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Amphibian Voice

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GREAT LAKES BIODIVERSITY II

North vs. South—Who Has What Herps?

By: Christine Baptista, Wetland & Rouge River Conservation Assistant

North western Ontario (NWO) is different in many ways from southern Ontario; there is more snow in the winter, more daylight hours in the summer, and more natural wilderness. There is also a difference in the species of amphibians and reptiles that can be found in local wetlands. As a Lakehead University student in Thunder Bay, Ontario, and a summer student at the Toronto Zoo's Adopt-A-Pond Wetland Conservation Programme, I get to experience the best of both worlds.

Because the north is colder, and because amphibians and reptiles need to thermoregulate (that is, they rely on heat from the local climate to keep them warm), there are, overall, fewer species found in the north. However, there are *different* species (or subspecies in some cases) found in Northern Ontario. The rock base in southern Ontario is primarily sedimentary, but Thunder Bay and most of northern Ontario is underlain by the Canadian Shield. This is composed of sedimentary, metamorphic, and volcanic rock, making the soil conditions different than that found in sedimentary-underlain southern Ontario. Add this to the fact that the climate in NWO is mostly suitable for coniferous trees, and you have got a very different type of habitat than the south. Let's take a look at what amphibians and reptiles you can expect to find in the Great White North!

In this Issue

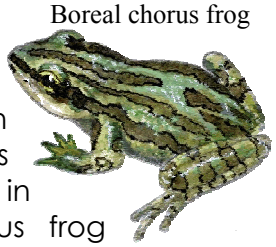
Why Two Issues on Great Lakes Biodiversity ??

The launch of the Ontario Biodiversity Strategy in 2005 by the Ontario government has provided the necessary theme and structure for the Adopt-A-Pond Programme's involvement. The Strategy is a comprehensive report describing the importance of species diversity to ecosystem integrity, with a particular emphasis on wetlands. We are in the early stages of "niche-partitioning", but the Adopt-A-Pond is confident that our past experience and expertise will prove important toward accomplishing the 37 recommendations in the Strategy.

Continued on page 7 ...

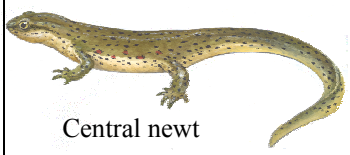
Anurans (Frogs and Toads)

Boreal chorus frog



Most species of Ontario anurans can be found in Thunder Bay and northern Ontario. The only two species that are exclusively found in NWO are the Boreal chorus frog (*Pseudacris maculata*), which is now recognized by COSEWIC (Committee On the Status of Endangered Wildlife in Canada) as a separate species from the Western chorus frog (*Pseudacris triseriata*), and the Cope's gray treefrog (*Hyla chrysoscelis*). The Cope's gray treefrog can be distinguished from the Gray treefrog (*Hyla versicolor*) (which is also found in Northwestern Ontario) by a slight difference in the call (visit the FrogWatch-CANADA website at http://www.naturewatch.ca/english/frogwatch/learn_frogs.asp?Province= to hear the two calls), and by a difference in the number of chromosomes in the cells of individuals. The only species of Ontario anurans which are *not* found in NWO are the Fowler's toad (*Bufo fowleri*), Northern cricket frog (*Acris crepitans*), and the Western chorus frog (*Pseudacris triseriata*).

Salamanders



Central newt

There is only one subspecies of salamander found in NWO that is not found in the south: the Central newt (*Notophthalmus viridescens louisianensis*). The Central newt is a subspecies of the Eastern newt (*Notophthalmus viridescens*). The Eastern newt species complex includes four subspecies, including the Red-spotted newt (*Notophthalmus viridescens viridescens*) which is found in central and southern Ontario. The Central newt has the most northerly range of all Eastern newt subspecies. In fact, the Central newt rangers further north than any other newt species in North America.

Also found in the Thunder Bay region are the Mudpuppy (*Necturus maculosus*), Blue-spotted salamander (*Ambystoma laterale*), Spotted salamander (*Ambystoma maculatum*), Northern two-lined salamander (*Eurycea bislineata*), Four-toed salamander (*Hemidactylum scutatum*), and the Eastern red-backed salamander (*Plethodon cinereus*).

