

THE FORKED TONGUE

THE MONTHLY NEWSLETTER OF THE GREATER CINCINNATI HERPETOLOGICAL SOCIETY

Vol. XXXI, No. VI

www.cincyherps.com

June 2006

The Editor's Den

The June Forked Tongue includes features an article Leopard Frog Recovery Efforts in Canada.

Calendar of Events

10/04/06, Monthly meeting featuring Glen Schulte speaking on Herps of Costa Rica.

11/01/06, Monthly meeting featuring Kristen Stanford speaking on conservation efforts of two Ohio species, the Eastern Fox Snake and Lake Erie Water Snake.

Northern Leopard Frog Recovery Program

Kendell, K. 2004. Northern leopard frog recovery program: Year 5 (2003). Unpublished report, Alberta Conservation Association, Edmonton, AB.

Once a common and widespread species throughout much of Canada, the northern leopard frog (*Rana pipiens*) has declined or vanished from much of the western portion of its range (Roberts 1987, Seburn and Seburn 1998). In Alberta, the decline resulted in a significant range contraction and reduction in population numbers leaving the leopard frog absent from much of its northern and western range (Roberts 1981). The northern leopard frog has been considered to be an "At Risk" species in Alberta since 1991. It was designated as "Threatened" under Alberta's *Wildlife Act* in 1996. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) lists the prairie population of the northern leopard frog as "Special Concern" (COSEWIC 2002).

The leopard frog has demonstrated little ability to naturally disperse back into the broader parts of its historic range because of large tracts of unsuitable habitat between existing populations.

As a result, the re-establishment of leopard frogs into these former areas will be dependent on transplanting individuals from existing populations in southern Alberta. (Cottonwood Consultants 1986, Roberts 1987, Wershler 1991, Wagner 1997).

In 1998, the Alberta Fish and Wildlife Division began to explore the feasibility of reintroducing leopard frogs into formerly occupied habitats (Fisher 1999). With the information gathered, Alberta Fish and Wildlife

Division and the Alberta Conservation Association initiated a reintroduction project at the Raven Brood Trout Station near Caroline, Alberta, that has been carried out since 1999.

The 2003 study area for the leopard frog project included egg mass collection locations in southern Alberta (near Bow City) and frog release sites in the upper headwaters of the Red Deer and the North Saskatchewan Rivers.

Two large outdoor ponds at the Raven Brood Trout Station were used to rear leopard frogs from egg stage of development to young of the year frogs. The Raven Brood Trout Station is an Alberta Sustainable Resource Development owned and operated facility. As in previous years, the outdoor ponds (hereafter referred to as east and west rearing pond) at the facility offered managed access and the means to confine captive-reared juvenile leopard frogs prior to being released into the wild.

In 2003, four leopard frog egg masses were collected from four different ponds in southern Alberta. All ponds were in the vicinity of Bow City. More specifically, one pond was located at Circle E Ranch (Ducks Unlimited managed property); another egg collection site was located on private land along the Bow River. The remaining two ponds were near the Bow City recreation area. The four egg masses were transported individually, in 2-liter thermos', to the Raven Brood Trout Station. Each egg mass was then placed separately into a floating egg mass predator enclosure, in the east and west rearing ponds. Once the eggs hatched, the hatchling tadpoles were confined to the enclosures until they were free swimming and were then disproportionately released between the two ponds. During the captive rearing process the water levels and potential predator threats were carefully monitored and managed when needed. Metamorphosed frogs were collected soon after the first completely transformed frogs were observed on the shore of the rearing ponds in noticeable numbers. Nets and funnel traps were used to capture the frogs. Each funnel trap contained a lynch of water so that the frogs would not desiccate and the traps were left unchecked for no more than a 24-hour

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period. For a complete description of the funnel traps used in 2003, see Kendell (2001).

At the end of August, water levels in the rearing ponds were reduced to allow personnel to more easily capture the remaining leopard frogs. The weight and snout-to-vent length (SVL) of every tenth frog captured for release into the wild was measured and recorded. While handling frogs during the marking stage, physical abnormalities such as missing limbs and wounds were generally noted.

