healthy than it might be, we cannot simply ignore them!

Think of the ecosystem, our Muskoka watersheds, as an aircraft, and all the species living here as the rivets holding it together. Losing one rivet is unlikely to cause the plane to crash, but how many rivets can be lost before that crash occurs? This chapter presents what we know about species at risk in the Muskoka watersheds, how their status might be changing, and what we as individuals can do to help prevent their loss from the landscape.

Since our 2018 Report Card, there have been several changes in the list of species at risk that occur in the Muskoka watersheds. Has the situation improved or gotten worse? Sorry, it's more complicated than that. We need to recognize that a global biodiversity crisis is occurring.

WHAT ARE SPECIES AT RISK AND WHY ARE THEY IMPORTANT IN MUSKOKA?

The official list of species at risk in Ontario (SARO) is a list of species of plants and animals that have been determined to be threatened with extinction, extirpation, or endangerment in the province. In other words, the SARO list comprises species that have been professionally evaluated for their ability to persist in this province. In this regard, the SARO list is comparable to other lists of species judged to be in danger in other regions: Canada's Species at Risk Public Registry of species judged at risk in Canada, the USA's Endangered Species List of species judged at risk under the Endangered Species Act, the IUCN Red List of Threatened Species, judged to be at risk worldwide, and so on.

In all these cases, species are listed because they have been determined to be at risk because of the natural and human-induced threats that they face, including;

- Habitat loss: the replacement of natural habitat by agricultural, industrial, urban, or other human-built environments.
- Habitat fragmentation: the splitting of areas of contiguous natural habitat into smaller, separated parts such as by roads constructed through natural areas and by any form of development that alters or divides portions of natural habitat.
- Enhanced competition, predation, or disease resulting from introduced and/or invasive species.
- Traffic mortality.
- Direct killing or harassment by humans.
- Illegal or excessive harvesting including poaching and overhunting.
- Pollution, especially from chemicals released to the environment.
- A changing environment that is becoming less suitable for them.

In Ontario, species thought to be at risk are brought to attention of the Committee on the Status of Species at Risk in Ontario (COSSARO), an expert panel of up to 12 members. Available evidence is reviewed, and a decision made. If a species is classified as at risk by COSSARO, it is added to Ontario's List of Species at Risk (https://www.ontario.ca/laws/regulation/080230) in one of four categories, as defined in Table 17. Species on the list are reviewed and reclassified as needed from time to time.

Table 17. Species at Risk Categories.

Category	Definition
Special Concern	Lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination of biological characteristics and identified threats.
Threatened	Lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening it.
Endangered	Lives in the wild in Ontario but is facing imminent extinction or extirpation.
Extirpated	A native species that no longer exists in the wild in Ontario but exists elsewhere.

Extinction is a normal part of evolution. Species have been going extinct for millions of years. Over the last 500 million years, there have been five mass extinctions during which substantial proportions of all species present on the planet went extinct. The most severe of these was at the end of the Permian (approximately 90% of species lost); the most recent was at the end of the Cretaceous (approximately 75% of species lost, including all remaining dinosaurs except birds). Extinctions have always occurred at much slower rates between these mass extinction events, but today the global extinction rate is about 1000 times greater than the long-term average. While the causes of extinction vary depending on the species, many scientists are now concerned that we are entering another mass extinction event. This one is being caused by human activities such as loss and fragmentation of habitat, pollution, over-harvest, and climate change.

A list of species at risk tells us that there are species in our local environment that are at imminent risk of extinction. In 2023 the SARO list includes 237 species; 50 species of special concern, 56 threatened, 115 endangered, and 16 listed as already extirpated in Ontario. This is a substantially lower number of species at risk than we reported in 2018, primarily because COSSARO re-evaluates species from time to time as more data become available and many species that were on the list are now deemed to not be at risk. Most of the listed species occur in more southern parts of Ontario where urbanization and agriculture have had the greatest impacts on natural systems.

SPECIES AT RISK IN THE MUSKOKA WATERSHEDS

Located at the southern edge of the Canadian shield, the Muskoka watersheds are the northern limit for many southern species, and the southern limit for many northern species. This has resulted in biologically diverse terrestrial and aquatic ecosystems. Among the species occurring here, 48 species are on the SARO list (District Municipality of Muskoka, Georgian Bay Biosphere Reserve).

