



Amphibian Voice

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FOOTPRINT FILES: OUR IMPACT ON THE FLORA AND FAUNA OF WETLANDS

“Risky Business”: An Introduction to the Species at Risk Act

By: Steve Jones, Canadian Wilderness & Wildlife Program Coordinator, Toronto Zoo

The term “species at risk” seems to be a popular catch phrase these days. What is a species at risk (SAR), and how do the animals labeled as such gain this identity?

How Does a Species Get Labeled “At Risk”?

SAR are species that have been designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as being in one of five categories of peril. Those categories in



Have you seen the Northern Cricket frog recently? With the last confirmed sighting in 1996, this species is thought to be extirpated in Ontario. Photo: Hammerson, from Colorado Herpetological Society website (www.colorherp.org)

endangered because of a combination of biological characteristics and other threats, which reduces their ability to survive.

- **Threatened** species are those which have factors reducing their populations, and if those factors are not reversed, the species will become endangered or extirpated.

- **Endangered** species are those which are facing imminent extirpation or extinction.

- **Extirpated** species are those that do not exist in the wild in Canada, but persist elsewhere (i.e. in other countries or in captivity).
- **Extinct** species are those which no longer exist.

ascending order of threat are Special Concern, Threatened, Endangered, Extirpated, and Extinct.

- **Special concern** species are those which may become threatened or

In this Issue

Risky Business.....	1-3
Shoreline Development.....	4
Climate Change.....	5
Aquatic Invasives.....	6
Purple Loosestrife.....	7
Froggy Fables.....	8

Continued on Page 2

To assess and designate a species as one of the above mentioned categories, COSEWIC consults experts on a particular species to gather all available information, evaluates that information, and makes a recommendation through a report. The entire COSEWIC committee gathers biannually to evaluate the reports and arrive at a consensus to the appropriate designation level a species should be afforded.

What Protection is Afforded to Species at Risk?

In June of 2003, the Species at Risk Act (SARA) became legislation. The Act was designed to work in conjunction with two other government programs called the Accord for the Protection of Species at Risk, and the Habitat Stewardship Program for Species at Risk. The induction of the SARA gave animals listed as either Threatened or Endangered, legal protection in an effort to conserve the species, subspecies, or distinct population, as well as to encourage the management of species currently not at risk, of becoming at risk. For those species that fall into one of the two "at risk" categories as laid out in the SARA, the Act provides immediate legal protection.

Once a species is listed as at risk in the SARA, it becomes illegal to kill, harass, capture, collect, and destroy habitat of that that species. This leads into one of the areas that the SARA addresses, where previous legislation did not. Landowners, whether it is private, corporate, or government, may receive compensation for losses incurred as a result of critical habitat occurring within the land limits. This, in combination with stiff penalties for not abiding by the SARA, encourages everybody to participate in the survival of a SAR.

At the same time as the SARA gives immediate legal protection, it also requires that a species recovery plan be developed and implemented. The appropriate federal minister assembles a team of experts to develop an action plan of the steps required to secure the species. That plan must address ways of preserving unprotected critical habitat, identify actions which are destroying critical habitat, and must contain ways to monitor the recovery of the species.

The SARA appears to be a much needed governmental step to secure our native species. Support from all parties, including government and private, will ultimately decide if species will be preserved.

What Are Some Wetlands Species That Are Currently At Risk?

The **Blanding's Turtle** is among the group of turtles that fall into the larger group of pond turtles. Blanding's Turtles are a semi-aquatic species of a medium size, which can attain a carapace (upper shell) length of up to 30 cm.



Six of the eight turtle species in Ontario are Species at Risk, including the Blanding's turtle.

They typically inhabit lakes, permanent and temporary ponds, streams and wetlands. The Blanding's Turtle was listed as Endangered in Nova Scotia and Threatened in the Great Lakes/St. Lawrence Population in May of 2005.