Turtles

Western painted turtle

Of the 8 species of turtles in Ontario, only 1.5 can be found in the Thunder Bay region. I say 1.5 species, because Thunder Bay is home to the Snapping turtle (*Chelydra serpentina*), and the Western painted turtle (*Chrysemys picta bellii*), one of four subspecies of the Painted turtle (*Chrysemys picta*). Though the Turtle Tally gets many reports of Western painted turtles each year, most reported locations are too far south for this to be true. The Midland painted turtle (*Chrysemys picta marginata*) is found as far north as Wawa, and the Western painted turtle is found from the Hornepayne region, westward into Manitoba. Location is the best way to tell the difference between these two subspecies of turtles, as they are similar in appearance and difficult to distinguish. Ontario's other turtle species all prefer the warmer climate of the south.

Thunder Bay

Snakes

Of all the snake species in Ontario (and there are 15 species), only one sub-species is found in north-western Ontario and nowhere else. The Red-sided gartersnake (*Thamnophis sirtalis parietalis*) is found on the outskirts of rural Thunder Bay, from just north of Hearst, west into Manitoba. This subspecies differs from other gartersnakes in

that there are reddish patches or markings along the side flanks of the snake's body. A second unique feature of the Red-sided gartersnake is their incredible communal overwintering behaviour. Indeed, no other snake in the world lives in hibernacula which house up to 10,000 snakes at a time. Other species of snakes that can be found in north-western Ontario (though not exclusively) are the Eastern gartersnake (*Thamnophis sirtalis sirtalis*) and the Northern red-bellied snake (*Storeria occipitomaculata occipitomaculata*). The Red-bellied snake has bright red colouration on its underside. What is it about Thunder Bay that seems to attract red snakes?!

Red-bellied snake

Lizards

Northern Ontario may have suitable habitat for some turtles and snakes, but the Five-lined Skink (*Eumeces fasciatus*) is one reptile that just can't take the long, cold winter months. The range of the five-lined skink does not exceed 46° latitude, let alone the 48° Thunder Bay is located at!

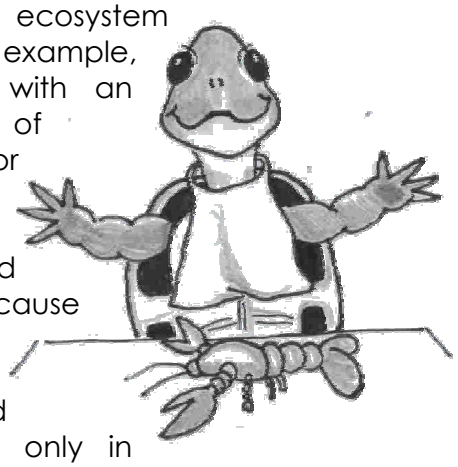
So if you are ever in northern or north-western Ontario, there are lots of amphibians and reptiles to see! If you do manage to spot something, please report your sighting to FrogWatch Ontario www.naturewatch.ca/english/frogwatch/on/ or to The Ontario Turtle Tally www.torontozoo.com/adoptapond/TurtleTally.asp?t=form. And if you're ever traveling across Canada, I recommend stopping in Thunder Bay — it's a great city!

Wetland Energy Budgets

By: Heather Marcks,
Curatorial Conservation Assistant

All wetland organisms - large and small, plants and animals - are essential to ecosystem health and are connected in what is called a food web. All living things get energy from the food they eat. The primary source of food and energy in a wetland food web is plant material. Plants receive their energy from sunlight. Many insects and other small creatures like snails and crayfish feed on algae and wetland plants to gain energy. These small animals are then eaten by fish, frogs and other animals who in turn are eaten by larger ones. As you move through the food web energy is passed from one animal to another. It is important to remember that the energy passed through the food web originates from plants and insects, snails and other small animals of the wetland.

