

Amphibian Voice

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Thunder Dance Turtle Island Conservation

By: Candace Maracle, Programme Coordinator

In the springtime, the Haudenosaunee people celebrate the Thunder Dance and acknowledge the return of the Thunderers, the Grandfathers, who bring the rains from the west to revive the plants and summon the wetlands back to life. This and other First Nation's teachings are among the Traditional Ecological Knowledge (TEK) that is valued by the Toronto Zoo's Turtle Island Conservation programme. Supported by Environment Canada's Aboriginal Funds for Species at Risk, the programme partners with First Nations communities to bring together keepers of TEK, Elders and local residents. Together, this invaluable team establishes the conservation needs within a community, and promotes the value of TEK.

Language is vital to reviving TEK and promoting Species At Risk (SAR) conservation and recovery. In support of language and TEK revitalization, the Turtle Island Conservation team is currently working on a number of initiatives in First Nations' languages (Mohawk and Ojibway). Currently, there is a turtle identification guide, the Frog Calls of Ontario CD, as well as turtle road crossing signs in both languages. The Mohawk sign (left, below),

features the image of a snapping turtle that resulted from a collaboration among the Turtle Island Conservation team, the Haudenosaunee Environmental Task Force, and the Toronto Zoo's Graphics Department. The Ojibway road crossing sign (right, below), features Woodland art generously donated by Anishnawbe artist, Peggy Pitawanakwat.



Other programme initiatives include: providing outreach education presentations in First Nations communities, which reflect the principles of respect, reciprocity and our responsibility to Mother Earth, curricula development, facilitating Elder/Youth dialogue, and promoting SAR monitoring programs in First Nations communities. We also

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hope to revitalize First Nations' ecological practices of sustainable living by collaborating with various partners and participants, which will be used in planning SAR conservation and habitat restoration.

Overall, the programme's focus has been to communicate the TEK and general biology of SAR turtles and wetland habitat. For example, students and adults have enjoyed learning about the 13 Moons teaching which relates to the scales (scutes) on a turtle's shell (carapace) to the annual cycle of the moon, the Haudenosaunee Creation story, which tells the story of how Turtle Island (North America) came to be, and the teachings which indicate the symbiotic relationship and interdependence of all life on Mother Earth.

UPCOMING EVENTS

- Join the Turtle Island Conservation team at the Toronto Zoo to celebrate **National Aboriginal Day!**

Enjoy:

- **Traditional Teachings and Storytelling**
- **Interactive presentation of drumming and dancing by Lost Dancers from Six Nations**

LOCATION: Savanna Picnic Site, Toronto Zoo

TIME: 10:00am – 4:00pm

DATE: Friday, June 20, 2008 (on Summer Solstice)

- First Nations' Biodiversity Summer Internships

Visit our website:

<http://torontozoo.com/adoptapond/tici.asp>

Toads, Toads, and More Toads

By Donna Speers



American toad

In spring 2006, our neighbours found six toads in the shallow water that had collected in their pool cover. The males' enthusiastic singing had attracted one female to the area and just hours before she was about to lay her eggs we netted the mating pair and put them in our backyard pond. By doing this, we ensured that the eggs would not be flushed down the storm drain when the cover was removed.

Mrs. and Mr. Toad swam around our pond and decided it would be a suitable place to live. They produced a never-ending string of eggs that draped over the stones, around the potted bulrushes and around the entire pond.



American toad egg masses

Then Mrs. Toad, having done her part, hopped up the cedar ramp and off into the garden with Mr. Toad still clinging tightly. He was about half her size. Later on, Mr. Toad returned alone and with the other rescued male songsters, began to sing. Their chorus rang throughout the neighbourhood and they sang us to sleep each night.

They were comical to watch. If one of the males plopped into the water, another one would jump onto its back to mate, thinking it was a new female entering the pond. The male on the bottom would then emit a release call and the two males would quickly separate and head in opposite directions. They would also jostle for the best spot on the log and belt out one song after another to no avail, because the one and only female had already left the yard. Within days

of the males leaving, the pond was black with wriggling tadpoles, and over the next few weeks, the tadpoles began to transform. It seemed that in no time at all they had developed their back legs followed by their front legs. There were tiny toads hopping everywhere measuring about half an inch in length. To me, they were a miracle. I tried to imagine what it would be like to be that small with nothing to guide you but your instincts and possible danger lurking at every turn.

A Turtle-riffic Time at the Turtle Stewardship and Management Workshop!

