
CROAKS AND TRILLS

Volume 11, Issue 1



June 2006

From the Editor



The Alberta Volunteer Amphibian Monitoring Program has a new toll-free phone number!

1-877-777-FROG

If you have any questions or comments regarding the AVAMP, or require assistance in determining the coordinates of your observations, please contact Kris Kendell at: 1-877-777-FROG (toll free), or 780-422-4764 (local); or by e-mail: kris.kendell@gov.ab.ca

- or visit -

www.ab-conservation.com/frog/monitoring

--- Kris Kendell

Snakes in the grass: a study of plains garter snakes in Alberta

By Krysia Tuttle

Have you ever been out for a stroll on a hot afternoon in the prairies and heard a rustling in the grass as you walked by? What you may have heard but not seen was a garter snake darting for cover. Snakes are notorious for being tricky to find, as they are behaviorally inconspicuous, fast-moving and very well-camouflaged to their surroundings. However, if you know when and where to look, garter snakes are fairly predictable in the types of places that they reside and can often be found in grassy fields or marshes or hidden under bushes, rocks, wood piles and even under old farm buildings.

Alberta has three species of garter snakes: the red-sided garter snake (*Thamnophis sirtalis*), wandering garter snake (*Thamnophis elegans*) and plains garter snake (*Thamnophis radix*). The range of plains garter snakes extends into the southern part of our province, and I am studying a large natural population located near Miquelon Lake Provincial Park, north of Camrose.



Plains Garter Snake (Photo by Krysia Tuttle)

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Snakes in the grass *(cont'd from page 1)*

Research on garter snakes in Alberta is not as extensive as in other provinces, and this is potentially a problem for conservation and management planning for the species.

My research involves learning more about the natural history of these snakes including their population characteristics, what they are eating, what types of habitats they are using and their movement patterns between these habitats.

Findings from my study will help to expand our knowledge of garter snake ecology in general, as well as identify the types of habitats these species require for survival, so that we can protect threatened populations.

Below is some information on garter snakes, with a little taste of what I found in my first field season:

Plains garter snakes are slender bodied, medium-sized snakes (the largest one I found was over a metre long!), each with a bright orange dorsal stripe, two lateral yellow stripes and distinctive black facial markings. Like most garter snakes, they primarily eat frogs (e.g., wood and boreal chorus frogs), but they also occasionally take worms, leeches and even small mammals.

These snakes are viviparous, giving live birth to as many as 40 offspring in late summer! No parental care is given to the newborn snakes and they must find food and shelter all on their own. Many of the snakes I found had injuries or old scars, possibly indicating that they have frequent close encounters with their various predators (hawks, crows, coyotes, weasels, etc.).

When captured, these snakes rarely bite, but instead expel an odorous fluid that often discourages most predators (and people!) with a keen sense of smell. However, the faithful herpetologist learns to appreciate this fragrance as an indicator of a successful day in the field!

The typical life cycle of a garter snake in Alberta involves hibernation underground during the winter, emerging with the warm temperatures in the spring to mate, migrating to summer habitats to feed and give

birth, and returning to den sites again in the fall. In the spring and summer months, I mainly found snakes basking in the sun on grassy hillsides, in thick marsh vegetation or hidden under logs, bushes or discarded man-made objects (e.g., tires, planks of wood, garbage cans).

I also frequently found snakes on paved roadways, as they often move across roads or use them as a source of heat, after being warmed by the sun. Vehicles are very high sources of snake mortality, so when out driving on country roads, especially on warm days, please remember to watch out for snakes lying on or crossing roads!



Plains garter snake habitat at Miquelon Lake Provincial Park
(Photo by Krysia Tuttle)

Since snakes are ectothermic (i.e., cold-blooded), they must spend up to eight months hibernating in den sites (called hibernacula), protected from the harsh winter temperatures experienced in Alberta. Snakes may hibernate individually or communally in anything from large rock sinks and old mammal burrows to various types of human structures. A large part of my research is trying to determine what types of sites plains garter snakes are using to hibernate and how far they have to move between summer feeding grounds and winter den sites.

As these den sites are important to the survival of snake populations, reporting the locations of any den sites or large aggregations of snakes in your area will be very helpful to both my research and to the preservation of Alberta's reptile fauna.

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Snakes in the grass *(cont'd from page 2)*

Have fun out there on your nature walks and remember to pay close attention to any rustling in the grass—you may just see a snake!

For more information on this study please contact: Krysia Tuttle (Department of Biology, University of Victoria, Victoria BC): ktuttle@uvic.ca

Reptile observations and snake den site locations can be submitted along with your amphibian monitoring data, to Kris Kendell (Alberta Volunteer Amphibian Monitoring Program Coordinator). ❖

Amazing amphibians and remarkable reptiles!