Before going further, note that COSSARO designates species to be at risk, or not, in Ontario. While COSSARO does examine population performance at local scales, it does not specify whether a species' populations are doing well or otherwise in specific regions within Ontario. If a SARO species occurs in our watershed, it may be at risk of dying out here, or its local populations might be doing quite well and could help to sustain its populations elsewhere through dispersal. We should do what we can to assist it even when local populations seem to be sustaining themselves.

The SARO species known to occur in the Muskoka watersheds are tallied in Table 18. Six species (forked 3-awned grass, rusty-patch bumblebee, northern brook lamprey, western chorus frog, eastern milk snake, and Henslow's sparrow) included in our 2018 Report Card are no longer included. Eight other SARO species (American ginseng, black ash, spotted wintergreen, American bumblebee, northern sunfish, evening grosbeak, wood thrush, and yellow rail) have been added. Another six species on the list have had their status changed since our 2018 Report Card. Four of these six (lake sturgeon, massasauga rattlesnake, red-headed woodpecker, and Algonquin (eastern) wolf) are now more critically endangered than before, while the fox snake and barn swallow have improved status. As further discussed below, the additions and deletions since our 2018 Report Card are due to changes in actual status, or new records of a SARO species in our region, or errors in the 2018 Report Card.

Table 18. The 48 species at risk occurring in the Muskoka watersheds in 2023. The status at time of our 2018 Report Card is shown in brackets.

Type	Common Name	Habitat	Status
Plant	American Ginseng	Understorey plant in rich, well-drained soils of mature deciduous forests	Endangered (Omitted by error in 2018)

Type	Common Name	Habitat	Status
Plant	Branched Bartonia	Sphagnum bog or fen wetlands dominated by sedges or low shrubs	Threatened
Plant	Broad Beech Fern	Rich soils in deciduous forests dominated by maple and beech trees	Special Concern
Plant	Black Ash	Shade-intolerant wetland tree	Endangered (New SARO addition Ontario)
Plant	Butternut	Open sunny areas near forest edges with moist, well-drained soil	Endangered
Plant	Engelmann's Quillwort	Shallow waters of lakes, rivers and wetlands	Endangered
Plant	Spotted Wintergreen	Dry oak-pine woodland habitats	Threatened (Omitted in error, 2018)
Insect	American Bumblebee	Open grasslands and meadows	Special Concern (New addition Muskoka)
Insect	Monarch Butterfly	Meadows and open areas where milkweed and wildflowers grow	Special Concern
Insect	West Virginia White	Moist, deciduous woodlands with a supply of toothwort	Special Concern
Fish	Grass Pickerel	Wetlands, ponds, slow moving streams, shallow bays of larger lakes with warm, shallow water and plants	Special Concern
Fish	Lake Sturgeon	Large rivers and lakes less than 30 feet deep	Endangered (Special Concern)

Type	Common Name	Habitat	Status
Fish	Northern Sunfish	Shallow vegetated areas in warm, slow-flowing rivers, streams and in lakes	Special Concern (Omitted in error, 2018)
Reptile	Blanding's Turtle	Large wetlands and shallow lakes with abundant vegetation	Threatened
Reptile	Common Five-lined Skink	Underneath rocks on open bedrock	Special Concern
Reptile	Eastern Foxsnake	Prairies, savannahs, rock barrens, wetlands, shoreline edge, forest edge	Threatened (Endangered)
Reptile	Eastern Hog-nosed Snake	Sandy shorelines, swamps, pine or oak woodlands	Threatened
Reptile	Eastern Musk Turtle	Slow moving water with muddy bottoms and abundant vegetation	Threatened
Reptile	Eastern Ribbonsnake	Close to water	Special Concern
Reptile	Massasauga Rattlesnake	Tall grass prairie, bogs, marshes, shorelines, forests, alvars	Endangered (Threatened)
Reptile	Northern Map Turtle	Rivers and lakeshores with emergent rocks and fallen trees	Special Concern
Reptile	Snapping Turtle	Shallow water with soft mud and leaf litter	Special Concern
Reptile	Spotted Turtle	Ponds, marshes, bogs with an abundant supply of aquatic vegetation	Endangered
Bird	Bald Eagle	Large areas of forest cover near lakes or rivers	Special Concern
Bird	Bank Swallow	Low areas along rivers or streams with cliff ledges	Threatened