This species faces threats to their sustainability, similar to other pond turtles. Those threats include the draining of wetlands which results in a loss of habitat and a loss of potential nesting sites. By losing potential nesting sites, the Blanding's Turtle is being forced to utilize gravel shoulders of road ways, which greatly increases the chances for road related mortality. Road mortality tends to affect the mature population, the most sensitive of life stages. Survival of this species is very sensitive to adult mortality, and even slight increases in mortality (<5%) could potentially threaten the species, as they will not adjust their reproductive output in response to increases in adult mortality.

A large increase in raccoon population in the past century is further leading to the species demise, causing a seriously low nest survivorship in some areas. Nest survivorship is already extremely low (~5%), and slight increases could be extremely detrimental to the stability of populations.

The Prothonotary Warbler was listed as Endangered in 1996.

The **Prothonotary Warbler** is a medium sized bird measuring up to 14 cm long. They have a brilliant coloured head and chest, with a yellow-green back, and azure wings and tail. This Carolinian species generally inhabits forested swamps, where they nest in tree cavities, preferably low to the ground and over water.



Prothonotary warbler. Photo taken from: The U.S.G.S. National Wetlands Research Center (www.nwrc.usgs.gov/about/feb/warbler.htm)

Over time Southern Ontario has lost about 70% of its original wetlands. Much of this loss has come as a result of human impact, through draining, and filling in wetlands. As the Prothonotary Warbler is a wetlands species, it depends greatly on this habitat, and the loss of such has caused dramatic declines in their population. In recent times the wetland loss has slowed, and when combined with efforts from the warbler's recovery team, this species may recover from their population losses.

Other species at risk that reside in wetland habitats include: the Fowler's toad, the Eastern ribbon snake and the spotted turtle.



The Fowler's Toad - Threatened



Eastern ribbon snake – Special Concern



Spotted turtle - Endangered

Wetlands are one of the most biodiverse ecosystems in the world. Any changes that occur to wetland habitats impact a large number of species and can lead to their eventual designation as a Species at Risk. Conservation of critical habitat is essential to the survival of many species, as well as the preservation of wetland ecosystems as a whole. The effort to conserve is a simple practice which can and should occur by all people in order to preserve our remaining creatures. Although not all species are in peril, many will need our help in the future. If we all begin to practice conservation and preservation, much of our beautiful and interesting fauna will be around for generations to come.

Editor's Note – For more information on Species at Risk try visiting the following websites:

www.speciesatrisk.gc.ca

www.ontarioparks.com

www.cosewic.gc.ca

www.cws-scf.ec.gc.ca

Shoreline Development: Why Current Practices Need to Change

By: Lisa Sealock

As populations continue to increase, more and more people are living farther from urban centres or nearer to wetland shorelines. The resulting houses, roads and commercial development are putting increasing pressure on wetland habitats.

Wetlands at the margins of lakes, rivers, bays and the ocean protect shorelines and stream banks against erosion. Wetland plants hold the soil in place with their roots, absorb the energy of waves, and break up the flow of stream or river currents. Wetlands also hold water, which reduces runoff and flooding.

Shoreline development, direct removal of land for canals, redistribution of material for development and other processes that alter hydrography create conditions of erosion, submergence and degradation of vegetation.

Docks, piers and boathouses enhance our enjoyment of aquatic resources, but these structures and armoring of shoreline habitat can harm fish and other wildlife. The shoreline and shallow water vegetation that many fish, amphibian and waterfowl species use for food and cover can be shaded out by over-water structures, removed to create beach or armored conditions, or eliminated by dredging. Shoreline development has been linked with reduced numbers and size of fish, reductions in water quality from inadequate septic systems and runoff from maintained lawns. You can still enjoy aquatic resources, but there are ways you can help to preserve them, such as maintaining vegetated shoreline habitat, planting native plants and keeping docks and boathouses to the minimum size needed to access the water.

The preservation of shoreline vegetation and the

natural character of the banks are key to preserving the health and biodiversity of wetlands.

Shoreline vegetation:

- Provides food, shelter, nesting and breeding areas for wildlife.
- Stabilizes the shoreline by anchoring the soil in place, thus reducing erosion. During rainstorms unanchored soil washes into the wetland. This decreases water quality significantly; many animals move away from these areas because the soil blocks gills and impairs vision, making it more difficult to locate prey and avoid predators. The eggs of fish and frogs become smothered and can even suffocate.
- Acts as a filter, preventing some of the residential and agricultural fertilizers, pesticides and herbicides from entering the wetland.



