

GRAND ACTIONS

THE GRAND STRATEGY NEWSLETTER

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Grand River
Conservation
Authority



The Grand:
A Canadian
Heritage River

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Cover photo

The Black Rat Snake is the most threatened snake in the Grand River watershed in spite of its value in rodent control around barns and farm buildings. The biggest enemies of this large, non-venomous snake are humans. Jason Culp provided this photo.



I BRAKE FOR SNAKES

by Jason Culp, Grand River Conservation Authority

Spring is in the air...and crawling along the ground. To some people this means getting out and planting a few trees; some people are thinking of returning to their favourite fishing spot; and some people are watching their gardens for spring's first show of colour. Others, myself included, are waiting for a show of a different type to begin. Nature's great snake show is due to start very soon.

Not everyone finds our legless friends as fascinating. For some people the very word "snake" is enough to cause cold sweats, combined with varying degrees of shakes and shivers. The official term for this is "ophidophobia", meaning, a fear of snakes. This fear can range from slight to extreme, with those suffering from an extreme fear of snakes, potentially incapable of even looking at their pictures in a magazine or newsletter. Many people believe that this is an irrational fear; learned behaviour as a child from a fearful adult, from witnessing another person being bitten by a snake and having a hysterical

reaction, or from being teased with a snake when younger. No matter how you look at it, in most cases the fear is genuine, and no one who suffers from ophidophobia should be belittled for it.

There are 17 snake species known to live in Ontario. Of these 17 species, 12 inhabit the varying ecosystems of the Grand River watershed, although some would say that the numbers should be 18 and 13 respectively. On a provincial scale, 18 may be a more accurate number, but the Timber Rattlesnake hasn't been seen by anyone in the province since 1941 and has been listed as extirpated by the Committee on the Status of Endangered Wildlife In Canada (COSEWIC). In the Grand River watershed there is the very likely possibility that the number of snake species is actually 13. In the northern and southern extremities of the watershed, where suitable habitat still exists, the Massasauga Rattlesnake may still be present. In both regions historical records and local knowledge indicate that not too long ago rattlesnakes

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SNAKES

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were relatively common. It is also worth mentioning that the Massasauga Rattlesnake is the ONLY venomous species of snake that is confirmed to still live ANYWHERE in Ontario.

Unfortunately many of these species are under pressure for their very survival. Increased urban and rural development, agricultural operations, road mortality and human persecution are taking their toll. Of the 17 species known to occur in Ontario, nine (53%) are listed as either species of special concern, threatened or endangered by COSEWIC. Of these nine species, four have ranges that extend into the Grand River watershed. With increased development, habitat is lost and fragmented, often destroying overwintering and egg laying sites for many species of snakes. Road mortality also takes its toll on many snakes, especially some of the larger species as they cross the roads in search of food, shelter or a warm basking spot.

Agricultural operations may also affect snake populations as mechanized farming practices, wetland draining, field runoff and the application of fertilizer and pesticides kill off small rodents, amphibians and invertebrates which make up the majority of most snake's diets. Snakes' being deliberately killed by fearful humans also continues to be a contributing factor to their decline. In the Carolinian Zone of Ontario, of which the southern range of the Grand River watershed is a part, human persecution is considered by many researchers to be one of the most prevalent factors in the decline of Black Rat Snakes. These large constrictors, snakes that subdue their prey by squeezing it until dead, are victimized because of their imposing size, curiosity, and affinity for farm buildings.

