

## **Springbank Reservoir Reptiles At Risk Study**

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### **Overview**

The Upper Thames River Conservation Authority has led an ongoing reptiles-at-risk research and recovery program since 1994. The West London area, from Harris Park to Springbank Dam, has been of particular interest with regard to changes experienced along the Thames River since the shutdown of Springbank Dam in 2006. The significant ecological changes to the river and adjacent floodplain habitat, since the dam has been inoperable, have been notably and continually positive for many species found in this region, including the Spiny Softshell turtle. The Spiny Softshell Turtle is designated both federally and provincially as Endangered due to small and declining populations, and significant threats to both habitat and individuals throughout the species' small Canadian range. The Thames River maintains the largest known population of Spiny Softshell Turtles in Canada, with the City of London housing a large portion of that population.

Reports provided to the City of London in 2015 and 2016 clearly outlined the beneficial changes of a free-flowing river, without Springbank Dam. These changes have continued to be positive over the convening seven years of research. Surveys comparing habitat and species assemblages before and after the dam was operable have shown a significant increase in at-risk turtle observations, as well as new and improved habitat availability and quality, since the dam has been out of commission. Without the influence of Springbank Dam, the substrate, shoreline contours, sediment dispersal and water depth along this section of the Thames River have become functional and important for at-risk reptiles and various other native species.

While the Springbank Dam was in operation, natural habitat conditions were disrupted by artificially altered water depth and flow, and other changes caused by the creation of a reservoir. This resulted in the area being unsuitable for many activities necessary for survival by habitat specialists such as the Spiny Softshell Turtle. A complex mosaic of habitat types is necessary for Spiny Softshell Turtle population viability and long-term recovery. The minimum habitat requirements for this species include Brumation, Oviposition, Nursery, Foraging and Thermoregulation Habitats, all of which now occur within the former footprint of the Springbank Reservoir. Turtles generally show great fidelity to certain habitats, and unnatural changes to these areas could lead to mortality or decreased health.

Softshell turtles only occur at a small number of sites in Canada and, due to their habitat specialization, are highly susceptible to declines from anthropogenic factors. The absence of a functioning Springbank Dam has resulted in an increase of rare, and important, habitat features necessary for the recovery and long term viability of various species in this region. It is important to retain and secure these habitats within the natural ranges of reptiles at risk, and over the long-term. Based on the findings of our research, as well as available peer reviewed literature, and the natural history parameters employed by the species being studied, it is apparent that important habitat necessary for turtle survival would be lost if the Springbank Dam were to be put back into operation.

Upper Thames River Conservation Authority staff first initiated turtle surveys in 1994, which have since developed into an ongoing, long-term research and recovery program on reptiles at risk throughout the Upper Thames River Watershed. The Thames River within the City of London was part of these early studies, which have now spanned approximately three decades in duration. Early surveys, in the area affected by the Springbank Dam reservoir, resulted in very limited observations of reptiles at risk. Impoundments are not well-tolerated by a number of sensitive wildlife species, including many reptiles at risk, so as the habitat began to revert back to more natural conditions with the failure of the Springbank Dam, the numbers of at-risk reptile observations have increased, along with the newly available habitat.

The area impacted by Springbank Dam is known to provide habitat for a number of rare reptile species, such as the Endangered Eastern Spiny Softshell Turtle (*Apalone spinifera*), and two species of Special Concern turtles, the Northern Map Turtle (*Graptemys geographica*), and Snapping Turtle (*Chelydra serpentina*). Additional species, such as Milksnake (*Lampropeltis triangulum*), a species of Special Concern, and the Endangered Queensnake (*Regina septemvittata*) may also be influenced by current river conditions within the city.

The number of Endangered Spiny Softshell Turtle observations, as well as nests now located within the area in question, has increased since the failure of Springbank Dam in 2006. For example, 50 nests were located in 2015, 51 nests in 2016 and most recently, 54 nests were located in 2023. This represents over half of all known nests within the City of London in 2023. To put this into perspective, while the Springbank Dam was functioning, no nests were discovered due to lack of appropriate habitat (all nesting habitat was flooded out within the Springbank Reservoir).