By: Christine Baptista, Turtle Stewardship Coordinator, and Ian McIntosh, Adopt-A-Pond Coordinator

Recently, the Toronto Zoo hosted a 3 day turtle stewardship and management meeting for 130 participants. The goals of the meeting were to discuss long-term viability of habitat complexes for the conservation of long-lived turtle species, as well as protection and construction of critical habitat, and controversial conservation practices such as headstarting. The first day consisted of two concurrent hands-on practicums: Wetland design and construction, and turtle rehabilitation. The two remaining days consisted of talks given by guests and keynote speakers from across North America.

The wetland design and construction practicum was led by Tom Biebighauser of the USDA Forest Service, an expert in creating man-made wetlands that look and function naturally. The practicum team arrived in the field at 9:00am, and by dinner time that evening two ephemeral ponds had been constructed on Zoo property. Ephemeral ponds (vernal pools) provide important habitat for many of Ontario's reptiles and amphibians including the Species at Risk Blanding's turtle. These two wetlands were specifically designed to create important breeding habitat for Gray treefrog populations in the Rouge Valley.

The turtle rehabilitation practicum was led by Dr. Kristy Hiltz from the Kawartha Turtle Trauma Centre, and Toronto Zoo vets Dr. Graham Crawshaw, Dr. Jean Paré, and Dr. Maya Kummrow. Attendees of this practicum enjoyed several presentations from the vets on



Pond Construction © AAP

various aspects of injured turtle care and rehabilitation methods. In the afternoon they applied some of what they learned to an actual rehabilitation session. Coconut shells were halved by the maintenance staff at the Toronto Zoo and participants cracked and then repaired the shell to simulate the repair of a turtle shell.



© M. Karch

Repaired coconut shell using brackets and wire.

The speaker sessions discussed basking site habitat, nesting sites, stewardship, overwintering, population habitat viability analysis (PHVA), and headstarting. Our three keynote speakers were Dr. Ron Brooks from the University of Guelph who spoke on turtle status designations and how they pertain to conservation efforts, Dr. Justin Congdon from the University of Georgia who

spoke on turtle life-tables and conserving adult turtles before juveniles, and Dr. Whit Gibbons also from the University of Georgia who spoke on turtle conservation as a whole, and keeping your passion and drive in times when conservation seems hopeless.

The meeting was a great success that educated and renewed our resolve to save and protect reptiles and amphibians and the environments they inhabit. Many thanks to those who organized, ran and attended the conference making it a turtle-riffic event!!

A New Subspecies of Common Reed Grass Invades Our Wetlands

By: Bob Bowles



Many people are aware of a European plant with a beautiful mauve flower called purple loosestrife that has been introduced into North America by garden planting that has become strongly established as an invasive plant in our wetlands due to media coverage by several groups. However, there is another invasive plant that is damaging to wetlands that many have not even heard about. The problem is that this new invasive is a subspecies and very similar to a native species of reed. The new subspecies may have established here as early as 1970 but was not recognized as an alien until the late 1990's. It is very difficult for the average person to distinguish it from the native species and since it is a grass without colourful, showy flowers it may go unnoticed. The plant is European common reed, *Phragmites australis australis* and looks almost identical to American common reed, *Phragmites australis americanus*. Botanists have found that the native subspecies has red to reddish-purple internodes at the base of the stem and lower glumes that measure longer than 4 mm. in length. The invasive European subspecies has pale yellow internodes at the base of the stem and longer, lower glumes measuring less than 4

mm. The highly invasive European subspecies has established itself recently in colonies along major roads and then is spread into nearby wetlands where it flourishes and crowds out native species of plants.



Invasive European common reed.

Wildlife and water flow within the wetland help spread the seeds to new wetland locations where colonies soon choke out the wetlands. It has become a major pest of irrigation and flood channels around the world and is able to in water up to 2 meters deep or on dry ground. Water draw-down which controls most aquatic plants has no effect on this subspecies. Sensitive wetlands should have buffer zones exceeding 1 km to prevent colonization of this invasive subspecies. The subspecies is now spreading across Canada from colonies in Ontario and Quebec and just been recently reported in western Canada and the Maritimes. It is expected that within the next 20 years it will be found in all wetlands with roads nearby. Monitoring of the two subspecies will be essential to protect the native biodiversity of Ontario wetlands.

To learn more about the environment and protecting the world around us join Kids For Turtles Environmental Education. Information can be found at www.kidsforturtles.com or email info@kidsforturtles.com or telephone 705-325-3149. To learn more about phragmites control visit www.torontozoo.com/adoptapond

The Awakening

By: Mandy Karch

Spring time is a very special season when the animals and plants that laid dormant over the winter months awaken. Spring arrives with the call of the song birds as longer daylight hours cue the symphony of voices and birds sing to attract a mate. The early rains revive the plants and summon the amphibians and reptiles to emerge from their overwintering sites.