Type	Common Name	Habitat	Status
Bird	Barn Swallow	Open barns, under bridges, in culverts	Special Concern (Threatened)
Bird	Black Tern	Shallow cattail marshes and lake edges	Special Concern
Bird	Bobolink	Tall grass prairie, open meadows	Threatened
Bird	Canada Warbler	Damp, mossy forests with dense understory	Special Concern
Bird	Cerulean Warbler	Mature deciduous forests	Threatened
Bird	Chimney Swift	Mature forests, nesting in hollow trees or cave walls. Found in manmade structures in urban settlements (chimneys, air vents, outhouses)	Threatened
Bird	Common Nighthawk	Open areas with low ground vegetation including forest openings, grasslands and bogs	Special Concern
Bird	Eastern Meadowlark	Tall grasses and hayfields	Threatened
Bird	Eastern Whip-poor-will	Deciduous or mixed open forests with little or no underbrush	Threatened
Bird	Eastern Wood-pewee	Forest edges	Special Concern
Bird	Evening Grosbeak	Open, mature, mixed wood forests	Special Concern (New SARO addition Ontario)
Bird	Golden-winged Warbler	Shrubby fields, woodland edges, abandoned farm fields, wooded swamps	Special Concern
Bird	Least Bittern	Wetland habitats with cattails and open pools and channels	Threatened

Type	Common Name	Habitat	Status
Bird	Olive-sided Flycatcher	Coniferous forests at forest edge and openings such as meadows and ponds	Special Concern
Bird	Peregrine Falcon	Tall, steep cliff ledges close to large bodies of water	Special Concern
Bird	Red-headed Woodpecker	Open deciduous forest with dead trees	Endangered (Special Concern)
Bird	Wood Thrush	Mature deciduous and mixed forests	Special Concern (Omitted by error, 2018)
Bird	Yellow Rail	Deep among reeds and sedges of wetlands	Special Concern (New Addition Muskoka)
Mammal	Eastern Small-footed Myotis (Bat)	Under rocks, rock outcrops, buildings, under bridges, caves, mines, or hollow trees	Endangered
Mammal	Eastern (Algonquin) Wolf	Deciduous or mixed forests near a water source	Threatened (Special Concern)
Mammal	Little Brown Myotis	Trees, abandoned buildings and barns, and cold and humid caves	Endangered
Mammal	Northern Myotis	Under loose bark and in cavities of boreal forest trees, and in caves or abandoned mines	Endangered
Mammal	Tri-coloured Bat	Old forests or barns, and in caves	Endangered

Table 19. The six species listed in 2018 but now considered to be either not occurring in the Muskoka watersheds or no longer at risk in Ontario. Previous status is shown in parentheses.

Type	Common Name	Habitat	Status
Plant	Forked Three-awned Grass	Open, bare ground or sparsely covered grassy areas	Does not occur in Muskoka (Endangered)
Insect	Rusty-patched Bumble Bee	Mixed farmlands, urban settings, savannah, open woods and sand dunes	Does not occur in Muskoka (Endangered)
Fish	Northern Brook Lamprey	Clear, cool-water streams with soft substrates including silt and sand	Does not occur in Muskoka (Special Concern)
Amphibian	Western Chorus Frog	Marshes or wooded wetlands for close proximity to both terrestrial and aquatic habitats	Not at risk (Threatened)
Reptile	Eastern Milksnake	Old fields, pine forest, open deciduous woodland, rock barrens, sand dune	Not at risk (Special Concern)
Bird	Henslow's Sparrow	Abandoned farm fields, pastures, wet meadows	Does not occur in Muskoka (Endangered)

WHAT DOES IT ALL MEAN?

Taken at face value, the status of species at risk could be seen as relatively stable since 2018. A list of 46 species in 2018 has grown to 48, with six species removed and eight added (four of the eight should have been there in 2018). Two other species have been given less dire classifications, and four species have been reclassified as more critically endangered. Several things argue against complacency, however.

- COSSARO reviews many species for which insufficient data are available to evaluate whether or not they are at risk; these are set aside.
- COSSARO is a committee of up to 12 people. It has a limited capacity to evaluate species brought forward.
- COSSARO is politically constrained to not list species at higher risk levels if they are doing well in neighbouring jurisdictions such as Manitoba or New York, even though their numbers may be declining in Ontario. Groups and individuals only bring forward species that have attracted interest.