- Most amphibians are far-sighted and some can see objects quite well at distances up to about 15 metres.
- The “kangaroos” among frogs, marsupial (pouched) frogs, have a breeding pouch on their backs in which they carry first their eggs and later their tadpoles.
- Amphibian respiration differs from that of reptiles, birds and mammals in that amphibians must inhale air through their nostrils into the mouth cavity, by lowering the floor (or fundus) of their mouth. They then press this air into their lungs through swallowing motions, while keeping their nostrils and mouth firmly shut.
- In 1977, John B. Phillips provided evidence that some amphibian species can utilize the Earth's magnetic field for orientation.
- Many amphibians have the ability to change the colour of their skin. Ambient temperature, humidity and light can all contribute to colour change. However, diet, mood, season and general health can also play an important role.
- Common names for North American reptiles and amphibians (north of Mexico) were first standardized in 1956.
- A frog's eyeballs do more than just provide sight... they also can be lowered into the roof of the mouth to help the frog swallow large articles of food. ❖

Alberta Volunteer Amphibian Monitoring Program: 2005 results

In total, 34 individuals and families contributed 294 amphibian observations and four reptile observations in 2005. Of these 294 amphibian observations, eight records were of observations made in 2004 (submitted with 2005 data).

Records for nine of the 10 species of amphibians found in Alberta were submitted in 2005-06 (including the eight records from 2004); in addition, one species snake was observed (Table 1). Great Plains toads were not observed by volunteers in 2005.

Table 1: Number of observations submitted by volunteers in 2005 for each species of amphibian and reptile.

Species Observed	Number of Observations
Boreal Chorus Frog	109
Wood Frog	102
Columbia Spotted Frog	15
Northern Leopard Frog	2
Plains Spadefoot	2
Boreal Toad	17
Canadian Toad	22
Long-toed Salamander	10
Tiger Salamander	7
Red-sided Garter Snake	4

Data collected in 2004 (submitted in 2005-06) included three amphibian species: boreal chorus frog (n=4), Canadian toad (n=3) and wood frog (n=1).

All amphibian data collected and submitted by volunteers in 2005-06 have been entered into the Fish and Wildlife Management Information System (FWMIS) database. FWMIS is a database maintained by Alberta Fish and Wildlife Division and used to store observational data on wildlife species within Alberta. ❖

Monitoring can occur throughout the spring, summer and early fall for various age classes of amphibians.

Have fun monitoring amphibians in 2006!

Virus-induced mass mortality in a population of tiger salamanders in southwest Alberta

By Cam Goater

Viral diseases are recognized as one of the causes of declines in amphibian populations. A summary study of 60 known amphibian mass mortalities in the United States between 1996 and 2001 indicated that 50% were caused by virus-induced outbreaks. For tiger salamanders, two strains of *Ranavirus* were shown to cause mass mortalities in populations in Arizona and Saskatchewan.

Although *Ranavirus* has been suspected to cause mass mortalities in populations of tiger salamanders in Alberta for some time, a confirmed diagnosis came in the summer of 2005 from dead and dying salamanders collected from a population in a small foothills lake near Crowsnest Pass in southwest Alberta.



Livingston Lake was the site of a mass mortality of tiger salamanders (Photo by Dr. Cam Goater)

This was the second mass mortality in the lake. In July 2003 the landowner reported thousands of dead larval and recently metamorphosed salamanders along the shoreline of the small lake. The landowner had not observed salamander mortality in previous years.

The mortality received interest among local landowners when a large adult female grizzly bear and two cubs were observed feeding on salamander corpses. In 2005, the landowner detected another mass mortality involving hundreds of larvae. Samples were collected of dead and dying larvae and they were sent to the Wildlife Disease Diagnostics Laboratory in Regina for molecular and histological analyses.

Ranavirus was isolated from all individuals and each host showed the characteristic signs of fatal infection including hemorrhagic lesions of internal organs, skin sloughing and skin ulceration.



Tiger salamander larvae infected with *Ranavirus*
(Photo by Dr. Jesse Brunner)

Ranavirus is one of four genera within the Iridoviridae family of viruses. Members of this group are poorly studied, primarily because as little as 10 years ago they were considered non-pathogenic. But disease outbreaks in widely scattered amphibian populations and in recreationally important fish have changed that view. The *Ranaviruses* are now considered under the “emerging infectious disease” umbrella and as such are a concern to amphibian biologists and conservation biologists.

The emergence of *Ranavirus* in this particular lake is of special concern. Results from studies in the western United States indicate that *Ranavirus*-induced die-offs are associated with disturbed and degraded wetlands. This small lake on private land is relatively pristine.