The four most critically troubled species of snakes in the Grand River watershed each have a unique reason



Small vertebrates, like this Northern Leopard Frog, make up the bulk of the diet for most snake species in Ontario. Photo: Jason Culp.

for their vulnerability, illustrating the wide range of hurdles the species as a whole is facing. Butler's Garter Snake is a species of special concern (COSEWIC) and in the Grand River watershed can only be found in the area around Luther Marsh. It is thought that its range once covered a much greater area, and that it is now limited by climate and the reduction of prairie or open habitat. The Queen Snake, which is designated as threatened, requires highly specialized habitat and is found predominantly in the middle region of the watershed. Queen Snakes require a large body of permanent water, sufficient cover along the banks and an abundant population of crayfish that are their staple diet. Urban encroachment and water pollution are two factors having a severe impact on this species. The Eastern Hognose Snake, another species of special concern, has been recorded from several locations in the watershed. This species prefers sandy soils, open areas and forest edge close to water, with an abundance of amphibians that make up its diet. Hognose Snakes are threatened by insufficient habitat,

possible competition from other species, and human persecution due to their defensive posture, which may include puffing out their necks and hissing violently when disturbed. The Black Rat Snake is arguably the most threatened species in the Grand River watershed. This snake is designated as threatened and the only other viable populations known to occur in Ontario are in Norfolk County and in Eastern Ontario. This is Ontario's longest snake having an average length of 106.7 to 183 centimetres, with the record being 256.5 centimetres or 8½ feet! The life-history features of this species, loss of suitable denning and nesting habitat, and human persecution are the main factors contributing to its decline.

Those of us familiar with the habits of our scaly counterparts often are perplexed by the inability of man and snake to get along. With all of the potential benefits snakes can have for the urban and rural landowner, why would anyone not want them around? A healthy population of snakes around your farm, house or cottage can be more effective at keeping the local rodents in check than the neighbourhood cats. Snakes of all species, shapes and sizes are also important components of our local environment. Snakes are, for the most part, secondary predators; meaning that they feed on a variety of prey items including rodents, small birds, frogs, toads, insects, earthworms and small fish, but are also a consistent part of the diet of many larger predators and scavengers. For those species of snake that lay eggs, many nests become the restaurant of choice for raccoons, and as juveniles, snakes are prey for just about every carnivore that is big enough to swallow a gummy worm. This includes frogs, fish, birds, and some turtles. As adults, the only thing that changes is the size of the animal that feeds on them, including skunks, fox, and various

raptors. Even scavengers such as opossums will dine on snakes if the opportunity arises.

I realize that people with my affinity for snakes don't comprise the majority of the human population. Snakes don't necessarily warrant our admiration, but they definitely deserve our respect. Snakes are one of the only species of animals in Ontario that are still intentionally killed for no reasons other than fear and lack of awareness. I enjoy their company, and have even gone so far as to offer several of them permanent residence in my home where they fascinate my relatives and friends, and I deliberately encourage their presence in and around my yard. So as spring approaches, before I start planting a few more trees, and watching for the first signs of life in my gardens, I'll be watching that dark crevice between the foundation and the front porch.... waiting for the true harbingers of spring to come out and flick hello.

You can learn more about snakes from these readily available resources: Conant and Collins. Peterson Field Guides—Reptiles and Amphibians of

Eastern and Central N. America. 1991. Species at Risk in Canada website: www.speciesatrisk.gc.ca Canadian Amphibians and Reptile Conservation Network website: www.eqbdqe.cciw.ca/partners/carcnet/intro.html Norfolk Field Naturalists—Natural Areas Inventory of Haldimand-Norfolk website: www.kwic.com/nfn/naiherp.htm



MILESTONES

Milestones are progress or products of *The Grand Strategy* Joint Work Plan.

Orthoimagery Makes Debut

By Christopher Eckstein, GRCA

Aerial photography is a tool that has been with us for a long time. Gaspard Felix Tournachon captured the first known aerial photograph in 1858, from a balloon over Bievre, France. Advances in equipment and film led to photographs being taken using kites and pigeons. Wilbur Wright took the first photograph from an airplane in 1909. Now most maps are created using some sort of remotely sensed imagery, taken from airplanes, satellites or by other means

such as radar. The art and science of creating maps using photographic images is known as photogrammetry.

Conservation authorities, municipalities, government agencies, businesses and community groups depend on information resources such as aerial photographs and maps to support essential programs and services. Until recently, aerial photography provided the major tool for giving us large scale maps of land features.

