



toronto
1974 ZOO 2024

2024 IMPACT REPORT

Connecting people, animals
and conservation science to
fight extinction



The Toronto Zoo acknowledges the land we are on is the traditional territory of many nations including the Mississaugas of the Credit, the Anishinaabeg, the Chippewa, the Haudenosaunee and the Wendat Peoples and is now home to many diverse First Nations, Inuit and Métis peoples. We also Acknowledge that Toronto is covered by Treaty 13 with the Mississaugas of the Credit and the Williams Treaty signed with multiple Mississaugas and Chippewa bands.

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A NOTE FROM THE CEO

In 2024, we commemorated 50 years of dedication to the animals in our care and in the wild, along with the teams and communities committed to their well-being. In this report, we celebrate the critical impact Your Toronto Zoo had on safeguarding the future of our planet's biodiversity and climate. Through interdisciplinary research, training, communication and outreach in conservation science, we made significant strides in protecting endangered species and restoring natural habitats. "Conservation is a collaborative effort, and through our partnerships with local and international organizations, we were able to amplify our impact and unite to promote a nature-positive world." -Dr. Gaby Mastromonaco, Toronto Zoo Chief Science Officer. Our work has not only contributed to global conservation efforts but has also inspired countless individuals to join us in the fight to save species from extinction.

— Dolf DeJong, Toronto Zoo CEO



Partners

1. Alderville First Nation

2. Ape Action Africa

3. Beausoleil First Nation

4. Boston University

5. Calgary Zoo/Wilder Institute

6. Canadian Museum of Nature

7. Carleton University

8. Chester Zoo

9. Cheyenne Mountain Zoo

10. Cincinnati Zoo and Botanical Garden

11. Consecon Foundation

12. Couchiching Conservancy

13. Curve Lake First Nation

14. EcoKare International

15. Edward Lowe Foundation

16. Environment and Climate Change Canada

17. Georgian Bay Biosphere
18. Georgina Island First Nation

19. Government of British Columbia

20. Government of Northwest Territories

21. Greater Vancouver Zoo

22. Hiawatha First Nation

23. Huron Stewardship Council

24. International Rhino Foundation

25. Interventions in Wild Animal Health

26. Laurentian University

27. Little Ray's Nature Centre

28. Louisville Zoological Garden

29. Mabula Ground Hornbill Project

30. Magnetawan First Nation

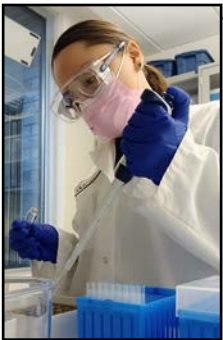
31. Maitland Valley Conservation Authority

32. Marine Institute of Memorial University

33. Marmot Recovery Foundation



Your Toronto Zoo partnered with Chester Zoo for future wildlife biobanking collaboration



Your Toronto Zoo's Reproductive Science Unit hosted a graduate student from Mexico completing hormone assays for threatened bat species



Two Toronto Zoo employees traveled to Madagascar through the Partners in Protection Travel Program and accomplished community conservation projects



In collaboration with several partners, your Zoo's Species Recovery Team released 74 Endangered Blanding's turtles to the Rouge National Urban Park for population reinforcement

