

Animal Welfare Science

The Association of Zoos and Aquariums (AZA)

The Association of Zoos and Aquariums is a global leader in species conservation and animal welfare. Together, they monitor its member institutions and enable the public to trust in their zoos and the work they are doing.

Animal Welfare Science Program at Toronto Zoo

Animal welfare encompasses many different definitions and subjects. It is the protection of the health and well-being of animals but also how an animal is coping with the conditions in which it lives. AZA defines animal welfare as an animals collective physical and mental state over a period of time and is measured on a continuum of good to poor. It is also important to note that there is a difference between animal welfare and animal rights, as animal welfare is measurable whereas animal rights are a personal belief. At the root of all the definitions, if an animal experiences good welfare if it is free from pain, stress or discomfort, is well nourished, comfortable, safe, and can perform natural behaviours.

The welfare of animals within AZA and CAZA has grown accordingly in recent years. In 2017 AZA introduced a number of new accreditation standards making animal welfare a condition of the accreditation process - AZA Accreditation Standard 1.5.0 Animal Welfare, Care, and Well-Being. The institution must have a process for assessing animal welfare and wellness and animal welfare considerations will impact every component of accreditation. This means all areas of Zoo operations, from Facilities to Education, Public Relations, etc. must all consider animal welfare.

Animal welfare has always been a top priority for the Toronto Zoo. As we move forward, we will be taking a more scientific approach to evaluate the well-being of animals in our care. As we learn more about the importance of individual animal's experiences, physical health, behavioural health, and overall environment, we are challenged to find ways to assess the comprehensive welfare of animals on a consistent basis and ensure that animals residing in our care are given ample opportunities to thrive.

Animal Welfare Assessment

Using the **5 Welfare Domains and 5 Opportunities to thrive**, as our framework, which include **Nutrition** (a species suitable diet provided in a way that ensures physical and mental health), **Environment** (opportunities to self maintain and promote comfort), **Health** (access to a wellness program, rapid diagnosis and treatment), **Behaviour** (social opportunities and provision for species appropriate and diverse behaviours) and **Mental Domains/Choice and Control**, we implemented an Animal Welfare Assessment process with various inputs and outputs to assess animals, across all taxa, at Toronto Zoo. This includes having a team of various staff conduct formal evaluations to get a better understanding of an animal's overall welfare. This includes looking at natural and individual

history, all facilities, resources, programs and procedures that go into keeping our animals. In addition, we will be conducting science based animal welfare research on selected animals (species) that have been highlighted for various reasons (poor welfare, event impacts, etc.). Mechanisms to identify and evaluate the welfare/wellness impacts of significant life events or changes in the animal's environment could include construction events, unusual weather events, noise intrusion, changes in housing, or changes in animals exhibited with or nearby, etc. We will also conduct evaluation assessments for animals undergoing quarantine and for our ambassador outreach animals.

Geriatric Animals

We are also working on formulating a Quality of Life Checklist for geriatric animals. This will be an aged animal assessment to monitor animals over time and will be performed every 6-12 months (or more depending on the individual animal) to document a decline in health and welfare. As with humans, older animals require special care and adjustments to their environment to ensure their overall well-being.

Training

Education is a key part of understanding animal welfare and we will have numerous training sessions for all departments in the Zoo. This will include mandatory welfare modules to ensure that everyone understands the importance and complexity of animal welfare and their role in ensuring the best welfare for all of our animals.

By implementing this Animal Welfare Program, we are well ahead of the game and Toronto Zoo demonstrates its commitment to the animals we care so much about. Animals that demonstrate positive effective states can instill respect and wonder in guests. By telling the stories of these animals, we can connect with people in a personal way and can change how they think about the natural world by emphasizing the importance of conservation and what we all need to do to save species!



Maria Franke, Manager of Welfare Science, has worked at the Toronto Zoo for over 30 years!

FACILITIES & INFRASTRUCTURE



General Maintenance

Consists of the work force and materials to maintain the Zoo and ensure compliance with AZA requirements, the Ontario Building Code, O.H.S. A, and other regulatory agencies in the areas of carpentry, painting, locksmithing, and welding. This includes glazing, small roof repairs, and custom designing and construction of items particular to a Zoo such as shipping crates, plexiglass aquarium tops, special animal shift doors, and maintenance and repair of animal exhibits, and emergency repairs.

The team works hard to follow a preventative maintenance schedule for the entire Zoo for projects both big and small! This includes installation and maintenance of doors, hardware, painting of pathways, picnic tables, public benches, handrails and other surfaces, animal holdings, paddock holdings, concrete sites, palisade posts, offices; as well as the repair, installation, and construction of fences, signs, asphalt roadways, roof and eaves troughs, animal and bird cages, sun shades for exhibits, Bush Camp tent set up, and special requirements for group picnics and other Zoo functions.

General maintenance must maintain 107 buildings, totaling 402,257 sq. ft; 300+ picnic tables and shipping crates; 8,000 locks, 20 km of road, 31 km of fence, and 1800 signs!

In 2019, the Maintenance team worked closely with other departments on the Terra Lumina Night Walk project and Conservation Campus (front entrance) project.

Electrical & Plumbing

From lighting to electrical units, plumbing and even sound systems, our electrical and plumbing team works hard to fulfill work orders all across the Zoo site. One major project our team was responsible for over this past year, was replacing the lighting in the main parking lot, administrative building parking lot, Zoo vehicle parking lot, transit building, and bus loop and drop off loop. It is now all LED lighting and runs on less than half the amount of power than before! Another major project our team was responsible for was installing dozens of VFD units all over site to step down the run demand of our larger pump and fan units. This has cut down our power usage immensely!

Throughout the year our team is responsible for pump maintenance to keep all the pools operational for our animals and fish. In peak season, Splash Island keeps the team busy every day with the cleaning and startup procedure and constant return trips for back washing filters, as well as performing regular filter, pump and filter back washes daily throughout the Zoo site. The team installs new water lines that are required, makes repairs to the old, and fixes the odd major watermain break!

During peak season, the electrical and plumbing team are responsible for setting up for events occurring on site almost everyday. They are responsible for sound system set up or providing temporary lighting for guest access and exit.

Some of the large projects that our team will assist with in the future include a new African Rainforest Pavilion generator installation and a new Indo-Malaya Pavilion generator. This year, the team worked closely on the new exciting Terra Lumina Night Walk project!

Our team is always busy and working hard to keep our beloved Zoo running smoothly!



Transit

The Zoo's existing fleet of Zoomobiles has been operating at the Zoo since the 1980's. The existing Zoomobiles provide guided tour and transportation services to over 150,000 guests during the summer months. Each Zoomobile consists of an open air drive unit and 3 tow behind open air coaches & carries approximately 100 – 120 guests at a time. The current Zoomobiles are operating from approximately May 1st – October 15th. It is the Zoo's intention to further enhance the guest experience at the Zoo by offering them a warm and comfortable tour/ transportation of the Zoo during the colder months by way of an enclosed and heated Zoomobile. The intention is that the new Zoomobile will be dual duty, preferably enclosed in the winter with operable doors and windows. In the warmer months the doors will be removable in order to return to the open air type vehicle. The winter route will slightly differ from the summer route as it will be a little shorter but take the guests to Zoomobile stations that are closer to the Zoo's indoor pavilions.



COMING SOON...

New Outdoor Orangutan Exhibit

An important part of Toronto Zoo's renewal plan is a brand new outdoor exhibit for our critically endangered species, the Sumatran orangutan. Mimicking natural rainforest environments, the new space will enhance the physical and mental health of these intelligent and playful apes, improve the viewing experience for guests, and enhance global captive breeding efforts.

The new outdoor exhibit will be located south of the Indo-Malaya Pavilion at the location of the former Gaur holding and outdoor exhibit. This exhibit will be viewable along the main Zoomobile route and will provide immersive and interactive experiences for the orangutans and Zoo guests. The new outdoor area will more than double the living space for the orangutans and will greatly enhance the animal's overall health and well-being as it will allow them to live a more arboreal lifestyle. The new exhibit will consist of enrichment elements such as cables and platforms, a tunnel, and an orangutan O-line in parallel with a guest boardwalk. In addition, the exhibit will provide an improved guest experience through better lines of sight, more interesting natural structures. Interactive features will engage guests and connect them with the difficult situation these endangered red apes face, while empowering people to help save them in the wild.



Conservation Campus - New Front Entrance

The existing Front Entrance of the Zoo was designed and built as part of the original construction in 1974. Minor modifications have been made subsequently with the addition of the Greenhouse Gift Shop, the expansion of admission booths, as well as landscape upgrades. The Front Entrance and Welcome Area Project is identified for completion as part of the 2016 Capital Master Plan. The front entrance of Toronto Zoo will become a state of the art community gathering point and show Toronto Zoo as a world-class institution in the zoo community. A major revitalization is pivotal to the guests' arrival point to the largest zoo in Canada and is essential in providing a compelling guest experience. This area of the Zoo has a major impact on the guest perception as it is the first and last point that a guest sees during their visit. The new front entrance will be welcoming, functional in terms of services and amenities for guests and staff, and leave a lasting impression on all. It will also have the potential to serve as a community centre, active year round and in the evenings. The design for the new front entrance and welcome area will include construction of a new facility that will contain guest admissions, retail, rental services, restaurant and food preparation space, an animal exhibit, event/community spaces, office space, space for educational opportunities and a theatre.



Public Washroom Improvements

Since Toronto Zoo opened in 1974, the operational requirements have increased, and significant updates or modernizations have not been made to the public washroom facilities. Therefore, Toronto Zoo acquired a qualified and experienced consultant team to facilitate and develop a sustainable and state-of-the-art design of public washrooms. Discussions with appropriate Toronto Zoo staff and a complete review of the site, facilities, exhibits, equipment and infrastructure occurred to confirm the design concept and prepare the required design documents. As well, the direction of the Zoo and its mission, vision, goals and objectives as set out in the 2015-2020 Strategic Plan were considered in preparing the proposed design with respect to animal care, existing structures, site conditions, financial sustainability, conservation, education and guest experiences.

Construction for the Caribou Café washroom began in Fall 2019.



HORTICULTURE

The Palm Oil Crisis

The picture on the left may look like just another palm tree, but it plays a pretty big role in your day to day life. That is an African Oil Palm (*Elaeis guineensis*). This palm is the reason thousands of hectares of old growth rainforest are being cleared everyday to plant oil palms as a crop. To date it already covers an estimated 27 million hectares, mainly in Indonesia and Malaysia. This widespread deforestation is pushing many species of plants and animals, such as the rare Sumatran orangutan, to the brink of extinction.

The oil from its fruit can be found in over half of processed grocery store products. This includes frozen goods, soaps, cosmetics, confectionary products and it is now increasingly being used as a biofuel as well. Some confusion arises when people try to identify products which contain palm oil and its derivatives. This is because it goes by dozens of names such as palmitic acid, sodium lauryl/laureth sulphate and sodium palm kernelate. You may not even realize that you are purchasing a product that contains it!

Toronto Zoo Horticulture branch helped to illustrate this problem to guests by adding an African Oil Palm on display in the Indo-Malaya Pavilion last year. We decided to include an African plant outside of its native habitat in a different bioregion, to illustrate the profound impact that this crop has on the southeast Asian ecosystem. Despite being cultivated by the millions in tropical plantations, the African oil palm is virtually impossible to find in the nursery industry. After two years and several attempts to procure a specimen, it took the work of ten people, a backhoe and a 5,000 pound pump cart to get it into the pavilion as it weighed approximately 1,000 pounds! This was the largest and most costly tropical specimen that has been planted at the Zoo in the past 25 years.

What You Can Do To Help

- **SHOP RESPONSIBLY:** Buy products from companies that have joined the Roundtable on Sustainable Palm Oil (RSPO). You can print the shopping guide at cmzoo.org/Conservation/PalmOilCrisis
- **USE YOUR POWER AS A CONSUMER:** Write to your favourite restaurants, companies and supermarkets. Educate them on the importance of using Certified Sustainable Palm Oil.



Projects Completed by Horticulture:



Began planting Spring blossom trees to begin development of a Spring Blossom festival. With 20 trees planted in 2019, there is a plan to plant over 100 trees.



Completed landscaping in the new Hippo exhibit and Aldabra tortoise exhibit, enhancing the area for animal enrichment and mimicking their native areas of the world.



- Prepared multiple sites across the Zoo for the many Wild Encounters taking place behind the scenes.
- Assisted with the setup of the Washed Ashore exhibits.
- Planted and maintained the garden beds during the 2019 season.
- Helped complete the Public Relations stage at our front entrance.
- Created a picnic area for guests over our geothermal bed.
- Protected the Core Woods on the Toronto Zoo property as Native Trillium plants continue to thrive there.
- Completed all seasonal decorating.
- Hosted the Orchid Oasis festival, showcasing a variety of hand-picked orchid species for our guests to enjoy!