During the winter ectotherms rely on physiological adaptations to survive the freezing temperatures, sometimes in the absence of oxygen (hypoxia). Behaviourally, animals may escape freezing temperatures by overwintering beneath the frost line underground or at the bottom of a deep pond, where water doesn't freeze and remains at approximately 4°C. Alternatively, animals may overwinter on land and cope with freezing physiologically using one of two strategies. First, animals may avoid freezing through the presence of proteins and sugars in their cells. Similar to windshield wiper fluid that prevents snow from freezing to the windshield, sugars prevent the animal's cells from freezing by lowering the freezing point of the cellular fluid. This protects the integrity of the cell, which if ice crystals formed, could be punctured and destroyed. If small ice crystals do form, the antifreeze proteins surround the crystal and prevent further growth thus avoiding physical damage to the animal.

The second overwintering method is to tolerate freezing. Hatchling painted turtles and wood frogs use this strategy. Wood frogs overwinter on land on the forest floor hiding beneath damp leaf litter to avoid dehydration. When ambient temperatures drop to freezing however, the frogs too will freeze. To avoid injury, ice crystal growth is initiated around bacteria found on the skin or in the gut, or around a protein. This way, freezing is controlled and ice crystal formation is restricted to the abdominal cavity and just under the skin. Ice accumulation in these open spaces is safe and does not interfere with the vital organs. As

much as 65% of the molecular water may be frozen and the frog enters a state of suspended animation as breathing and circulation cease.



Frozen wood frog.

By reducing their metabolic rate, animals with freeze avoidance or tolerance strategies are able to live for months without oxygen. Under hypoxic conditions, animals will shut down various physiological processes, thereby reducing the need for energy production. For example, a turtle's heart will only beat 5 times per minute when in the overwintering state. With the body's processes halted, there is little demand to circulate oxygen and nutrients and rid the body of carbon dioxide. However, should the turtle require oxygen, small amounts may be extracted from the water and absorbed through the lining of the mouth or cloaca (the vent in the tail).

As incredible as all of these physiological adaptations are, it is even more interesting how turtles specifically survive coming out of this state in the spring. Compared to the mammalian brain, which is damaged when deprived of oxygen and then further damaged when oxygen is re-introduced, the turtle brain recovers without any side-effects. Damage in the mammalian brain is caused by the overproduction of reactive oxygen free radicals that result from the sudden influx of oxygen. The mechanisms turtles use to prevent damage are 1) reduced production of these free oxygen radicals or 2) an advanced means of securing the radicals with a high level of antioxidants, or a combination of 1 and 2. Additionally, turtles may have more stable brain tissue that is either

resistant to damage or has ways of quickly repairing any damage that occurs.

The ability of our northern animal populations to survive freezing temperatures and emerge unharmed in the spring is truly remarkable. When you are lucky enough to see a basking turtle or hear the song of the frog in early spring think about the physiological adaptations that enabled the animals to survive the winter months and then come out ready to resume life.

For more information on winter survival techniques and the challenges amphibians and reptiles encounter when emerging in the spring go to:

- <http://www.naturenorth.com/winter/frozen/Frozen.html>
- <http://http-server.carleton.ca/~kbstorey/ftverts.htm>
- Milton, S.L. and Prentice, H. M. 2007.

Beyond anoxia: The physiology of metabolic downregulation and recovery in the anoxia-tolerant turtle. *Comparative Biochemistry and Physiology. Part A* 147:277-290.

A Green Future at the Toronto Zoo

By Dave Ireland

The Toronto Zoo has a strong record of environmental protection and energy conservation. We understand and accept that climate change is a real threat to earth's biodiversity, and that humans are largely responsible for global warming as a result of our use of non-renewable energy resources and the emission of greenhouse gases. We encourage people to lessen their ecological footprint on the earth.

Green Plan 2007

The Green Eco-Zoo Team (GEZT) is an advisory committee to the General Manager comprised of Zoo staff from all divisions and units. The "Green Team" addresses the environmental impacts of Zoo operations, policies and

procedures, and makes recommendations that will lessen our ecological footprint in the Rouge Valley and on the earth. The Green Plan sets aggressive targets for reducing CO₂ emissions and water consumption.