Insects are often overlooked. Although small, these animals are numerous, diverse, and play a major role in wetland energy budgets. Because insects and other small wetland animals are sensitive to their environment, they have been widely accepted as important indicators of water quality and ecosystem health. For example, water samples with an abundance of mayfly, stonefly or caddisfly nymphs may indicate good water quality because these organisms are sensitive to pollution and generally found only in good water quality conditions. Diversity of wetland organisms is also very important in determining ecosystem health. Biodiversity provides the tools required for adaptation in a world where environmental conditions are constantly changing. Climate change, pollution and disturbances such as storms and invasive species can cause damage to habitat or long-term loss of diversity. Maintaining and increasing numbers of organisms found in ecosystems helps to safeguard from these and other environmental changes. The more diversity there is in an ecosystem, the better it will be able to withstand and recover from disturbances.



Food webs, energy flow and biodiversity are not simple topics. To complicate things, many animals eat more than one kind of food and therefore have more than one role in a food web. Omnivores eat both plants and animals, and herbivores and carnivores are not necessarily limited to one type of food. For example, snapping turtles eat fish, snails, carrion and other dead organic matter but also small plants and

algae. Bullfrogs generally eat snails, dragonflies and other insects but will also eat anything that they can swallow, including fish, smaller amphibians and even snakes! Bullfrogs are also prey for a host of predators, including herons, raccoons and mink.

All wetland organisms are essential to ecosystem health and play valuable roles in food webs. The disappearance of species, even small ones, could have cascading ecosystem effects.

Birds of a Feather Predate Together

By Maria Bennell, Bird Conservation Technician

The Great Lakes riparian zone is important habitat for wild bird species. In fact, over 100 species of birds inhabit the Great Lakes wetlands alone, including some very unique (e.g. grebes, bitterns), some very abundant (e.g. Red-winged blackbirds), and some very endangered (e.g. Black terns, Piping plovers) species. Given the fact that wetlands harbour a plentiful amount of insects, amphibians, and plants, it is no surprise that birds flock to these locations. Of particular interest are the behaviours, and often large size, of the carnivorous and carrion (feeding on dead flesh) feeders: the birds of prey. "Birds of prey" or "raptors" are general terms used to describe vultures, hawks, eagles, osprey, owls, and falcons. These fierce predators are sometimes thought to be nuisances because they may attack farm poultry or threatened wild bird, reptile, and amphibian species. However, they play an important functional role in their environment. As top predators, raptors are keystone species of wetland habitat: changes in their status can reflect changes in the population levels of their prey species and the environment.

Photo: Heather Marcks

Birds of prey hunt for food primarily using their powerful talons (claws). Owls – which are nocturnal (night) or crepuscular (twilight) hunters – have particularly keen vision. Great horned owls primarily eat small mammals, rodents, birds, and smaller owl species. However, they occasionally feed on reptiles, amphibians, fish, and insects. Diurnal (active by day) hawks are medium-sized raptors that hunt their prey by sudden dashes from concealed perches. Close to half of the Red-shouldered hawk's diet consists of reptiles and amphibians, making it the largest reptile and amphibian-consuming raptor in North America. The Red-tailed hawk, the most common hawk in North America, is an opportunistic hunter, feeding almost exclusively on small rodents. Reptiles and small birds make up the rest of their diet. Dashing through vegetation to scoop up its prey, the Cooper's hawk feeds mainly on birds, but also eats small mammals, amphibians, and reptiles.

Other (non-raptor) wetland birds display interesting behaviours during prey capture. Members of the heron family, which feed on fish, frogs, salamanders, lizards, snakes, birds, and aquatic invertebrates, are skilled hunters. For example, Great blue herons use their long legs to wade through shallow water to catch prey with sharp "spearlike" bills. The Green heron is one of the few tool-using birds, dropping bait (e.g. insects, earthworms) onto the surface of the water to hunt. The night heron prefers feeding in shallow waters, grasping its food with its bill. A technique called 'bill vibrating'(opening and closing the bill rapidly in water) creates a disturbance which may lure prey. Additionally, the Loggerhead Shrike, a smaller predator, kills its vertebrate prey (mice, small birds, small snakes, lizards, and frogs) by breaking their necks. With the ability to carry prey as heavy as its own body, the shrike locates a spot where it places its prey on thorns or barbed wire in order to eat it.

Photo: Dave Ireland

So, for all you frog-lovers out there, remember that amphibians, like other secondary and tertiary consumers, are the "energy packages" that sustain top predator populations. Additionally, these predators help to maintain healthy frog populations.