Wetland plants, such as cattails, provide many valuable services, including acting as important buffers against shoreline erosion

The trouble with the natural shore is that there isn't as much as there used to be. The profusion of vegetation has been cut down or built over. When a natural shoreline is altered the intricate balance between creatures, plants and earth is impacted.

If you would like to learn more about the prevention of the negative impacts associated with shoreline development, you may be interested in obtaining the following publications:

- The Dock Primer – A Cottager's Guide to Waterfront-Friendly Docks
- The Shore Primer – A Cottager's Guide to a Healthy Waterfront

Produced by Cottage Life, in association with Fisheries and Oceans Canada, these are great resources to help you

protect and enhance shorelines. Both resources can be found on the Fisheries and Oceans Canada website, www.dfo-mpo.gc.ca, by clicking on the Infocentre button, and then the Guidelines & Factsheets button.

Editor's Note – Another great way to help out is to get involved in the Great Canadian Shoreline Clean-up, stay tuned to the AAP website for news on next year's event.

Research on Global Climate Change and its Impact on Amphibian Populations

Amphibians are important bioindicator species because they are particularly sensitive to climate change and increases in U.V. radiation. Many researchers who started trying to solve the puzzle of amphibian declines during the past decade have now become even more motivated by the feeling that amphibians may be telling us something important about the threats to biodiversity on our planet.



Penn State

Joseph Kiesecker, professor of biology at Penn State, reports the research team he leads has shown that global warming causes changes in rainfall patterns, causing stress in moisture-sensitive amphibians, leaving them susceptible to a variety of pathogens. The specific stresses and specific resulting causes of death depend on the specific conditions in the animals' local habitat.

For over 10 years, the team has been collecting data at a number of sites in the Cascades. The researchers build experimental devices which include boxes they designed to anchor toad eggs at different distances below the surface of the lake in order to learn whether a thicker blanket of water better protects the eggs from the damaging effects of ultraviolet radiation. "We have found that water levels are shallower during years when there is less snow, which exposes the eggs to more ultraviolet light and makes them susceptible to disease outbreaks," says Kiesecker.

In the early 1990s, the team started to see 80 to 100 percent mortality. The toad eggs laid at shallower depths, which are stressed by overexposure to ultraviolet light, are killed by a water-mold pathogen, *Saprolegnia ferax*, which generally attacks only organisms that are injured or under stress in some way.

Oregon State University

Zoologists at Oregon State University (OSU) presented the first major field study which concludes that the levels of ultraviolet, or UV-B, radiation now found in sunlight can cause physical deformities in amphibians.

In this experiment, which was done with long-toed salamanders in lakes of the central Oregon Cascade Range, more than 90 percent of the salamander embryos that were not shielded from UV-B radiation either died or hatched with deformities.

By comparison, almost all of the embryos protected by special filters from the UV-B radiation levels that are currently present in sunlight survived and were perfectly normal.

In previous studies, Blaustein and his colleagues demonstrated that natural levels of UV-B radiation were causing high levels of embryo mortality in several species of frogs, toads and salamanders.

The latest research examined long-toed salamanders, partly because they were known to have low levels of the enzyme photolyase, which plays a key role in repairing DNA damaged by UV-B. This salamander in particular, and many other amphibians in general, are vulnerable species because they have no hair or feather protection, lay unshelled eggs and at various stages of development may be exposed to a wide range of environmental insults.

State University of New York in Syracuse

James Gibbs of State University of New York in Syracuse and Alvin Breisch of the New York State Department of Environmental Conservation have found a compelling connection between changes in the calling dates of frogs and changes in local air temperatures.

To assess climate change over the last century in the Ithaca area, Gibbs and Breisch used historical records of the average daily maximum temperatures from November through June, which are key months for the timing of frog reproduction. During five of these key months, the temperatures increased about 2 to 4°F. To determine the earliest calling dates of six frog species in the area, the researchers used existing studies of two time periods: 1900- 1912 and 1990-1999.