Captive-reared leopard frogs were marked using a Visible Implant Elastomer (VIE) tagging system (Northwest Marine Technology, Inc. 2003). The tagging system provided an externally visible internal identification mark. The mark consisted of a fluorescent elastomer agent, that when mixed with a curing agent, cured into a pliable solid within 24 hours. Using a 3/10 hypodermic syringe, this biocompatible agent was injected into the webbing between the fourth and fifth toe of the rear foot of each young frog. To reduce the activity level of the young frogs during the marking process, they were occasionally subjected to chilled (4-6°C) spring water. In 2003, all frogs were marked with purple elastomer. Captive reared frogs were transported to release sites using 70-litre tote bins. Frogs were released directly into suitable potential breeding habitat at their respective release site.

Leopard frog surveys began in mid May 2003 for potential surviving leopard frogs at all three sites. Early spring surveys focused on favourable leopard frog breeding habitat and for evidence of breeding (i.e., egg masses). Surveys continued through June, July and August at all three sites.

To date nearly 12,000 captive-reared leopard frogs have been released into designated release sites near Caroline, Rocky Mountain House and Red Deer, Alberta. Confirmed leopard frog observations and evidence of breeding activity indicate preliminary success of the project at the initial release site near Caroline, Alberta (Kendell 2003).

In total, 7,380 tadpoles were counted from the four egg masses collected in 2003. The overall productivity (percent of tadpoles that survived to metamorphosis) in the two rearing ponds in 2003 was slightly higher than the previous year (Table 1). Of the 7,380 living tadpoles introduced into the two ponds, 2,491 metamorphs were captured, marked and released, representing a survival rate of approximately 34%. The release of frogs commenced on 8 August with frogs collected shortly after complete metamorphosis. Ninety-two percent of the frogs reared in 2003 were

collected and released at designated sites by 14 August. The remaining captive reared frogs were collected and released by 26 August. All 2,491 frogs reared in 2003 were distributed and released at the three predetermined release sites: Raven River (n=1,196), North Saskatchewan River (n=795) and Ducks Unlimited Hummer Property (n=500).

Two female leopard frogs released in 2000 (marked with orange and green elastomer on frogs' left hind foot) were captured. The first frog was captured on 18 June and the second frog was captured on 8 August. Both frogs were observed and captured within the rearing ponds at the Raven Brood Trout Station. Each frog was subsequently released into a nearby pond upon capture.

Three unconfirmed sightings of leopard frogs were recorded in 2003 – all associated with the Caroline release site. In one incident, the observers failed to get a visual sighting on the frog, but based on distance covered as the frog leaped into the water and the size of splash, all observers were confident it was a leopard frog. Two separate local landowners reported observing leopard frogs on their property upstream from the Raven Brood Trout Station, along the Beaver Creek. Surveys along Beaver Creek, further upstream from the station, were undertaken in 2003-04 but no leopard frogs were observed.

Over the last 40 years, northern leopard frog populations have declined dramatically over much of the species' range in North America. In Alberta, these declines were accompanied by changes in distribution. Since 1990, considerable effort has been expended trying to locate leopard frogs in Alberta. The results of a recent inventory for the species in 2000-01 indicated that the leopard frog occurs in abundance at only a few isolated and fragmented sites, primarily along the lower reaches of a few major drainages in southern Alberta (Kendell 2002c). Little studied, the status of leopard frog populations in extreme north-eastern Alberta is largely unknown.

The northern leopard frog has been considered to be an "At Risk" species in Alberta since 1991.

It was formally designated as "Threatened" under Alberta's *Wildlife Act* in 1997. Recent reevaluation/recommendation of the Endangered Species Conservation Committee (ESCC), as "Threatened", has been sent to the Minister of Alberta Sustainable Resource Development.

Initiation of formal recovery planning will begin in 2004-05 with the formation of a Provincial Recovery Team.

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A critical review of the core program activities and areas is currently underway by the program coordinator and should be further addressed in 2004-05 by a newly formed leopard frog Recovery Team. Under this review, new partnerships and funding sources will be explored, and program components will be studied, expanded or modified where needed to increase the scientific basis of the program and its effectiveness. The author recommends that the Recovery Team address emerging genetic questions and concerns of leopard frog populations in the province, undertake an evaluation of the current reintroduction program, and incorporate stewardship activities to ensure existing populations remain viable. These approved and endorsed objectives should include the release of captive reared leopard frogs at designated release sites. Release stock would be obtained from leopard frog egg masses collected from source populations and reared through metamorphosis at the Raven Brood Trout Station. However, release stock could also be obtained in other ways, such as through a leopard frog captive breeding program at the Calgary Zoo or possibly through individuals transplanted from secure populations in other jurisdictions.

