

WINTER NORTHERN LEOPARD FROGS AT CYPRESS HILLS INTER- PROVINCIAL PARK

SUSAN M. MCADAM, Saskatchewan Environment and Resource Management, 350 Cheadle Street West, Swift Current, SK S9H 4G3 and MELODY NAGEL-HISEY, Saskatchewan Environment and Resource Management, Cypress Hills InterProvincial Park, Box 850, Maple Creek, SK S0N 1N0

On December 30, 1997 the authors were participating in the Cypress Hills, Centre Block, Christmas Bird and Mammal Count. At about 1p.m. we were walking the Highland Trail to see what birds and mammals we could add to the list. On the west side of the trail loop around Lone Pine Creek, we found spring fed, open water beneath, and east of a footbridge.

The spring was nearly dry in late summer, but it began to run again late in the fall. The open water was now deep and extended about 3 m. east where ice and snow covered the surface of the beaver dammed creek. The substrate was muddy with abundant cobblestone.

We noticed several motionless Northern Leopard Frogs (*Rana pipiens*) lying spread eagle on their backs at the bottom. On closer examination we found a total of ten seemingly dead and four live Northern Leopard Frogs. The live frogs appeared to be in individual overwintering pits such as those reported by Preston ; they had their legs tucked up and were facing into the mud³.

The live frogs moved only when touched, at which their hind limbs kicked, causing them to move further into the mud. The frogs we thought dead were not touched. No other frog species were seen, however, Brook Sticklebacks (*Culaea inconstans*),



Leopard Frog

Olaf Christian Jensen

Waterboatmen (*Corixidae*), and Backswimmers (*Notonectidae*) were moving about rather slowly in the water. Melody visited the site on January 5th and 6th, and found the live frogs had worked their way deeper into the mud. The frogs we found were not frozen but were cold enough that mobility was almost nonexistent.

On January 15th Melody made another trip to the spring and was surprised to find six Northern Leopard Frogs lying on their backs, some with their tongues

partly out and eight frogs in the tucked up posture. When one of the spread-eagled frogs was touched, it moved.

Melody collected two of the spread eagled frogs with closed mouths and put them on snow in the refrigerator to warm up a bit. One of the frogs became somewhat active, recovering the tucked up posture and moving its limbs. The other frog appeared dead, its eyes clouded and no movement was observed. These frogs were kept in a chilled condition so they could be returned to the capture site. On January 16th Jerome Schommer and Susan visited the site to return the refrigerated frogs, take photographs, and collect a frog with its mouth open and its tongue out to see if it would recover. This collected frog did not recover and we suspected it was dead.

The area of open water had expanded to about 3 m by 7 m. A total of 14 frogs were seen excluding the two returned from captivity. Six of the Northern Leopard Frogs were in the belly up, spread eagle posture, and eight were belly down, either tucked up or spread out. Three frogs were almost entirely buried in the stones. One had only its hind legs exposed, one had one hind leg exposed, and one had its head partly exposed. A couple of frogs were seen swimming slowly for about a metre.

Northern Leopard Frogs are poikilothermic ectotherms which means their body temperature changes with their environment and they obtain body heat from their environment. These animals become less able to carry out metabolic activities as temperatures drop below the optimal temperatures of 30°-40°C. Enzymatic activity is low enough when temperatures fall below 5°C that frogs stop eating. During winter, activity is frequently reduced to the point of dormancy⁴.

Some species such as Wood Frogs (*Rana sylvatica*) are able to supercool their blood to prevent ice crystal formation, or to survive freezing for up to several weeks by using carbohydrates which reduce the freezing point of cells while allowing extracellular fluids to freeze⁴. Cook states that Northern Leopard Frog bodies may often be found lying on their backs on the bottom after attempting to overwinter in water with insufficient dissolved oxygen concentrations for their survival¹. William Preston found that frozen frogs, which appear dead, have recovered upon thawing (pers. comm.).

Dr. Diane Secoy (pers. comm.) said she has seen frogs moving beneath ice. Dr. William Preston (pers. comm.) thought movement under ice was possibly to circulate water or to shake silt off their bodies for improved oxygen exchange across the skin. It is possible the frogs we saw came from sites beneath the ice to the spring fed water where oxygen levels may have been higher.

This note was written because of growing interest in amphibians and the Northern Leopard Frog in particular. Northern Leopard Frogs have experienced a serious decline in abundance and distribution since 1978^{2,4}. However, in the Centre Block, populations have recovered somewhat in recent years. In the last two years, Rick Goett, Park Program Manager, reported seeing more Northern Leopard Frogs than in previous years.

The weather may have been a factor in this phenomenon. Early winter snow accumulations were below average but temperatures were near normal. Most of the 15 cm snow cover fell on December 29th. Air temperatures on January 30 ranged from +1.5°C to -0.5°C at the usual 4:30p.m. temperature recording

time on the count day. January 5 temperatures ranged from -2.5°C to -11°C . January 6 temperatures ranged from -0.5°C to -3.0°C . January 15 temperatures ranged from $+3.5^{\circ}\text{C}$ to -13.0°C . On January 16th air temperatures ranged from -1.0°C to -12.0°C with 2 mm of snow fall.

Acknowledgements

Information received from Rick Goett, Wayne Harris, Larry Helmerson, William Preston, and Diane Secoy were appreciated. Field assistance was provided by Jerome Schommer, Cypress Hills Conservation Officer.

Literature Cited

1. COOK, F.R. 1984. Introduction to Canadian Amphibians and Reptiles. National Museums of Canada. Ottawa. 200p.

2. POWELL, G.L. AND A.P. RUSSELL. 1996. Alberta's Amphibians and Reptiles: Current Research and Conservation Issues. 253-256p. In W.D. Willms and J.F. Dormar, eds. Proc. Of the 4th Prairie Conservation and Endangered Species Workshop. Prov. Museum Of Alberta Natural History Occas. Paper No. 23. 337p.

3. PRESTON, W.B. 1982. The Amphibians and Reptiles of Manitoba. Manitoba Museum of Man and Nature. Winnipeg. 128p.

4. RUSSELL, A.P. AND A.M. BAUER. 1993. The Amphibians and Reptiles of Alberta. University of Calgary and University of Alberta Presses. 264p.



American Bittern

Ron Jensen