34. Métis Nation of Ontario, Georgian Bay Community

35. Michigan Department of Natural Resources

36. Ministry of Environment, Conservation and Parks

37. Ministry of Natural Resources and Forestry

38. Mississaugas of the Credit

39. Mount Washington Tony Barrett Marmot Recovery Centre

40. Nashville Zoo

41. National Aviary

42. Nuclear Waste Management Organization

43. Ontario Federation of Anglers and Hunters

44. Ontario Power Generation

45. Pan Eco Orangutans

46. Parc Omega

47. Parks Canada

48. Peel District School Board
49. Phoenix Zoo

50. Planet Madagascar

51. Pontificia Universidad Católica de Chile

52. Queen's University

53. Rama First Nation

54. Red Panda Network

55. Scales Nature Park

56. Science North

57. Sciansational Sssnakes

58. Scugog First Nation

59. Shawanaga First Nation

60. Six Nations of the Grand River

61. Smithsonian Conservation Biology Institute

62. South African Foundation for the Conservation of Coastal Birds

63. Sumatran Ranger Project

64. Toronto and Region Conservation Authority

65. Toronto District School Board
66. Trent University

67. U.S. Fish and Wildlife Services

68. Universidad EARTH

69. Universidad Nacional Autónoma de México

70. University of Guelph

71. University of Illinois

72. University of Memphis

73. University of Saskatchewan

74. University of Toronto

75. Vancouver Aquarium

76. Weenusk First Nation

77. Wiikwemkoong First Nation

78. Wildlife Preservation Canada

79. York University

80. 8 Trees Inc.

ACTIVE RESEARCH projects

- Addressing Knowledge Gaps to Inform Recovery and Conservation Management of Ontario Bats
- American Institute of Rhinoceros Science (AIRS) - A Model for Saving Species with Science *Ex Situ*
- Assessment of Nutrients in Wild Plants Consumed by Vancouver Island Marmots for Studying Heart Health and Hibernation Physiology
- Assisted Reproductive Technologies as a Method of Embryo Production in Wood Bison
- Behaviour and Physiology of Polar Bears under Human Care
- Expression of Migratory Urge and the Impact of Sustained Time in Human Care on the Migratory Behaviour of the Endangered Loggerhead Shrike (*Lanius ludovicianus*)
- Flange Development of Male Orangutans in Relation to Skeletal Growth
- Fukui Pot Bycatch Reduction for River Otters
- Genome Analysis and Development of Biobanking Protocols for At-risk Boreal Caribou in Canada
- Investigating Headstarting as a Method to Recover At-risk Turtle Populations, and Applying this Method to Recover Blanding's Turtle in the Rouge Watershed
- Noninvasive Molecular Sexing of Threatened Eastern Massasauga Rattlesnakes (*Sistrurus catenatus*) in a Conservation Breeding and Reintroduction Program
- PantherAI: An Autonomous Behavioural Monitoring Tool for Assessing Activity Budgets and Space Use in Tigers Under Human Care
- Selection and Validation of Suitable Release Sites for Conservation Translocations of a Temperate Zone Snake Based on Hibernation Habitat Quality



4
Post-Doctoral Research
Fellows Hired



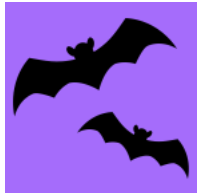
25+
Research Projects
Supported by
Your Zoo



50
Years of Conservation
Science in Action



100+
Zoo Species Banked in
TZ Wildlife Cryobank



73,437
Community Conservation
Acoustic Bat Observations



440+
Animal Births/Hatches
at Your Toronto Zoo



25
Participants in the AZA
Pathway Toward
Membership Workshop



700+
Attendees of Scientific
Conferences
Hosted by Your Zoo



21
Animals in ZooMonitor
Welfare Science
Volunteer Program



112
Animals Raised and
Released to
the Wild



100
Publications Reached
by Reproductive
Science Team

BY THE NUMBERS

50 YEARS OF CONSERVATION

1974

Your Toronto Zoo opened its doors and welcomed over 3,000 members in its first year.

1977

First accreditation by the Association of Zoos and Aquariums (AZA) was received.



1980

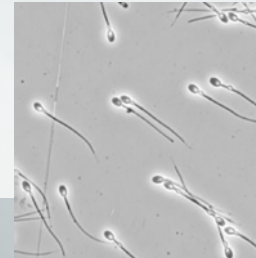
First Residency in Wildlife Medicine program in Canada was hosted at your Zoo.

1985

First wood bison released to help restore wild populations in Manitoba.

1990

Your Toronto Zoo initiated a living cell wildlife biobank with animal sperm banked for the first time at your Zoo.



1991

The black-footed ferret conservation, Adopt-a-Pond, and Turtle Island Conservation programs launched.



2008

Nutrition Science's browse program began, resulting in over 9,000kg annually of fresh plant material for animal diets and enrichment.

2015

Your Toronto Zoo's Native Bat Conservation program began.



