Amphibians on my Land

Habitat Stewardship in Agricultural Landscapes

"If frogs aren't thriving around the dugout and along the creek it says something about our management. Maybe we have done some things right, because the frogs are still here. But can we do things better?"

Ken and Nora Balog, Balog Ranch

Foreword

Biodiversity, sustainability, ecological services. These are terms that are as important to sound agricultural practice as they are to conservation. As the prime stewards of the most dominant use of land in North America, crop and livestock producers are a critical link between pockets of natural habitat and cultivated land, between livestock and wildlife, and between the present state and future survival of one of our most abundant – yet delicate – life forms: amphibians.

Maintaining amphibian habitat and sound agricultural practices go hand in hand. By integrating habitat for amphibians, the stewardship practices presented in this brochure serve to make agriculture more productive and sustainable, while increasing the aesthetic, cultural and recreational aspects of the steward's land – and ultimately its value.

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Alberta Conservation Association
Conserving Alberta's Wild Side

Northwest Partners in Amphibian and Reptile Conservation

Government of Alberta

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Getting to know our amphibian neighbours

For many of us, our earliest experiences with nature likely involved catching frogs, toads or salamanders that inhabited local ponds or creeks. By observing them sing, mate and have their young, these amphibians also likely provided us our first understanding of the interconnectedness between life cycles, aquatic habitats and seasonal change.

Over the vast time-span of life on earth, amphibians have become one of the most successful groups of animals. There are more than 6,000 species of amphibians worldwide – more than the total number of mammals. New species of amphibians are being described yearly through genetic research and expeditions into remote regions of the world. Yet, they remain one of the most at risk: about one in three known amphibian species is considered threatened with extinction. Habitat loss and fragmentation are among the greatest threats to their survival.


photo: Patrick Eriksson


photo: Kris Kendell, ACA


photo: Jason Bouwman

Why should we care about amphibians?

Beyond childhood exploration and experience, we rarely pay much attention to frogs and other amphibians – much less notice the important work they do in maintaining a healthy and balanced ecosystem.

Since the early beginnings of science, amphibians have been instrumental in helping mankind make great discoveries in medicine and science and have contributed to our understanding of the environment. Amphibians help maintain nature's delicate balance, playing a key role in energy flow and nutrient cycling in both water and land environments and consuming unwanted algae and bothersome insects. They then act as a conveyor belt, transferring energy from their food to predators (snakes, birds, mammals and fish) higher up the food chain.


photo: Doug Adama


photo: Mike Jokinen, ACA

- Tadpoles of frogs and toads consume tremendous quantities of algae in ponds and wetlands.
- Amphibian populations can eat millions of insects annually, many of which damage crops and trees or threaten our own health and well-being, such as West Nile Virus carrying mosquitoes.

Healthy amphibians, healthy environment

If the frogs on your land disappear it can be an early indicator of changes in the health of the uplands and riparian areas on your property.

Amphibians play a unique role in the environment, acting as a kind of early warning system against threats to or imbalances in water or air quality. Much like the canaries used in coal mines of the past, whose sensitivity to deadly methane and carbon monoxide gases warned miners of impending danger, amphibians' sensitivity to environmental pollutants is registered far before it becomes of consequence to us.

Because amphibians have thin, permeable skin, environmental pollutants can easily absorb into their body. And because amphibians often live both in water and on land they can provide us feedback about more than a single aspect of their environment. This sensitivity to changes in their surroundings makes amphibians good indicators of environmental health.

The northern leopard frog: home on the range

The northern leopard frog is a common example of an amphibian that has adapted to life on the range, making its home where grasslands or meadows and permanent water (like ponds, marshes, lakes and slow-flowing rivers) meet.

Named for the array of irregularly shaped dark spots that adorn their backs and legs, northern leopard frogs are easily recognized. Their greenish-brown earthen colours and attractive spot pattern allow them to blend perfectly into the shadows of their grassy and marshy environments, but their movement reveals the distinctive flash of light-coloured ridges on either side of their back.

The northern leopard frog was once an abundant and widespread frog species across much of North America. Today they have become rare in many areas where they were once common, particularly in regions of western Canada and the western United States. Like many amphibian species, loss of quality habitat, disease and pollution present the greatest threat to northern leopard frog populations.