Maps, whether hardcopy or digital, are classified by a variety of means. Planimetric maps illustrate physical features on Earth's surface as two-dimensional objects. Topographic maps are distinguished from planimetric maps by including features that show the elevation of the terrain. These two types of maps are often combined to create a "thematic" map that shows information of particular interest such as wetlands.

Unfortunately, aerial photographs and topographic mapping throughout the Grand River watershed are, to varying degrees, outdated. Provincial topographic mapping, known commonly as Ontario Base Maps (OBM), were generated roughly 15-20 years ago. Federal maps, such as the National Topographic Series (NTS) are just as old.

Aerial photography and large scale mapping are used at the GRCA for determining the extent of natural hazards, wetlands, and floodplains. They provide key resource information to GRCA's planners and engineers when reviewing development proposals and municipal planning documents and are used for many other applications. Partnerships between the GRCA and member municipalities have provided newer aerial photographs and large-scale topographic mapping in selected areas such as Brantford, where in 1995 mapping was carried out through an



This aerial photograph shows the Grand River at Parkhill Dam in Cambridge.

ORTHOIMAGERY

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agreement between the GRCA and the city. Such partnerships, carried out through shared-cost arrangements, have proved beneficial and cost-effective to all involved.

Other tools developed for use at the GRCA include Geographic Information Systems (GIS), which can provide many layers of information on digital maps. For instance, onto a map of a particular area can be layered a map of the road systems, or infrastructure such as sewers or environmentally sensitive features such as groundwater recharge areas.

A new tool known as “orthoimagery” uses both aerial photography and a Digital Elevation Model (DEM) to create a realistic picture of the landscape which can be used to facilitate measurements of distances, angles, directions, and areas of special interest.

GRCA staff have long recognized the need for state of the art, watershed-wide, mapping information and tools. In November 1997, the GRCA invited other watershed partners to discuss a pilot project to provide first hand experience with orthoimagery. Before 1997, few jurisdictions in Canada had acquired orthoimagery. In 1998, orthoimagery was acquired for New Hamburg, in Wilmot Township. This pilot project provided important insight into the benefits of developing this product for use by GRCA and its partners.

In 1999, the GRCA hosted additional information sessions to report pilot results and discuss starting a shared-cost, multi-partner project. With overwhelming support, the GRCA proceeded and released a detailed Request for Proposal (RFP) in the spring of 2000. In order to make this tool more cost-effective and available on a wider basis than the Grand River watershed, the Upper



This aerial photograph shows a small stream with a protective buffer of trees and shrubs. This buffer reduces the risk of pollutants entering the waterway with runoff from the adjacent land.

Thames River Conservation Authority, and its municipal partners, joined the GRCA to expand the project area to include both watersheds. The combined areas include roughly 1.5 million hectares, of which approximately one million pertains to the Grand and its municipalities.

Working together, with the GRCA taking the leadership role, orthoimagery technology has now been developed that will enable *Grand Strategy* partners to work more efficiently and accurately. Additional benefits include the ability to:

- access positionally-accurate pictures of the landscape;
- monitor and report landscape changes;
- superimpose existing geospatial vector/raster data to identify areas of change;
- manipulate imagery within non-GIS environments, i.e., enlarge, reduce, crop and integrate with other business operations e.g., email attachments, written correspondence, reports, presentations and displays, etc.

For the GRCA, these new mapping tools will be invaluable for administration of the Fill, Construction and Alteration to Waterways Regulation, the delineation of natural hazards, the review of municipal plans, and many components of *The Grand Strategy*. Developing state-of-the-art mapping tools within a partnership has provided economies of scale for all partners, sharing of information and expertise, and the ability to update and analyze information with more confidence and accuracy.

Several products will eventually be made available. These include:

- aerial photography contact prints;
- imagemaps (roughly 30" by 30" standard paper-based maps);
- orthoimagery (georeferenced digital files); and
- contact and orthoimagery paper indexes.