Participated in the Symcor planting Acres for the Atmosphere and pollinating plant gardens on site. This is a yearly event with nearly 100 volunteers participating.



Transferring pollen for our Corpse Flower, 'Pablo', into the McMaster Corpse Flower on July 4th, 2019. This marked the first time, we believe, in the world pollen was stored using cryopreservation and then used for pollination.

Donated two corms of the first Corpse to bloom in the GTA, to the Royal Botanical Gardens in Burlington.



Created a Canadian-themed courtyard at our front entrance.

Completed the new Greenhouse entrance, and surrounding gardens.



Created a new natural play area in Eurasia for children to become connected with nature (used recycled material from the Panda Exhibit).



Maintain the Americas Mayan Temple area, one of the most photographed areas on site.

- Created many planters across the Zoo site (no two are the same) as well as butterfly pavilion entrance planters with Hibiscus and other flowering plants to attract hummingbirds and butterflies.
- Maintained the core woods as well as hire an arborist to inspect the site twice a year to ensure that the area is maintained (all hazardous trees removed).
- Completed planting 1,000 apple and crabapple trees on site for browse production (will not be ready to be harvested for 5 to 8 years). Red Mulberry and Willow continuing to be planted on site.
- Hosted Greenhouse tours for guests to enjoy our extensive collection of plants. Here in the greenhouses, our staff are able to explain the plants we have specifically grown for browse or medicinal value for some of our animals here on site.



GREEN INITIATIVES

Toronto Zoo has a strong record of environmental protection and of energy efficient operations management. We have motivated staff and volunteers that understand the importance of living sustainably in balance with nature. We understand and accept that climate change is a real threat to Earth's biodiversity and we encourage people to lessen their ecological footprint on the Earth. By setting a positive example and promoting public awareness of environmental issues, the Toronto Zoo will be viewed as an important source of information and inspiration for individual and group action against climate change.

In 2007, Toronto Zoo published its Green Plan renewing its commitment to demonstrate environmental leadership in all aspects of our operations, including sustainable growth and maintenance. To date, Toronto Zoo has achieved 25 of the 27 action steps identified in the Green Plan and has made significant movement toward achieving its 2027 targets for energy, water and waste management on-site.

In 2019, Toronto Zoo continued to implement an ISO14001 compliant environmental management system providing a framework to actively reduce our negative environmental impacts and ensure we are able to achieve certain environmental targets while providing a balance with other operational needs and services.

GREEN INITIATIVES

Staff Involvement

Green Eco-Zoo Team (GEZT)

The Green Eco-Zoo Team (GEZT), is a non-technical advisory committee to the CEO. The 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 organizational structure of GEZT incorporates all divisions and units of the Zoo and meets quarterly.

GEZT provides an annual report to the CEO for presentation to the Board of Management on environmental projects, programs, and initiatives in progress or completed over the past year. In 2019, GEZT concentrated on 5 main areas to focus Toronto Zoo's environmental sustainability platform. This included implementation of an ISO14001 - compatible Environmental Management System (EMS), palm oil awareness, energy consumption reductions, water consumption reductions, and waste management.

Fox's Den: Design a Product to Reduce Plastic Waste



On August 14th, 2019, Toronto Zoo held its first ever Fox's Den challenge for staff and volunteers. The challenge was focused on bringing awareness to issues with plastic waste and our ecological impact. So, the task at hand was to design an innovative product or project that would reduce plastic waste within individual branches here at the Zoo or to come up with an idea that reduces your ecological impact on energy consumption, water consumption or waste. After developing a product or coming up with an idea, staff and volunteers then created a 5 minute presentation and pitched their ideas to the Fox's Den panel of experts. This panel featured a special guest, Dolf DeJong, our very own CEO.

With special first place and second place prizes for winning participants, we had plenty of innovative and interesting ideas!

Plastic Free July Ecochallenge

This year, staff at Toronto Zoo joined the Plastic Free July EcoChallenge, where participants reduced their single-use plastics for one month. For the entire month of July, staff accepted daily challenges such as picking up three pieces of litter a day, replacing their plastic toothbrush with a bamboo alternative or even pledging to watch a documentary film about waste with their friends and family. All of this effort culminated to an enormous impact! As a team of 181 members, we kept a large amount of waste from reaching landfills. This includes 144 disposable cups, 833 plastic containers, 1,027 pieces of plastic cutlery, 1,019 plastic bottles and 518 plastic straws. On top of this we picked up 904 pieces of litter, consumed 209 zero waste meals, conducted 11 waste audits, signed 100 petitions, and dedicated 46 volunteer hours.



The Plastic Free EcoChallenge mission is to raise awareness of the dangers of single-use plastic on our environment, and challenges individuals, organizations and communities to do something about it!

"IT TAKES THREE WEEKS TO CHANGE A HABIT. IF YOU CAN STICK WITH A NEW BEHAVIOUR FOR 21 DAYS IN A ROW, YOU'RE A LOT MORE LIKELY TO KEEP IT UP FOREVER." - PLASTIC FREE JULY

Highlights: Environmental Initiatives



Toronto Zoo staff have taken a giant leap towards a zero waste facility, by implementing a zero waste employee program. This encourages all staff and volunteers to consciously produce less waste and divert what waste they produce from the landfill.

The Wildlife Nutrition Centre came up with the idea to use glycerine bags to eliminate 50 percent of plastic bags used in the preparation of animal diets. Glycerine bags are biodegradable and are diverted to the Zoo’s compost facility.



Healthy ecosystems start with healthy water. The installation of three new windmills which use the renewable power of wind to aerate the Zoo’s stormwater management ponds in conjunction with the new floating wetlands, will create healthy habitat for fish, frogs, birds and more!

Toronto Zoo has installed 6 water bottle filling stations to help reduce the amount of single use plastic waste generated each year. In the first 3 months, Zoo staff alone saved 964 single use bottles!



Environmental Management System (EMS)

Chemical Management

Here at the Zoo, we restrict the use of pesticides on site, opting for the use of ecological control methods for landscaping and bio-controls to help keep pests under control in the pavilions and greenhouses.

In addition, we maintain an electronic database linked to a Globally Harmonized System for chemical management.

We also source where possible, Ecologo certified or plant-based products and are continuously evaluating new alternatives.

Energy Management

We are currently investing in the renewal of our facilities, specifically upgrading existing energy services with more efficient systems. In addition, we are actively researching energy production on site, electric vehicle charging stations and engagement opportunities to reduce our resource consumption for the future.

We have a total of 12,673 square feet of green roof; 50 solar thermal panels to supply hot water to the Administrative Support Complex; cool our Caribou Café with our ICE Bear system, 12% of our transit fleet is made up of electric vehicles; we have many on-demand water heaters to help our annual energy savings by \$ 3,168; and since 2016, we have Variable Frequency Drives (VFD’s) installed in our larger buildings to help reduce our energy consumption per month, per building, by 30%.

Stewardship of the Land

The Zoo occupies 287 hectares of valley, river, forest, field and meadow ecosystems at the edge of the Rouge National Urban Park. We provide beautifully wild and ecologically sustainable spaces for staff, guests, our animal ambassadors, and the diverse wildlife of the Rouge River Watershed. Progressive development of the Zoo property to support wildlife conservation programs and work of the Toronto Zoo involves commitment to management and rehabilitation of the site and of critical habitats for local species at risk, as well as help to mitigate climate change.

Programs & Awareness

Toronto Zoo leads with practical examples of how we can reduce the impact of our operations on the environment, by increasing communication and transparency on how we are actively reducing our impact. Such examples include Party for the Planet event and Waste Free Wednesdays.

Water Management

Here at Toronto Zoo, we surpassed our 2027 water reduction target of a 40% reduction below 1990 levels. We have maintained this reduction since 2011.

In addition, in 2018 we installed a Rainwater Harvesting System that filters, stores, and distributes collected rainwater to our horticultural greenhouse.



Sustainability & Purchasing

At the Toronto Zoo we give preference to products and services that are deemed to be environmentally superior.

Waste Management

Toronto Zoo staff and Volunteers participate in the Terracycle Waste Stream Program. This diversion program finds alternatives for products that are not yet blue-box recyclable.



Another way we divert waste is by collecting feminine hygiene products here at the Zoo and send them to the Durham York Energy Centre (DYEC).

Toronto Zoo also developed a Phone Apes cell phone recycling program which increases awareness about the environmental impacts of consumable products on wildlife.

In addition, we compost organics on site which is used in indoor and outdoor garden beds.

Green Initiative Exhibit



Washed Ashore

On Thursday May 16, 2019, Toronto Zoo officially opened a new temporary exhibit, Washed Ashore - Art to Save the Sea. The exhibit displayed ten larger than life sculptures, created by Washed Ashore, a non-profit organization whose mission is to use the arts to educate a global audience about plastic pollution in oceans and waterways and to spark positive changes in consumer habits.

The exhibit educated guests about the negative and devastating effects of plastic pollution, with each sculpture built completely from plastics found in oceans and waterways around the world. Each year, 300 million pounds of plastic are produced globally and less than 10% of it is recycled!

Toronto Zoo also created its own sculpture named 'Poly' the Polar Bear, built with plastic from local shoreline cleanups, from the Zoo's site, and local supporting organizations.

EVERY PIECE OF PLASTIC WAS ONCE PURCHASED BY SOMEONE, DISCARDED, BECAME WATERBORNE, AND LANDED ON A BEACH WHERE SOMEONE ELSE PICKED IT UP TO MAKE A DIFFERENCE.

This exhibit was supported by 10,000 Changes, a multi-platform plastics engagement program launched in June 2019 that will help Canada move toward zero plastic waste.



'Poly' the Polar Bear



WASHED ASHORE.ORG
ART TO SAVE THE SEA



LEARNING & ENGAGEMENT

Conservation Education Mission: Toronto Zoo will engage communities by providing the tools and knowledge to connect to nature and protect our natural world.



Toronto Zoo Volunteers

Volunteers assist in the delivery of the Zoo's educational experiences, using their knowledge and interpretive expertise to help connect guests with nature, bring conservation messages to life, and to enhance the experience of each guest with whom they come in contact with.

Here at Toronto Zoo, we have four categories of volunteering opportunities. We have Year Round Volunteers, Summer Information Volunteers, short-term volunteer opportunities (Wildlife Health Centre Interpretive Volunteers or Volunteer host) and Zoo Ambassador Student Volunteers.

To learn more about becoming a volunteer, visit www.torontozoo.com/BecomeAVolunteer/

In 2019, our roster of 431 volunteers donated 39,088 hours of their time, making contact with 1,033,138 people!



LEARNING & ENGAGEMENT



Educational Programs

The Toronto Zoo provides a perfect setting for individuals of all ages to explore the natural world first hand, providing opportunities to observe and interact with plants and animals from around the world which they may not otherwise get an opportunity to experience in the wild. Such opportunities help to connect people with nature, establishing a bond which creates an unparalleled opportunity to foster conservation through education.

The Learning & Engagement Branch develops and delivers a wide range of educational experiences specifically designed for a variety of audiences/ages. These include the more formal school program offerings and educator resources, as well as a roster of themed public programs, overnight experiences, and summer day camps. In addition to these, the Learning & Engagement Branch is also involved in creating and reviewing content for interpretive graphics/displays, providing interpretive training and support to staff/volunteers (both internally and externally), plus creating and operating interpretive displays to support special events at the Zoo and in the community.

Formal Education Experiences

- Curriculum-linked programs for a variety of grades
- Professional development sessions for educators
- Internship programs
- Operation Conservation (grant-funded program for Grade 6 students of underserved communities).
- Educational resources for educators

Non-Formal Education Experiences

- Themed family and children's programming (weekends & evenings throughout the year)
- Adult only programming (e.g. Love at the Zoo Valentine's Program)
- Overnight programs for Guides, Brownies, Scouts, and Cubs (Sept. - May)
- Zoo Camps (summer day camp for ages 4-16) & Serengeti Bush Camp (overnight experience for families, adults, youth/school groups; May long weekend to Labour Day)

Informal Education Experiences

- Interaction with a Volunteer at an interpretive station
- Interactive exhibits displays
- Animal Shows, keeper talks and close encounters
- Free play in the Kids Zoo or Nature Playground areas



Zoo School

The Toronto Zoo has received credit granting authority from the Ministry of Education for the Grade 11 Biology, University Preparation (SB13U) course. This intensive four-week summer program is delivered in both July and August. This unique learning experience engages students through interactive learning opportunities, behind-the-scenes tours, career discussions with Zoo staff, and formal classroom lessons. Curriculum content includes Scientific Investigation Skills and Career Exploration, Diversity of Living Things, Evolution, Genetic Processes, Animals: Structure and Function, and Plants: Anatomy, Growth, and Function.



DID YOU KNOW?

This program has been running for the past 10 years, with two sessions a summer. With 18 students participating in each session, we have taught over 396 students in our "Zoo School"!