Notice that the list contains only three insects but 20 birds. This is not because birds are at greater risk of extinction than insects: it's because people care about birds a lot more than they do about the thousands of insects that occur in Ontario. The official list of species at risk is a list of those species that people have become concerned about. It does not accurately reflect the reality of what is happening to our biodiversity.

Even for the whole of Ontario, the SARO list includes only lichens, plants, molluscs, insects, fish, amphibians, reptiles, birds, and mammals. We have numerous species that do not belong to one of these groups and some of them are surely at risk. This is not a problem unique to Ontario. Even global databases of species at risk of extinction are compiled in the same haphazard way, relying on interested individuals to bring forward species for consideration and evaluation (Lepczyk et al., 2022).

The six species removed from the SARO list for Muskoka, since our 2018 Report Card (Table 19), have not been removed because they have recovered and are thriving. Species like the forked 3-awned grass, the rusty-patch bumblebee, and the northern brook lamprey probably never occurred in Muskoka and should never have been on the local list. The western chorus frog has larger populations in southwestern Ontario but has long been quite rare on the Canadian shield. There is evidence of genetic differentiation between these regions and the shield populations may be a distinct species. COSSARO reasoned that the genetic differences were not definitive, treated it as a single species, and removed it from the list because of the healthy southwestern populations. It perhaps should be considered at risk in Muskoka, but the rule is if a species is not declared at risk for the province, it cannot be declared at risk for a region within the province unless it has been formally identified as part of a distinct population.

The milk snake has been removed from the list because healthy populations of this relatively secretive species exist in many parts of southern Ontario, including Muskoka. It has not recovered since 2018 and it should never have been classified as at risk. Henslow's sparrow remains listed as Endangered in Ontario, but it has been removed from the Muskoka list because there have been no recent sightings here. Muskoka is at or beyond the northern limit of its range in the province so whether the lack of sightings means it is now extirpated here or was never here in the past is uncertain.

The list of species at risk in Ontario and the list for Muskoka are both useful. But they should not be interpreted as factually complete lists: they are indicative, not definitive. And the rules governing whether a species is listed or not have elements that are logically consistent, but not necessarily biologically logical.

GLOBAL BIODIVERSITY LOSS – ARE WE DOING ENOUGH?

Globally, scientists now estimate that species are going extinct at a rate at least 1,000 times faster than the long-term average of 1 species per million species per year (Pimm et al., 2014). Over 40,000 species are listed as threatened worldwide, which equates to about a million species threated with extinction over the next 100 years (Diaz et al., 2019). A recent evaluation suggests over half the currently threatened species worldwide will require active and targeted recovery efforts if extinctions are to be avoided (Bolam et al., 2023). Listing species at risk is not sufficient, even if the lists were complete, which they are not. And the global problem of biodiversity loss can only be dealt with by solving it locally for specific species in many different places.

What does this mean for the Muskoka watersheds? We need to ask ourselves whether we really care about these struggling species in our midst. Are we doing all that we could do to enable their populations to thrive? Does their possible loss even matter to us?

What could we do that is not already being done? The good news is that provincial ministries attempt to track sightings of species at risk, while keeping such information confidential to prevent illegal collection and sale as exotic pets, and both provincial and municipal governments take some steps to conserve such species.

In recent years, improvements to roads in our region have been timed to avoid conflict with nesting turtles and have included the installation of fencing and underpasses (culverts) to permit turtles, other reptiles, and small animals to cross roads safely. About ten years ago, in undertaking improvements to Muskoka Road 10 (MR10) and Muskoka Road 48 (MR48), the District Municipality of Muskoka (DMM) identified risks to nesting turtles and ensured roadwork was scheduled for periods outside the nesting season. As well, on MR48, three underpasses were installed using 1.8m diameter culverts with the lower 25% filled with natural substrate.