To date, copies of aerial photography contact prints had been received and distributed to all municipal project partners.

To generate orthoimagery takes much longer, mainly due to the complexity of the processes involved and the sheer size of the project area—roughly a year or so in our case. Now, approximately 25% of the orthoimagery digital files had been received from the contractor. Delivery of the remaining images is expected by the end of March 2001. Hardcopy prints will be available shortly after. Partners, such as the Regional Municipality of Waterloo, already have their contact prints and orthoimagery, and their staffs are using them on a daily basis. Eventually, orthoimagery will be available to other potential users when the details and terms of delivery have been determined. Information will be published on the GRCA website at www.grandriver.ca as soon as it becomes available.

For more information on aerial photography and orthoimagery,

contact the GRCA at 519-621-2761, visit the website at www.grandriver.ca or contact your local municipal offices.

Business Water Quality Program—ROW

By Eric Hodgins, Region of Waterloo

Water quality is critical for both urban and rural residents in the Region of Waterloo. Region water supplies are taken from surface water and groundwater resources, and are influenced by the quantity and quality of both sources. Contamination of surface water and groundwater may result from both urban and rural land uses, and may be very localized (point source) or widespread (non-point source).

In recognition of the benefits to the Region of reducing rural non-point source impacts on water quality Regional Council approved the Waterloo Rural Water Quality Program (RWQP) in 1997. The program provides financial incentives to rural landowners to implement measures to improve surface water and groundwater quality.

In November 1999, the Region approved in principle a financial incentive program to address potential impacts from urban point sources of contamination. The objective of the program is to reduce the potential that spills or chemical releases may impact water resources. It will be modeled after the Waterloo RWQP but will be designed to reflect the different organizational structure of the business community and will be aligned with existing pollution prevention initiatives in the Region. The Region committed \$1.5 million over five years to the program. Environment Canada has also committed \$60,000 for the first year and may provide further funding in subsequent years.

The program is currently being

developed by a Steering Committee consisting of over 20 local businesses, business associations, and government agencies. The program will likely be open to all businesses within the Region but will focus on the manufacturing sector and those businesses located in Well Head Protection Areas around municipal water supply wells. It is anticipated that the program will provide up to a maximum of 50% of the costs to businesses to conduct a facility assessment, make capital and train staff in the areas of spill and pollution prevention. The program launch and final approval of the program structure is anticipated in May 2001.

WHAT'S HAPPENING?

Wings of Paradise

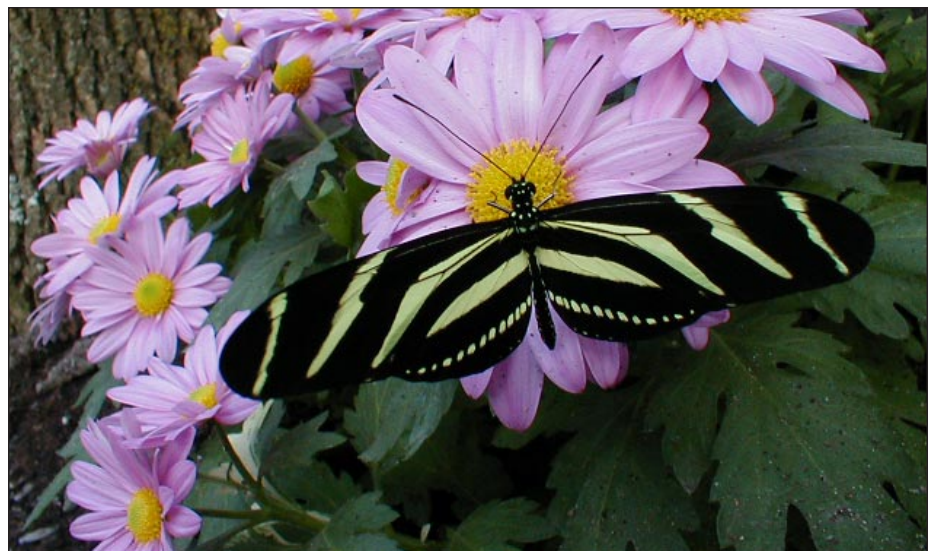
Imagine sitting in a warm tropical garden, admiring huge bright butterflies moving delicately among colourful flowers—in Ontario, in winter! This is now possible with the opening this February of the Wings of Paradise butterfly conservatory on Kossuth Road