2022

Your Toronto Zoo appointed AZA's first Director of Indigenous Relations to advance efforts bridging social and conservation narratives.

2024

Your Toronto Zoo celebrated 50 years in the community and launched the Guardians of Wild campaign.



Contributing to Canada's 2030 Nature Strategy

through Conservation Breeding & Translocation

Vancouver Island marmot
Marmota vancouverensis
O'wilch'uqs

Global threatened status determined by the IUCN



National threatened status determined by COSEWIC



Eastern massasauga rattlesnake
Sistrurus catenatus
Massasauga Medwe'enh O'nekén:tsi

Blanding's turtle
Emydoidea blandingii
Blanding o m'sheekahnmon Blanding Ra'nó:wara



English name
Scientific name
Anishnaabemowin
(Ojibwe) name
Haudenosaunee (Mohawk) name
Cowichan name



The 2030 Nature Strategy Plan recognizes the Kunming-Montreal Biodiversity Framework that sets specific goals and targets for restoring biodiversity. Your Toronto Zoo's *ex situ* breeding and translocation programs fall under Target 4 of the framework:

“maintain and restore the genetic diversity within and between populations of native, wild and domesticated species...including through in situ and ex situ conservation and sustainable management”

Eastern loggerhead shrike
Lanius ludovicianus
Gichi-wiindigoo-bineshiinh



IMPLEMENTING THE IUCN'S **ONE PLAN APPROACH**

Your Toronto Zoo worked with the Vancouver Island Marmot Recovery Program partner, the Calgary Zoo/Wilder Institute, to complete the first ever assessment of nutrients in wild plants consumed by Vancouver Island marmots. Plants sampled include some of the marmots' known favoured forbs and grasses (such as lupine, mountain wild-oat and wild blueberry). Samples were taken throughout the active period, May to September, to capture the changes in nutrient composition that occur over the course of the plants' life cycles. Your Toronto Zoo is currently analyzing these plants for specific nutrients that are linked to improved heart health and hibernation physiology. This aligns with the International Union for the Conservation of Nature's (IUCN's) One Plan Approach, that emphasizes the connection of *in situ* and *ex situ* activities for species conservation.

The next steps are to integrate the data from wild plants into the development and testing of an improved diet program for the marmots that can optimize health and increase survival upon release. Your Zoo Horticulture Team plans to develop a large growing site for wild plants to be included in the marmot diet. Land development will begin next year, with plants to be ready for marmot diets in 2027.



REINTRODUCTION TO THE WILD

The eastern massasauga rattlesnake is an endangered species in southern Ontario with only two small populations remaining. Surveys over the last decade at Ojibway Prairie have identified a precipitous decline in abundance, and an extremely high risk of local extinction. Your Toronto Zoo has partnered with Wildlife Preservation Canada to recover this species within its native range. After successfully overwintering juvenile massasaugas, a translocation study was conducted with 22 individuals at Ojibway Prairie in autumn. Toronto Zoo's Wildlife Heath team conducted a thorough Disease Risk Analysis to identify potential threats to both in situ and ex situ groups. All 22 snakes underwent surgery to implant radio transmitters that were used to track individuals as part of the study. Additional research in your Zoo's Reproductive Science Laboratories utilized skin sheds of these individuals to non-invasively sex snakes using molecular genetic techniques, which can help inform sex-specific survival outcomes.

This marked the beginning of a long term augmentation program targeting the Ojibway Prairie population of eastern massasaugas. This species serves an important role in the ecosystem, serving as both predator to rodents and also prey for raptors. Continued breeding efforts at your Zoo, including investigation of brumation, sperm collection, male-male combat behavioural studies, and more, serve to bolster the conservation breeding program for future releases.