The culverts are about 400 m apart, and fine mesh diversion fencing was installed on both sides of the road to guide turtles and other small animals towards the culverts. More extensive fencing and larger culverts were used when the Ontario Ministry of Transport (MTO) undertook improvements to Highway 400 over the past decade. Square-section culverts, primarily for drainage, had been used when the highway was upgraded around 2000. In 2014, fine-mesh exclusion fencing was installed along both sides of the highway connecting five existing culverts in a 3.3 km section south of Go Home Lake Road. From 2016 to 2017, fine-mesh exclusion fencing as well as large animal fencing was installed on both sides of a 9.6 km section south of the Lake Joseph Road interchange. These fences divert animals to the eight 1.8m square-section

culverts along this section and a single 4m square culvert accessible to larger animals. The primary objective for the fine-mesh fencing of Highway 400 was protection of nesting turtles and snakes. During 2022 to 2024, DMM is upgrading Fraserburg Road (MR14) which had been impassable during the severe 2019 flood. With the Ontario Ministry of Natural Resources and Forestry (MNRF) providing input to planning, DMM is looking to schedule the roadwork well outside the nesting season for turtles, and to provide suitable sandy fill in appropriate locations to encourage nesting away from the road surface. Each of these cases is an example of a government authority undertaking specific actions that help to conserve SARO species in Muskoka.

WHAT CAN YOU DO?

Ontario has clear requirements in law governing how or if development can occur on lands where SARO species are present, and our municipalities do what they can to protect such species when development projects are being approved. But laws on the books do not automatically lead to compliance by those who prefer to use their land without regard to the requirements of other species.

While many people may be aware of the decline of well-known species such as Ontario's turtles, the peregrine falcon, and the monarch butterfly, little is known about the loss of other important species such as the Algonquin (eastern) wolf, lake sturgeon, and bobolink. Declining populations of all species, particularly those at risk, may impact humans in numerous ways.

High biodiversity is the basis of ecosystem resilience and the foundation of the human economy. We rely on healthy ecosystems for our quality of life, for cleaning our air and water and, particularly in areas such as Muskoka, for supporting our tourism and recreation-based economy. The loss of native bees and other pollinators impacts agricultural productivity. The loss of fish species impacts lake dynamics and therefore sport fishing and potentially cottage-country tourism. The loss of plants will reduce forest and grassland productivity, limiting the food available for wildlife. Given the changes in lake chemistry taking place in this region, we also need to attend to the status of important lake food-web species, such as *Daphnia* and other zooplankton species that are unlikely to ever find their way onto a SARO list. Losses of such species could have important consequences for more visible parts of our lake ecosystems.

If we are serious about reducing the rate of extinction, we must up our game individually because of the forecasted effects of climate change, let alone other environmental stressors, that keep creating new challenges for all our native species. The recovery of many at risk species

can be aided by habitat protection. In the Muskoka watersheds, we need to encourage all landowners to maintain natural environments wherever possible on their property. They will be rewarded with abundant wildlife and the background music that birds, frogs, and insects provide us for free.

We also need to become better informed about the biodiversity crisis that our list of 48 species at risk hints at, and, in particular, about how the loss of diversity as species disappear detracts from the ecosystem's capacity to be resilient in the face of various stressors. Thinking of the ecosystem, our Muskoka watersheds, as an aircraft, and all the species living here as the rivets holding it together can be helpful. Losing one rivet is unlikely to cause the plane to crash, but how many rivets can be lost before that crash occurs?

As well as being better informed about our species at risk, we need to be more alert to their occurrence, and we need to take the time to report our sightings via the several on-line portals that now exist as apps on cell phones. That way governments have better information on where protection is needed for which species. As well, we citizens could demand full enforcement of existing law, as well as stronger laws to protect biodiversity. Biodiversity provides the fabric that enables our ecosystems to function. Our ecosystems sustain our own lives.

Several portals that facilitate reporting sightings are;

- The **Natural Heritage Information Centre** (www.ontario.ca/page/natural-heritage-information-centre) provides helpful information that can aid in recovery efforts and restoration and gathers reports of Species at Risk sightings.
- **NatureWatch** (www.naturewatch.ca) aims to engage Canadians in collecting scientific information on nature to understand the changing environment. Programs include FrogWatch, PlantWatch, IceWatch, WormWatch and MilkweedWatch.
- Ontario Nature ran the **Ontario Reptile and Amphibian Atlas** Program (www.ontarionature.org/protect/species/herpetofaunal_atlas.php), in which citizen scientists could help track reptiles and amphibians. That program has now ceased although the site contains much useful information and directs visitors to the Natura Heritage Information Centre and iNaturalist.
- **iNaturalist** (www.inaturalist.org) is an online social network of people sharing biodiversity information to help each other learn more about nature. Record your own observations, get help with identification from experts, and collaborate with others who are also connecting with nature.