Today, crop and livestock producers, conservation organizations, universities and governments are working together to protect remaining populations of the northern leopard frog through habitat stewardship, population monitoring, research, reintroduction and awareness.


photo: Kris Kendell, ACA

Connecting with frogs: a kind of fairy tale of stewardship on the Balog Ranch

By Lorne Fitch

photo: Kris Kendell, ACA

In the Brothers Grimm fairy tale, The Frog Prince, a royal son was bewitched and transformed into a frog by a wicked witch. The kindness of a princess and her kiss allowed him to be returned to his human form. And then they lived in the proverbial "happily ever after."

If only it was that simple for dealing with the plight of northern leopard frogs in Alberta. With dramatic declines in numbers and only a handful of known breeding sites in the province, these frogs need help. Can stewardship be part of the solution across Alberta, and if so, how?

From their ranch in southern Alberta, the Balog family is showing us how it can be done. They haven't kissed any frogs, but their stewardship efforts have enabled the frogs on their property to survive and thrive.

What was it about the northern leopard frogs on the ranch that created empathy and responsibility for them? Stewardship can be a complex decision to explain, but easy to observe.

As Ken, the fourth generation of Balogs on the ranch says, "If frogs aren't thriving around the dugout and along the creek it says something about our management. Maybe we have done some things right, because the frogs are still here. But can we do things better?"

The spark to start that process of doing things differently often occurs over a cup of coffee. The Balogs have always taken a keen interest in the wildlife that flies over, walks across or swims through the ranch, but from time to time even the keenest interest needs some outside help. Of course they knew about the frogs, but it wasn't until a pair of biologists sat down at the kitchen table and explained the results of an amphibian inventory that it became clear their frogs were of the threatened northern leopard variety.

Putting awareness into action

Ken and Nora have been active volunteers in their community for many years. Stewardship – the kind that includes caring for smaller and sometimes overlooked species like frogs – is itself a form of volunteerism, so getting involved didn't require a big ideological change for the Balogs.

Stewardship of northern leopard frogs on the Balog Ranch began, and continues to be, a productive collaboration between the Balog family, the Alberta Conservation Association and MULTISAR ("Multiple Species at Risk", an association of multiple partners including Alberta Conservation Association, Alberta Sustainable Resource Development and the Prairie Conservation Forum. The program works to conserve habitat for species at risk in the grasslands of Alberta while balancing the needs and goals for sustainable ranching).

The Balog Ranch lies in an arid landscape, so riparian areas are the focus for livestock management to aid in sustainable levels of grazing and also share with frogs.

Based on range inventories and a long history of grazing, the Balogs have a good understanding of the long-term carrying capacity of their pastures. They also know that the theoretical "average" amount of forage may not be available in dry years, so they adjust the annual stocking rate to compensate for rainfall, and to harvest forage and allow grass to recover they rotate cattle through their pastures. Livestock management is as much art as science. The challenge comes when the needs of frogs are added to the equation.

Upon listening to the biologists' ideas, it became evident the solution would not come at a loss of grazing land but rather how to manage livestock with the needs of frogs in mind. Frogs, like cows, thrive with clean water, lush vegetation and security for the rearing of young. Land management changes must therefore benefit both frogs and cows. Without choices for water and motivation to move cows can linger too long in riparian areas, affecting both the quality of their water and the places frogs need. It came down to planning: to enhance frog habitat the timing and distribution of livestock along Red Creek needed to change.

Riparian areas are the greener areas next to streams and around wetlands. They are highly productive and provide a readily available source of water for livestock and wildlife.

photo: Nora Balog, Balog Ranch

Save a frog. Outsmart a cow.

It is said that riparian grazing management is simply outsmarting a cow. Maybe it's not so much about outwitting them as giving them drinking options that take pressure off riparian areas. With the help of ACA and MULTISAR the Balogs installed two off stream water troughs to give cows an alternative to drinking directly from the creek. One system taps water from a dugout (or excavated pond), the other is a portable one that allows livestock pressure points to be minimized along Red Creek. In dry years the watering systems conserve water, a significant benefit to cows and frogs in an arid landscape.