Globally, turtles are one of the most at risk vertebrate groups; even within Ontario, all 8 native turtle species are listed as at-risk. An estimated 1000 to 2500 adult Spiny Softshell Turtles are thought to remain in Canada, all of which are limited to pockets along a small number of river and lake sites in southern Ontario, and two locations in southern Quebec. The City of London maintains a nationally significant population of Spiny Softshell Turtles, and is the second largest population known in Canada. One of the primary threats to softshell turtles is habitat loss, especially the lack of suitable Oviposition (Egg-laying) Habitat. The nesting habitat available in west London now, did not exist while Springbank Dam was in use, and would be lost if Springbank Dam were to be put back in operation. In addition to these oviposition sites, important nursery, thermoregulation, and foraging habitat has been confirmed, all of which would not be suitable, or even available, for use by Spiny Softshell Turtles with a functioning Springbank Dam.

Nesting areas that have been established since the dam has been inoperable, have taken years to reach their current successional stage; if the dam is again put into operation, these will be lost due to water level changes. Similarly, the protection of animals at nursery sites can be disrupted by unnatural water fluctuations and long-term flooding. In such cases, turtles that currently use these habitats would be killed or displaced. Since brumation (hibernation) migrations can begin in August or September, areas affected by a functioning dam will likely not be appropriate due to unnatural water levels lasting well into the fall. If turtles were to locate an area to brumate before water levels were reduced, they may not be able to survive the winter once water levels recede due to dam operations. Thermoregulation Habitat will be reduced in areas of the reservoir as water levels rise, generally impacted by overhanging vegetation or heavily used by people. Without a functioning Springbank Dam, natural scouring of the shoreline occurs each winter and spring, providing Thermoregulation, Nursery and Oviposition Habitat.

A complex mosaic of habitat types are necessary for Spiny Softshell Turtle population viability and long-term recovery. The minimum habitat requirements for survival include Brumation, Oviposition, Nursery, Foraging and Thermoregulation Habitats. Turtle migration routes that include passing through the current dam, have had since 2006 to become established and are based on current river conditions. Blocking these migration routes could result in mortality or displacement if habitat features are no longer accessible, or are lost due to increases in water depth. The absence of a functioning Springbank Dam has resulted in an increase of rare, and important habitat features for reptiles at risk. Additionally, at-risk species have adapted to and fully utilize these newly available areas, which now play a significant role in the recovery and long term viability of these species in this region.

Brief Overview of Effects of a Functioning Springbank Dam on Spiny Softshell Turtle Habitat:

Dam	Wildlife Movement	Oviposition Habitat	Nursery Habitat	Foraging Habitat	Thermoregulation Habitat	Brumation Habitat
<b>With Dam</b>	Movement is impeded during the most important time of year. Access to important habitats beyond the dam is prevented. Range expansion is restricted.	Egg laying sites are flooded before, during or after nesting season. Egg mortality occurs or females are forced to move to inappropriate, or crowded sites in order to nest. Nest failure or inability of hatchlings to reach important habitat occurs.	Shallow water habitats are flooded, mortality can occur, or turtles are forced to move to inappropriate or crowded sites. Opportunities for foraging, brumation and thermoregulation at the nursery site are lost or impeded. Unnatural water depths and temperatures.	Increased water depth and a barrier results in changes to food availability, changing sedimentation and siltation levels, thermal properties change and availability of high quality shallow-water foraging habitat decreases.	Increased water depth results in the areas with limited or no basking sites. Existing thermoregulation sites are lost. The effect of winter and spring shoreline scouring is irrelevant since water covers scoured areas when the river is dammed.	Water levels are altered significantly, and much differently than during natural water level changes, resulting in difficulty and high risk in brumation area selection. This can result in mortality of all age classes during winter.
<b>Without Dam</b>	Unimpeded movement between areas of important habitat. Seasonal migrations can occur and population can expand.	Winter and spring shoreline scouring maintains oviposition sites. Sites that have been established over time are retained and new sites may develop over time. Adjacent nursery, foraging and brumation habitat is currently available.	Can be maintained in a similar form throughout the majority of the year, allowing for appropriate opportunities to feed, bask, seek cover, survive the winter and grow. Nursery Habitat is necessary for turtle growth, survival and recovery.	Unimpeded shallow-water river habitats provide increased water clarity, natural temperature gradients and increases in food availability (ie crayfish) due to natural flow and flushing of sediments, rather than accumulation.	Winter and spring shoreline scouring maintains thermoregulation sites (reduces growth of vegetation). Thermoregulation sites that have been established over time are retained and new sites may establish over time.	Water levels and temperatures that have not been artificially manipulated provide less risk for wildlife. Brumation habitat selection can occur without threat of artificial water level changes.