"I know I have said it before but I shall say it again, it was the best decision of my life to come to this course - it was simply the best course I have ever taken. What made it amazing were the teachers, the creativity, the animals, the people - basically everything and everyone involved... Thank you to all the teachers for inspiring me to do more and giving me hope and courage." - Former Student, Jax

Orangutan Palm Oil Hot Spot Activity Zone

Supporting the theme “orangutans need rainforests, and so do we”, an interactive activity zone was created and is operated by Volunteers to help guests understand the importance of the rainforest to orangutans and raise awareness about the issue of sustainability surrounding palm oil. An orangutan- friendly shopping guide was created as part of this, and is available for guests to take home to help them make sustainable shopping choices.



Connecting with Nature through Play

An expanding body of scientific evidence suggests that nature-deficit disorder contributes to a diminished use of the senses, attention difficulties, conditions of obesity, and higher rates of emotional and physical illnesses. Research also suggests that the nature-deficit weakens ecological literacy and stewardship of the natural world. These problems are linked more broadly to what health care experts call the “epidemic of inactivity”, and to a devaluing of independent play. Nonetheless, we believe that society’s nature-deficit disorder can be reversed.” (Children & Nature Network, 2015).

Today’s children are often bombarded with electronic media, full schedules, and highly structured lives. Outdoor natural play spaces provide a place to take a break, for children to use their imagination/creativity to have fun, get dirty, and experience just being kids. Toronto Zoo has been working to create a variety of play spaces in natural areas throughout the Zoo encouraging interaction with the natural world. These play spaces provide opportunities for young children to develop essential cognitive and motor skills and allow them to freely express themselves all while immersing them in the natural world.

Visit one of our play spaces today, located outside the Africa restaurant (next to Gorilla Climb) or near the entrance to Eurasia Wilds (opposite the kangaroo walkthrough at Australasia).



Toronto Zoo's Conservation Education Committee

To further help guide educational experiences and conservation messaging here at the Zoo, we have a cross-section of staff who are part of a Conservation Education Committee (CEC). This is an internal Advisory Committee that helps direct effective educational opportunities for guests in line with the Zoo’s strategic plan. The purpose of the Committee is to assist in developing tools and methodology to evaluate educational experiences, make recommendations to improve educational experiences to ensure they fit with the broader message, and to work collaboratively with all Zoo branches to ensure consistent messaging.

Bison and Caribou and Polar Bears, Oh My!

As long-time partners, both the Toronto Zoo and Parks Canada continue to work together to inform Canadians and foster public understanding about the importance of protected areas for conserving biodiversity and species at risk. This past summer, Zoo guests had the opportunity to explore three Parks Canada stations featuring interactive and educational activities surrounding Canadian wilderness and biodiversity and highlighting the Canadian species the Zoo and Parks Canada are working together to save and protect.

The stations included:

- **Saving Species at Risk** - hear about our many conservation stories surrounding species at risk, the collaborative work Parks Canada is doing with Toronto Zoo, and simple things guests can do at home to help wildlife.

- **Wildlife Monitoring and Observing** - learn how to explore nature by looking and listening for signs of wildlife in their natural habitat, and test your knowledge of Canada’s biodiversity with species identification challenges.

- **Tundra Trek** - experience sites in Nunavut and the Western Arctic, and learn about the work being done to conserve our northern habitats.

- **Plus NEW for 2019, Learn-to Camp Pop Ups!** - On select dates throughout the summer, Parks Canada staff also set up a Learn-to Camp demonstration site (at the Front Courtyard Kiosk). Here guests could discover more about camping, camp cooking, national parks, hiking, wildlife safety and the outdoors! Through these demonstrations guests are able to develop the knowledge and skills to feel confident planning and carrying out their own camping adventure.



University/College Partnerships & Other Collaborations and Training

Toronto Zoo makes contributions in the areas of wildlife care, and reproductive, veterinary, behavioural and nutritional sciences, as well as species preservation with many partners, including conservation groups, governmental organizations, and environmental organizations, other wildlife care facilities, and universities and colleges.

These partnerships allow the Zoo to share resources such as personnel, expertise, equipment and training which assist us in advancing towards our common goals.

Adjunct University Positions

Toronto Zoo staff have adjunct university appointments and provide lectures, advice, and assistance to student programs. Graduate studies are available through Zoo collaborations and include M.Sc., Ph.D., D.V.Sc., and Post-Doctoral programs.

Doctor of Veterinary Science (D.V.Sc.) Degree Programs

Specialty training in zoological medicine and pathology has been offered in collaboration with the Ontario Veterinary College (O.V.C.) since 1979. Presently, two graduate veterinarians are gaining first-hand clinical experience and working on original research projects as part of their three-year Doctor of Veterinary Science (D.V.Sc.) degree programs. The objective of the program is to train veterinarians to become clinically competent in zoological medicine, and to develop a strong understanding of diagnostic tools and the ability to perform pathological studies. Graduates of the program will have the background to practice and teach zoological medicine and to carry out conservation work and research, with the capability to contribute fully to the scientific activities expected in a modern zoo or wildlife-related organization.

Post-graduate Training

Post-graduate level training has been offered in reproductive physiology and biotechnology for M.Sc. and Ph.D. programs and post-doctoral fellowships for over 25 years. Students gain a thorough understanding of experimental design and in-depth knowledge of reproductive physiology and laboratory techniques associated with different aspects of assisted reproductive technologies as applied to zoo species.

Student Externships / Summer Students

The Wildlife Health Centre accommodates senior veterinary students on externships throughout the year from veterinary colleges around the world.

Each summer approximately fifteen university students complete their summer research at the Toronto Zoo. Research project topics range from green plans and wetland conservation to nutrition and reproduction.

The Role of Zoos in Conservation - University of Toronto Scarborough Course: BIOC62H3

Toronto Zoo staff are guest lecturers for the Role of Zoos in Conservation course taught at the University of Toronto, Scarborough Campus. The course is a lecture and discussion course that examines the role of zoos in conservation, with an emphasis on the following contemporary topics: involvement of zoos in situ and ex situ conservation; captive breeding and reintroduction of species; new technologies to assist in reproduction in wild populations; the importance of nutrition and behavioural enrichment in captive animals; zoos and animal health and welfare; zoos and public involvement/education; and the role of zoos in wildlife research.

Toronto Zoo Staff Venomous Animal Training Course

The purpose of this course is to train Toronto Zoo staff how to safely work with venomous/poisonous reptiles and amphibians. Staff learn Toronto Zoo accepted policies, procedures and techniques for dealing with potentially dangerous animals. At the end of the course, staff continue with training on site until a checklist is completed, and they are approved to work with each species housed at Toronto Zoo.

Toronto Zoo staff are required to work with potentially dangerous venomous/poisonous reptile and amphibian species while servicing for general care and maintenance, and assisting in veterinary procedures and occasionally when assisting outside organizations. To ensure that staff are properly informed and trained on working with these animals, Toronto Zoo has developed and regularly offers this course. Staff are trained on venomous/poisonous reptile and amphibian biology, and behaviour and management using approved techniques and following approved protocols and procedures.

All training of staff is documented and staff are required to sign off on the Venomous Reptile Care Expectations before being approved to receive venomous reptile keys. Training to work with venomous species is an ongoing process, with handling procedures being used as opportunities for staff to enhance their skills.



Canadian Armed Forces Preventive Medicine Course & Toronto Animal Services Training

The purpose of these courses is to train staff from the Canadian Armed Forces (CAF) and Toronto Animal Services (TAS) to recognize and safely deal with potentially dangerous animals

that they may encounter during the performance of their duties. The courses teach basic identification and handling techniques that involve some manipulation of animals.

CAF personnel are often required to serve in foreign countries where they might encounter species of reptiles, amphibians, and invertebrates that could pose a threat to human safety. In order to keep personnel and wildlife safe, this workshop teaches CAF medical personnel to recognize and safely deal with potentially dangerous species they may encounter. Species identification, safe handling techniques, and first aid treatment is the focus of the workshop. Participants should leave the course with a better understanding of how to deal with potentially dangerous animals and the injuries they may inflict on humans. Presentations are given on reptiles, amphibians, and invertebrates, followed by a practical demonstration using both live animals and inanimate systems. Participants have the opportunity work directly with live animals to better prepare them for encounters they may experience in the field.

Toronto Animal Services personnel are sometimes called upon to identify and handle potentially dangerous animals as part of their daily job. This course is designed to teach TAS staff basic identification and handling techniques to assist them in the safe performance of their duties. TAS staff may also be required to care for confiscated/rescued animals for extended periods so the course also provides basic husbandry information and potential health concerns for both animals and staff. Participants receive hands on training with live animals. They learn techniques for handling and containing animals that they may be called upon to collect, transport, and temporarily house.

Eastern Massasauga Rattlesnake Public Workshop

Each year Toronto Zoo hosts rattlesnake workshops for individuals who share habitat with rattlesnakes near their homes and cottages, where they work and play. These popular workshops provide an opportunity for participants to learn about the biology and life history of this snake and how to safely share habitat. Discussions about the natural history of rattlesnakes are followed by ample opportunity to ask questions. Participants learn to identify Eastern massasaugas and other native snakes and about the vital role they play in Ontario's wilderness and meet a live rattlesnake! A portion of the proceeds gathered for this program are directed towards funding massasauga rattlesnake conservation at Toronto Zoo.

Community Outreach

Here at Toronto Zoo, our mission is to educate guests about wildlife and our animals but also to spark a passion to protect these animals in the wild and the habitats they live in. That is why it is so important for us to participate in outreach activities, whether it is interacting with our guests on site through casual encounters, keeper talks, or by participating in offsite visits where we can introduce our animals to the community!

Public Involvement & Curriculum Links

Outreach Ambassadors

In many ways, education and conservation are inseparable and go hand-in-hand. For many of the Zoo's research efforts to have an impact, the public must be made aware of the significance of good environmental stewardship and the need to maintain biodiversity in natural ecosystems.

Ambassador animals provide compelling experiences for guests and allow them to gain and maintain personal connections with nature. They inspire guests to protect the environment and discover the animals within it.



Animal ambassador, Captain Sunshine, our Blanding's turtle

35,013

Animal Show Visits

The Wonders of Wildlife Show is an interactive opportunity for guests to see first-hand some of the Zoo's amazing animals in action! Located at the Waterside Theatre, this show is a must see for guests of all ages as captivating birds fly overhead and incredible creatures show off their wild behaviours through activities on stage. With the shows newly added backdrop, you never know where the next animal will appear from!



Our new animal show wall at the Waterside Theatre.

1,381

Casual Encounters

The Casual Encounters program offers unexpected opportunities to meet animals and keepers in public areas across the Zoo site.



177,189

Keeper Talk Visits

Toronto Zoo keepers provide engaging and educational talks to guests at scheduled times and locations throughout the day. During meet-the-keeper talks, keepers discuss individual species as well as their feeding habits and threats to survival in the wild.



One of our keepers speaking at our Giraffe Keeper Talks

4

Offsite Visits

Toronto Zoo's animal outreach program introduces some of the Zoo's amazing animals to the community.



One of our staff hosting a casual encounter with Micheal, our pied imperial pigeon

WILD ENCOUNTERS



On Thursday, May 16, 2019, Toronto Zoo officially opened the new Wild Encounters tours, where guests have the chance to go behind-the-scenes with staff to experience some of our amazing animals and habitats up close! At the beginning of these behind-the-scenes experiences, our Wild Encounter Tour Guide leads up to 8 guests on an interpretive tour, where they learn about the work Toronto Zoo does for the conservation of our animals, about their biology, and how our keepers take care of them. At the end of the tour, guests receive a meet and greet with a Wildlife Care Keeper and experience an up-close encounter. Here, participants learn about the personality of these animals and in some cases interact with them!

The Wild Encounters take place with the kangaroos, capybaras, Aldabra tortoises, flamingos, Indian rhinos, giraffes, Amur tigers, Sumatran tigers, African penguins, polar bears, gorillas, caribou, and our outreach birds. In addition, tours of our Wild Spaces are offered as well, such as the African Rainforest Pavilion, African Savanna Hoofstock building, and invertebrate house, as well as “Hidden Zoo” tour, which takes guests behind the scenes at our Wildlife Health Centre, Nutrition Centre, and Horticulture Greenhouse.



We are extremely proud of how we care for our animals and it is our hope that by allowing our guests to experience this up close, they will be inspired to create meaningful action in their everyday lives and make a positive impact on our natural world and environment. With each encounter we highlight our conservation efforts and passion and give examples of ways that they can make a difference. Our hope is that by sharing our passion, we will inspire more people to take action to effect real change! Animal welfare is our top priority and our animals have the choice to participate in these encounters or choose to leave at any time.



In the first month that Wild Encounters was launched, over 950 spots were sold!

With the great success of the summer pilot program sales were extended until Thanksgiving and then continued again after Halloween.