in Cambridge. The building houses a 10,000 square foot conservatory with 75 species of tropical plants, a cascading waterfall, hundreds of butterflies, insect exhibits, a gift shop and café, and more. Butterflies seen at Wings of Paradise come from butterfly farms in Costa Rica, Kenya and the Philippines in the pupa stage. Visitors can watch through the windows of the “hatchery” as butterflies emerge and are released into the conservatory.

The lifelong dream of John Powers, well-known butterfly expert, became a reality when the new facility opened in February. Partnerships with Union Gas and Enermodal Engineering enabled builder Fred Scheidel to produce an energy efficient building that will save Wings of Paradise approximately \$8,298 per year in energy costs. Assistance with energy expertise and design was provided by Union Gas as part of their Design Advisory Program, which encourages builders to try new approaches to energy efficiency.

Because the building changes will produce energy savings of more than 25% from an earlier design, the project qualified for a \$24,894 grant from

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This Zebra Longwing butterfly from Costa Rica is one of the one of the 35 species in the Wings of Paradise conservatory, and one of more than 1,500 butterflies that can be enjoyed by visitors.

WINGS

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Natural Resources Canada's Commercial Building Incentive Program. The grant will be used to help finance the energy efficiency upgrades which are expected to reduce carbon dioxide emissions by 81 tonnes per year.

On opening day, Wings of Paradise was presented with an award of recognition from Natural Resources Canada for adopting an energy efficient design aimed at reducing greenhouse gas emissions.

The facility is open year round, and summer attractions include a garden centre, a butterfly meadow and a forest nature trail. School tours are welcome. Monarch Day in September celebrates the migration of the Monarch butterflies. For more information on opening hours, group bookings and admission fees call (519) 653-1234.

News From Luther

There is exciting news from Luther Marsh. This headwaters area in Dufferin County is "the jewel of the north" in the Grand River watershed. Luther Marsh has been designated as an Important Bird Area of national significance for both the large number of birds that concentrate during migration and for threatened species which nest within the wetlands at Luther Marsh.

The Important Bird Areas (IBA) program is an international effort to identify, conserve and monitor a network of sites that provide essential habitat for bird populations. Luther Marsh joins the international ranks in developing a conservation plan for birds and habitats.

Luther Marsh is jointly managed by the GRCA and the Ministry of Natural Resources. The partnership with the Important Bird Areas Program implemented by the Federation of Ontario Naturalists is considered to be another step in the recognition of the



Luther Marsh is a significant breeding and feeding area for ducks like this Green-winged Teal hen and her offspring.

importance of wetlands in the headwaters of the Grand River watershed.

The Monticello Project is also a new and complementary initiative undertaken by Ducks Unlimited (DU). DU has completed 80 hectares of wetland restoration in the northeast corner of Luther Marsh Wildlife Management Area near the hamlet of Monticello. This new wetland was completed in partnership with the Ministry of Natural Resources and the GRCA in the fall of 2000. The project consists of five earthen dykes and three water control structures. As spring arrives, water will be collected to partially fill the two wetland cells within the Monticello Project. By 2002 these cells will be completely operational.

In addition to the wetland habitat, The Grand River Foundation has generously supported a native grass component to the Monticello Project. This will enhance opportunities for nesting birds and other wildlife dependent on permanent grasslands and meadows, which are lacking in many areas in this part of the watershed. The remaining lands will be leased to local farmers and a rotational cropping management plan will be

developed as part of the overall strategy for the site.

