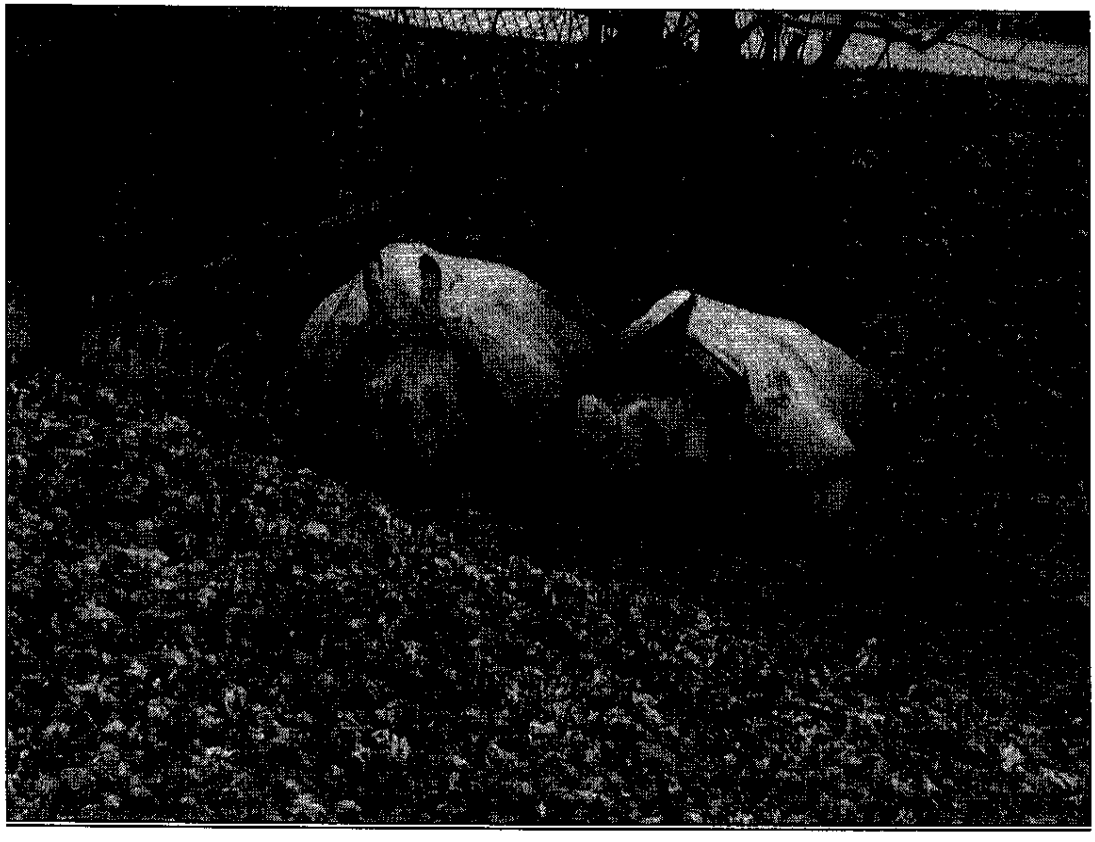
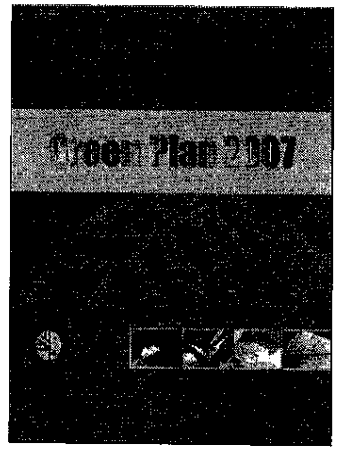
toronto ZOO

2009 ENVIRONMENTAL INITIATIVES REPORT



PREFACE

Toronto Zoo Green Plan



An action-based, goal oriented plan was created to guide the long-term sustainability of Zoo operations and our impact on the Rouge Park and our earth. The Green Eco-Zoo Team (GEZT) is a committee of Zoo staff representing all Zoo Branches that documents and reports directly to the CEO on Environmental Initiatives. The GEZT met with a professional facilitator over two intense meetings in April and May of 2007 to develop a document that would accurately represent our short-term goals while at the same time provide the framework for a carbon-neutral zoo within two decades. The Green Plan 2007 emerged from these meetings and was adopted by the Board of Management on 2007-07-17. The Green Plan sets ambitious targets of a 95% reduction of GHG emissions and a 40% reduction in water consumption by 2027. Three broad strategies embody the Plan:

1) **Green corporate culture**
2) **Green National Leadership**
3) **Green management of operations**

Short-term activities and long-term goals will be reviewed and updated every 3 years. The Toronto Zoo annual Environmental Initiatives Report will provide updates on completed and in progress staff and volunteer activities that satisfy Green Plan action steps.

Toronto Zoo Green Mission Statement:

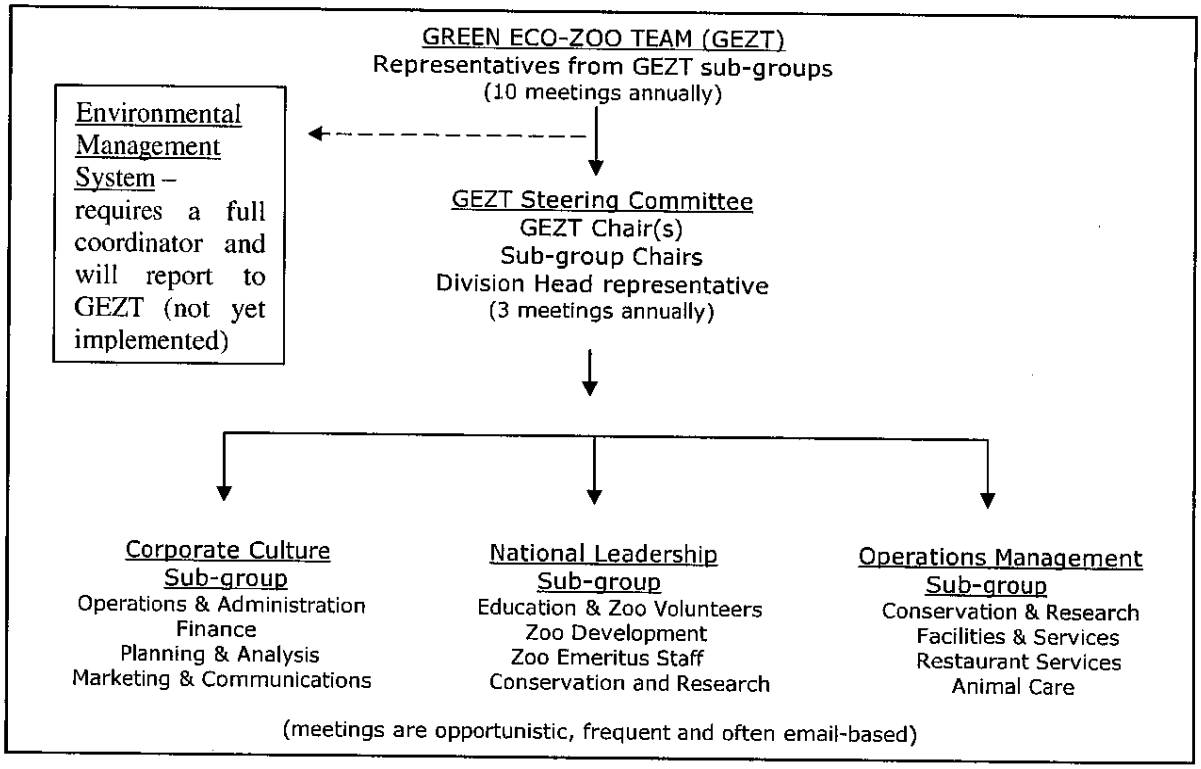
The Toronto Zoo has a strong record of environmental protection and of energy efficient operation management. The Zoo has stimulated staff, volunteers and the public to live sustainably in balance with Nature. We understand and accept that climate change is a real threat to earth's biodiversity, perhaps most acutely to our own species. We accept 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.