Off-stream water sources together with movement of salt blocks allow the Balogs to manage cattle distribution for the betterment of both livestock and frogs. As Ken and Nora have observed, "Give cattle a choice of clean water, they'll walk a mile to the trough." Other livestock producers have noted better weight gains with clean water. The Balogs are pleased with the livestock health benefits of watering sites where cattle can avoid being bogged in mud.

Inclusion, not exclusion, has been the solution for the Balogs' operation. It's not cows or frogs, ranchers or biologists, agriculture or environment; on the Balog Ranch all the "ors" have been replaced by "ands". In this example of stewardship there are many benefits to replacing an "or" with an "and". Two organizations involved in the business of conservation of landscapes and wildlife found an agricultural partner willing to work with them and have succeeded in protecting valuable habitat for the threatened northern leopard frog.

photo: Nora Balog, Balog Ranch

The association and relationship developed between staff of ACA/MULTISAR and the Balogs goes beyond strictly business. Getting to know one another over the years has led to mutual respect, credibility, learning and sharing. Both cows and frogs benefitted from this working relationship. The Balogs now have a comprehensive ranch inventory and a management plan to guide their efforts to maintain and sustain the ranch. Financial assistance through ACA/MULTISAR from Government of Canada Habitat Stewardship Program and Canadian Natural Resources Limited helped with the off stream water developments that aid their livestock management efforts.

As one example of stewardship the Balogs have figured out how to live on a piece of land and maintain a species of wildlife at risk for the benefit of all. Besides technical expertise and pieces of equipment, the project's success required caring, open-mindedness, ecological awareness, a strong land ethic and a vision for the future. There is a harmony and a relationship between humans and wildlife on the Balog Ranch that is inspirational.

Like the fairy tale at the beginning, this story too has a happy ending, for the northern leopard frogs on the Balog Ranch and those who care for them.

photo: Nora Balog, Balog Ranch

A family affair

An initial school field trip to the ranch where ACA/MULTISAR biologists taught students about frogs sparked the imagination of one of Ken and Nora's daughters, Beth, who developed a fascination with frogs. Beth has since surveyed frog population levels along the creek and is interested in pursuing a career in resource management. "I want to care," related Beth. "We all need to care about wildlife. I want to show people that even a small change can make a difference."

The project on the Balog Ranch has led to even greater family awareness. Nora points out now "checking the cows also means checking the frogs."


photo: David Coambs

Wetlands: wet, wild and wonderful

Wetlands are known by many names: sloughs, marshes, ponds, fens, bogs and swamps. No matter how small or seemingly insignificant, wetlands are among our most productive and fertile ecosystems. In addition to being a home for amphibians for at least part of their life cycle, wetlands also serve a myriad of other purposes.

How wetlands help agriculture

- Prevent flooding
- Maintain water tables
- Provide shelter, forage and water for livestock
- Assist in fire suppression
- Absorb pollutants from runoff and the air
- Contribute to cloud and rain formation

Much like our kidneys, wetlands perform a natural cleansing function by retaining sediments and pollutants which are then absorbed, held and broken down by soil and wetland plants. Healthy functioning wetlands prevent flooding in fields and pastures, holding water much like a sponge, soaking up rain and snowmelt and slowly releasing runoff from storms and thaws. In doing so, they help recharge ground water and maintain our water tables and wells. Wetlands also offer significant benefits for livestock production, act as "seed banks" for native plant species, provide benefits in relation to fire suppression and even create local cloud formation and rain by increasing evaporation of water into the atmosphere.

But – importantly – wetlands are also a source of enjoyment for us, providing a place to paddle, watch wildlife, hunt and fish … or to just sit and listen to the frogs.