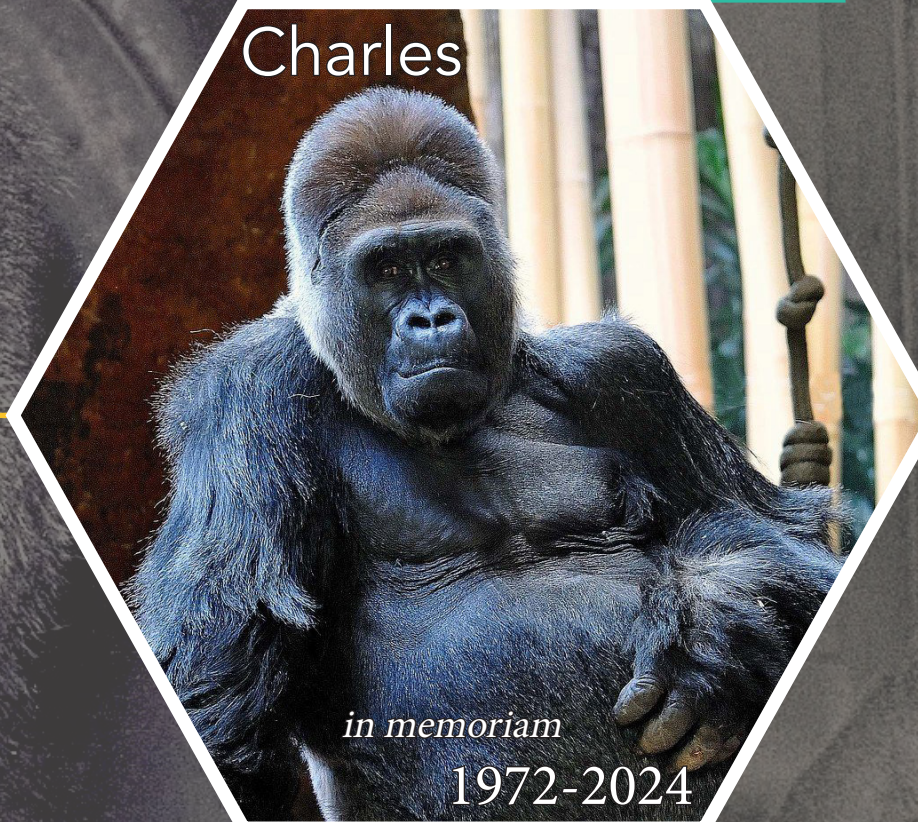


holistic well-being

Nutrition Science staff have continuously optimized great ape diets at your Toronto Zoo. There has been an increased focus on mirroring diets from the wild, including offering browse (e.g. tree leaves) and decreasing high-sugar fruits. Nutrition Science has collaborated with **Veterinary Science** staff in efforts to prevent cardiovascular disease by offering supplements such as omega-3.

Veterinary Science staff partnered with a cardiologist as well as members from the Great Ape Heart Project to perform cardiac assessments on adult male gorillas to monitor their heart health and accrue data for this species.

Charles



Wildlife Care and **Project Management** staff collaborated to install platforms, bridges, and rubber handholds to improve the safety and physical well-being for geriatric silverback gorilla, Charles, along with future senior apes under your Zoo's care.

Wildlife Care staff were closely involved in training gorillas like Charles for voluntary procedures. **Welfare Science** has been involved with long-term behavioural monitoring, including quality of life assessments, to enhance the lives and overall well-being of great apes at your Toronto Zoo.

Reproductive Science staff worked with **Veterinary Science** to biobank living cells from Charles for long-term storage in your Toronto Zoo Wildlife Cryobank.