Report Organization:

Green Corporate Culture

Green Eco-Zoo Team (GEZT)

The organizational structure of the GEZT incorporates all divisions, branches and units of the Zoo and is outlined below:



In 2009 the GEZT met 9 times, and the GEZT Steering Committee met 2 times. All meeting Minutes and Agenda can be found electronically at G:\Green Plan\GEZT Committee.

Environmental Initiatives Report – Annual

The first Environmental Initiatives Report was submitted to the Board of Management in 1995. This annual report summarizes the activities and items initiated across all divisions in the previous year. This report is presented to the Board of Management annually.

Renewable Energy Generation and Demonstration – 2009 Report to the Board

This staff report was presented to the Board of Management in October 2009. It provides specific examples of small, medium and large-scale renewable energy generation projects that are applicable on the Zoo site, and ranks them according to their feasibility.

Of particular note in this report is the recommendation to not pursue large-scale (>500kw) wind turbines at Toronto Zoo and instead pursue small-scale wind turbine technology for educational and some energy subsidy purposes. The report also summarizes the status on the proposed >4MW biogas facility and explains steps required to see this valuable project succeed.

Towards a carbon neutral Toronto Zoo – 2008 Report to the Board

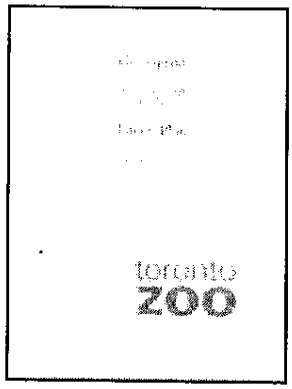
This staff report was presented to the Board of Management in October 2008. It provides examples of actions that will reduce and/or offset carbon dioxide (CO_2) emissions from Toronto Zoo facilities and operations in order to achieve our Green Plan targets.

The cost of achieving this target depends on what actions are taken and when. If creative public-private partnerships are developed, or large donations are received, targets will be achieved faster. No single action will achieve Zoo targets, but when taken in concert, the actions described in this report can result in a near carbon-neutral Toronto Zoo. Costs are provided for all actions listed.

The actions are summarized in the following three categories, described in detail in the Report:

I) Carbon offsetting (or carbon self-taxing)
II) Conservation and energy efficiencies
III) Renewable energy development

Toronto Zoo Greenprint – 2007



Since the inception of the Zoo in 1974, staff and volunteers have been on the leading edge of the environmental movement. Over the years, many small and large "green" initiatives have occurred, thanks to our dedicated staff and volunteer base. The Environmental Protection Committee (EPC) formed in 1995 to account for this movement and to maintain documents on progress for staff and volunteers for information on past activities. The Greenprint document spans from 1989 through to 2006, and is dynamic and will continue to be updated. The Greenprint does not need to be printed, as the virtual Table of Contents allows users to surf the large document much like an online webpage.

Environment First Policy (GEN-001)

The purpose of this policy is to encourage operational practices that promote a high standard of environmental protection. As a result, the Zoo has undertaken many environmental initiatives in waste and pollution reduction, energy and water

conservation, and habitat restoration. The Environmental First Policy was updated and approved by the Green Eco-Zoo Team in November 2007.

Environmental Purchasing Policy (FIN-007)

The purpose of this policy is to encourage eco-ethical partnerships with our many suppliers. The use of this policy has created opportunities for our Graphics, Custodial and Stores Units to source new products that illustrate a marked decrease in their overall ecological footprint. The Environmental Purchasing Policy was updated and approved by the Green Eco-Zoo Team in November 2007.

Green objectives in exempt staff Professional Management Plan (PMP)

Exempt staff was instructed to include the following Objectives into their 2008 PMP submission:

Performance Objectives:

1) To support the vision of the Toronto Zoo Green Plan 2007 and the Zoo's goal of sustainable operation management.
2) To align Branch or Unit objectives and cost centre budget lines with long-term (20-year) strategies and action statements identified in Green Plan 2007.
3) To satisfy short-term action steps (1-3 years) identified in Green Plan 2007.

Possible Measurement Criteria:

Branch or Unit activities supported Green Vision Statement (Eco-ethical partnerships, green funding plans, green staff culture, promotion of green programs and achievements, and sustainable energy use and production). Branch or Unit activities promote 1 or more of the 9 broad 20-year action statements of the Green Plan 2007. Branch or Unit activities satisfy 1 or more of the 27 specific 1-3 year action steps of the Green Plan 2007.

Green initiatives in cost centre manager budget submissions

Exempt staff with Cost Centre responsibilities was instructed to:

1) identify items or lines in their budget that support long-term strategies and action statements of the Zoo Green Plan (pg. 11).
2) identify items or lines in your budget that do not support long-term strategies and action statements of the Zoo Green Plan.
3) describe any items or lines in your budget that satisfy short-term action steps (1-3 years, pg. 12-14) of the Zoo Green Plan (2007-2010). Specifically, identify items or lines in your budget that:

- Comply with the Environmental Purchasing Policy FIN-007;
- Comply with the Environment First Policy GEN-001;
- Comply with and/or are affected by the Corporate Smog Alert Response Plan;
- Comply with the Toronto Green Development Standard;
- Improve the health of your staff;

- Assist the Zoo reach our goal of;
    - 95% reduction of CO_2 emissions by 2027;
    - 40% reduction in water consumption by 2027;
    - 70% diversion of waste from landfills by 2027.

