

# Endangered, Iconic Jefferson Salamander

Written and photographed  
by Don Scallen



The Jefferson salamander stirs as snowmelt trickles into her subterranean realm. Bare-skinned, soft-bodied and scarcely as thick as an index finger, she crawls methodically upwards through fissures in the dolomite rock. Then, gaining the surface and finding that a protective cloak of darkness has settled over the forest, she creeps into the leaf litter.

**H**er keen olfactory sense registers the odour wafting from a particular vernal pool – “her” pond, the one where she hatched and the one she has returned to every spring for a dozen years.

At the pond she slips into the ring of open water surrounding the largely ice-covered surface. The temperature of the water is scarcely above zero, but still fully adequate for Jefferson salamander breeding. Within a few days she will mate, lay her precious eggs and then retreat back underground where she will remain for the next 11

months, until the revolving Earth again tilts the northern hemisphere towards the sun.

I’ve watched Jefferson salamanders over many springs. I find it astonishing that these small vertebrates, bereft of fur or scales, can thrive in temperatures that leave their human observers, wrapped in winter parkas, shivering pondsides. Some years they even arrive at the ponds before winter has lapsed. On March 18, 2012 I found Jefferson salamanders breeding at a pond near Terra Cotta. Freshly laid eggs were clustered along submerged branches.

These egg masses are smaller than those of the more abundant Spotted salamander. Whereas a Spotted salamander egg mass can approach the size of a closed fist and contain 200 or so eggs, a typical Jefferson egg mass is about thumb-sized, containing generally, from 10 to 60 eggs.

## Secrets Yet to Learn

The scarcity of Jefferson salamanders and the brief window of opportunity to observe them above ground, means we undoubtedly have a lot to learn about them. Jim Bogart, Professor Emeritus at the University of Guelph and the pre-eminent Jefferson salamander expert in Canada, says “One would think studying a species for over 30 years would reveal all of their secrets but I think we are still in the initial stages.”

During his decades of Jefferson salamander research Bogart focused on their perplexing genetics. What he discovered was astonishing. He found that Jefferson salamanders, along with other species of related salamanders, live alongside a fifth column of all female clones that perpetuate themselves, in Bogart’s words, by “stealing sperm from the males.”

▲ The endangered Jefferson salamander returns each spring to the forest pool where she was hatched, to lay her own eggs. Photographed in March, the beginning of the breeding season, this vernal pool is on the Niagara Escarpment near Terra Cotta.

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NIAGARA  
ESCARPMENT  
Views



▲ The Jefferson salamander was designated an endangered species in 2010.

Jefferson salamanders surface in early spring to mate and lay eggs, and then return underground for 11 months. ▼



▲ A Jefferson salamander egg mass, laid underwater, contains only from 10 to 60 eggs. Don Scallen's years of patient exploration of Escarpment wetlands have resulted in his breathtaking photography.



Along with his ground-breaking genetic research, Bogart presided over studies of Jefferson salamander habitat. One of his students, Karine Berault, looked at the critical habitat of Jefferson salamanders for her Master's thesis. This research involved inserting small transmitters into the body cavities of female salamanders. One memorable field session Berault followed a salamander that was moving far too fast. The puzzle was solved when Berault tracked the signal to a gartersnake. Berault, snake in hand, returned to Bogart's University of Guelph lab, where she awaited the inevitable reappearance of the swallowed transmitter.

Along with discovering that gartersnakes feed on Jefferson salamanders, Berault's research discovered that Jefferson salamanders could travel more than one km from their breeding ponds. This had important implications for habitat protection. Bogart says "Prior to my study, developers assumed that a 30 metre 'buffer' was all that a salamander would need around a breeding pond."

**"Gartersnake" instead of the two-word "garter snake" is the new spelling, decided a few years ago by the Canadian Amphibian and Reptile Conservation Network.**

The Jefferson salamander was designated as an endangered species in 2010 by the Committee on the Status of Endangered Wildlife in Canada. Professor Bogart explained the reasons: "This salamander has a restricted range within populated and highly modified areas. Over the past three generations, the species has disappeared from many historic locations and the remaining locations are threatened by development, loss of habitat, and potentially the presence of those sperm-stealing unisexual populations of salamanders." Jeffersons are found primarily along the Niagara Escarpment with outlying populations in

Norfolk County, York Region and a few other locales.

**Niagara Escarpment a Necessity**

The deciduous forest of the Niagara Escarpment offers the Jefferson salamander the best hope for survival. Crucial is the continuity of that forest, for it allows the salamanders to travel, maintaining the health of the species through genetic mixing.

Recently, a swath of this Niagara Escarpment forest was threatened by a quarry expansion proposed by Nelson Aggregates in the Mount Nemo area of Burlington. The humble

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Jefferson salamander became the totem animal for the opposition to this proposal.

In the fall of 2012 the “Joint Board,” a group of government agencies made up of the Ontario Ministry of Natural Resources, the Region of Halton, the City of Burlington, Conservation Halton and the Niagara Escarpment Commission, ruled against the quarry expansion. The Niagara Escarpment Plan (NEP) provided the necessary underpinning for this decision. One of the primary objectives of the NEP is the protection of “unique ecologic areas,” in this case being the habitat of the endangered Jefferson salamander.

Of course the defeat of the quarry application did more than protect the Jefferson salamander. As Professor Bogart says, “Habitat protection for one species can protect many other plant or animal species that have not been adequately studied and may exist in the same rare or unique habitats.” The Jefferson salamander became the unlikely champion of a myriad of other life forms.

I’m thankful that the Niagara Escarpment Plan saved the Jefferson salamander and its habitat in Burlington. But I wonder about the prospects of diverse natural habitats that do not have “endangered” species to rally around – or the provisions of a Niagara Escarpment Plan to protect them.

And I wonder too, about a more fundamental question. Almost every village, town and city in Ontario and, of course, the province as a whole, looks to

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**A sleepy-looking Jefferson salamander lays eggs on a submerged stick in a spring pond.**





▲ Jefferson salamanders have a grey or brown back, and may have blue flecks on the sides and limbs. There are also different species of salamanders, the more abundant Spotted salamanders, with yellow spots, and Blue-spotted salamanders.

Leaf litter helps to camouflage this Jefferson salamander. Note the blue specks on its sides and limbs. ▼

continued growth for economic salvation. That growth, of course, requires tremendous quantities of aggregate. The pressure to mine the valuable dolomite of the Niagara Escarpment, the stronghold of the Jefferson salamander, will remain intense.

This spring however, I'll try to forget this uncomfortable

truth and once again venture into the cold night to welcome the Jefferson salamanders back to the vernal pools – a mysterious and wonderful rite of spring that has likely unfolded for thousands of years - and one that can so easily be brought to an end. **NEV**

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