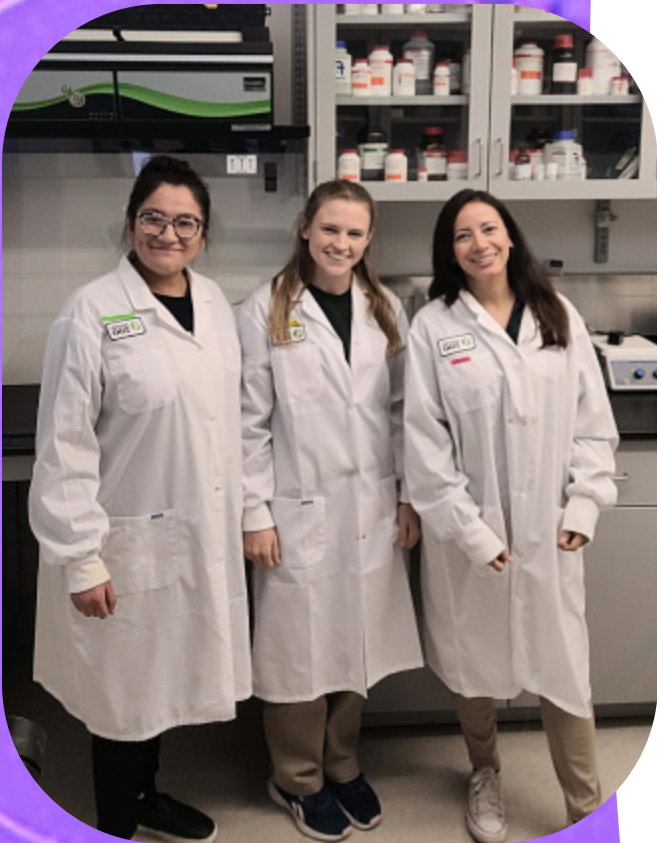
Research & Compliance completed 18 on-site inspections, including the great ape habitats and holdings, to ensure facilities and animal care are held to the highest standard.

BRAIDING TRADITIONAL KNOWLEDGE WITH CONSERVATION SCIENCE



In conservation science, collaboration is key. Your Toronto Zoo initiated a Caribou Genome Biobanking Project that investigates methods in reproductive and general cell cryopreservation for vulnerable populations of Ontario’s boreal caribou.

Your Zoo partnered with Weenusk First Nation (WFN), an Indigenous community in Northern Ontario, to provide guidance, and integrate conservation science and traditional knowledge as an integral part of working with this iconic and culturally significant Canadian species.



As part of this collaboration, your Zoo recently welcomed a research assistant from WFN who received specialized training in your Zoo’s Reproductive Science Laboratories and travelled with the team to test sample collection methods in the field.

The partnership between your Toronto Zoo and WFN brings invaluable perspectives to innovative research endeavours such as biobanking and contributes to collaborative efforts and solutions for at-risk Canadian species.

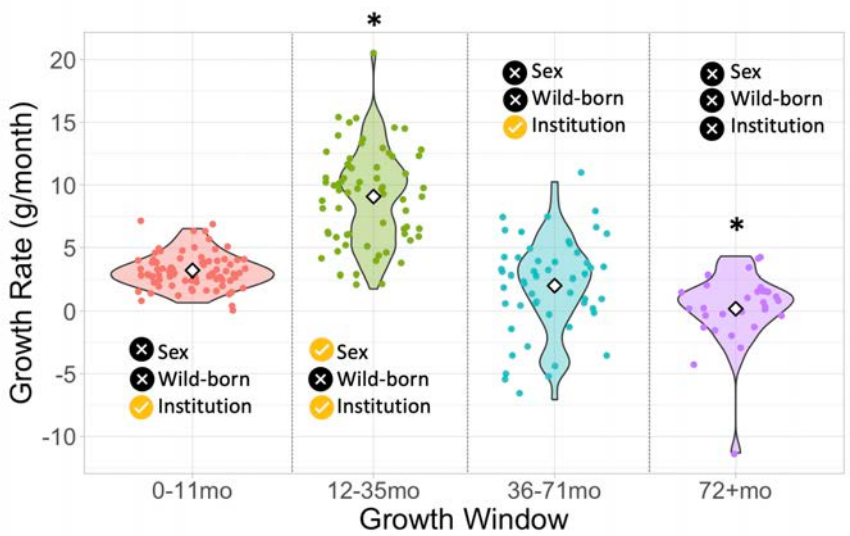


SPECIES 360

Did you know that your Toronto Zoo plays a pivotal role in creating the world’s largest and most comprehensive knowledge base on over 22,000 species? As a member of the global nonprofit Species360, your Toronto Zoo contributes data on the animals and groups in its care every day, from lifecycle traits to environmental needs.

The information is recorded in the Species360 Zoological Information Management System (ZIMS), now 50 years old and the world’s largest source of data on wildlife species. To date, your Toronto Zoo has contributed data on more than 43,517 animals and 1,963 species, subspecies, and breeds to Species360 ZIMS.