Toronto Zoo Carpooling Program

During the peak season over 500 employees must make their way to and from the Zoo every day, coming from as far west as Guelph and Hamilton and as far east as Bomanville and Lindsey. Although we don't include the carbon emissions associated with this travel in our annual energy report, fuel use for employees probably contributes significantly to our overall carbon footprint. It was for this reason that CER staff initiated the Zoo's Carpooling Program.

Two large, laminated maps of the area encompassing employee travel were posted in the Administrative Support-Centre and the Front Entrance buildings and a colour-coded sticker system was used to allow "drivers" and "passengers" to easily determine where they could provide and find rides, respectively. The program was initiated in October 2009 and so the true test of its effectiveness will come in the summer of 2010.

Environmental Management System

A long-term goal of the Green Plan is to accurately measure and document our footprint on the Rouge Valley land and the greater region and earth. Specially, the Green Plan recommends the implementation of an Environmental Management System using the internationally recognized standard ISO 14001:2004. Currently, Zoo procedures and practices that impact the environment (air, water, soil and staff and our Collection) are documented in different ways by different staff and is not fully comprehensive.

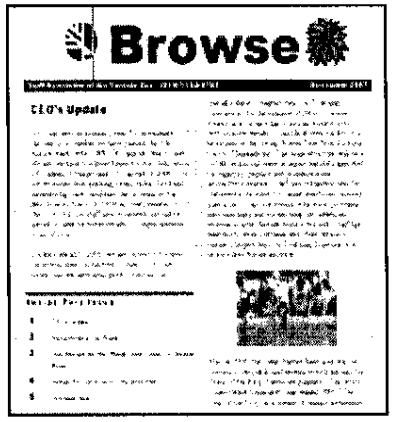
In 2009 an ISO 14001:2004 Gap Analysis was completed by staff and outside consultants. The final report contains many recommendations that will assist the Zoo achieve ISO 14001:2004 certification. During 2010 staff will assess and implement where feasible recommendations and prepare a report, including financial implications, to the Board in fall of 2010.

Lunch and Learns

A total of seven Lunch and Learn sessions were offered to staff in 2009. As well, different episodes of *Planet Earth* were shown on the big screen in the Administrative-Complex Boardroom.

E-Browse

Education staff began issuing the Zoo newsletter, Browse, electronically in mid-2007. This effort continued in 2009 to good reviews from staff. Paper copies are posted in all Zoo areas that do not have computer access. GEZT member updates and submissions on various environmental topics are routinely printed in Browse.



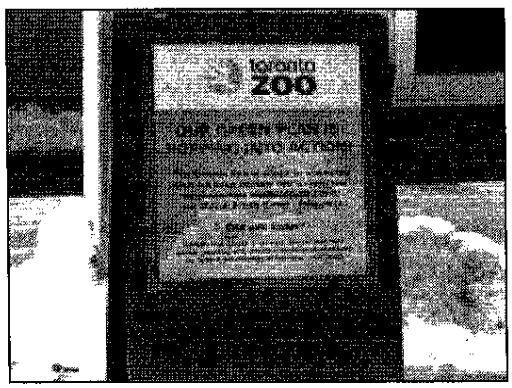
Good Food Box Program

Representatives of the Animal Health Centre (AHC) initiated the Good Food Box Program at the Toronto Zoo in 2005. This program delivers fresh, locally grown (as much as possible) fruit and vegetables to the Zoo semi-weekly. Local communities are supported in this manner, and gas emissions are significantly reduced, notably in the wintertime. A pool of about 40 staff members take part in the Good Food Box Program.

General conservation initiatives by Zoo staff and volunteers

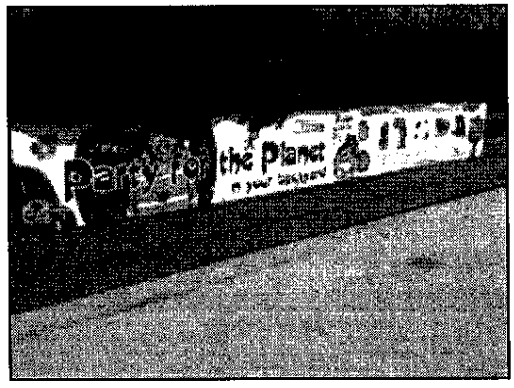
Zoo staff and volunteers are by nature environmentalists. Many "green" efforts happen every day at the Zoo, and we list just a few of them here:

- Paperless meetings are routinely held by PR staff, GEZT meetings, and large AHC meetings;
- Marketing have reduced the number of media kits printed by posting resources online;
- Lights are turned off when facilities are not in use, including walk-in freezers in the ANC;
- LCD computer monitors are replacing older, less efficient models;
- Small compost containers provided to individual units for organic matter have succeeded in diverting useful organic waste from the landfill;
- Printed banners for marketing promotions have increased since 2003. Graphics staff has been successfully recycling worn-out or outdated banners as drop sheets for the numerous painting projects around the Zoo;
- Animal Care staff routinely evaluate protocols to increase energy and water conservation;



Green National Leadership

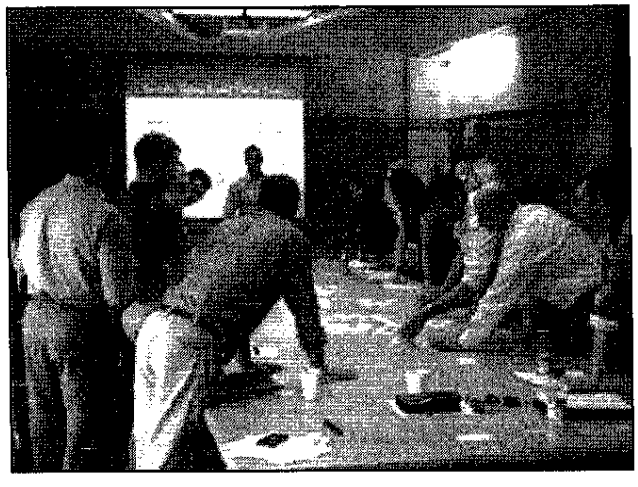
Green events and education programs



GEZT staff members from the Conservation, Education and Research division coordinate and develop events for Zoo staff, volunteers and visitors, as well as the broader community. In 2008/09, the several events were attended and lectures/workshops/presentations were offered. Events in included

- Participation in Earth Hour (March),
- Earth Day – Party For The Planet (April),
- International Biodiversity Day (May),
- Presentations and seminars to Zoo Camps and programs,
- 'Green' training to Zoo volunteers and Camp Councillors
- Booth at the City of Toronto Live Green Festival,
- Zoo Camp, Critter Crew, EnviroRangers and Operation Conservation include education for sustainable development messages (waste management, energy efficiencies).
- University lectures, including McGill University, University of Toronto at Scarborough, Trent University, McMaster University and the University of Guelph
- Mayor Miller's 20 Minute Clean-up (April)
- Great Canadian Shoreline Clean-up (September)

ECOexecutives Workshops (Experiential Connections for Ontario Executives)
www.ecoexecutives.org



ECOexecutives is a new program that consists of a series of 1-day sustainability workshops for executives of mid-sized (>50 employees) Ontario based and operating businesses. This business sector is the economic engine of our province and also the largest contributor of carbon emissions. We invited, free of charge, business leaders from this sector to the Zoo for an experience of a lifetime, one that provides both the inspiration (up-close and personal with polar bears, for

example) and resources (leading technology and marketing experts, for example) to make informed and cost effective decisions about their triple bottom line.