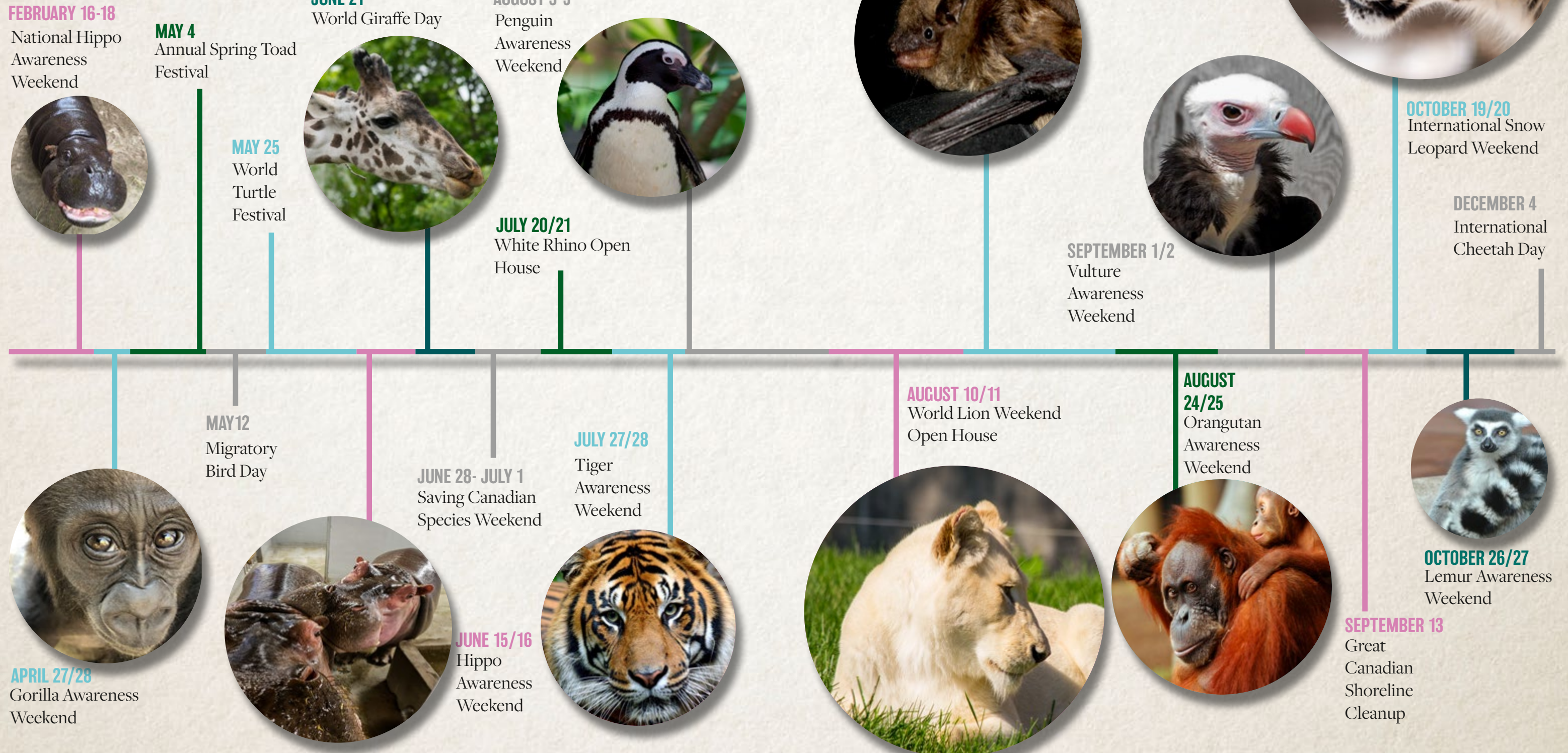
By the end of 2019, the revenue for Wild Encounters was \$132,000 and the program saw over 2,983 encounters.

A full 2020 schedule will be launched in March 2020!

Saving Species

Toronto Zoo hosts Species Awareness/Saving Species Days and Weekends throughout the year to celebrate different species of animals from all over the world. These awareness events allow guests to visit our animals on site and to participate in the meet-the-keeper talks, enrichment presentations, and family activities. The events highlight how human activity is affecting wild animal populations and how we can help protect these species.

Days 2019



PASSIONS TO ACTIONS

KEEPER FEATURE



MEET SUE EBERTH

Sue is a Grade III Keeper in the African Rainforest Pavilion, who works with many different animals, from ring-tailed lemurs and slender-tailed meerkats, to pygmy hippopotamus' and Western lowland gorillas. She is responsible for not only providing daily care such as food and water but also daily enrichment, whether it be an approved enrichment device, a training session (e.g. for a physical exam), a keeper interaction of some kind, or a Wild Encounter activity for the gorillas, Aldabra tortoises, and meerkats specifically.



2017 Cameroon



2019 Cameroon

"IT IS LIVING A DREAM... I COULD NOT WORK HERE AND IN GOOD CONSCIENCE DO NOTHING TO HELP THEM."

For over 30 years Sue has been supporting various conservation efforts with a focus on gorillas and their habitats, so when she was hired here at the Zoo in 2008, it was a dream come true. Sue began working in the Indo-Malaya Pavilion first, moved over to become a keeper for our elephants for 3 years, then ultimately moved to the African Rainforest Pavilion in 2014. In the African Rainforest Pavilion, gorillas are one of the animals she works with most, working with them on a daily basis. Sue describes it as a living dream and focuses heavily on conservation issues gorillas are facing. In order to help gorillas, Sue and her gorilla team have been organizing an awareness day each year to benefit Ape Action Africa, and this year the Zoo team raised just over \$5800 dollars! In addition, Sue and the team celebrate World Gorilla Day as well, where extra educational time is spent discussing the plight of gorillas and sharing information about our Phone Apes Program. This program, which has been in operation since 2006, is a 100% landfill free cell phone recycling service. It has been awarded top honours among North American zoos, aquaria and wildlife organizations in 2007 and 2009, and has made Toronto Zoo the most trusted cell phone recycler in the Greater Toronto Area & throughout Ontario. The recycling of cell phones and other small electronic devices helps reclaim valuable metals and reduces the demand to mine Coltan (a metallic ore used to produce tantalum capacitors in almost all cell phones, laptops and pagers) in the rainforests of the former Republic of the Congo, where, unfortunately, the endangered Lowland gorilla resides. In addition, Sue continues the fight for gorilla conservation and awareness and seeks support each year from the Zoo's Endangered Species Reserve Fund to obtain more help for gorillas.

In her spare time, Sue is very passionate about raising awareness about the conservation issues gorillas are facing. Since 2005, she has been volunteering with Ape Action Africa (AAA), a non-governmental organization (NGO) in Cameroon Africa, where she helps care for orphaned gorillas and chimpanzees that have been negatively affected by the bush meat trade. In addition, she has travelled to the African Rainforest on her own time (from 3 weeks to 3 months) to hand rear orphans, reintroduce them into conspecific groups, transport them across Cameroon to sister NGO's, develop enrichment devices, and enhance enclosure spaces. In addition, Sue is involved with Rotary International which has sponsored the education program for Ape Action Africa over the last three years. This year, Sue and her Rotary team have been able to provide over \$6,000 in support and are building an education centre right in the rainforest compound where they can reach the most rural of populations. Here, they can teach the local people the value of Cameroon wildlife and wild spaces while also educating the children of today about the plight of gorillas. Furthermore, Sue is also a part of the Rotary Action Group for Endangered Species, where she has been able to get the organization to list Ape Action Africa as one of their projects of choice!

In 2019 for World Gorilla Day, Sue and her team set up an education table with information for guests on our PhoneApes program, the status of the Western lowland gorilla which is listed as critically endangered (we are still losing approx. 3% of them annually to poaching), habitat loss, disease and how climate change plays a role. Social media posts helped push out the importance of gorilla conservation and spread awareness on how people can help.



2017 Cameroon



2012 Cameroon



2006 Cameroon



2016 Toronto Zoo

"TO HAVE BEEN IN THE PAVILION THROUGH THE LAST TWO GORILLA BIRTHS AND WATCHING THOSE CHILDREN GROW HAS BEEN VERY SPECIAL."

"...TO HAVE THE CHANCE TO WORK SO CLOSELY WITH CHARLES AND JOSEPHINE IS AN ABSOLUTE HONOUR."

One of the highlights of Sue's career is being a part of the team which formed the Zoo's first gorilla bachelor group. Being in the pavilion through the last two gorilla births and watching those children grow has been very special for her. This past year alone, Sue's area has seen several births between Charlie the baby gorilla, Ginger and Hazel, our baby red river hogs, and Penelope the baby pygmy hippo. But most importantly for Sue, having the chance to work so closely with Charles and Josephine has been an absolute honour. Sue says, "Both individuals are wild caught, first generation gorillas from Gabon. At 47 and 48 years old, they are well past their life expectancy and going strong. Out of the North American population of approximately 350 gorillas, 11 are left from the first generation, five males and six females. For them alone, we must raise as much awareness and support as we can for the animals that remain in the wild to this day."



PRIDE

On Saturday, June 15, 2019, Toronto Zoo hosted its first ever PRIDE event! The Zoo welcomed guests who had the chance to partake in PRIDE themed enrichments at six different locations across the site. These tours were led by Toronto Zoo staff along with guest presenters and PRIDE drag queen entertainers.

The event was all about celebrating Toronto PRIDE with fun, colour, and, of course DIVERSITY!



TERRA LUMINA

AN ENCHANTED NIGHT WALK



Photo by Moment Factory Terra Lumina



Photo by Moment Factory Terra Lumina

On Friday, December 13, 2019, Toronto Zoo celebrated the opening of Terra Lumina: An Enchanted Night Walk Into A Bright Future. Terra Lumina is the eleventh unique experience created in Moment Factory’s Lumina night walk series.

After nightfall guests are invited to pursue an immersive experience along a 1.5 km walking path that travels into the future and back. The journey begins when a portal carries guests into the luminescent wonders of the year 2099, a time when humans and nature learn to live in harmony.

Guests are transported by vibrant lighting, multimedia effects, breathtaking video projections to an enchanted world filled with possibility and explore this bright and hopeful future to reveal the powerful secrets of tomorrow.



Photo by Moment Factory Terra Lumina

The Journey with Moment Factory

Moment Factory is a multimedia studio with a full range of production expertise under one roof. The team combines specializations in video, lighting, architecture, sound and special effects to create remarkable experiences. With its headquarters based in Montreal, the studio also has offices in Los Angeles, Tokyo, London, New York City and Paris. Since its inception in 2001, Moment Factory has created more than 400 unique shows and destinations. Productions span the globe.

“At Moment Factory, we bring people together. Our shows and destinations pioneer forms of entertainment that offer the world new experiences. Whether at a concert, a flagship store or across an urban square, we aim to inspire a sense of collective wonder and connection.” Moment Factory



Photos by Moment Factory Terra Lumina



Photo by Moment Factory Terra Lumina

Animal Welfare Assessment: Keeping our Animals Happy

A crucial part of our journey to Terra Lumina was ensuring the continued well-being of our animals. As an AZA-accredited zoo, we are committed to operate based on three core principles: animal welfare, safety, and guest engagement. Excellence in animal welfare is the underlying foundation on which all accreditation standards and practices are based. An animal's welfare state at any given time is dependent on a combination of factors that encompass physical, behavioral and emotional well-being. Some of these factors contribute to the animal's welfare state, others are the measurable effects of these contributing factors. Most events in our lives and the lives of the animals we care for have the potential to affect well-being either in a positive or negative way. These factors can include things like social relationships and interactions, weather events, renovations and construction to the places we live, or things like our Terra Lumina which is a new and innovative guest engagement event that will change the regular routines for our staff and animals. Although Terra Lumina does not focus on the animals, some of our animals will be in nearby habitats during this time and may see and hear parts of the Lumina experience. To prevent adverse effects on our animals and mitigate any welfare concerns, we had our dedicated Keepers and other Wildlife & Science staff carefully monitor our animals throughout the process to maintain positive animal welfare as we provide a powerful and inspiring experience for our guests.

In the months leading up to the launch of Terra Lumina we conducted simulation trials using speakers and lights that were situated at key locations along the event route over a course of four weeks. Our Zoo's Animal Welfare Science team collected baseline behavioural data on animals day and night throughout this period. Throughout this trial period our Reproductive Sciences team performed stress hormone analysis and these results were compared to the behavioural observations. Data collected also helped us gauge the effect that changes in light, sound, and human presence outside of our normal operating hours may have on the animals and assists us in making any needed adjustments to the experience. While the initial test did not reveal any significant issues, we are continuing to closely monitor our animals to ensure they too are happy with the Terra Lumina experience.



Gabe Magnus collecting data.

SickKids[®] Dream Day

"They expressed how grateful they were for the opportunity to show their son all the animals he loves so much."