The researchers found that four of the species (spring peeper, wood frog, gray treefrog and bullfrog) are calling 10-13 days earlier, while two (green frog, American toad) have not changed their earliest calling dates.

Climate warming will probably have little impact on most of the frogs studied because Ithaca is in the middle of their breeding ranges. However, climate warming could affect species at the edges of their ranges.

Editor's Note – For more information on Climate Change, visit the Government of Canada Climate change website www.climatechange.gc.ca/english

Beware of the Aquatic Invasive Species

By: Lisa Sealock

Aquarium and water garden hobbyists have a selection of thousands of exotic species and varieties of plants, invertebrates, amphibians and fish readily available at local nurseries, pet stores, aquarium supply outlets or via the internet. Exotic species originate from other regions of the world, but are often attractive because they can add beauty and variety to home aquariums and water gardens.

Unfortunately some of these aquatic exotic species are "invasive" and become established and spread throughout our waterways with devastating impacts on native flora and fauna. Accidental and intentional releases of aquatic invasive plants and animals are becoming an increasingly common problem in North America.

Invasive species are generally adaptable to a wide range of environmental conditions, and in the absence of natural predators or controls, can spread aggressively and out compete native species.

The following are some examples of popular aquarium or water garden species that are invasive and pose significant environmental threats if released into the wild:

- European Frog-bit, *Hydrocharis morsus-ranae*
- Fanwort, *Cabomba caroliniana*
- Common Reed, *Phragmites australis*
- Hydrilla, *Hydrilla verticillata*
- Flowering Rush, *Butomus umbellatus*
- Yellow Floating Heart, *Nymphoides peltata*
- Yellow Iris, *Iris pseudacorus*
- Parrotfeather, *Myriophyllum aquaticum*
- Water Chestnut, *Trapa natans*
- Purple Loosestrife, *Lythrum salicaria*
- Goldfish, *Carrasius auratus*
- Grass carp, *Ctenopharyngodon idella*
- Mosquito fish, *Gambusia holbrooki*
- Oriental Mystery Snail, *Cipangopaludina chinensis*
- Tadpoles
- Newts

There are many steps that individuals can take to help prevent the spread of aquatic invasive species.

Before creating a water garden or starting an aquarium:

- Research invasive species of provincial or national concern and laws that may restrict their use
- Research the identification and scientific name of species you plan on purchasing
- Think about using only native plants
- If you are building a water garden, select a site that is far from natural waterways and isolated from potential floods

When buying aquatic plants, fish or invertebrates:

- Never collect plants or animals from the wild
- Choose a reputable nursery or aquarium retailer
- Ensure any plants you purchase are free from other plants or invertebrates that may be hidden on the plant or in the soil

When disposing of unwanted aquatic plants, amphibians, turtles, invertebrates and fish:

- Never release any aquatic plants, amphibians, turtles, fish or invertebrates in natural waterways
- If you have invasive species in your water garden, dispose of them before they are able to spread into a nearby waterway
- To dispose unwanted plants, dry them completely or freeze them and then dispose of them in your household garbage. Composting these plants is not recommended.
- Return fish that outgrow tanks to local aquariums or give them to school groups. Ontario also has a fish rescue program 1-800-563-7711.

Editor's Note – For more information on aquatic invasive species contact the Ontario Invading Species Hotline 1-800-563-7711 or visit the following website: www.invadingspecies.com



There are important steps you need to take to safeguard the environment from aquatic invasive species before building a water garden.

The Plant that Rocks the Cradle

By: Marg Fleming, Manager of Horticulture, Toronto Zoo

Wetlands are a cradle of diversity for plants, insects, amphibians, birds, and mammals. Maintaining the delicate balance of flora and fauna that is part of the dynamics of wetland diversity is easily threatened if non-native species are allowed to invade this habitat unchecked.