We booked 6 pilot workshops in the fall of 2009 including the launch day on September 22nd. The attendance roster was phenomenal, demonstrating the viability of the ECOexecutives program. In total, 72 high-level executives attended a workshop, and participants included the Director of Marketing for Pioneer Petroleums, the Vice President of JH Ryder Machinery, the Director of Operations of Maple Leaf Sports and Entertainment, the General Manger of the Markham Fair, the Coordinator for the Built Environment (Seneca College) and the Vice President of Facilities at the University of Ontario Institute of Technology, as well as senior managers from the Ministry's of the Environment and Economic Trade and Development.

We are thrilled that the pilot year of the Program was sponsored by the Ministry of the Environment *Community Go Green Fund 2009*. Other partners include:

- MOE's Ontario Environmental Leadership Program
- Bullfrog Power
- Mountain Equipment Coop
- TD Bank Financial Group
- Conservation Council of Ontario
- And others.

Preliminary results are posted on the website and final results from the first pilot year will be summarized in 2010. Several more workshops will be offered in the fall of 2010.

<u>The "Centre for Sustainable Life and Learning" project/concept</u>

• 2007 - a feasibility study was undertaken by consultants to document Zoo assets and determine how best to proceed with a proposal;
• Proposal is dynamic and flexible, and includes:

- 50,000sf, LEED Gold certified building proposed;
- Staff and partner office space, auditoria, classrooms, labs, and animal exhibits;
- Themes:

=> Education for Sustainable Development
=> Biodiversity conservation, Ontario focus
=> Green development standards

A "Centre" will effectively complement the United Nations Regional Centre of Excellence concept now called the Education for a Sustainable Toronto (see partnership section), and might serve as one of RCE Toronto's main

facilities;

Project Update:

- A partnership was formed in 2008 with Parks Canada to investigate opportunities on-site and in Canada's National Parks to showcase both organizations; the "Centre" is a profile project of interest to Parks Canada.
- Several meetings were held in 2009 with Seneca College, TRCA, the Canadian Energy Efficiency Alliance and others to re-investigate the applicability of an RCE Centre /facility at the Zoo.

ECO-CELL™ recycling program

In 2006 the Zoo joined forces with ~40 other zoos and aquariums from North America in a partnership with the US based cell phone recycling company ECO-CELL™. The objective of the program is to raise awareness about the negative effects of the cell phone and other small electronic device industries. Mining activities in Africa for minerals and metals used in the manufacturing of these products is disrupting lowland gorilla habitat, as well as the habitat of a great many other species. By recycling cell phones, pagers, blackberries, and other electronic devices, we can collectively decrease the demand for the raw materials used to make them. Program participants receive $0.50-$10 per device donated, and all money raised by the Toronto Zoo is donated to in situ conservation of lowland gorillas.

By the fall of 2007, more than 140 zoos, aquariums, and other wildlife conservation institutions had joined the ECO-CELL™ program, drastically increasing funds raised for projects like the Dian Fossey Gorilla Fund International. The Toronto Zoo collected more devices and raised more money than any other ECO-CELL™ participating organization in North American in 2007. Our totals in 2007 were: 4500 units, and >$2500. In 2008, the Toronto Zoo was ranked 4th among ECO-CELL™ participants, trailing our rivals from the Calgary Zoo by a few hundred phones!

In 2009, the Toronto Zoo once again regained the title of leading wildlife organization collecting cell phones for ECO-CELL, beating all 175 participating partners! Our totals for 2009 were: 4400 units, and >$2500 raised.

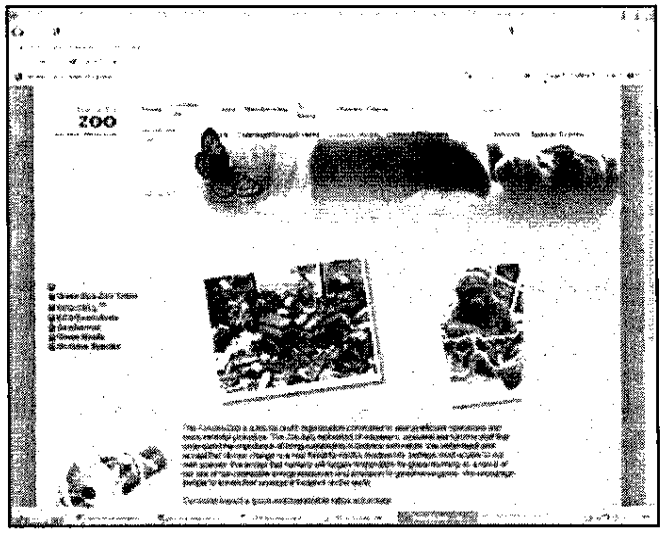
Eco-School™ certification of Education Branch

Zoo Education staff achieved a certified Silver Eco-School™ Status in 2008. According to Ontario Eco-Schools, the program, "has been designed collaboratively by school boards for school boards to incorporate environmental education as well as environmentally responsible action into the school setting. The program aims to influence young people during a formative period of life, and affect an exponential impact as children take a culture of conservation home with them." The Zoo is only the second non-formal education institution, next to the TRCA Kortright Centre, to become certified.

Zoo Education staff collaborated with the Royal Ontario Museum and other non-ofrmal education centres in 2009 to develop an "Eco-Centres" concept that will allow the Zoo and partners to market and measure student efforts on-site.

Website – www.torontozoo.com/conservation/green.asp

Website improvements to the environmental initiatives sections of the Zoo website have been continuing since 2007, with several updates in 2009. The Green Programs pages saw a significant increase in visitor attention due in large part to 7000 viewer hits to the ECOexecutives pages between September and November 2009.



The Green Programs section includes videos (Green Macaques), resources for going green (green roof how-to) and other useful and entertaining information.

