

Conservation Corner

The Leopard Frog and the Fungus

By Niki Wilson



Leopard frogs, once widely distributed throughout the province, are now a threatened species in Alberta. In the late 1970s and early 1980s their populations declined dramatically, and have never fully recovered. Their survival has been threatened by many challenges; habitat loss, road mortality, water quality issues, and a changing climate. Though some of these factors can be clearly linked to aspects of their decline, the mysterious role played by a devastating fungus is still being unraveled.

That fungus is *Batrachochytrium dendrobatidis* (*Bd*), or Chytrid fungus, and it's a crafty killer. It attacks the protein keratin that toughens amphibian skin and helps regulate hydration in their bodies. In addition, it has nasty and varied effects on different life stages—in tadpoles it disrupts the formation of their mouths, affecting their ability to eat. In juveniles and adults, it is thought to interfere with the growth of cells, and to disrupt the process of eliminating waste from the body.

The global spread of Chytrid has been,

for many species, catastrophic. Some studies document over 200 species extinctions across six continents. But did the fungus have a role to play in the sharp decline of Alberta's northern leopard frogs?

"Something wiped out leopard frogs thirty years ago," says Alberta Environment and Sustainable Resource Biologist Dave Prescott. Though Prescott says there is no concrete evidence linking Chytrid fungus to the decline, it's possible the disease was the culprit.

"That's always been my thinking as to what happened in Alberta, because there's really been no other explanation as to why they disappeared," says Prescott. Though other threats were actively affecting some populations, those factors were not universally present in all leopard frog communities.

"It wasn't habitat loss, it wasn't sun spots, it wasn't UV rays, and it wasn't herbicides, because [leopard frogs] disappeared from a lot of areas that weren't agricultural. Something we couldn't see went through the population and wiped out a very big percentage of it in a very small amount of time. To me, that sounds like a disease."

If Chytrid was the main player in the population declines at the time, then it's interesting to note that most Alberta leopard frogs are now resistant to infection. In a 2012 survey conducted by Prescott, colleague Scott Stevens and Doug Whiteside from the University of Calgary, the fungus was found on numerous seemingly healthy leopard frogs, among other amphibians.

"What we found, is that Chytrid was



How many of these frogs are northern leopard frogs? They all are: two are burnsi morphs, one is a green morph, and one is a brown morph. PHOTO: BY LOBA WOLF (OWN WORK) [CC BY-SA 3.0 ([HTTP://CREATIVECOMMONS.ORG/LICENSES/BY-SA/3.0](http://creativecommons.org/licenses/by-sa/3.0/))], VIA WIKIMEDIA COMMONS

far more prevalent in the province than we suspected,” says Whiteside. “Approximately 44 percent of sites we tested were positive for Chytrid, but the interesting thing was that we weren’t seeing a lot of mortality with it.”

That makes sense, says Whiteside, adding that studies on northern leopard frogs have revealed peptides on their skin that function as antifungals. “[Chytrid] doesn’t seem to affect them as much as other species in the world that don’t have as many of these peptides.”

Prescott says this pattern of population devastation and recovery with resistant individuals is often seen in wildlife disease. The hope is that eventually populations will recover to previous numbers, though this is not the case with the northern leopard frog in Alberta. Numbers are

low, though seemingly stable for the time being.

“While resistance to Chytrid is good news, we still have to be vigilant,” says Prescott, explaining that biologists are just beginning to understand how Chytrid behaves when compounded by other stressors. For example, says Prescott, a frog carrying the fungus may not succumb to the infection, but if the climate is changing, or there are pesticides in the water, Chytrid may exacerbate their effects, making the frog more susceptible.

Prescott points to a study in which frogs exposed early in their lives to the herbicide atrazine had a higher death rate, but only when infected with Chytrid. “Frogs that didn’t have Chytrid in the first place were fine.”

Biologists are working to understand the

history of Chytrid fungus in Alberta. It may have arrived here some thirty years ago, or it may have always been here. “I wouldn’t be surprised if it was in the province longer than we think,” says Whiteside.

Regardless, the behaviour of Chytrid in amphibian populations will likely evolve as the environment changes around the frogs, toads and salamanders that call Alberta home. While Chytrid is definitely a piece of the puzzle, Prescott says biologists still don’t know where it ranks in terms of threats to Alberta’s amphibians.

“It’s one of many threats we have to be aware of.” 🐸

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In Memoriam - Chris Havard,

June 12, 1944 - September 18, 2015

A few weeks ago our dear friend Christina Jean Ibbotson Havard passed away after years of struggle with cancer. In June she and her lifelong friend Vivian Pharis gave an inspiring account of what it meant to them to have the chance to learn about our mountain wilderness. The Hostelling Association was their gateway into the world of hiking, camping, and skiing; it also was the gateway to many enduring friendships. Many of those friends, like Chris, became lifetime members of AWA. Chris and her husband Ken have been strong supporters of AWA and their gifts covered a significant portion of the purchase price for the Hillhurst Cottage School. Pictured here during AWA’s 50th anniversary on June 25, 2015, Chris was vibrant, inspiring, and passionate on that day. In the days that followed Chris and Ken spent time in Manyberries, Cypress Hills, Brooks, and other prairie spots, enjoying the birds and reliving memories from days long gone. Chris was Ken’s soul mate, mother to Jennifer and Noel, and grandmother to Kieran, Ryan, Benjamin, and Eric. Chris, a very giving soul who loved nature, was perhaps above all a person who cared so deeply for the values and people she loved. She believed in the work of AWA; she knew her help would make a difference in our day-to-day ability to pursue our shared vision for wild lands and wildlife throughout Alberta. AWA is honoured and grateful to her family as they have asked friends and family to remember Chris with a memorial donation to AWA. Chris is dearly missed. In the days since her memorial service, she has been in our thoughts with warm memories of a kind and gentle woman who believed passionately in what we do.