ZIMS curates data from your Toronto Zoo along with those from accredited zoos and aquariums around the world. This influences what is known about animals and their environments, including insight into disease treatment, animal welfare, population health, and species conservation.



Research from your Toronto Zoo was presented at the first-ever Species360 Conservation Science Alliance Research Symposium. The study focused on growth and reproduction data of over 110 eastern massasauga rattlesnakes across 23 institutions over 20 years to help inform the conservation breeding program.



A WORLD OF DATA

Six Toronto Zoo Wildlife Care staff travelled to Sumatra to work alongside the Sumatran Ranger Project to build a livestock corral in Tangkahan, a rural settlement on the edge of the Gunung Leuser National Park. The Sumatran Ranger Project is a community conservation initiative, established to help provide long term protection of the Leuser Ecosystem forest edge to benefit both wildlife and people.

The Leuser Ecosystem is home to the Critically Endangered Sumatran tiger. There are less than 900 individuals left on the planet, and your Toronto Zoo is the only zoo in Canada to house them. In addition to the *ex situ* conservation your Zoo partakes in for this species, *in situ* volunteering through the Sumatran Ranger Project to build corrals and destroy harmful snares leads to targeted conservation efforts to prevent the extinction of the Sumatran tiger.



supporting COMMUNITIES

Your Toronto Zoo launched the Partners in Protection Travel program to support *in situ* conservation and engage staff to utilize their unique skillset to further your Zoo's stated mission of connecting people, animals, and conservation science to fight extinction. Two Toronto Zoo staff members travelled to three communities in Madagascar: Ambarindahy, Maevatanimbary, and Andranohobaka to support the Conservation and Women's Health Project in partnership with Planet Madagascar. The project works with the communities to make safe and reusable sanitary pads for women to reduce waste, reduce cost, and promote women's health. Over 100 women from the communities participated in the project.