Amphibian-friendly dugouts

Dugouts with a low shoreline gradient, shallow marshy edges and minimal impact from livestock can provide productive breeding habitat for amphibians. To better recreate the function and appearance of a natural wetland, spread the top layer of organic-rich freshly excavated soil over the dugout's bottom. Move the remaining soil from excavation to an upland site away from the dugout. Before spreading the excavated soil at the upland site, scrape the topsoil and save it for later spreading over the less fertile excavated soil. Then seed all spread soil and disturbed areas with native grasses. These extra steps will encourage a rich wetland plant community, provide optimal cover for amphibians, minimize weed growth, and prevent the excavated soil from eroding back into the dugout.


photo: Marie Ruzicka, Sunrise Farm

Ephemeral value

Ephemeral wetlands (also called vernal pools, seasonal / temporary ponds or wetlands) are landform depressions that fill with water following heavy rainfalls, spring snowmelt, or as a result of a high water table. Typical characteristics of ephemeral wetlands are that they are fishless and dry up in early fall or drought years. Because they are prone to frequent drying, their value to the landscape and wildlife is often underappreciated. Yet ephemeral wetlands are a unique and specialized amphibian habitat, home to distinct species of amphibians that have adapted to their variable cycle.

Retaining ephemeral wetlands makes sense. Left intact, they provide an important connection to the groundwater system, and like other wetlands, they will store and absorb surface runoff and help prevent flooding in fields and pastures. But if cultivated, the texture and composition of soils associated with ephemeral wetlands make them susceptible to compaction from farm equipment. This compaction can lead to soils that are difficult to till and impede plant growth, lowering crop yield. Furthermore, the often saline and impervious soils associated with ephemeral wetlands are less suitable for crop growth. In wet years, returns from farming inputs in these areas can be especially low.

Negative implications of cultivating wetlands:

- High soil compaction reduces yield
- Saline soil not suitable for long-term sustainable crop production
- Susceptible to flooding in wet years


photo: Dr. Wayne Lynch


photo: Brad Downey, ACA

Buffers offer protection

Riparian buffers are areas of land in permanent forage or native vegetation adjacent to wetlands, lakes, streams and rivers. The plants naturally found within riparian buffers are strongly influenced by the presence of water and are generally more productive than those in neighbouring uplands.

Ideally, the full, natural integrity of the riparian buffer around a water body or along a watercourse should be kept intact. A well-maintained riparian buffer provides the best possible cover, burrowing and foraging areas for amphibians: the greater its size the greater the opportunity for amphibian populations to thrive and be resilient to floods, drought or disease.

But riparian buffers preserved in their natural state can also provide significant benefits to your operation.

Benefits of riparian buffers

- Slow water runoff, trap sediment and enhance water infiltration
- Prevent soil erosion from scouring currents, fluctuating water levels, moving ice, and wind-driven waves
- Trap fertilizers, pesticides, bacteria, pathogens and heavy metals, minimizing the chances of these potential pollutants reaching surface and ground water sources
- Protect livestock from harsh weather
- Provide a source of income through selective harvest of trees in wooded riparian areas
- Provide space for crop pollinators and crop pest predators to live
- Increase the aesthetic value and recreational opportunities on your land

While some level of grazing or forage harvest is necessary for maintaining the health and function of wetlands and riparian buffers, unrestricted livestock access in these areas can have significant negative impacts. Nutrient loading, excessive removal of vegetation, and soil compaction and disturbance from livestock can harm wetlands and riparian buffers. Adopting a grazing management plan inclusive of controlled wetland and riparian grazing and a rotational grazing system will make the most of your range while at the same time protecting these habitats.

Alternative grazing solutions

Encourage cattle to make use of pasture and graze away from wetlands and riparian buffers through:

- Portable windbreaks and shelters placed in the uplands
- Cattle oilers and rubbing posts placed in the uplands
- Offsite livestock watering systems placed away from water bodies
- Electric fencing to create a riparian pasture
- Salt and mineral locations placed in the uplands

photo courtesy of USDA NRCS

Crop producers that match fertilizer application with crop needs and avoid pesticide drift can prevent contamination of surface waters and impacts on non-target species.

photo: Kris Kendell, ACA

Square up, save up

When used to square-up fields, riparian buffers can save you time and resources. Squared fields help minimize the over-application of seed, pesticides and fertilizers by reducing the amount of time turning and frequency of equipment overlap, while at the same time increasing the safety for equipment and reducing fuel used.

photo: ACA

What are the alternatives to direct access watering?