COMPASS Food biodegradable products:

In 2008 the COMPASS Food Group included biodegradable utensils, plates and coffee cups into their supply, with the Peacock Café the pilot facility. All on-site barbeques and picnics are almost entirely biodegradable and most of the waste was diverted from landfills. In 2009 Compass adopted a site-wide biodegradable utensil and cup campaign and will continue to work with Materials and Collections staff toward increased landfill diversion.

Green Retail at Toronto Zoo

In 2008 the Main Retail Gift Shop got a 'green' makeover. An entire 120sf section of the main gift shop was dedicated to sustainable products, including stainless steel water bottles from Kleen KanteenTM, elephant poo paper products, organic and bamboo clothing and rechargeable flashlights and gadgets, among others. Our visitors responded well to these new products: a total of 15% of retail sales (or ~$350,000) stemmed from sales from green products. In 2009, the new Zootique shop has increased supply to the "Green Shop" section.

Green Partnerships with the Toronto Zoo

Zoo staff and GEZT members collaborate on various projects and programs with other conservation groups concerned with sustainable development and education, including:

♦ *Conservation Council of Ontario (CCO)* – www.weconserve.ca
The Zoo has been a member of the CCO for over two decades, and CER staff continues to participate in this grassroots movement toward creating a culture of conservation in the City of Toronto and the Province of Ontario. A new graphic portable display is being built using the template and resources of the CCO's WeConserve Campaign.

♦ *Education Alliance for a Sustainable Toronto (EAST)* - www.toronto.ca/esd
In 2005 the Toronto Zoo and members of the Education Advisory Committee headed up a group of partners to establish a Toronto Centre for Expertise in Education for Sustainable Development. Initially, a secretariat was established at the City of Toronto and it is currently hosted by the University of Toronto. EAST works cooperatively with provincial and national organizations to integrate with local sustainability challenges into the information and education flow of formal, informal and non-formal education in the Toronto region. The present focus is upon the City of Toronto specifically but initiatives are in place to include a broader membership across the Golden Horseshoe region. Dr. Rapley serves on the EAST Steering Committee.

♦ *Education Alliance for a Sustainable Ontario (EASO)* - www.sustainable-ontario.org
The Education Alliance for a Sustainable Ontario is a consortium of over 50 agencies, NGO's, school boards, colleges and universities in Ontario that support education for sustainable development throughout the province of Ontario. The vision of EASO is to "provide a forum for collaboration and leadership to advance education for thriving, diverse communities and ecosystems". EASO aims to integrate sustainability education in Ontario through policy, curriculum, capacity building and communication. Ontario ministries including the Ministry of Education and Natural Resources participate, and Dr. Rapley and Dave Ireland serve on the Steering Committee.

♦ *Biodiversity Education & Awareness Network (BEAN)* www.biodiversityeducation.org
The Biodiversity Education and Awareness Network is a third Green education group that has been active in Ontario since 2007. Performing the function of providing the education plan for the Biodiversity Strategy of Ontario (2005) and functioning as a specialized sub-group of EASO. A working group consists of 30 members representing institutions, organizations, universities, colleges, aboriginals, outdoor recreation, agriculture and media in Ontario. Dr. Rapley and Dave Ireland serve on the Steering Committee.

♦ *Ontario Biodiversity Council* – www.mnr.gov.on.ca/biodiversity
This is the advisory group to support the Biodiversity Strategy for Ontario (2005). Dr. Rapley made presentations to the council twice during 2007 and the Zoo hosted the group for a council meeting. The Toronto Zoo was very active with the Stewardship Group in 2008.

♦ *Polar Bear International* - www.polarbearsinternational.org

This is a non-governmental organization dedicated to the education and awareness of polar bears and the threat posed by global warming. Toronto Zoo developed a partnership with PBI in 2008. A student volunteer, Emily Hawling was sent to Churchill to participate in the Youth Leadership Program sponsored by PBI. Dr. Rapley is a member of the PBI Polar Bear Sustainability Alliance, and participated in PBI meetings and an expedition in Churchill including a special celebration at Wapusk National Park with collaborators from Parks Canada for the 2008 International Year of the Polar Bear. In 2009 two Animal Keepers, Lynda Bongelli and Heather Kalka participated in Cape Churchill activities founded by PBI. The Toronto Zoo is an Arctic Ambasssador for PBI. The partnership with PBI will greatly assist development and implementation of the Tundra Trek exhibit. Robert Bateman and singer Chantal Krevasiak participated in the opening sessions for the Tundra Trek in August 2009.

♦ *Green Tourism Association* – www.greentourism.ca

As a member of the Green Tourism Association, the Toronto Zoo supports the development of an urban green tourism sector in Toronto and can be found listed among the members on their website. The Green Tourism Association is a non-profit organization that works collaboratively with a network of businesses, community and environmental groups, government agencies, heritage and cultural organizations, and individuals. The mission of this association and its affiliates is to develop and cultivate a green tourism industry within the Toronto region. An ecologically sound industry fosters appreciation of and respect for diverse cultural and natural heritage, and strengthens local economies and communities.

Links with the City of Toronto

Zoo staff and GEZT members work with other Departmental and agencies, boards and commissions staff on the following committees and working groups:

♦ *City of Toronto, Climate Change, Clean Air and Renewable Energy Plan*

Mayor David Miller established this committee to engage City departments and affiliated agencies, boards and commissions (ABC's) in an integrated process to develop a Green Plan and facilitate programs across the City.

Conservation, Education & Research staff participated in numerous workshops and planning sessions. The exercise resulted in an extensive networking of departments and agencies coordinated by the Toronto Environment Office. City of Toronto's official 'Green Plan' was adopted by Council in July 2007. Significant funding opportunities through the Toronto Hydro Endowment Fund were identified. The networking and cooperative work continues. All the departments and ABC's, including the Toronto Zoo, presented reports to the City of Toronto, Environment and Parks Committee and follow up reports on Green progress at the Zoo have been provided.

♦ *Smog Alert Response Team*

Facilities & Services staff provides valuable input to the City of Toronto Smog Alert Team and the Zoo is capable of running our operations uninterrupted due to our use of propane during smog events. GEZT members assist Facilities & Services staff reviews the Zoo's smog Alert Policy every year. Smog Alert Plan

Staff continued to implement a Smog Alert Plan for the Zoo as a component of the City of Toronto Corporate Smog Alert Response Plan. The plan is activated on Smog Alert days and Zoo operations are modified to reduce emissions that contribute to poor air quality and smog. We have committed to suspend pesticide spraying; postpone non-essential use of vehicles on and off site for deliveries and errands; suspend the use of oil-based paints, solvent and cleaners unless required for disinfection; suspend the use of horticultural equipment and sweepers except where required for public or animal health and safety; and refuel essential vehicles early in the morning or after sundown whenever possible. Additional modifications were made specific to individual unit operations.