As is true for many emerging diseases, important details regarding transmission biology are unknown. We do not understand how *Ranavirus* is transmitted between hosts, nor do we know whether transmission involves resistant resting stages. Information on species range is also poor. This is an important concern in southwest Alberta, where tiger salamanders are often sympatric with chorus frogs and long-toed salamanders.

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Virus-induced mass mortality (cont'd from page 4)

We also do not know fully the host responses to infection, nor do we know the extent to which survivors act as carriers within populations and as sources of infection to adjacent, naïve populations. We also do not know the factors that trigger sub-lethal infections to shift to the pathogenic (disease-causing) stage.

In populations of tiger salamanders in southern Alberta, we also do not know the role of non-metamorphosing neotenic larvae in virus transmission.



Neotenic tiger salamander larva (Sketch by Brian Huffman)

It is clear that we have many more questions than answers. The key problem, as is true for many emerging infectious diseases, is whether the answers will come soon enough to reverse the disease's catastrophic impact on host populations.

For more information on this study please contact: Dr. Cam Goater (Department of Biological Sciences, University of Lethbridge, Lethbridge, AB): cam.goater@uleth.ca ❖

Alberta's northern leopard frog recovery program

By Kris Kendell and Dr. Dave Prescott

For many Albertans, the northern leopard frog is quite possibly the most familiar of Alberta's amphibian species. Historically, the leopard frog was a common and frequently encountered frog throughout much of its expansive North American range. Its familiarity

was further increased through its former wide use in biology classrooms for teaching purposes. More recently, the leopard frog's fame has also been accredited to its imperilled status in many jurisdictions, including Alberta, where the species has suffered dramatic declines.



Northern leopard frog (Photo by Kris Kendell)

Since 1991 the leopard frog has been considered to be an "At Risk" species in Alberta and was listed as *Threatened* under Alberta's *Wildlife Act* in 1996.

In February 2004, the Minister of Sustainable Resource Development (SRD) reaffirmed the listing of the leopard frog in Alberta, and formally initiated recovery efforts in the province.

The formation of the Alberta Northern Leopard Frog Recovery Team followed shortly thereafter, and the *Alberta Northern Leopard Frog Recovery Plan 2005-2010* was approved for implementation in late 2005.

The plan aims to restore viable populations of leopard frogs throughout their historical range in Alberta through habitat management, information and education, research and reintroduction of populations into vacant areas of the species' range.

In 2005, a detailed population survey was undertaken to document the distribution and size of the current leopard frog population in Alberta. Additional information on habitat threats and conditions were also collected at occupied and unoccupied sites to set the stage for a number of management (stewardship, reintroductions, etc.) and research (completion of a habitat suitability model) activities listed in the recovery plan.

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Leopard frog recovery program *(cont'd from page 5)*

In 2005, leopard frogs of at least one life-history stage (adults, juveniles, tadpoles and/or eggs) were found at 76 sites in the province and three new leopard frog sites were discovered. Survey results in 2005 also indicated that leopard frog populations remain small and fragmented in the province, and in some areas remain vulnerable to further declines.

Other research undertaken in 2005 included the collection of tissue samples from select major leopard frog populations to support an ongoing research project involving the investigation of the genetic diversity of leopard frogs in Alberta. This project was initiated in 2004 by the Alberta Conservation Association (ACA) and Alberta Fish and Wildlife Division (AFWD) with the planned analysis of the samples to be completed in partnership with University of Alberta. It is hoped that the outcome of this study will help determine the genetic variation in leopard frog populations in Alberta and help guide future recovery efforts.



A researcher collects a DNA sample from a northern leopard frog (photo by Kris Kendell)

Biologists leading the recovery of the leopard frog in Alberta hope that the public can help contribute information on the location of leopard frog populations in the province to assist with the conservation of this species.

For more information on the leopard frog recovery program, or to report a leopard frog sighting, please contact: Kris Kendell (Alberta Conservation Association): 780-422-4764 (local); 1-877-777-FROG (toll-free); e-mail: leopard.frog@gov.ab.ca; or visit: www.ab-conservation.com/leopard/frog ❖

Website of interest

<http://www.arkive.org/> ARKive is the Noah's Ark for the Internet era—a unique global initiative, gathering together into one centralised digital library, films, photographs and audio recordings of the world's species currently threatened with extinction. A large contingent of amphibians and reptiles are featured on this web site. This web site can be considered a key resource for scientists, conservationists, educators and the general public. ❖

CROAKS AND TRILLS is the official information newsletter of the Alberta Volunteer Amphibian Monitoring Program, a program delivered by the Alberta Conservation Association.

For more information on:

- the Alberta Volunteer Amphibian Monitoring Program
- amphibians and reptiles of Alberta
- how to submit monitoring data, or other amphibian and reptile observations

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