On Saturday, June 1, 2019 Toronto Zoo hosted its first ever "Dream" event in support of Toronto's Hospital for Sick Children. The Zoo was thrilled to host this event as a way to give back to the community and to offer children and their families a rare opportunity to enjoy a special day out as a family.

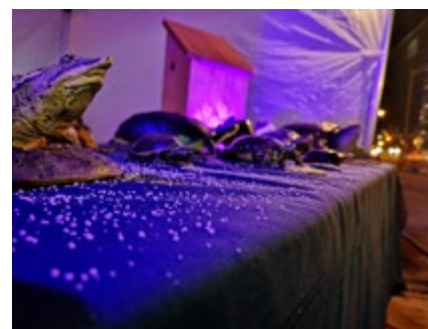
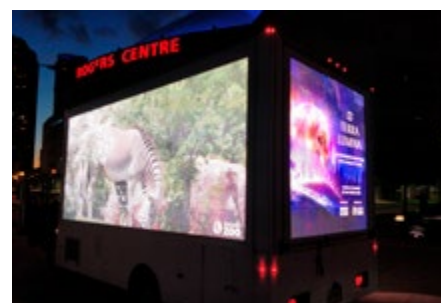
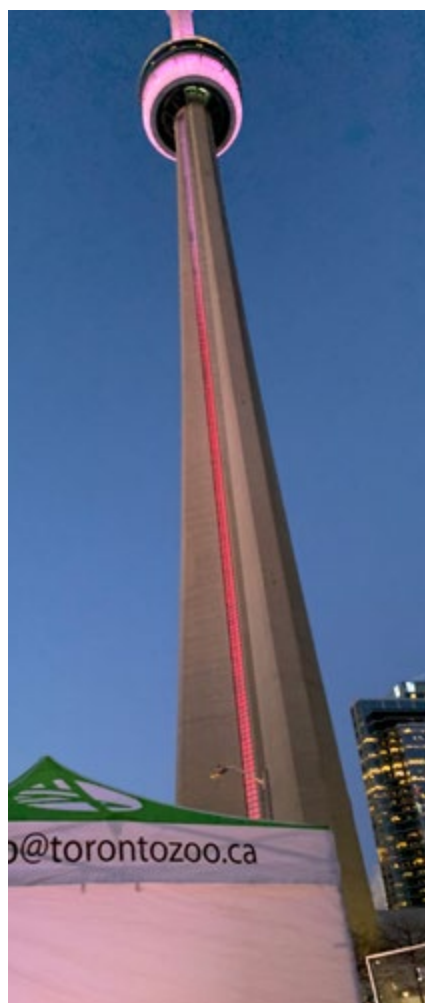
At the private event, over 300 families, who are currently in active care at SickKids, were greeted at the main entrance and were given complimentary admission, parking, rentals and carousel as part of their special day. Over 600 people were in attendance and enjoyed early and exclusive admission to the Zoo from 8am to 10am to allow them to enjoy access to exhibits and pavilions, special animal encounters, a Dream Day only Animal Show at 9:30 am in the Waterside Amphitheatre, Splash Island, Carousel and Zoomobile.

The Zoo was proud to be part of this special day for the children and their families while they built fond and happy memories of a beautiful day surrounded by animals and nature.

New Engagement Platform in Toronto's downtown core

Staff also participated in a new shared engagement opportunity at a key activation site adjacent to Bremner Blvd, across from the CN Tower and Rogers Centre.

This exciting opportunity allowed us to increase our Zoo presence in the downtown core and to develop a greater community impact.



Doors Open Toronto

On Saturday, May 25 and Sunday, May 26, 2019, Toronto Zoo hosted its first ever Doors Open. The 20th annual Doors Open Toronto presented by Great Gulf, provided an opportunity to see inside some of Toronto's most architecturally, historically, culturally and socially significant buildings across the city.

This year, for the very first time the Zoo opened the Administrative Complex for this program and provided over 1,100 guests with the opportunity to go behind the scenes at the new Wildlife Health Centre, Reproductive Physiology Unit, Project and Exhibit Design shop and the Wildlife Nutrition Centre, to get an up-close and personal look at how the Zoo cares for over 5,000 animals daily.

Many guests had no idea that the Zoo's behind the scenes were so interesting or that it even existed!



Participants of Doors Open learn about our unique nutritional program.

"THE BENEFIT FOR THOSE THAT ATTEND IS INCREDIBLY VALUABLE"



Participants of Doors Open learn about our Reproductive Sciences Program.



Participants of Doors Open look on as a veterinary procedure takes place.

BREW at the ZOO

toronto zoo

On Saturday August 31, 2019, Toronto Zoo hosted its first ever Brew at the Zoo! Taking place in the private and unique setting of the Toronto Zoo's scenic African Savanna, the event featured some of the GTA's best and most popular craft breweries, as well as African inspired food, musical performances, and, of course, some of Africa's most majestic species. Aside from the craft beer, wine and delicious foods, guests also enjoyed Meet-the-Keeper experiences, wild animal encounters and a silent auction!



OASIS ZOO run

10k Run & 5k Run/Walk

On Saturday, September 21, 2019 Toronto Zoo held its annual fundraiser run/walk for the Zoo. Open to all runners, walkers and fitness folks of all ages and abilities, the Zoo run brought the whole family together for a day of fitness, fun and fundraising. All proceeds went towards conservation and endangered species projects.



Toronto Zoo Polar Dip



On Saturday March 2, 2019, Toronto Zoo hosted its first ever Polar Dip, where participants had the chance to “dip” into icy-cold waters to raise awareness for polar species conservation. The dip took place outside the Zoo’s Wildlife Health Centre Viewing Gallery in a dip tank generously provided by GFL Environmental Inc. A registration fee of \$100 was required to participate, but the fundraising did not stop there! Participants continued to fundraise by collecting pledges from friends and family! The event also featured a silent auction and one-of-a-kind prizing, including exclusive special viewing of a polar bear behavioural training session with the keepers. Awards were given to the participants for “Top Individual Fundraiser”, “Top Fundraising Team”, “Best Dressed” and “Most Spirited”. The event raised \$14,192 in funds!

Following the dip, there was a ‘Post-Splash Bash’ in the warm climate-controlled Special Events Centre, where participants and guests had the chance to meet our polar bear keepers and find out about what the Zoo is doing to help these iconic animals.

The proceeds raised in the Toronto Zoo Polar Dip supported conservation in the wild, as well as Toronto Zoo’s role in scientific research, education and saving and protecting the polar bear for future generations.



Toronto Zoo is a champion for Canada’s majestic polar bears, listed as vulnerable by the International Union for Conservation of Nature (IUCN), as they are at risk of becoming endangered due to climate change. The primary conservation concern is habitat loss and reduced access to their seal prey. Scientists predict that as the Arctic continues to warm, two thirds of the world’s polar bears could disappear within this century. However, research shows that hope remains if action is taken now to reduce the impacts of climate change.



The Annual Move Your Paws for the Polar Bear Cause 1K & 5K Run/Walk

On Saturday, February 23, 2019, in collaboration with the Canada Running Series, the Toronto Zoo held its 6th annual Move Your Paws for the Polar Bear Cause 1K & 5K walk/run, where participants had the chance to run/walk through the Zoo in support of a great cause. The annual Move Your Paws event proceeds went towards the Toronto Zoo’s polar bears, as well as polar bears in the wild. The event brought outdoor fun, fitness, and fundraising to friends, family, and colleagues all over the Zoo!



THE POLAR DIP AND MOVE YOUR PAWS EVENTS RAISED OVER \$35,000 TO SUPPORT POLAR SPECIES!



ACHIEVEMENTS 2019:



BABIES OF 2019!



African Penguins

On March 1, 2019, African penguin parents Ellie and Chupa (who were recommended to breed by the Species Survival Plan) welcomed their third chick, Matilda. This signifies a great achievement for these penguin parents and the African Savanna Wildlife Care Staff as Toronto Zoo was able to reach 100% of our Species Survival Plan pairing and breeding goals in this breeding season. Of the 18 penguin species around the world, the African penguin is one of the most endangered, with the wild population size dropping by more than 97% in the past century. Recent estimates suggest, there could be as few as 25,000 breeding pairs left in the wild.

Red River Hogs

On February 17, 2019, Red River hog parents Tisa and Sir Phillip Pigglesworth III, welcomed their first litter of hoglets, Hazel and Ginger!

This makes the third litter of Red River hoglets born in Toronto Zoo’s history, coincidentally during the year of the pig!

Although these hoglets are born with yellow stripes along their back, they will grow out of these stripes into a rufous brown colour as the grow up.

On November 4, 2019, Tisa and Sir Phillip Pigglesworth III celebrated the arrival of their second litter.

Tisa is a great second-time mom, very trusting and comfortable with Keepers.



Arctic Wolves

On Wednesday, April 24, 2019, Keepers observed Vera go into a den and two days later Dora proceeded to follow. Having observed both females breed with Imiq in mid-February, this indicated that one or both of our females had given birth. On Thursday, May 2, 2019, Arctic wolf parents Vera, Dora and Imiq welcomed four new pups to Toronto Zoo!



Grevy's Zebra

On February 13, 2019, Grevy’s zebra parents Tori and Jake welcomed their third foal, Obi. This birth is an excellent achievement as this species is currently listed as Endangered on the IUCN (International Union for Conservation of Nature) Red List of Threatened Species, with the current global population of 2800.

Golden-lion Tamarins

On Sunday, July 14, 2019, Claire and Dolce our golden lion tamarin welcomed a new baby! Golden lion tamarins participate in “co-operative rearing”, which means the whole family will contribute and help raise the baby. Currently, the family consists of mom Claire, dad Dolce, older siblings Kat and Dave (born in March 2015), and the former baby of the family Carrie (born January 23, 2019).

We are proud to welcome this little one, especially since the golden lion tamarin is a part of our Species Survival Program here at the Zoo.

Masai Giraffe

On June 21, 2019, we announced that Mstari, our 2-year old female, and Kiko, our 7-year old male, are expecting their first calf! Based on her conception date of January 18, 2019, the calf is expected to arrive mid-April 2020. Giraffe pregnancies can range from 400-488 days in length, and so there is considerable difficulty in pinpointing a due date.

Toronto Zoo is part of the AZA Masai Giraffe Species Survival Plan (SSP), and with Mstari currently being the most genetically valuable female in the North American Masai Giraffe SSP, this expectant calf is very important! Toronto Zoo has had 19 giraffes born since 1974, with this upcoming birth being the first third-generation Toronto-born giraffe.



Walruses

In November 2019, Toronto Zoo announced it will be the temporary home to two walruses in 2020 to expand our capacity to help polar species and walruses.

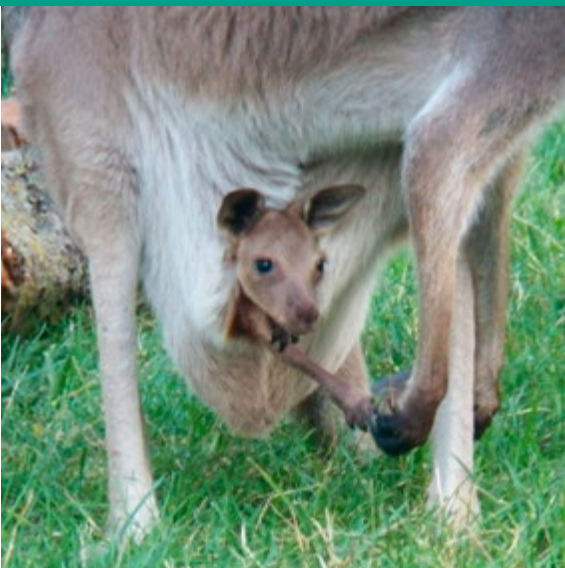
Three-year-old Lakina (female) and Balzak (male), returned to the Aquarium du Québec from their current home at the Vancouver Aquarium. Lakina along with her mother, 16-year-old Arnaliaq, will then prepare to take up residence at the Toronto Zoo in late Spring 2020 once modifications to our current polar bear habitat are complete. Balzak will remain in the walrus habitat at the Aquarium du Québec with his father, Boris. This change will ensure better reproductive management and allow for a study of the maternal bond that exists within the species..

This new addition will also result in changes to the current polar bears that live at the Toronto Zoo. Renovations are being completed on the Aquarium du Québec's polar bear habitat which will allow for greater capacity for polar bears. Hudson and Humphrey will be moving to join the 20-year-old polar bear Eddy in the Aquarium's new habitat once completed. Québec's female bear Taïga will then be joining our three other female polar bears here at our Zoo.

Western Grey Kangaroo

Our Kangaroo Walk-Thru was also reopened in 2019!

The walk-thru exhibit was temporarily closed to the public in 2013 for the opening of the Giant Panda Experience. The experience allows guests to step into the Australian Outback, adjacent to the Australasia Pavilion, and experience our kangaroo mob and wallabies from within their habitat.