A trail system will be set up to compliment the site and offer visitors an opportunity to experience wetland restoration first hand.

Walkerton Inquiry Submission

Conservation Ontario, the umbrella organization for Ontario's 38 Conservation Authorities, has released a research paper prepared for the Walkerton Inquiry. The paper is entitled "The Importance of Watershed Management in Protecting Ontario's Drinking Water Supplies". The purpose of this report is to define the role of watershed management in protecting drinking water supplies, to describe the current practice of watershed management in Ontario and to identify where current watershed management could be improved to benefit water supply source protection.

Staff from the GRCA have been heavily involved in preparation of the report, which is posted on the Walkerton Inquiry website at

www.walkertoninquiry.com for public review and comment. It is also available on the GRCA website at www.grandriver.ca

Planting Kiera's Forest

Kiera Schneider will be remembered not only for her sunny disposition and passion for reading and nature, but for the contributions made in her memory after her death last year at nine years of age. Many who knew how much she loved nature and the outdoors made environmental contributions including trees planted and donations made to The Grand River Foundation.

A special tree-planting day will be held at the Guelph Lake Nature Centre on May 12, 2001, in Kiera's memory. All are invited to come anytime between 10 a.m., and 3:00 p.m., and help start the growth of Kiera's Forest.

This day is also a reminder that there are many ways we can celebrate the memory of our loved ones. Trees are lasting, living memorials that provide ongoing environmental benefits for us all. Memorial contributions are also an important support to the environmental projects undertaken by The Grand River Foundation to improve the health of the Grand River watershed.

For more information about planting Kiera's Forest, call the Guelph Lake Nature Centre at (519) 836-7860. To make a contribution to Kiera's Forest or for information about The Grand River Foundation call (519) 621-2761, ext. 271.

Sunoco Earth Day Event

The GRCA, in partnership with Earth Day Canada, the City of Kitchener and, Suncor Energy Foundation, is staging a tree-planting event on Saturday, April 28th at Southwest Optimist Park, at Homer Watson Boulevard and Pioneer Drive, Kitchener. Hundreds of volunteers will

plant 1,000 trees and enjoy a day of family activities. Media partners are also being sought to help promote this event.

For more information contact Martin Neumann, (519) 621-2761, ext. 258.



LOOK WHO'S TAKING ACTION

Chad Drown

Chad Drown of Waterloo is an experienced environmentalist. For half of his life he has been an active advocate for responsible waste removal programs in his community, and an energetic participant and organizer of river bank clean up days.

Chad is twelve years old now with many competing interests such as school and hockey. However, he will still find time this April to organize friends and neighbours for an Earth Day collection of garbage at Kaufman's Flats on the Grand



Chad Drown (right) and Kevin Horn at an earlier spring clean up of Kaufman's Flats in Waterloo.

River in Waterloo. Two years ago, Chad took over the responsibility of organizing the clean up from his neighbours, the Earle family, who undertook the task for several years.

Chad first showed his interest in recycling and waste removal when he was two. In spite of rain or snow, he would wait patiently in the driveway for the arrival of the weekly garbage truck. At five, the scheduling of kindergarten conflicted with the rite of waiting for the garbage truck. This caused some difficulty as Chad obviously had a priority and it was not kindergarten. Sympathetic rearrangement of garbage truck routing took care of this problem.

Other environmental activities included gathering a neighbourhood petition at six years of age in an attempt to preserve area farmland from development. At ten, his comments on the future of garbage removal in Waterloo were well researched, organized into a folder, and presented to a surprised and impressed City Council.

Chad's ambitions for the future are not yet fully formed. His immediate concern is getting more people to take an interest in cleaning up Kaufman's Flats in late April. Last year 20 or so "regulars" turned up for the day. It bothers Chad that although the neighbourhood has grown by leaps and bounds and many neighbours use the area for recreation, only a few take responsibility for its welfare. Apart from the usual proliferation of maroon coffee cups, beer bottles and litter, last year's crew found dumped asphalt and scrap metal, and filled garbage bags from an area with regular garbage pick up. This year Chad will again post flyers around the new neighbourhoods and hope that some stewardship seeds will take root and flourish.