- *West Nile Mosquito Monitoring Program*

Animal Health Centre staff are leaders in animal disease research. As such, vets and student research assistants have helped further policies on mosquito monitoring (larval and adult) as well as analyzing the vectors responsible for the transmission of the West Nile Virus. All standing water, ditches and holding containers and natural ponds are monitored and larval of the genus Culex. are routinely eliminated with the save use of larvicide's specific to these invertebrates.

- *Waste Diversion Committee*

Horticulture & Materials staff participates with other City of Toronto ABC's on this committee with the objective to cumulatively achieve a 70% waste diversion level for all City of Toronto operations. Anne-Marie Burrows represents the Zoo on this Committee. The committee met 4 times in 2009 and will continue to meet in 2010.

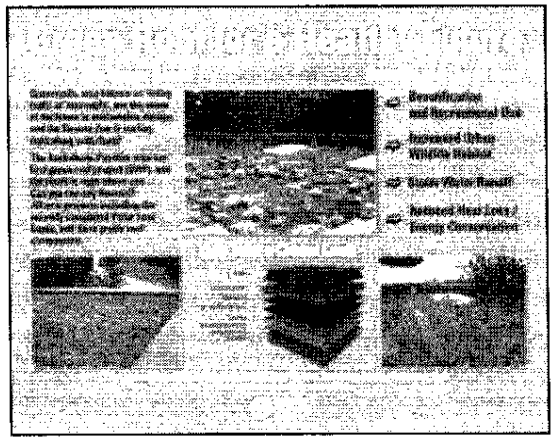
Green Management of Operations

Green Macaques! Project

The goal of the Green Macaques! Project is to raise awareness about energy demand for space heating and cooling in Ontario, and to educate and inspire our visitors about sustainable solutions. Space heating and cooling represents ~60% of energy use in Ontario, and the dominant source of fuel comes from the non-renewable sector. Conservation and energy efficiency is very important, but to achieve sustainable development a change in fuel source is necessary as well. Natural Resources Canada states that geothermal systems have the least environmental impact of any space heating technology on the market today.

The Green Macaques! Project will demonstrate the power of geothermal energy on a scale understandable by students and our public. The $112m^2$ (1200sf) outdoor area of the exhibit will be an oasis of heat in the middle of winter, contrasted against the snow and ice of the Rouge Valley. The Green Macaques! Project will visually and textually demonstrate geothermal technology in action, and visitors will be permitted to touch and feel the warmth of a (non-animal) section of the exhibit. The project was completed February 2009. The Zoo appreciates a grant award from the Ontario Ministry of Energy's Community Conservation Initiative, the Toronto Atmospheric Fund and Bullfrog Power toward this unique, and sustainable, Zoo project.

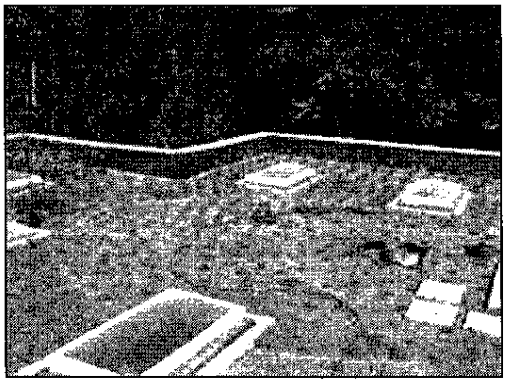
Green roofs – year 2



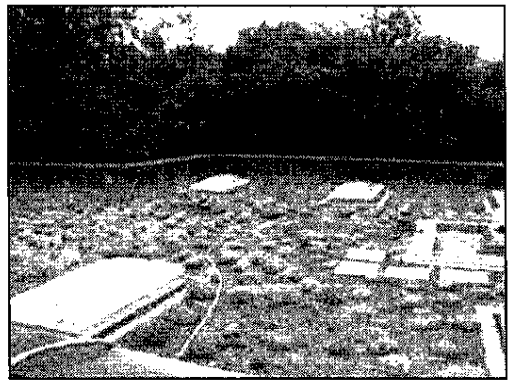
Green roofs, also known as 'living roofs' or 'eco-roofs', are the wave of the future in sustainable design, and the Toronto Zoo is surfin' right along with them! While the term 'green roof' could mean many things, it refers here to a roof with one or more extra membranes, including a waterproof and root-proof section that is covered by various types of vegetation. Below, an illustration of the various layers that makes up a green roof.

What will green roofs do for the Zoo and its visitors?

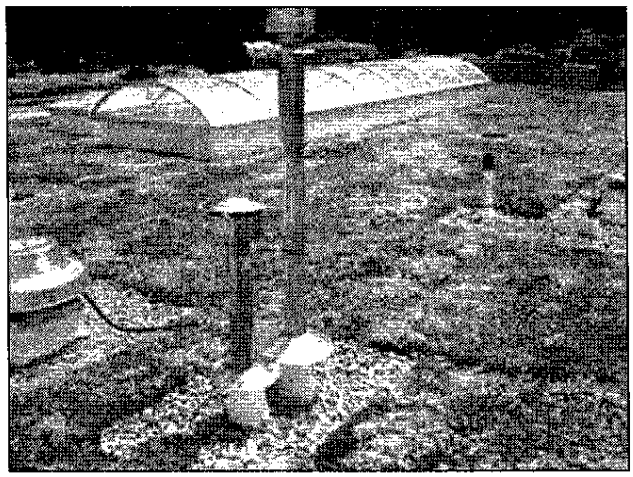
- Filter particles from the air and turn carbon dioxide into oxygen. 1.0 m^2 (10.76 ft^2) of uncut grass can remove 0.2 kg of particulates from the air and fulfill one person's oxygen requirements during one year!
- Cool air around the building, reducing the *urban heat island effect*. This effect describes the phenomenon of cities being several degrees hotter than the surrounding countryside due to the replacement of natural landscape with hard, impermeable surfaces. Recent studies have indicated that greening just 6% of the City of Toronto's rooftops could reduce summer temperatures by 1 – 2°C, saving an estimated $1.0 million in energy costs/year.



Australasia green roof – June 2008



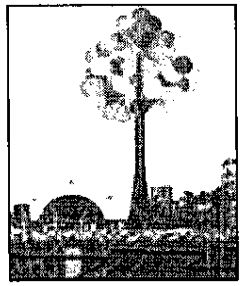
Australasia green roof – June 2009



Polar bear holding, Tundra Trek, 5000sf intensive green roof – Year 1 (2009)

Project Management

Achieving our Green Plan targets depends equally on staff conservation behaviour, and decisions made and projects completed by our Facilities & Services staff. Energy and water consumption and waste production must be reduced substantially over the next 20 years if we are to lower or eliminate our ecological footprint on the Rouge Valley ecosystem and the earth.