To date, approximately 12,000 captive-reared leopard frogs have been released at the three selected release sites in the Red Deer and upper North Saskatchewan River drainage. The observation of at least 24 leopard frogs, one egg mass and breeding activity (calling), between 2000 and 2003, indicate preliminary success at the Raven River release site near Caroline. The reintroduction of the leopard frog into its historic range has helped reduce its restricted breeding distribution and sensitivity to environmental changes and stressors that may affect localized populations. Today, remaining leopard frog populations primarily occur in southern portions of the province, of which many are isolated and vulnerable to disturbance, disease and natural disasters. The long-term benefits of the program include increased biodiversity at release sites, the creation of a more stable and widespread leopard frog distribution in Alberta, and the contribution of knowledge to other biologists in other jurisdictions undertaking conservation oriented amphibian reintroduction programs.

Other objectives should involve better understanding the genetic variation in leopard frog populations throughout Alberta to address whether or not populations within Alberta are genetically distinct based on geographical location. Data collected would help the Recovery Team better understand the genetic

diversity of populations, assist in the selection of source populations to draw stock for captive rearing and in the determination of release sites.

The Provincial Recovery Team should address the genetic diversity of leopard frogs in Alberta. Concerns have been raised that gene flow between genetically distant populations, such as those at the interior of a species' range and those on the periphery, would actually increase the probability of extinction in augmented populations. Important considerations must be given to the genetic makeup of reintroduced individuals to guard against offspring being maladapted to the local environment.

Through a newly formed Provincial Recovery Team, it is also recommended that a broad landscape stewardship approach be delivered to ensure that land use practices maintain or improve habitat that is critical to the survival of the leopard frog.

Although little studied, the decline of the leopard frog in Alberta does not appear to be part of a regular cycle (Wagner 1997). Habitat loss is believed to be one of the causes of northern leopard frog decline in several northwestern states (Koch et al. 1994) and in some areas of Alberta populations have undoubtedly been affected by it as well. Leopard frogs rely on the juxtaposition of a variety of habitat types to meet their annual life history requirements. For example, the leopard frog requires three distinct habitat types: a breeding pond, upland foraging habitat and a suitable over-wintering water body. This dependency for a mosaic of habitat types makes the leopard frog particularly vulnerable to the alteration, fragmentation or loss of key habitat. Within the core of the leopard frog's current range, habitat degradation and loss can be the result of mismanaged livestock grazing. Livestock are considered to be a significant threat to frog populations in southern Alberta (Wagner 1997). Water management practices have also been identified as a possible limiting factor for leopard frogs in Alberta by reducing wetland vegetation and/or water levels affecting both the quality and availability of cover vegetation and breeding and over-wintering habitat (Wagner 1997).

The author recommends that the Recovery Team undertake an assessment of habitat at extant leopard frog sites to help to ensure that land use practices that support populations are encouraged, thus maintaining or improving habitat that is critical to the survival of the leopard frog. This assessment of habitat could be carried out at known major leopard frog sites identified in the 2000-2001 leopard frog inventory (Kendell 2002c). Efforts should also be taken to sample sites

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located in northeastern Alberta. Selected leopard frog sites in the South Saskatchewan and Milk River drainage basins should be investigated.

Habitat, landscape features as well as potential threats to the sites should be identified and recorded at each occupied site investigated. This information would be used to determine if habitat “improvements” are necessary or required at those sites: e.g., mitigation, restoration, land management improvements, fencing, controlled grazing, etc. Many of these mentioned habitat improvement initiatives could be integrated with existing stewardship programs such as the Nature Conservancy of Canada and North American Waterfowl Management Plan.

Data collected at sites investigated could also be used to create a model to identify criteria to separate high-quality reintroduction habitat from similar habitat of lesser value to leopard frogs.

Under this scenario, within the South Saskatchewan and Milk River drainages, sites should be selected amongst the four sub-basins: Bow River, South Saskatchewan River, Oldman River and Milk River. A number of confirmed historical leopard frog sites should also be investigated within the mentioned sub-basins for comparison of habitat with the occupied sites.

Ultimately, this information may improve the selection process for release sites with regards to the established provincial leopard frog reintroduction program, supporting the recovery of the species. Also, any potential habitat improvements could benefit a variety of species that share this ever-diminishing quality upland and riparian habitat in southern Alberta.