On Thursday, July 4, 2019, Tori, our 8-year-old Western grey kangaroo, was observed with a joey in her pouch! This made Tori and father Simon first-time parents. Keepers first observed Tori with a joey on April 13th and the little joey popped its head out on June 29th. Once born joeys stay hidden for approximately 3 months and will not leave the pouch for 6 months, eventually venturing out for short periods of time and returning for rest and food. Joeys continue to nurse for up to 18 months.

A second joey was born in September 2019.



EVENTS



On Friday, September 6, 2019, Toronto Zoo participated in the annual Great Canadian Shoreline Clean-up, a national conservation initiative led by Vancouver Aquarium and World Wildlife Fund Canada. The clean-up removes shoreline debris and garbage, which is responsible for the death of millions of animals every year. This event gives Toronto Zoo staff and local community members or groups the opportunity to take local action to clean-up communities in their backyard and do something positive to protect local wildlife.



Townline Marsh Cleanup

On Wednesday, May 8, 2019, Toronto Zoo participated in a staff run cleanup at the Townline Marsh. The marshlands were in desperate need of a clean-up, and with 26 staff volunteering 62.25 hours of time, the area was left much more suitable for wildlife. Now that the marshlands are cleaned up they are ready for the eco-passage work that will be taking place in 2020-2021.

Love at the Zoo

From Thursday February 14 to Saturday February 16, 2019, the Toronto Zoo held its annual Love at the Zoo event.

Each evening included a romantically-inspired dinner with hors d'oeuvres, buffet dinner, dessert and a complimentary glass of sparkling wine, as well as a special animal encounter, an interactive group presentation, and a tour of our Reproductive Labs led by our Reproductive Specialist Team.

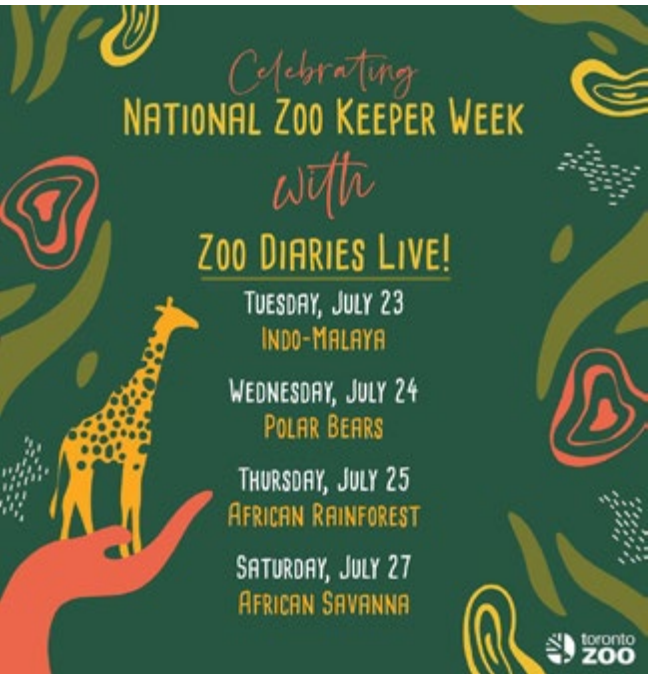


Keeper Week

On July 21 - 27, 2019, Toronto Zoo celebrated National Zoo Keeper week. The entire week was focused on highlighting and celebrating the hard work and dedication provided by the Zoo Keepers as they care for some of the worlds most endangered and vulnerable species. Zoo Keepers play a vital role in the ongoing fight for species survival and the presentation of the natural homelands inhabited by the animals they care for. National Zoo Keeper week provides the opportunity to recognize the efforts of our Zoo Keepers and increase awareness about the importance of animal conservation.

This past year we had 4 different events during the week. This included Zoo Diaries Live!: Indo-Malaya; Zoo Diaries Live!: Polar Bear; Zoo Diaries Live!: African Rainforest; and Zoo Diaries Live!: African Savanna. These events included a special presentation on the species of focus and guests were able to meet some of our very own Toronto Zoo Keepers who were able to share stories and information on how we take care of our animals.

A portion of the proceeds gathered were directed towards the Toronto Zoo chapter of American Association of Zoo Keepers.



Events

Save the Vaquita Day!

On July 6, 2019, Toronto Zoo hosted volunteer representatives from The Porpoise Conservation Society in celebration of International Save the Vaquita Day. A few volunteers were stationed at a booth outside the entrance to the Americas Pavilion from 10 am to 4 pm to engage Zoo guests in activities, raise awareness of the endangered vaquita and collect signatures for their petition to save the Vaquita (with around 100 signatures collected).

According to The Porpoise Conservation Society, the vaquita is the most endangered marine mammal in the world, with less than 20 individuals left. Listed as critically endangered, the population has declined by 90 percent between 2011 and 2016. Found only in the Sea of Cortez (Northern Gulf of California), the major threat these porpoises face are entanglement in gillnets due to fishing for endangered totoaba, however, they are also negatively affected by the shrimp fishery industry as they are caught as by-catch.

To learn more about these critically endangered species, visit the following link:
<https://porpoise.org/save-the-vaquita/>



National Indigenous People Day

On June 21, 2019, Toronto Zoo celebrated National Indigenous People Day and over 20 years of strong, vibrant cultures and traditions. For the entire weekend only the Zoo offered complimentary admission to Indigenous people with the presentation of their status card, Metis card or an Inuit Health Branch Client Identification Number. On the Friday, there was a First Nations Art Garden gathering to meet with our Turtle Island Conservation team and explore the Indigenous programming and resources available at Toronto Zoo. On the Saturday and Sunday, there was an event in the Wildlife Marquee where guests learned about local indigenous history and tradition with smudging throughout the day, teaching about the sacred medicines, the opportunity to create your very own medicine bag, and learning why these are such an important piece of indigenous culture. In addition, there was a very special bird show offered on the Saturday and Sunday as well, followed by an Indigenous storytelling and teaching of the Creation Story and the significance of our Turtle Island Conservation Program.



Taylor Tabobondung, our Turtle Island Conservation Steward, leading smudging ceremonies.

World Giraffe Day with Dr. Anne Innis Dagg

On June 21, 2019, Toronto Zoo welcomed Dr. Anne Innis Dagg for a reading of her children's book by the giraffe enclosure. Otherwise known as "The Woman Who Loves Giraffes" in her documentary, Dr. Anne Innis Dagg is a Canadian zoologist, feminist and author of numerous books. She is a pioneer in the study of animal behaviour and is credited with being the first to study giraffes in the wild in Africa. She has also researched and written extensively about the gender bias in academia, with some experience with the issue herself. Dr. Dagg read her book called "5 Giraffes" on World Giraffe Day to celebrate the species and raise awareness to all that came to the event!



Spring Toad Festival

On Saturday May 4, 2019, Toronto Zoo held its annual Spring Toad Festival at the Americas Wetlands, where guests celebrated the arrival of spring by experiencing the sights and sounds of amorous male toads in search of that special someone! Although the emergence and courtship of the toads was the main event, there were heaps of other fun activities for children and adults alike, including air-brush tattoos, Toady the Mascot, information on how to become a Frog Watcher or Turtle Detective, and froggy games like "Fish for a Prize." It was "toad-ally" fun for the whole family!



Bat Night

On Saturday August 17, 2019, Toronto Zoo held its annual Bat Night. The evening began with an informative presentation by two of Canada's leading bat experts, Dr. Brock Fenton and Dr. Paul Faure, as they shed some light on these mysterious and often misunderstood creatures. After the presentation, guests were able to experience the Zoo after dark for a short tour to and "listen to the night" and identify wild bats using special "bat detectors". Guests also had the chance to meet two big brown bats from Dr. Faure's research colony for an up close look at this common Ontario species while discovering more about the work being done at the Zoo and across the province to monitor and help protect these important creatures!

45 YEARS



On Thursday, August 15, 2019, Toronto Zoo celebrated 45 years! Hosting over 19,000 guests at the Zoo, it was the largest day of visitation since May 2013 and the biggest day in August since 2009.

Members enjoyed an additional 10% off in all of our gift shops (20% in total) and 2 for 1 Conservation Carousel Tickets, while guests enjoyed 45% off Zoo admission! Throughout the entire day, guests also celebrated with our animals by enjoying special enrichment sessions, including Puppe our orangutan, Vasili our male Amur tiger, and Tempete our Arctic fox.



The '74 Club

Among the thousands of animals that have lived at the Zoo since it opened, three of our animals have all been living at the Zoo for 45 years, some since opening day on August 15, 1974!

Puppe, our Sumatran orangutan, is the oldest living animal at our Zoo. She was born in 1967 in Sumatra and has lived here since 1973. Her sharp mind and powers of observation have made her a well recognized individual here at the Zoo - sailing across the moat in a bowl, twisting open a tube of lipstick, and even washing her side of the viewing glass with a bucket of water. She has six offspring, including Budi who still lives here today.

Josephine, our Western lowland gorilla, is now 48 years old (surpassing the average lifespan of gorillas). She frequently uses tools such as filling empty containers so she can drink from a cup, using old browse sticks to fish items out of her reach, and she even once removed the screws from the ductwork above the keeper hallway with a piece of browse!

Charles, our Western lowland gorilla and probably the most best recognized animal at the Zoo, just turned 47 in 2019. He is protective of his family and shows immense patience with the younger gorillas (even when they throw mulch over him). However, if a toad makes its way into the exhibit, you won't find Charles anywhere near it - he is petrified of them! Most recently, he has fathered Charlie (named after Charles), our newest addition to one of our troops.



NEWS WORTHY

Toronto Zoo Provides Anti-venom

As an accredited facility that is home to venomous snakes, Toronto Zoo maintains an inventory of anti-venom which is imported through Health Canada's Special Access Program for non-marketed drugs for the treatment of serious or life-threatening conditions. It is stocked here at Toronto Zoo primarily to ensure the health and safety of staff, however, when the need arises the Toronto Zoo will provide assistance to the public with venomous snake bite cases.

On Friday, June 7, 2019, Toronto Zoo was contacted by the Ontario Poison Centre, located at SickKids Hospital, for assistance with an Ontario patient requiring treatment for a venomous snake bite. The patient was experiencing re-emerging symptoms following a snake bite she received while vacationing in Thailand. Although the patient had been treated in Thailand, upon returning to Ontario the symptoms returned and she was subsequently admitted to the Grand River Hospital in Kitchener.



A venomous eyelash viper.

In consultation with Ontario Poison Control, the Toronto Zoo's Acting Manager of Safety and Security, Lead Keeper of Reptiles & Amphibians and the Acting Director of Wildlife Care and Welfare, determined the best course of action was to immediately send six vials of anti-venom from Toronto Zoo's inventory to the Grand River Hospital. This was to ensure that the patient received the quickest treatment possible, as timely access to the most appropriate anti-venom is essential for recovery. In addition, the Zoo's Lead Keeper of Reptiles & Amphibians continued searching for another location in North America that had anti-venom specific to a snake bite from a Malayan Pit Viper and another Ontario facility was identified and provided additional anti-venom.

Toronto Zoo Collaborates with TTC

This past year, Toronto Zoo and TTC came together to share an amazing partnership opportunity: an advertising campaign that promotes the Zoo as a TTC destination! The campaign ran from May until September and came at no cost to Toronto Zoo as it was TTC's internal campaign. The project was valued as over \$1,000,000, with over 3,000 ads posted all around downtown Toronto on TTC posters, subway door cards, subway interiors, streetcar/bus interiors, and streetcar vinyls.



NEW FEATURES



On Wednesday March 27, 2019, Toronto Zoo launched its new podcast series titled “Wild for Life”, which takes you behind-the-scenes and unveils the “hidden zoo”. Each episode gives information on the critical conservation work that protects endangered species and works to preserve biodiversity. A new episode will become available every Wednesday where you will have the opportunity to hear from wildlife care, nutritionists, ecologists, veterinarians, social scientists, wildlife biologists, and more that are working hard to help protect wildlife from all over the world.



The making of episode 12 with Erica Jacques and Alison Babin, discussing “Pygmy and River Hippos at The Toronto Zoo”.

Tune In On:

iTunes: <https://podcasts.apple.com/us/podcast/wild-for-life/id1456395854?mt=2>

Spotify: <https://open.spotify.com/show/2rk1sfoAECFczk4SGeXLPS>

Google: https://play.google.com/store/apps/details?id=com.google.android.apps.podcasts&hl=en_CA



The making of episode 17 with Ashley Fell and Brendan Bonner, discussing “Outreach and Discovery” here at the Zoo.



The making of episode 6 with Angie Snowie and Deserrai Buunk, discussing “Protecting Rhinos with Rhino Keepers”.