A Wet Home for an Unusually Air-borne Mammal

By: Daniela Rambaldini, Turtle Outreach and Stewardship Coordinator

An insightful bat conservationist once observed that, "If the world weren't batty, it'd be buggy!"

It's so true -- the world *is* batty! With more than 1000 different species around the world, the order Chiroptera (bats) comprises close to 25% of all mammals! It's no wonder that these unique and fascinating creatures are keystone species in many ecosystems, including wetlands.

Wetlands are among the most productive ecosystems on Earth and these habitats are wildlife havens teeming with a plethora of insect and plant life. Notorious for their voracious appetites, insect-eating bats are common wetland residents or frequent visitors in search of water and a solid meal of tasty insects.

A typical diet of an insectivorous bat consists of a smorgasbord of moths, beetles, mayflies, caddis flies, flying ants, and various dipteran flies (such as midges, crane flies, and gnats). What about mosquitoes? Yes, bats often supplement their meals with a serving of mosquitoes as well, especially when there is a concentrated abundance or 'swarm' of these pesky insects -- a nice comfort for those of us who enjoy exploring wetlands but dislike the uncomfortable swelling itch of an occasional female mosquito's bite.

Despite the often over-looked beauty and wonderment of insects and other arthropods, they play an extremely important role in the functioning and nutrient cycling of wetlands; however, just as crucial are their predators. While bats hunt keenly for nocturnal arthropods, most birds and fish feed on diurnal species (those that are active during the day). But arthropods are not the only wetland denizens that fall victim to bats. In South and Central America, the Frog-eating bat (*Trachops cirrhosus*) feasts on -- you guessed it -- frogs!! There are other tropical bat species that also eat frogs, as well as toads, amphibians, lizards, and whatever other wetland creatures they may find.

Species interactions such as these highlight the critical importance of biodiversity within any ecosystem, albeit food webs and predator-prey "links" are not the only ways that different wildlife species contribute to an ecosystem. Case in point: while they roost in trees, caves, or even

The Little Brown bat (*Myotis lucifugus*) is one of the most common bat species found in southern Ontario's wetlands.

local buildings, the world's only flying mammals not only help to keep insect populations at bay, but also contribute a healthy dose of nitrogen-rich guano (bat scat) to keep soils full of the nutrients that plants and fungi need to survive.

Evidently, bats are extremely beneficial and necessary members of wetlands, and great animals to encourage if you have your own pond. Installing a simple bat box, which is relatively inexpensive to buy or build, in a warm spot near your pond will provide a potential home for any one of Ontario's 8 arthropod-devouring bat species (check out Bat Conservation International www.batcon.org and the Toronto Zoos bat programme http://emandev.cciw.ca/partners/adoptapond/urbanoutback/part38.html for great tips and building plans).

In Southern Ontario, the most common species you'll see zipping through the night sky over a wetland or visiting your bat box is the Little Brown bat (*Myotis lucifugus*), a neat little critter that is just as endearing as its name suggests!

We can all thank bats, in part, for making wetlands into habitats that we can enjoy everyday.

Great Lakes Marsh Monitoring Program: Amphibian Data Used to Score Wetland Health

By: Tara Crewe, MMP Biologist
Reprinted from the Marsh Monitoring Program Newsletter Spring 2005 Number 11

Wetlands throughout the Great Lakes basin provide critical ecological functions that are valuable to both humans and wildlife. Despite their importance, the Marsh Monitoring Program (MMP) is one of few initiatives that gather long-term, basin-wide biological data. The MMP is working with the Great Lakes Commission (GLC) on the Great Lakes Coastal Wetlands Consortium (GLCWC) to determine how data gathered by MMP volunteers can be best used to help assess the biological condition of Great Lakes coastal wetlands.

To assess biological condition, the GLCWC is developing Indices of Biotic Integrity (IBIs), using indicator species such as birds and amphibians. An IBI is a measure of how the biological community at a particular site compares to the biological community at a reference, unimpaired site. It is essentially a report card that tells managers which coastal wetlands are in need of remedial activities, and whether remedial activities are working.