Alternatives to direct access watering usually involve fencing off the water source to limit or eliminate direct access by livestock. The development of a natural buffer of native vegetation is also maintained. There are many alternatives to direct access watering that may be deployed in isolation or in combination depending on the needs of your operation. Examples include solar, wind and livestock-powered pumping systems, gravity-flow systems and access ramps.

photo: AARD

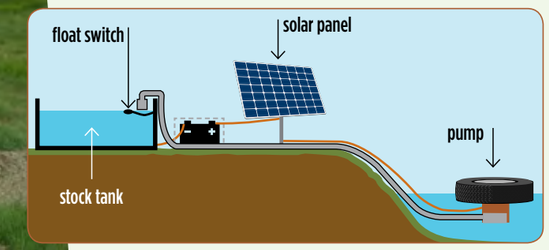
The nose-pump is a livestock-powered pumping system that permits livestock to pump water for themselves. The height and distance a nose-pump can pump water depends on the nose-pump type.

photo: Sarma Liepins, BC Ministry of Environment

Access ramps limit cattle access to surface water and are the minimum improvement to a livestock water source. When carefully constructed, they provide livestock better footing while drinking and cleaner water.

photo: Kris Kendell, ACA

A solar or wind-powered pumping system requires little maintenance and utilizes batteries and water storage to minimize risks to livestock. Portable systems can be easily mounted on a trailer or skid and moved for applications such as rotational grazing systems.



Gravity-flow systems are ideal for sloping pastureland where a dugout or dam can be located upslope from a watering site. They can also be used for springs where there is a sufficient elevation drop to the stock tank.

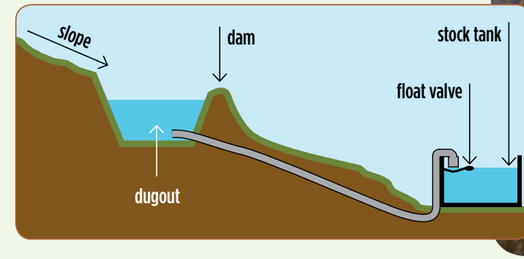


photo: Kris Kendell, ACA

Habitat corridors: an important link

An amphibian's natural habitat typically includes a number of habitat areas necessary for it to thrive, such as wetlands, burrowing sites and foraging areas. When these areas of habitat become separated or fragmented by agricultural activities, amphibian populations can decline.

Shelterbelts, grassed waterways and riparian buffers can re-connect those areas needed for amphibians and provide corridors to help them move more safely and effectively between habitats. Such corridors enhance genetic diversity of amphibian populations by allowing them to find new mates in neighbouring areas and find new habitat if local natural resources or environmental conditions become unfavourable. They also provide amphibians a place to live in the corridor itself.

In appropriate situations, wetlands, buffers, shelterbelts and grassed waterways can provide many benefits to your operation:

- Reduce soil erosion from wind and water
- Control drifts and trap snow, increasing moisture content in the soil
- Provide barriers for dust, smoke, odour and noise
- Offer protection from the elements to livestock
- Provide a source of income through haying or forage, or selective harvest of trees

photo: Doug Macaulay

Good business and good stewardship go hand in hand

There are many actions you can take that will benefit amphibians on your land. This may involve making only a small adjustment to your current land management practices. Actively managing your land and water for amphibians can save you time and resources, improve animal and plant health, increase land value, and increase returns from farming and ranching inputs.

Amphibian habitat and agricultural stewardship: the facts

- Amphibians are key indicators of environmental health
- Wetland areas, riparian buffers, shelterbelts and grassed waterways can provide many benefits to your ranching or growing operation
- Pumping water out of a dugout or wetland, or providing a non-erodible ramp, will allow livestock access to cleaner water and improves animal performance
- Adopting a controlled grazing and a rotational grazing system will make the most of your range while at the same time protecting wetland and riparian habitats
- Crop and livestock producers are key partners in landscape management that protects biodiversity for future generations
- Habitat loss, disease and pollution are key contributing factors to the rapid decline in amphibian populations

For more information about amphibians, the newest habitat stewardship practices and assistance with implementing habitat stewardship on your property contact:

Alberta Conservation Association
www.ab-conservation.com

Northwest Partners in Amphibian and Reptile Conservation
www.nwparc.org