COMMENDATIONS

Rudolf Ippen Young Scientist: Dr. Ellie Milnes



Dr. Ellie Milnes, the Zoo’s recent DVSc Student/Resident in Zoological Medicine and Pathology, was presented with the Rudolf Ippen Young Scientist Award at the Zoo and Wildlife Health Conference in Sweden in June 2019.

Professor Dr. Rudolph Ippen was a pioneer of the scientific discipline of wildlife pathology and co-founder of the International Conference on Diseases of Zoo and Wild Animals (now known as the Zoo and Wildlife Health Conference). This award honours young scientists whose scientific output, particularly the papers published in the past 12 months, document the beginning of a promising career in wildlife veterinary science, conservation medicine, or zoo animal medicine. Currently, Dr. Ellie Milnes is a veterinary research fellow in wildlife and One Health with the Global Health Program based at Ol Jogi Wildlife Conservancy in Laikipia County, Kenya, working for the Smithsonian’s National Zoo and Conservation Biology Institute.

Our very own Dr. Pauline Delnatte, staff veterinarian, also won this award in 2013, making Toronto Zoo the only institution whose residents have won this award twice! This is a testament to the incredible, world class training program that the Zoo and the Ontario Veterinary College offer jointly, and to the high caliber and commitment from our Residents.

Toronto Star Readers’ Choice Awards

The Toronto Zoo won four awards with the Toronto Star Readers’ Choice awards, including DIAMOND (top) AWARD for the Best Day Trip Destination!

The Zoo’s other wins included:

- Platinum (2nd place) Professional Services: Community Charity/Foundation
- Gold (3rd place) Entertainment: Children’s Entertainment
- Gold (3rd place) Entertainment: Local Waterpark



Toronto Zoo Receives Marketing Award from the Association of Zoos and Aquariums

At the Association of Zoos and Aquariums (AZA) conference in September 2019 in New Orleans the Toronto Zoo was recognized with the 2019 Excellence in Marketing Award for significant achievement for the zoo’s “Come See All That We Do At The Toronto Zoo” campaign.



DONORS:

The Toronto Zoo would like to acknowledge donors who have contributed \$500 or more in 2019.

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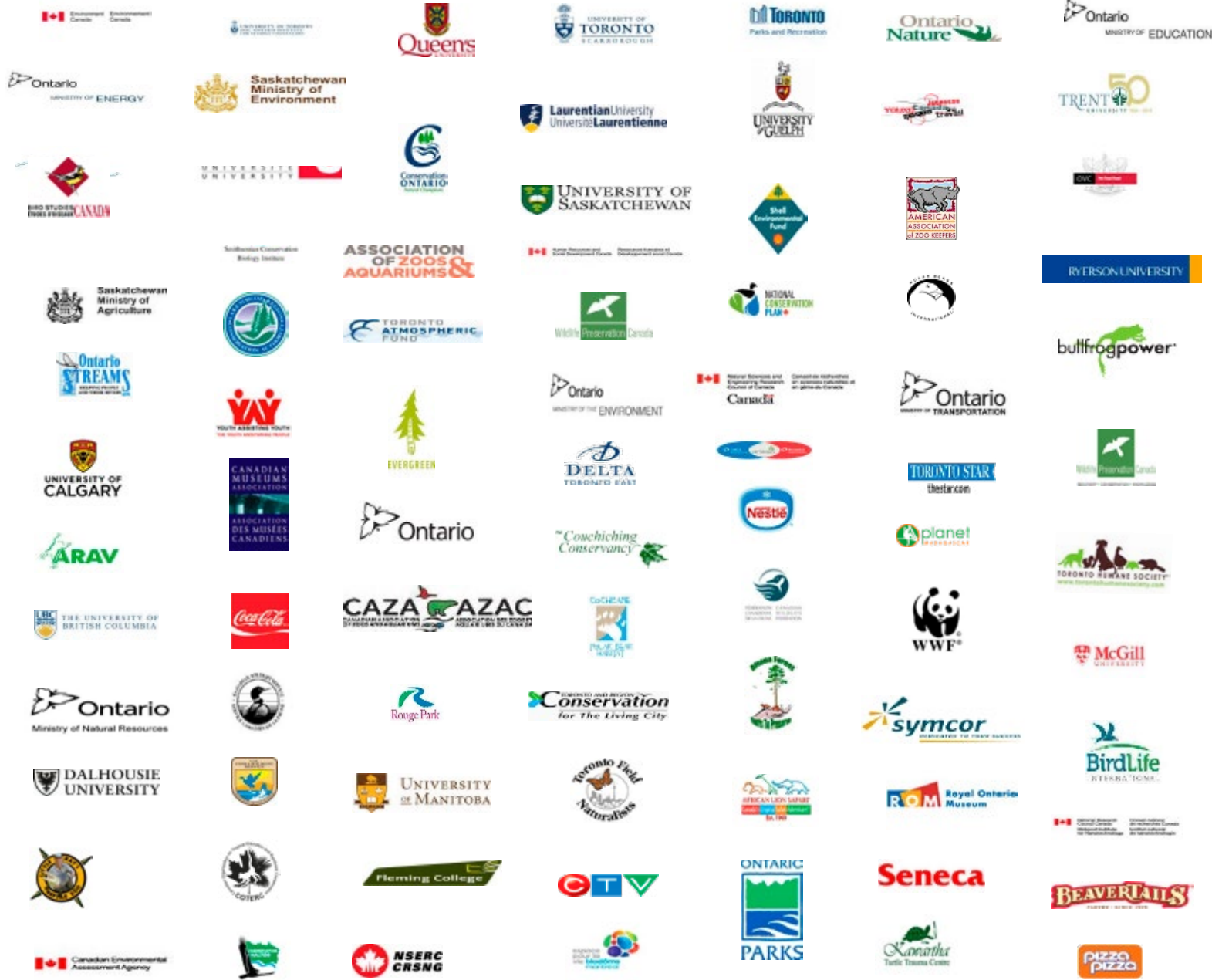
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DONATIONS

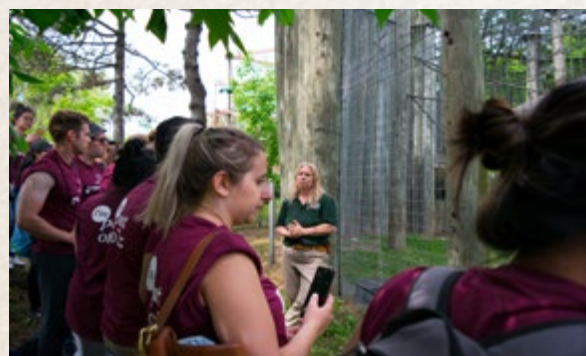
THANK YOU!



Thank you to Canada Blooms, who donated plants for our rose garden which allowed us to create beautiful landscaping near our Zootique Giftshop. Since 2018, they have donated materials with an estimated value of \$10,000!



A brand new feature for 2019 was our Daylily garden by the Amur Tiger exhibit. Thanks to Canadian Hybridized Growers, who donated 97% of our daylily garden, we were able to showcase close to 300 species of Daylilies. This was the largest collection of Daylilies in Canada.



Another community partner that helped created our most successful browse season yet is PricewaterhousesCoopers. This group of individuals not only helped harvest, pack, and ensile the browse donated by Acorn Development Corporation, but were also given the opportunity to feed the browse they collected to our animals.

The Nutrition Science Centre received almost 100 apple trees for harvest from Acorn Development Corporation. Staff worked like beavers to harvest material for the Zoo's animals, alongside another community partner. After it was harvested, packed, and ensiled, we had a total of almost 2,600 kg of apple and pear silage - a two year supply for our Western Lowland gorilla troops.



Symcor continued their strong support of Toronto Zoo and the renaturalization of the site in 2019 through corporate volunteerism and generous donations. In 2019, 227 volunteers took part in tree planting for the Acres for the Atmosphere program and pollinator meadow habitat restoration for the Meadows for Monarchs program. The Meadows for Monarchs planting added 1,500 pollinator friendly plants (from 27 native species) and the Acres for Atmosphere plantings added 500 native trees and shrubs!



PUBLICATIONS, RESEARCH PROPOSALS & OTHER PROJECTS

1.1 Publications 2018-2019

PEER-REVIEWED PAPERS

1. Dulude-de Broin F, Hamel S, Mastromonaco GF and Cote Steeve. Predation risk and mountain goat reproduction: evidence for stress-induced breeding suppression in a wild ungulate. *Functional Ecology* (2019); in press.
2. Stewart ND, Reilly A, Mastromonaco GF and Burness G. No island-effect on stress for a rodent from a near-shore archipelago. *Peer J* (2019); in press.
3. Imlay TL, Angelier F, Hobson KA, Mastromonaco GF, Saldanha S and Leonard ML. Intrinsic markers identify carry-over effects from non-breeding to breeding for three Nearctic-Neotropical migrant birds. *The Auk: Ornithological Advances* (2019) 136:1-15. doi:10.1093/auk/ukz053.
4. Dulude-de Broin F, Mastromonaco GF, Whiteside DP and Cote Steeve. Faecal metabolites and hair cortisol as biological markers of HPA-axis activity in the Rocky Mountain goat. *General and Comparative Endocrinology* (2019) doi.org/10.1016/j.ygcen.2019.04.22.
5. Stewart ND, Reilly A, Gilman C, Mastromonaco GF and Burness G. Evidence of degradation of hair corticosterone in museum specimens. *General and Comparative Endocrinology* (2018) 268: 128-133.
6. Acker M, Mastromonaco G and Schulte-Hostedde A. The effects of body region, season and external arsenic application on hair cortisol concentration. *Conservation Physiology* (2018) 6. doi:10.1093/conphys/coy037.
7. Hamilton MT, Finger Jr. JW, Elsey RM, Mastromonaco GF and Tuberville TD. Corticosterone in American alligator (*Alligator mississippiensis*) scutes: evaluating the feasibility of using keratinized tissues for investigating environmental stressors. *General and Comparative Endocrinology* (2018) 268:7-13.
8. Palomino JM, Jones L, Vanhanen T, Mastromonaco GF, Busato R and Adams GP. Alpaca embryo transfer on a private Canadian farm. *Canadian Veterinary Journal* (2018) 59:631-634.
9. Baqir S, Orabah AB, Al-Zeheimi N, Al-Shakaili Y, Al-Rasbi K, Gartley CJ and Mastromonaco G. Computer assisted semen analysis (CASA) in the captive Arabian leopard (*Panthera pardus nimr*): a multivariate clustering analysis. *Journal of Veterinary Science and Technology* (2018) 9. doi:10.4172/2157-7579.1000526.
10. Larouche CB, Mosley C, Beaufrère H, Dutton C. 2019. Effects of midazolam and nitrous oxide on the minimum anesthetic concentration of isoflurane in the ball python (*Python regius*). *Vet Anaesth Analg.* 46(6):807-814
11. Larouche CB, Johnson R, Beaudry F, Mosley C, Gu Y, Zaman KA, Beaufrère H, Dutton C. 2019. Pharmacokinetics of midazolam and its major metabolite 1-hydroxymidazolam in the ball python (*Python regius*) after intracardiac and intramuscular administrations. *J Vet Pharmacol Ther.* 42(6):722-731
12. Larouche CB, Beaufrère H, Mosley C, Nemeth NM, Dutton C. 2019. Evaluation of the effects of midazolam and flumazenil in the ball python (*Python regius*). *J. of Zoo and Wildlife Medicine*, 50(3):579-588
13. Larouche CB, Beeler M, arfisi J, Attard L, Nemeth N, Beaufrère H. 2019. Hemolymph cytology, hemocyte count, glucose, and electrolyte reference intervals in 93 Cameroon red tarantulas (*Hysteroocrates gigas*). *Vet Clin Pathol.* 2019 Sep;48(3):461-468
14. Léveillé AN, Bland SK, Carlton K, Larouche CB, Kenney DG, Brouwer ER, Lillie BN, Barta JR. 2019. Klossiella equi Infecting Kidneys of Ontario Horses: Life Cycle Features and Multilocus Sequence-Based Genotyping Confirm the Genus Klossiella Belongs In the Adeleorina (Apicomplexa: Coccidia). *J Parasitol.* 2019 Feb;105(1):29-40.
15. Milnes EL, Delnatte P, Woodbury M, Hering A, Lee S, Smith DA, Nemeth NM, Gu Y, Gehring R, Johnson R. 2019. Pharmacokinetics of imidocarb dipropionate in white-tailed deer (*Odocoileus virginianus*) after single intramuscular administration. *J Vet Pharmacol Ther* 43(1):33-37
16. Milnes EL, Thornton G, Léveillé AN, Delnatte P, Barta JR, Smith DA, Nemeth N. 2019. Babesia odocoilei and zoonotic pathogens identified from Ixodes scapularis ticks in southern Ontario, Canada. *Ticks Tick Borne Dis.* 2019 Apr;10(3):670-676.
17. Milnes EL, Thornton GL, Delnatte P, Léveillé AN, Barta JR, Smith DA, Nemeth NM. 2019. Molecular detection of Babesia odocoilei in wild, farmed, and zoo cervids in Ontario, Canada. *J Wildl Dis.* 2019 Apr;55(2):335-342.
18. Milnes E, Delnatte P, Dutton CJ, Brouwer E, Cai HY, Smith DA, Peregrine AS. 2018. Echinococcus equinus hydatid cyst in the liver of a Przewalski's horse (*Equus przewalskii*) in a Canadian zoo. *J Zoo Wild Med.* 49(4):1047-1050.
19. Milnes E, Delnatte P, Cai HY, Nemeth N. 2018. Systemic encephalitozoonosis due to Encephalitozoon cuniculi strain IV in a Vancouver island marmot. *J Zoo Wildl Med.* 2018 Jun;49(2):484-488.
20. Mathieu A, Pastor AR, Berkvens CN, Gara-Boivin C, Hébert M, Léveillé AN, Barta JR, Smith DA. 2018. Babesia odocoilei as a cause of mortality in captive cervids in Canada. *Can Vet J.* 2018 Jan; 59(1): 52-58.