A few examples of our green efforts in 2007

- GET A G.R.I.P.! – new this year, our Green Rewards Incentive Program for staff and volunteers provides monthly challenges, lunch & learn seminars, and newsletter notices that raise awareness about global warming issues;
- Waste management –
 - we diverted ~55% of our dry waste and ~80% of our wet waste from landfills;
 - we diverted 10.2 tonnes of diapers from landfills;
 - the Toronto Zoo lead all North American zoos and aquariums in the ECO-CELL™ cell phone recycling program, diverting over 4500 phones from landfills and raising over \$2500 for *in situ* gorilla conservation;
- Greening our transportation fleet –
 - all ZooMobiles are powered by propane allowing you to ride on City of Toronto Smog Alert Days! This and other energy efficiencies helped to reduce our CO₂ emissions by 4% from last year;
 - we converted 12 staff vehicles to hybrid propane/petrol engines;
 - we reduced our use of petrol and propane by 19% and 11%, respectively;
- Sustainable operation management –

- All incandescent light fixtures have been replaced with 32W fluorescents, and we're in the process of converting to 28W super efficient fluorescents;
- Greenroofs of Australasia! Check out 900sf of greenroof as you pass the pavilion in the ZooMobile, or 300sf of greenroof near the pavilion entrance!
- City of Toronto Water rewarded the Zoo with a \$9500 cheque for water conservation efforts in 2007!
- On-site invasive species program –
 - We continue to manage the Canada goose population that spoils on-site waterways... Don't feed the geese!
 - We are currently re-surveying the site for major plant invaders, including dog strangling vine and garlic mustard... Can you spot these pests!
 - Our horticulture unit rescued native species from on-site construction projects and restored a NATIVE PLANT PARADISE!

The task at hand for society will require a change in collective core values. We must make sacrifices, and we must think past the short-term. As an animal conservation organization, the Toronto Zoo must be a leader in this movement, and must demonstrate that our actions, both positive and negative, affect all life on earth.



Participants of the 20 minute makeover.

IMPORTANT

Notice to all *Amphibian Voice* subscribers:

In support of Toronto Zoo's Green Plan, the *Amphibian Voice* is going paperless. We are sure you will understand our wish to reduce paper use, so this issue (Spring 2008) will be the **last** hard copy edition. If you would like to continue receiving the *Amphibian Voice*, and you have not already done so, please send your email address to aap@torontozoo.ca with the subject heading "Amphibian Voice Subscription". No use will be made of your address other than to mail out the *Amphibian Voice* and AAP update info. You can unsubscribe at anytime.

For those subscribers who do not have internet access, we will still run a limited hard copy version, but we require that you re-submit your mailing information, if you haven't already done so, to:

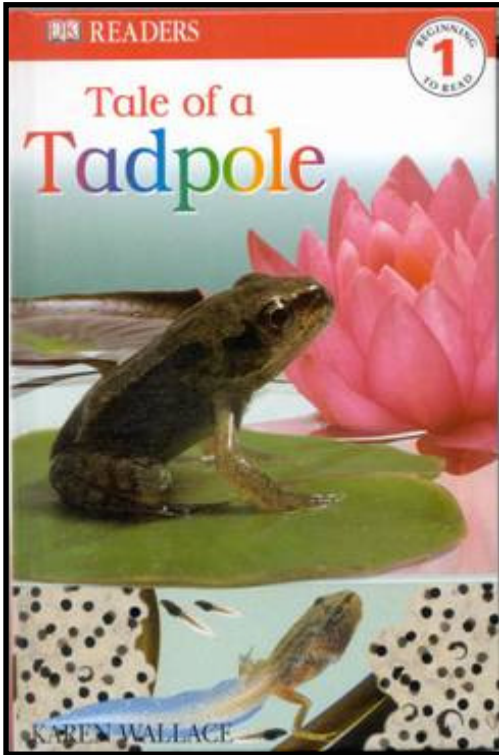
Adopt-A-Pond, 361A Old Finch Ave.,
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Thank you
for remaining a loyal reader of
Amphibian Voice.



Ribbit's review - Dk Readers Tale of a Tadpole

Written by Karen Wallace; Published by Dorling Kindersley Limited; Reviewed by: Ian McIntosh



This wonderful telling of tadpole metamorphoses is written for beginner readers. It is told with sharp photographs that grab the reader's eye and plenty of word repetition to build the reader's confidence.

Despite being targeted toward beginner readers this book is a great reference for general amphibian development. The tale is anatomically correct in its demonstration of a frog's life cycle from egg to adult. Basic concepts of ecology and interconnectivity are also shown through relationships between different species, including predation.

All around, *Tale of a Tadpole* is a great book for your young ecologist!

Published By: Dorling Kindersley Ltd.;
ISBN: 0789434377; List Price: \$4.99

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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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