To develop the amphibian IBI, population attributes (species richness and maximum call codes of species guilds) were tested for their response to the level of surrounding landscape disturbance, which was measured using Geographic Information System (GIS) landcover data. Wetlands ranged from minimally disturbed (high proportion of marsh/woodland in surrounding landscape) to highly disturbed (high proportion of urban development/agriculture in surrounding landscape). Once we determined which population attributes responded to disturbance, we combined the scores for each attribute into an overall amphibian IBI for each wetland (Figure 1).

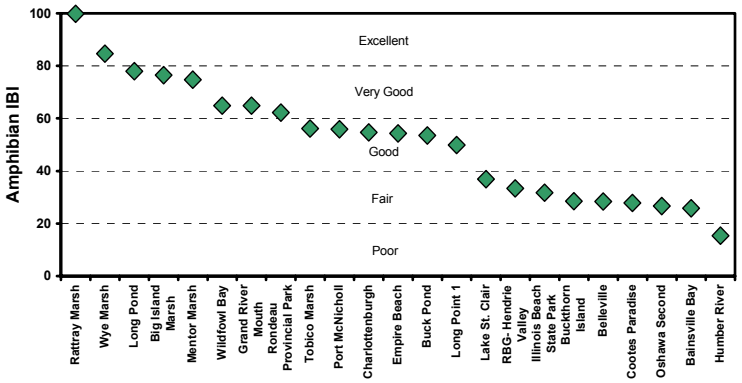


Figure 1. Index of Biotic Integrity for 23 Great Lakes coastal marshes surveyed by MMP volunteers. Wetland condition is classified based on the mean richness and mean maximum calling code of the amphibian community at each wetland.

IBIs were developed separately for years with high average Great Lakes water levels (1995-1998) and for years with low average water levels (1999-2003), because wetland communities may respond differently to various disturbances under different hydrological regimes.

Preliminary results suggest that Rattray Marsh has the highest biological integrity of all coastal marshes tested in the Great Lakes basin, followed by Wye Marsh (Figure 1). These marshes were classified as being in excellent condition. Alternatively, Humber River received the lowest IBI score and was classified as being in poor condition.

Overall, amphibian IBIs tended to decline as the level of disturbance in the surrounding landscape increased (Figure 2). This response was most

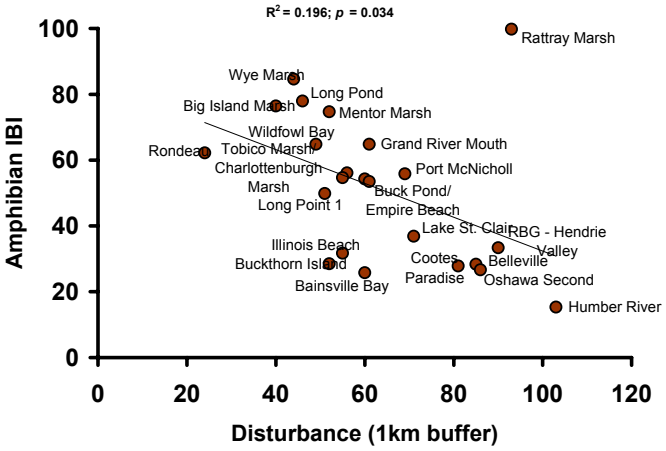


Figure 2. Relationship between amphibian IBI and landscape disturbance within 1 km of MMP wetlands surveyed for amphibians.

pronounced during high water levels. However, it is clear from Figure 2 that Rattray Marsh was an exception in that it received the highest IBI score even though it is located in the Greater Toronto Area, where the surrounding landscape is highly disturbed by urban development. Rattray Marsh is buffered by a considerable amount of forest and has been a Conservation Area since 1975. This long-standing protection has likely had a great influence on the retention of this area's biological integrity over time. Disregarding this outlier, amphibian data gathered by MMP volunteers reliably indicated wetland disturbance, and should therefore be considered as an indicator of biological health by the GLCWC.

The MMP is also developing IBIs using marsh bird data gathered by MMP volunteers. Expanding our knowledge of the effect of landscape disturbance on amphibian and marsh bird populations will enable better development and evaluation of conservation efforts to improve wetland health. Such important work simply could not be carried out without the continued support of our many volunteers.