1.1 Publications 2018-2019

CONFERENCE PROCEEDINGS

1. Fernandez Aguilar X, Leclerc L, Carlsson A, Hanke A, Di Francesco J, Mavrot F, Mastromonaco G, Kinniburgh DW and Kutz S. Understanding health challenges and drivers for the declining Dolphin and Union caribou. 68th Annual International Conference of the Wildlife Disease Association, Tahoe City, California, USA, August 4-9, 2019.

2. Di Francesco J, Mastromonaco G, Checkley S, Wynne-Edwards K, Rowell JE, Blake J and Kutz S. Validating the use of qiviut cortisol as a stress biomarker in muskoxen. 7th Annual Conference of the International Society for Wildlife Endocrinology, Pretoria, South Africa, October 13-16, 2019.

3. Robertson JK, Burness G and Mastromonaco G. Stress-induced peripheral hypothermia: role of the sympathetic nervous system in avian thermal modulation. Society for Integrative and Comparative Biology Annual Meeting, Tampa, Florida, USA, January 3-7, 2019.

4. Robertson JK, Burness G and Mastromonaco G. The heat is on: what thermal profiles reveal about stress in birds. Canadian Association of Zoos and Aquariums, Cambridge, Ontario, Canada, September 11-14, 2018.

5. Imlay T, Angelier F, Hobson K, Mann H, Mastromonaco G, Mills Flemming J and Leonard M. The role of food availability and wintering ground conditions on population declines for barn swallows in Maritime Canada. International Ornithological Congress, Vancouver, British Columbia, Canada, August 19-26, 2018.

6. Schoof VAM, Goldberg TL, Greenberg D, Mastromonaco G and Chapman CA. Role of age and sex in determining glucocorticoid response to parasite infection. American Association of Physical Anthropologists, Austin, Texas, USA, April 11 – 14, 2018.

7. Cervantes MP, Adams GP, Anzar M, Palomino JM and Mastromonaco G. In vitro embryo production from oocytes collected from non-superstimulated wood bison (*Bison bison athabasca*) following maturation in vitro using portable incubators. Annual Conference of the International Embryo Transfer Society, Bangkok, Thailand, January 14-16, 2018.

8. Milnes E, Dutton C, Larouche C, Delnatte P, Lentini A, Woodburn D, Nemeth N, and Smith D. An epizootic of mycotic shell disease associated with Nannizziopsiaceae fungal infection in juvenile wood turtles (*Glyptemys insculpta*) in a conservation head-starting program. 2018 Joint EAZWV/AAZV/Leibniz-IZW Conference Proceedings.

9. Milnes E, Delnatte P, Attard L, and Dutton C. Living syringes: a pilot study using hematophagous triatomine insects (*Triatoma dimidiata*) for blood collection from zoo reptiles. 2019 51st AAZV Annual Conference Proceedings.

10. Milnes E, Delnatte P, Woodbury M, Johnson R, Gehring R, Smith D, and Nemeth N. Towards an evidence-based treatment protocol for cervid babesiosis: pharmacokinetics of imidocarb in white-tailed deer (*Odocoileus virginianus*). 2019 51st AAZV Annual Conference Proceedings.

BOOK CHAPTER

1. A Pastor, E Milnes. 2019. Babesiosis in Cervidae. Fowler’s Zoo and Wild Animal Medicine Current Therapy, Volume 9, 647-655.

DOCTORAL THESIS

1. Milnes E. 2018. Eco-Epidemiology and Treatment of Babesiosis in Cervids. DVSc thesis. University of Guelph.

2. Larouche CB. 2019. The Use of Midazolam, Isoflurane, and Nitrous Oxide for Sedation and Anesthesia of Ball Pythons (Python regius). DVSc thesis. University of Guelph.

REPORTS

1. Adams GP, Zwiefelhofer M, Palomino JM, Cervantes M, Yang S, Anzar M, McCorkell RB and Mastromonaco GF. Development and use of a genome biobank to restore the genetic diversity of North American bison. Report to Parks Canada, January 2019.

1.2 Active Research Proposals 2019

REF. NO	PROJECT AND RESEARCHER	STATUS
2017-01-02	Studies on the Behaviour and Physiology of Polar Bears Under Human Care J. Wensvoort Toronto Zoo Feb/March 2017 – Jan/Feb 2022	Renewal/Amendment approved on 2019-05-22
2017-03-01	Habitat Use and Nesting Patterns of Turtles in Rouge Park and along the Highway 400 Corridor Research R. Vos Toronto Zoo April 2017 – December 2019	Renewal approved 2019-01-23
2017-03-02	Physiological Correlates of Fitness in Wild and Captive Reared Eastern Loggerhead Shrike J. Robertson Toronto Zoo April 2017 – December 2019	Renewal /Amendment approved on 2019-11-20
2017-03-03	Toronto Zoo Native Bat Conservation Program M. Franke Toronto Zoo June 2017 – March 2020	Renewal approved 2019-01-23
2017-06-01	Assessing the Nutritional Status of Free-ranging and Human Managed Populations of Black-footed Ferrets (Mustela nigripes) S. Gourlie & J. Wensvoort Toronto Zoo August 1, 2017 – December 31, 2018	Renewal received 2020-01-07
2017-11-05	Assessing the Potential for Visual and Behavioural Cue of Reproductive Ability in Golden Lion Tamarins A. Melin University of Calgary April 2018 – April 2019	Renewal approved 2019-01-23
2018-03-01	Ontario Reptile and Amphibian Field Methods Workshop (Pedagogical Research) R. Vos Toronto Zoo 2018-04-27 – 2019-04-30	Renewal approved 2019-01-23
2018-03-02	Eastern Milksnake Monitoring R. Vos Toronto Zoo 2018-04-01 – 2021-03-21	Renewal approved 2019-01-23

1.2 Active Research Proposals 2019

REF. NO	PROJECT AND RESEARCHER	STATUS
2018-05-02	Gut Microbial Communities of the Vancouver Island Marmot in Captivity and in the Wild P. Van Leeuwen Laurentian University 2018-05-24 – 2018-09-01	COMPLETED – manuscript in progress
2018-05-03	Exploring the Impacts of Diet Change on Gut Microbial Communities in the Relocation Context of Captive-born Animals (Deer Mice) P. Van Leeuwen Laurentian University 2018-05-24 – 2018-09-01	COMPLETED – manuscript in progress
2018-05-04	Flange Development of Male Orangutans in Relation To Skeletal Growth C. Knott Boston University 2018-06-01 – ongoing	Renewal approved 2019-09-18
2018-06-01	Toronto Zoo Carnivore Diet Mammalian Feeding Trial: Base & Dynamic Diet Investigation S. Gourlie Toronto Zoo 2018-09-01 – 2020-09-01	Renewal approved 2019-09-18
2018-09-01	Assessment of Physiological Parameters During Anesthesia in Przewalski’s Horses (Equus przewalskii) C. Larouche & E. Milnes Toronto Zoo 2018-09-01 – 2020-09-01	Renewal/amendment approved on 2019-11-20
2018-09-04	Venomous Training: Canadian Armed Forces & Toronto Animal Services (pedagogical) R. Vos Toronto Zoo 2018-11-06 – 2018-11-07	COMPLETED
2018-11-01	Imaging of Healthy Female Ball Pythons Using Ultrasonography, Computed Tomography, and Magnetic Resonance Imaging P. Delnatte/C. Larouche Toronto Zoo 2018-11-22 - 2019-01-31	COMPLETED
2019-01-01	Relationship Between Diet, Lipid Metabolism, Body Composition, and Hibernation in the Critically Endangered Vancouver Island Marmot (Marmota Vancouverensis) J. Aymen Toronto Zoo 2019-02-01 – 2020-07-01	Amendment approved 2019-05-22

1.2 Active Research Proposals 2019

REF. NO	PROJECT AND RESEARCHER	STATUS
2019-01-02	Eastern Massasauga Conservation Breeding Centres – Assurance Population/Head Start Project (Henvey Inlet First Nation and Ojibway Prairie Remnants Reptile Recovery Program) R. Vos Toronto Zoo Summer 2019 – Ongoing	Approved 2019-01-23
2019-05-01	Does Prey Consumption of an Invasive Fish Species Exceed Prey Consumption of Native Fishes at Increasing Water Temperature - Test Case Using the Invasive Round Goby and Native Fishes from the Credit River N. Mandrak & K. Greenham 2019-06-15 - 2019-12-31	Approved 2019-05-22
2019-06-01	Assisted Reproductive Technologies as a Method of Embryo Production in Wood Bison G. Mastromonaco Toronto Zoo Sept 2019 – Aug 31, 2022	Approved 2019-06-26
2019-06-02	Do Orangutans Choose to Choose S. MacDonald York University July 2019 – June 2020	Approved 2019-06-26
2019-06-03	Ultrasonic Calls in Mammalia J. Bowman Trent University 2019-07-15 – 2019-11-15	Amendment approved 2019-11-20

1.3 Operating Projects - 2019

Each year, the Toronto Zoo completes various operating projects that will make improvements to infrastruture and animal welfare. Projects are prioritized based on various criteria needs such as essential infrastructure/operating requirements, operational efficien- cy, public/staff safety, exhibit/holding repairs.

Projects completed in 2019 included the following:

- Indian Rhino House Soft Floor
- WHC Turtle Yard Roof Mesh Replacement
- Orangutan Climbing Structure Repairs
- Indian Rhino Manure Bin
- Outdoor holding Manure Bin
- Nutrition Centre Cold Room - design completed in 2019
- Archway Sign for Waterside Theatre
- New “Show Wall” for Waterside Theatre
- Enclosure – Peafowl Holding
- Quarantine Greenhouse Construction
- Sea Eagle Pool
- Demolish Existing Fish Carousel
- Symcor – Acres for the Atmosphere
- Symcor – Monarch Butterfly and Honey Bee Conservation
- Floating Wetlands

1.4 Endangered Species Reserve Fund (ESRF)

Toronto Zoo undertakes many conservation and research projects locally, nationally, and internationally for the benefit of threatened and endangered species, promoting species survival, reproduction, and habitat preservation. Most of this work is funded from the operating budget and is undertaken by Zoo staff directly or in collaboration with other external agencies.

The Zoo’s Endangered Species Reserve Fund (ESRF) was established for the purpose of funding research and education projects that directly assist in the conservation of endangered species. Money collected from the wishing wells on site and coin boxes at points of sale are also a source of annual additions to the Fund. Projects supported by the Endangered Species Reserve Fund in 2019 included the following:

- Beaded Lizard Community Based Conservation
- Long-term Monitoring of the Demographic Status of Komodo Dragon Populations and Their Prey in Komodo National Park
- Snow Leopard - Combating Poaching
- The Pygmy Hippo in the Upper Guina forest
- Forest Restoration - Besitang, North Sumatra
- Blanding’s Turtle and Wood Turtle Head-starting
- Toronto Zoo Bat Conservation Monitoring Program
- Aqua-Links
- Great Lakes Outreach Program
- The Influence of Seasonality on Assisted Reproductive Technologies in Wood Bison
- Ojibway Prairie Reptile Recovery Program
- Black-Footed Ferret Canadian Recovery Efforts
- Ape Action Africa Forest Education Office
- Toronto Zoo Conservation in Action: In situ Madagascar
- Tree Kangaroo & Biodiversity Conservation
- Action Indonesia: Conserving Anoa, Banteng and Babirusa
- Support the Southern African Foundation for the Conservation of Coastal Birds (SANCCOB)
- Hutan Reforestation Efforts in Kinabatangan
- Support of the Mabula Ground Hornbill Project
- Poison Response Action - Another Continental Vulture Crisis
- Conservation of Great Green Macaw, Costa Rica
- Securing the Last Wild Siamese Crocodile Population in Indonesia



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protecting species at
home and abroad.**

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