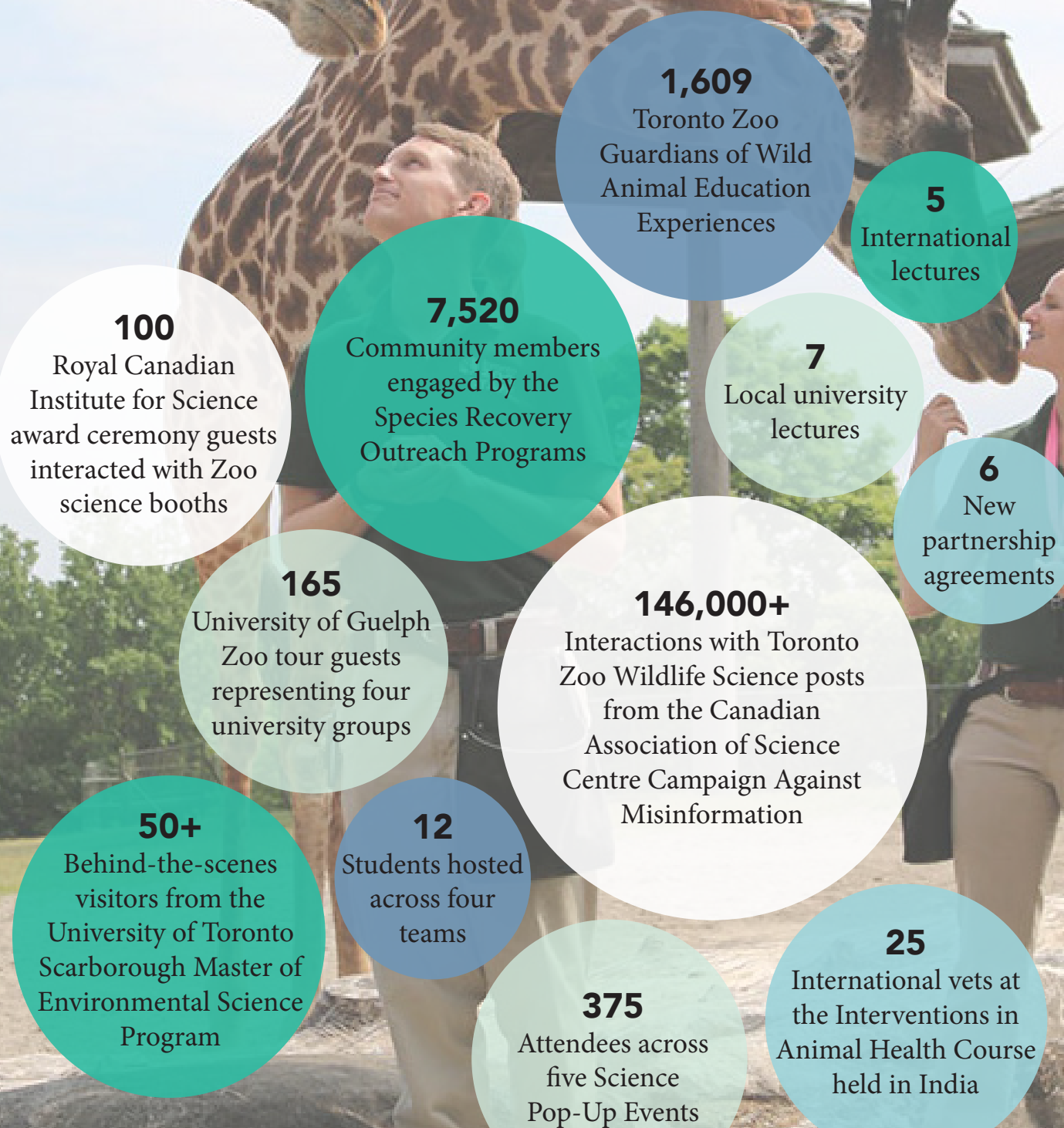
BUILDING A SCIENCE COMMUNITY

Your Toronto Zoo hosted the joint American Association of Zoo Veterinarians and European Association of Zoo and Wildlife Veterinarians Conference. Over 600 veterinarians attended the event in-person, with a further 100 attendees participating virtually. Three workshops were hosted on-site at your Zoo, including a: 1) Disease Risk Analysis workshop hosted by the Veterinary Science team, 2) Browse workshop hosted by the Nutrition Science team, and 3) Biobank workshop hosted by the Reproductive Science team. This global exchange of knowledge and skills increases the network of wildlife and zoo experts and can lead to enhanced animal care and conservation at a multitude of institutions.



SCIENCE COMMUNICATION

outreach events



- Canadian Association of Science Centre Campaign Against Misinformation
- Eagle Feather Ceremony with First Nation Community Members
- Lemurs & Lagers with Planet Madagascar
- Meet the Science Team
- Turtle Island Conservation Sea Ice Day Table: Effects of Melting Sea Ice on Inuit Communities
- Reproductive Science Love at the Zoo
- Reverse the Red 24-hour Livestream Watch Party
- Science Pop-Ups Featuring Wildlife Science Teams
- Seven Grandfather Teaching Tours
- Southern Ontario Reproductive Biology Conference
- University of Toronto Scarborough Undergraduate Experiential Learning Partnership
- Welfare Science at Your Toronto Zoo Talk
- Zoo After Dark: An Evening with Native Bats

SCIENTIFIC PUBLICATIONS

Cantarelli, V. I., Mastromonaco, G., Galeano, G., de Cuneo, M. F., & Ponzio, M. F. (2024). Use of urinary biomarkers of ovarian function in domestic *Chinchilla lanigera*: Assessing protocols for exogenous regulation of the hypothalamic-pituitary-gonadal axis. *Theriogenology Wild*, 4, 100074.

Chen, Y., Bell, T. H., Gourlie, S., Lei, Y. D., & Wania, F. (2024). Contaminant biomagnification in polar bears: interindividual differences, dietary intake rate, and the gut microbiome. *Environmental Science & Technology*, 58(24), 10504-10514.