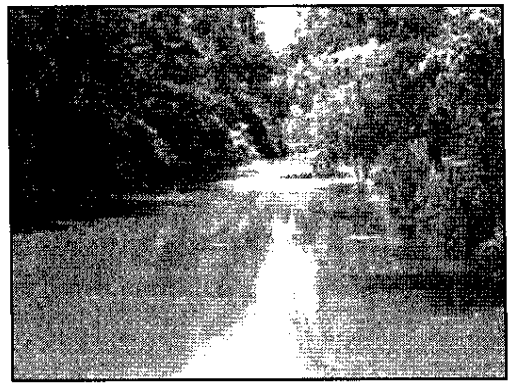


The adoption of the Toronto Green Development Standard for major new and retrofit projects on the Zoo site is a good direction. The TGDS is a volunteer-based building standard created by the City of Toronto and partners. The TGDS incorporates international protocols like Leadership in Energy and Environmental Design (LEED) but also incorporates protocols that are specific to our region and climate. All contractors and design teams working with the Zoo will follow, where applicable, the TGDS.

Waterway Management

In 2009 a Waterway Committee was formed and consists of Curatorial, Horticulture and Facilities and Services staff. Dave Ireland chairs the committee. The committee will sit 4-5 times per year and will report to the CEO. The committee builds upon over 20years of knowledge from a dedicated group of veteran staff, and will work towards implementing recommendations from past studies.

The artificial waterway has a history of chronic problems associated with storm water runoff, nitrogen loading, and algal blooms notably during the summer heat. The waterway is a partially closed loop system with pumps at the terminus that send water flow back to a waterfall at the system head. Some runoff at the terminus is held in a pond at the south end of the Zoo. The system is approximately 2km long and extends throughout the tablelands of the site. Generally, water is 1-3 meters deep with some sections reaching 4meters.



A Waterway Study was initiated at the end of 2004. After careful investigation and discussion with the Zoo, Harrington and Hoyle Ltd. landscape architects proposed man-made structures such as fencing to restrict movement of waterfowl, as well as dredging and wetland construction. Some recommendations from the study were implemented, and many were not. Horticulture staff restricts the use of waterway water for irrigation, particularly on turf areas

accessible by the public. This study will continue to be used to plan future improvements to the waterway.

During the design of the North Zoo Site Development project, initiated in 2009 and scheduled to proceed in 2010, contractors will be advised to use techniques outlined in the Waterway Study. Due to the size and nature of this project, as well as the Zoo's high environmental expectations, we anticipate waterway improvements to be ongoing for a number of years.

Americas Picnic Area Landscape Naturalization

As part of the North Zoo Site Redevelopment project – Phase I Tundra Trek, Horticulture staff restored a 0.6Ha parcel of forest and designed a unique picnic site for Zoo visitors. The site was cleared of invasive species, including an infestation of dog-strangling vine, and replanted using salvaged tree and shrub species from the construction zone, our own native plants grown in the green houses and other native plants from local providers. Picnic tables and a limestone/mulch pathway allow visitors to eat their lunch or just have a break in a relatively secluded wooded grove! The site is now a demonstration piece for visitors on the natural ecosystems we have in Ontario.

Invasive Species Management Program

Invasive alien species are defined as an organism that occupies habitat where it is not naturally occurring and are often transported by human based vectors. The IUCN defines invasive species as the second leading threat to biodiversity. Currently, Toronto Zoo is monitoring and in some cases actively managing several invasive species threatening the Great Lakes and the Rouge Valley. Two projects Zoo staff are conducting are:

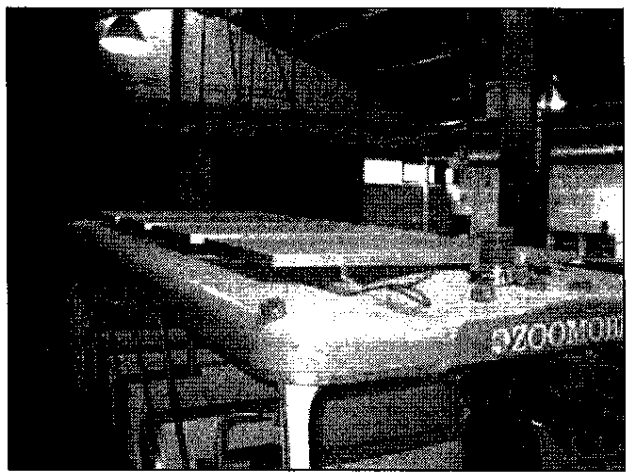
- Canada Goose (*Branta canadensis*) (Animal Health Centre staff) - A large population of Canada Goose remains on Zoo grounds throughout the year and causes substantial eutrophication of our waterways. Their feces is either directly deposited into waterways or it leaches in via rain and run-off. Several techniques to eliminate or decrease the goose population have been attempted and active management continues.

- Garlic Mustard (*Alliaria petiolata*) – Garlic mustard is a member of the mustard family and originates from Europe and parts of the Asia and Africa. The biennial plant was introduced to North America in the 1860s where it was used for culinary and medicinal purposes. Garlic mustard has become a prominent species within the Rouge Park and Toronto Zoo site. A scientifically approved management technique is to pull the plants during the flowering period in mid-May, and continue to do so until the seed bank is exhausted. Seeds remain dormant in the soil for 5 years. Disturbed soil should ideally be replanted with native ephemeral flowers, shrubs and tree species.

In 2008 the Toronto Zoo held its first Garlic Mustard Pull. In partnership with Evergreen and UTSC Community Partners, CER and horticulture staff pulled 850 pounds of garlic mustard out of ~12Ha of the Core Woods area of the Zoo (a relative fragment of the Rouge Park). In 2009, the Zoo and partners from TELUS, Seaton House, LEAF, Evergreen and UTSC pulled over 4200 pounds of GM! The following day a group of high school students joined CER and Horticulture staff and planted 350 native ephemeral flowers, several shrubs and a ceremonial tree.

Transit & Fleet

The Transit Unit is responsible for the maintenance of 22 medium or large vans and trucks, 10 very large trucks, a garbage packer, an ambulance, several all-purpose Gators, a fleet of electric golf carts, and a fleet of propane powered Zoomobiles. We take the environmental impact of our vehicles seriously at the Zoo. Our Transit staff has initiated many improvements, for example the conversion of 12 vehicles to propane/gas hybrid engines. The conversion allows for the operation of vehicles on smog days. In 2007 and 2008, Transit staff tested solar power golf cart technology on-site. Conclusions and recommendations were positive, and in 2009 the Zoo purchased 3 solar powered gold carts and 2 solar powered utility carts.