For more information on the Marsh Monitoring Program visit www.bsc-eoc.org/mmpmain.html or contact Kathy Jone, Aquatic Surveys Volunteer and Data Coordinator by phone 1-888-448-2473 ext. 212 or by email aqsurvey@bsc-eoc.org.

Toronto Zoo Symposium and Forum

By: Daniela Rambaldini, Turtle Stewardship and Outreach Coordinator

In March 2007, the Toronto Zoo will host a Blanding's Turtle Management Symposium and Roads & Ecopassages Forum. The events will explore management and outreach strategies for Canada's threatened Blanding's populations, and create a partnership among biologists, urban planners, and road engineers for designing sustainable road networks in southern Ontario. For more information, please visit: http://www.torontozoo.com/adoptapond/BlandingsEcopassages.asp.

Conference sponsors:

Environment Canada Environnement Canada
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Great Canadian Shoreline Cleanup—Correction

Editor's Note: In our Summer issue we stated that ALL the Toronto and area TD Canada Trust Great Canadian Shoreline Cleanups were coordinated by the Toronto Zoo. We made an error. The Toronto Zoo is the proud coordinator of ONE of the more than 800 cleanups that happened across the country from September 16 - 24. The Vancouver Aquarium, who organizes the program across the country, has staff and volunteers right here in Toronto to help out with the more than 250 cleanups throughout Ontario. For more information about how you can get involved, visit www.vanaqua.org/cleanup or call the Toronto office at 416-484-7729.

Oh yeah, and Toronto has ports on Lake Ontario only!

Continued from page 1 …

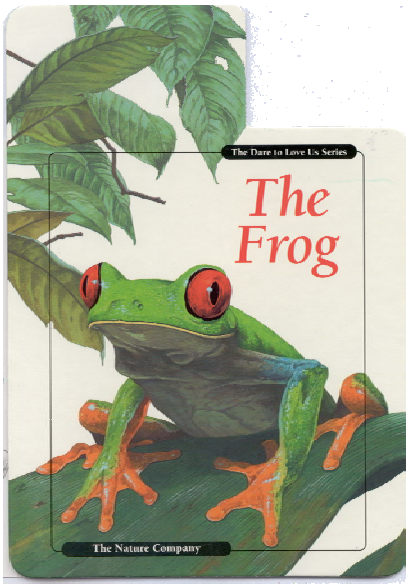
In the Summer 2006 issue of *Amphibian Voice*, 'Great Lakes Biodiversity', we gave you a taste of research activities and stewardship opportunities happening in the Great Lakes area, including our FrogWatch and Turtle Tally projects. In this issue, 'Great Lakes Biodiversity II', Tara Crewe, from Birds Study Canada's Marsh Monitoring Programme, expands on stewardship opportunities and illustrates how volunteer data collection is used to answer questions about wetland condition (p.6). Staff of the Adopt-A-Pond Programme provide informative stories about the biology of wetland communities and the amazing interactions that occur between bats, birds, insects, plants, and, of course, amphibians and reptiles.

The objective of the last two issues of *Amphibian Voice* is simple: provide basic biological information about the diversity of life in the Great Lakes wetlands and provide stewardship opportunities and success stories to encourage you to get involved in Biodiversity Conservation.

RIBBIT'S REVIEW - The Frog

Written by Ted Robertson and Jean Echols

Reviewed by: Heather Marcks, Curatorial Conservation Assistant



This fold out book is a great way for people young and old to learn about amphibians, and in particular frogs and toads. The book answers the popular question of 'what's the difference between a frog and a toad?' and dispels the myth that you can get warts by touching a toad.

Easy to understand language describes the life stages from egg to tadpole to adult frog, and along the way you learn about the physical changes that occur. Facts about how a frog eats with its sticky tongue, how some frogs change colour to blend in with their surroundings, and how you can tell where a frog lives by the form of its feet, make the book interesting and informative.

References help children to relate to the subjects - "Each egg is protected in a jelly-like covering, not a hard shell like a chicken egg" - and encourage the reader to use their new knowledge - "Look at the feet on the frogs in this book and guess where they live." Well drawn illustrations nicely demonstrate the books main topics. The real fun part about the book is the button on the front cover – push the button and listen to a frog Ribbit!

Volume 16, No. 3

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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