Cigler, P., Davis, L. R., Gmür, S. L., Clauss, M., Hatt, J. M., Ohlerth, S., ... & Kummrow, M. (2024). Evidence for seasonal shift in the reproduction of Aldabra giant tortoises (*Aldabrachelys gigantea*) in managed care in the Northern hemisphere compared to the natural habitat in the Southern hemisphere. *Zoo Biology*, 43(5), 458-469.

Hee, O., Pruvot, M., Mavrot, F., Dickinson, E. R., Mastromonaco, G. F., Kugluktuk Angoniatit Association, ... & Kutz, S. (2024). Evaluating the utility of harvester-collected samples for muskox (*Ovibos moschatus*) pregnancy diagnostics. *Theriogenology Wild*, 5, 100110.

Herrick, J. R., Bateman, H. L., Curry, E., Nagashima, J. B., & Songsasen, N. (2024). Hormones and reproductive cycles in carnivores. In *Hormones and Reproduction of Vertebrates* (pp. 415-456). Academic Press.

Mastromonaco, G. (2024). 40 'wild' years: the current reality and future potential of assisted reproductive technologies in wildlife species. *Animal Reproduction*, 21(3), e20240049.

Mastromonaco, G. F. (2024). A quarter century of CANDES: The state of embryo technologies in companion animals, non-domestic and endangered species. *Theriogenology Wild*, 4, 100069.

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Nielsen, R., Trautwein, S. E., Booth, L., Clauss M., Fienig E., Fisher T., ... & Tidière, M. (2024). Continuous enhancement in management, care, and welfare in Panthera species in zoological institutions as evidenced by the increase of two survival summary metrics. *Conservation Science Alliance Scientific Report*.

Stewart, N. D., Tabh, J. K., Mastromonaco, G. F., & Burness, G. (2024). Island living indirectly affects hair glucocorticoid levels in a small mammal. *Ecological and Evolutionary Physiology*, 97(5), 263-273.

Taylor, R. S., Manseau, M., Keobouasone, S., Liu, P., Mastromonaco, G., Solmundson, K., ... & Wilson, P. J. (2024). High genetic load without purging in caribou, a diverse species at risk. *Current Biology*, 34(6), 1234-1246.

van Leeuwen, P. M., Mastromonaco, G. F., Mykytczuk, N., & Schulte-Hostedde, A. I. (2024). Captivity conditions matter for the gut microbiota of an endangered obligate hibernator. *Conservation Physiology*, 12(1), coae072.

Veloso-Frías, J., Soto-Gamboa, M., Mastromonaco, G., & Acosta-Jamett, G. (2024). Seasonal hair glucocorticoid fluctuations in wild mice (*Phyllotis darwini*) within a semi-arid landscape in north-central Chile. *Animals*, 14(9), 1260.

Association of Zoos and Aquariums

ACCREDITED BY THE
**ASSOCIATION
OF ZOOS &
AQUARIUMS**

The Association of Zoos and Aquariums (AZA) has been the primary accrediting body for zoos and aquariums for over 40 years and is dedicated to advancing zoos and aquariums in conservation, animal welfare, education, science, and recreation. AZA accreditation is among the most prestigious achievements in the zoo industry.

Canadian Council on Animal Care



The Canadian Council on Animal Care (CCAC) provides national oversight for animal-based science activities in Canada. The Toronto Zoo maintains a CCAC Certificate of GAP – Good Animal Practice that recognizes an institution's commitment to achieving high standards of animal ethics and care in science.

Ontario Ministry of Agriculture, Food and Agribusiness



Toronto Zoo is a registered animal research facility under the Animals for Research Act (ARA) of Ontario, overseen by the Ontario Ministry of Agriculture, Food and Agribusiness (OMAFRA), who provides an annual license. OMAFA provides provincial oversight for the welfare of animals, including animals used in research.

Animal Care & Research Committee



Toronto Zoo's Animal Care & Research Committee (ACRC) is the local institutional animal care committee as mandated by CCAC and OMAFRA and reports directly to the CEO. ACRC provides oversight for the ethical care and use of animals in science at the Zoo and is comprised of internal and external committee members.



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OF WILD
STAFF**



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**WILDLIFE
CONSERVANCY**

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conservation
in action!