An exciting project that was initiated in 2009 was the full conversion of one of our Zoomobiles from propane to electric with the bulk of the energy coming from 16 solar photovoltaic panels mounted to the roof. This project is being executed completely in-house with Transit staff installing and testing the new vehicle. We hope to showcase the worlds first solar-powered Zoomobile in 2010.

Waste Management

Co-mingled recycling started in earnest at the Zoo in 2002 in response to the closure of the Keele Valley landfill site and the inevitable levy of 64$/tonne placed on garbage by the City of Toronto. Our waste diversion rate in 2003 of 31% was the start of our aggressive plan to divert >80% by 2010, in alignment with City operations. In 2006, our diversion rate was just over 50% and was 55% in 2007 and was 62% in 2008. In 2009 we continue to excel by achieving a 66% diversion rate (see **TABLE 1**).

Management of our organic or wet waste is important because we produce a significant amount per year. In 2008 and 2009, the Zoo processed 2130 tonnes and 2800 tonnes of organic waste, respectively; processing includes the collection of waste from animal areas, Horticulture Centre, and offices and other buildings.

TABLE 1. The total waste (metric tonnes) diverted from landfills itemized by material and year is provided below:

MATERIAL	2006	2007	2008	2009
Bones	32	33	16.8	17.1
Cardboard	52	54	63	68.83
Co-mingled recyclables	126	149	127	132
Diapers	9	10.2	2.1	0
Fluorescent light-bulbs	0.25	0.25	0.31	0.38
Hazardous waste products	0.75	0.75	4.1	5.2
Organic waste*	2150	2050	2130	2800
Paper	3.4	4.1	9.5	6.2
Plastics	1.8	2.4	6.7	5.8
Skids / Pallets	1	1.6	10.5	11.2
Wood	16	21	36	38.6
Misc. Items**	4.8	7.1	77.1	81.2.5
Total weight recycled	**264 tonnes**	**308tonnes**	**404 tonnes**	**3615 tonnes**
Total weight to landfill	**245tonnes**	**255tonnes**	**245 tonnes**	**1825 tonnes**
Waste Diversion	**52%**	**55%**	**62%**	**66%**

* Organic waste is collected and stored on-site, and is not included in waste diversion ratio

** Misc. Items include oil filters, batteries, scrap metal, tires, cell phones, and furniture

Utilities

TABLE 2. Total GHG Emissions by fuel type (tonnes of CO_2) for 2005-2009 (after adjusting for billing period, weather conditions and energy costs):

Year	Electricity	Natural Gas	Heating Oil	Petrol	Diesel	Propane	TOTAL
2009	**2587**	**3578**	**42**	**174**	**187**	**84**	**6652**
2008	2567	3434	51	170	160	79	6460
2007	2779	3778	53	197	137	41	6984
2006	3626	3202	32	117	170	13	7160
2005	3690	3336	52	143	140	14	7375

Potable Water

Zoo operations required over **298,000,000 litres (298,000m^3) of treated, municipal water in 2009**, an decrease of 8.6% from 2008 (**TABLE 3**). The increase water use can be, in part, attributed to the temporary Stingray Bay Exhibit as well as North Zoo Site Redevelopment construction projects. Our Green Plan target is 180,000,000 litres per year by 2027. This represents a reduction of 40% of 1990 levels.

Staff respect water as a fundamental resource and conserve wherever possible, but most operations, from Animal Care to Splash Island to public services, must also be respected. It will require creativity, wise use of new technologies, and a continued culture of conservation to reach our goal of 40% reduction (from 1990 levels) by 2027.

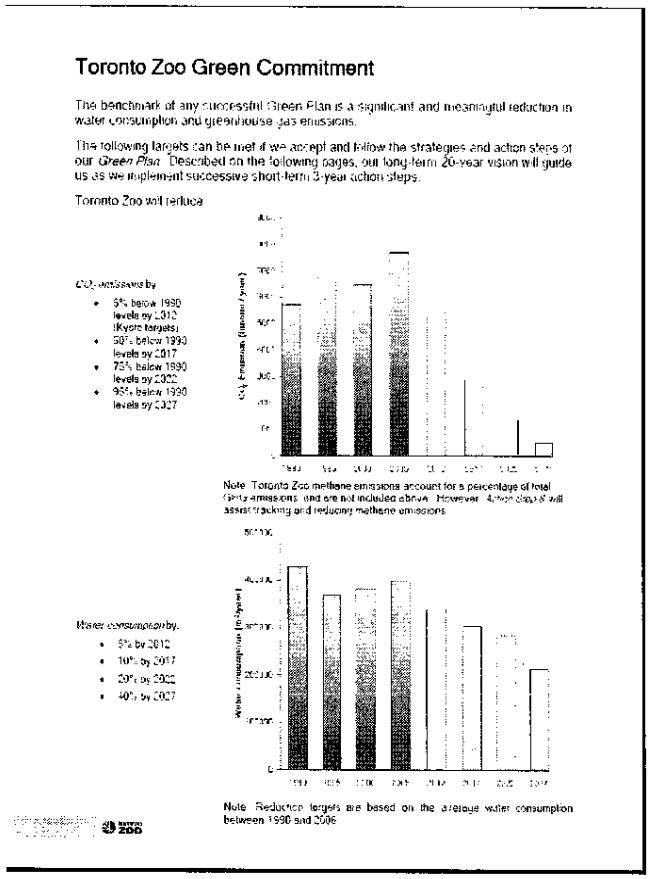
TABLE 3.

Year	Consumption (m^3)	Cost ($)	Reductions
2009	**298,000**	**563,000**	**9%**
2008	320,000	556,000	18%
2007	405,500	644,000	- 14%
2006	352,900	503,300	3 %
2005	360,800	516,000	10 % (from 2004)

The **Environmental Initiatives Report** is intricately linked to the **Energy (and Water) Report** as the former seeks to positively impact (i.e. lower) the latter. In the future the two reports will refer to one another where appropriate and specific data from the Energy Report will be linked to certain activities.

Conclusion

The total cost of all energy in 2009 including the 22% water, was $2,523,700. Non-renewable energy prices (gas, natural gas, heating oil, petrol, diesel, and propane) will increase, and some estimates suggest the increase could be dramatic in the next decade. It is therefore important that we achieve Green Plan targets for economic reasons. A conservation culture will achieve a reduction in energy use; but alternative fuels and systems must be incorporated if the Zoo is going to significantly reduce its ecological footprint..



Dr. William Rapley
Executive Director, Conservation, Education and Research

List of Attachments:
Toronto Zoo Green Plan 2007
See website – torontozoo.com/conservation