Purple loosestrife is an alien plant that invaded North America from Europe in the early 1800's. It is suspected to have arrived here as contaminated ship's ballast. Because purple loosestrife was thought to have medicinal properties, this may also explain its introduction. Regardless of its origin, as an alien plant purple loosestrife quickly began to overrun its habitat of choice - North American wetlands.

Today purple loosestrife dominates many of our local wetlands, overwhelming the valuable native plants. Purple loosestrife is an exotic invader, so having left all of its natural checks and balances behind in Europe it meets with little resistance. Our native flora had never before contended with such aggressive behaviour from another species and were quickly overwhelmed by purple loosestrife's vigour. Purple loosestrife dominates and out-competes its swamp mates until a solid monotypic stand of purple loosestrife remains. Dense thickets of dead purple loosestrife stems that accumulate annually deter wildlife/waterfowl. As a result a dramatic change in biodiversity of the wetland species occurs and their populations decrease. Natural cover becomes lost and with it goes the wildlife that depends on it.

How can purple loosestrife be so destructive?

- Each purple loosestrife plant is capable of producing up to three million seeds that are very light and can be carried long distances by the wind.
- Virtually all of the seeds will germinate! Some will even wait a long time in the soil or under the water until conditions become favourable for invasion.

- Once established, purple loosestrife can spread by underground roots as well. Even the smallest root left in the ground after an attempt at eradication will revive the population by growing new sprouts!
- Even gardeners have been responsible in part for purple loosestrife's success. Cultivars purchased at the local garden centre can be pollinated by the wild invader species producing seed that is just as aggressive.

What can we do?

- Garden varieties of purple loosestrife are not sterile as advertised. They can form viable aggressive seed. Don't buy them. Most wild infestations of purple loosestrife are the result of garden escapes!
- On a small scale the flower heads of purple loosestrife can be removed before seed forms.
- Dig out entire plants, keeping in mind that any roots left intact will resprout. Burn plants after they have dried in the sun. No herbicides have been approved for the eradication of purple loosestrife in or near water!



Purple loosestrife. Photo: Marg Fleming

What about those "bugs"?

Several insect pests have been reunited with purple loosestrife since its uninvited arrival:

Galerucella californiensis and *G. pusilla* are beetles that eat the **leaves**. *Hylobius transversovittatus* is

a **root**-mining weevil, and *Nanophyes marmoratus* is a **seed**-eating weevil.

Studies with these superhero bugs have bought a reprieve for threatened wetlands. And luckily purple loosestrife is the only entrée they like! Results have been promising, and dramatic positive reversals in wetland ecology have occurred following the introduction of purple loosestrife's native predator species to our vulnerable habitats.

Anything else?

Yes. Purple loosestrife is arguably a visually stunning plant that belies its evil intentions. Do not be tempted by its pleasing appearance. Substitute a pot of *Liatris spicata* for the garden instead. This innocent look-alike perennial is hardy, well-behaved, and of similar appearance and colour.

The Boiled Frog – A Parable

The parable goes.....

"They say that if you put a frog into a pot of boiling water, it will leap out right away to escape the danger.

But, if you put a frog in a kettle that is filled with water that is cool and pleasant, and then you *gradually* heat the kettle until it starts boiling, the frog will not become aware of the threat until it is too late. "

While no one would actually do this, the point is to explain how the frog's survival instincts are geared towards detecting sudden changes.



This parable is often used to illustrate how humans have to be careful to watch slowly changing trends in the environment, not just the sudden changes. It is a warning so we pay attention not just to obvious threats but to more slowly developing ones.

You can find this fable, along with several others, at the following website: <http://www.allaboutfrogs.org/stories/>

Editor's Note – This fable has been included for the reason listed above. Please do not kill any animal by attempting to test its validity with actual frogs.

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Amphibian Voice is distributed to schools and communities participating in the Adopt-A-Pond programme. The purpose of this newsletter is to provide information on amphibian, turtle and wetland conservation issues and efforts in Ontario.

Send in your stories, drawings and photographs to the address below and we will "hoppily" include them in future issues.

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We welcome support of our programme! Please make cheques payable to "Toronto Zoo" and send them to the following address. Thank you!

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