To learn more about the Kaufman Flats cleanup, call Chad Drown at 745-7353. If you want to volunteer, he will be pleased to hear from you.



DID YOU KNOW?

- The Red-Bellied snake is the smallest snake in the Grand River watershed, rarely exceeding 30 cm in length. It is a gardener's best friend, feeding mainly on slugs, although it will also eat earth-worms and beetle larvae.
- Most snakes lay eggs but some, like the Eastern Garter snake, give birth to live young. Baby snakes are independent of their mother from birth.
- Snakes shed their outer layer of skin several times a year. About ten days before shedding, a snake's eyes become clouded and whitish as the old skin separates from the new. The cloudiness clears just before shedding takes place.
- Snakes are ectothermic or cold-blooded, meaning that they get their heat from outside their bodies.
- Black or "melanistic" garter snakes with a white throat and chin can be found in some areas of the Lake Erie shore.
- The Eastern Smooth Green snake is a uniform grassy green above and

cream or white below. It feeds chiefly upon grasshoppers, crickets, caterpillars and spiders, although other small creatures are sometimes eaten.

- A snake has two smelling organs. As well as a nose, it has two small cavities in the roof of its mouth (Jacobson's organ) which are connected to the nerves of smell. A snake's tongue is part of its smelling system and can pick up odours from the air, transferring them to the Jacobson's organs. This is what a snake is doing when its tongue is flickering.



THE GRAND STRATEGY CALENDAR

April 26, 2001, Water Managers Working Group meeting, at 1:30 p.m., at the GRCA Auditorium, Clyde Road, Cambridge.

Saturday, April 28th, 2001, Sunoco Earth Day Tree Planting at Southwest Optimist Park, corner of Homer Watson Boulevard and Pioneer Drive, Kitchener.

Saturday, April 28, 2001, GRCA Parks with camping facilities open. Shades Mills Conservation Area opens May 5, 2001. For more information phone (519) 621-2761.

May 4-6, 2001, Ontario Trails Council Conference, in Sudbury. The theme is "Paths to Partnerships", and presentations will include topics such as trail building and management, and partnership opportunities to maintain, fund, link, and use trails. For information call Jason Nelson at (705) 674-4455, ext. 4632.

May 6, 2001, Sunday walks at the J. C. Taylor Nature Centre, the Arboretum, University of Guelph, from 2:00 p.m. to 3.30 p.m. Sunday themes include: May 6—Wildflowers; May 20—Spring and Migration; June 3—Late Spring Discovery Tour. For information call the Arboretum at (519) 824-4120, extension 2113. Participation free (suggested donation, \$3.00 per person).

Sunday, May 6, 2001, Dandelion Festival 4, Waterloo Park, Waterloo, from 11 a.m. to 4 p.m., rain or shine. Admission free, donations welcome. A fun-filled family day with special events for all ages.

May 12, 2001, Planting Kiera's Forest, at the Guelph Lake Nature Centre, Guelph. Drop by anytime between 10:00 a.m. and 3:00 p.m. to help plant a tree in memory of Kiera Schneider. For more information call the Guelph Lake Nature Centre at (519) 836-7860.

ABOUT THIS NEWSLETTER

This newsletter is produced as a communications tool by the Grand River Conservation Authority on behalf of the partners in *The Grand Strategy*.

This newsletter can be seen on the Internet at www.grandriver.ca

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For newsletter submissions

Contact the Editor, Liz Leedham, c/o Barbara Veale at the above address. Newsletter submissions must be made by the 15th of the month prior to publication, and may be subject to editorial change. Tax deductible donations and sponsorships toward the cost of producing this newsletter are always welcome.

Publications Mail

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