Finally, in 2003, the Alberta Conservation Association expanded their partnership with the Calgary Zoo to include a scientific research project, which may have future management implications on the reintroduction program. This expanded partnership was in addition to the in kind volunteer support the zoo historically provided from the involvement of its staff and volunteers during the marking and releasing of captive reared frogs at the Raven Brood Trout Station.

During the 2003 field season, in consultation with the Alberta Conservation Association, the Calgary Zoo initiated a study which involved the following objectives: (1) to determine the density of northern leopard frogs in the study area after release (2) to determine the habitat selection and relative abundance of northern leopard frogs post-release, (3) to determine post-release movement rates and the effect of frog size and weight on dispersal distance, (4) to determine the exposure of northern leopard frogs to potential

naturally occurring chytrid fungus before release, one month after release and one year after release. To facilitate work completed in 2003, an optimal pitfall trap design (i.e., depth and width) to capture leopard frogs was researched and tested. Ten drift fencing arrays in a Y-design (each with a 5 m long arm) were set-up at random locations throughout the Raven Brood Trout Station quarter section. Three straight-line fences (each 10 m long) were also set up within the study area along major water bodies. In total, 49 pitfall traps were in operation between 12 August and 26 September, and were located in various habitat types. Samples to be tested for chytrid fungus were taken from approximately 50 leopard frogs (pre-release) and a number of wood frogs naturally occurring in the study area. Samples have not yet been analyzed. In addition to a small number of leopard frogs released that season (~8), wood frogs and boreal toads were also captured in the traps. Finally, a transect survey was conducted every afternoon along a major drainage in the study area. This survey effort was in addition to the formal and informal surveys conducted by ACA staff, mentioned above.

Since 2000, the author has recommended that the idea of a leopard frog captive-breeding program, involving the Calgary Zoo, be investigated. The primary goal of such a program would be to maintain a genetically viable breeding population of leopard frogs over the long-term and that could be used to produce leopard frogs for the purpose of reintroduction. A number of areas of research would arise from such a program at the Calgary Zoo and could include: hibernation (what role air and water temperature, photoperiod and other water quality conditions have on hibernation), reproduction (how weight loss and water quality conditions during hibernation and weight gain prior to hibernation affect reproductive success) and the evaluation and role genetics play on the survival rate during hibernation and reproductive success. Existing education and outreach programs at the Calgary Zoo would also help raise public awareness of the leopard frog.

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GCHS Members may run a free classified ad of 7 lines or less at no charge for an unlimited time; however, the ad will be canceled after one month unless the editor is informed to continue it. Please include scientific names for the animals with your ad as well as your phone number and area code. Ads of up to 7 lines for non-member are \$2 per issue; ad charges for items more than 7 lines long are as follows:

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1/4 page	\$6 per issue
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Requirements for Submitting Articles to the Forked Tongue

Articles can be submitted via 3.5" floppy disk or hard copy to Editor, GCHS 11470 Gatch Hill Road, Aurora, IN 47001.

Articles may be e-mailed to Grady Calhoun at gradycalhoun@earthlink.net.

Black and white photographs can be included with articles. Photo submissions should include your name, phone number, and description of photo on the back. Photos can be returned.

All time dependent submissions must be in the editor's possession no later than the meeting previous to the publication.

Classifieds

Rats and Mice for sale. Reasonable price. Call Jesse or Tom (513) 876-0579.

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(Number to left of decimal indicates males; number to right of decimal indicates females; number to right of second decimal indicates number of unknown sex. For example, 3.2.1=3 males, 2 females, and 1 unsexed specimen)

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About the GCHS

The Greater Cincinnati Herpetological Society holds monthly meetings which typically consist of a short business section, a refreshment intermission, and a program related to herpetology. Both members and nonmembers are invited to attend. Membership is open to anyone with an interest in reptiles and amphibians. New members may sign up by mail or at the monthly meetings. Members receive monthly issues of *The Forked Tongue* and free classified advertising. Annual dues should be directed to the secretary at the society's mailing address, according to the rates below:

Student	\$10.00	Corresponding	
	\$10.00		
Individual	\$15.00	Sustaining	\$25.00
Family	\$20.00	Institutional	\$30.00
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- Meet individuals knowledgeable about herpetoculture
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- Receive a 10 percent discount on herp-related items and services when you show a valid membership card at the following establishments:

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