

2021 Environmental Initiatives Report

Presented to the Board of Management of the Toronto Zoo

By Green Eco-Zoo Team

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This Environmental Initiatives Report provides a progress summary of the initiatives implemented by the Zoo in 2021 to meet the objectives of the 2007 Green Plan and the Environmental Management System. In 2021, the Conservation Programs & Environment Office concentrated on waste management, energy consumption reductions, and surface water quality improvements. Although COVID-19 restricted public education and engagement activities planned at the Zoo in 2021, infrastructure improvements and staff engagement continued.

New Toronto Zoo Sustainability Plan

Through 2021, the Conservation Programs & Environment Office developed a new sustainability plan that aligns with the Zoo's new strategic direction. For the past 15 years the Zoo has been following the 2007 Green Plan, however our understanding of climate change science and development of innovative technology has advanced significantly, and it is time to update our sustainability plan to incorporate this knowledge as well as the new climate resiliency directives such as TransformTO, The Biodiversity Strategy and the United Nations Sustainable Development Goals. The new plan sets more aggressive short-term targets for waste diversion and water consumption and revises achievable greenhouse gas emissions based on our current status. We also set long term goals for net zero waste diversion, water consumption and greenhouse gas emissions. In addition to the traditional operational targets, the Zoo has set directions for naturalization and rehabilitation to support biodiversity and to work alongside the community to help others outside our gates to achieve climate resiliency. The TZNet0 Plan will be published in early 2022.

Environmental Management System

GEZT manages the Zoo's ISO14001:2015 compatible Environmental Management System (EMS). It continues to work through the action plans set out in the EMS to ultimately achieve the 2007 Green Plan objectives and is adopting new action plans to align with the new sustainability plan.

As part of the Environmental Management System, incidences on site that have had or may have a negative impact on the environment are to be reported to the Conservation Programs & Environment Office. There were nine environmental incidences on site in 2021.

1. Approximately 50 litres of hydraulic fluid spilled on soil within the White rhino exhibit during general landscape maintenance. The driver immediately contained the spill and worked with staff responders to clean up all the fluid and remove any contaminated soil from the area. The spill resulted from deterioration of rubber hose on rental equipment.
2. A fire occurred in the change room at Splash Island. The fire was restricted to the structure's frame and did not involve any natural spaces.

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3. During excavation of the foundation at Valley Halla, the contractor discovered and punctured an old, buried fuel drum which had not been identified on any renderings. A small amount (approximately 5 litres) of diesel fuel was spilled to the surrounding soil. The drum, remaining fuel and contaminated soil was removed and disposed of using appropriate measures.
4. Approximately 37 litres of used cooking oil leaked from a storage container at the Africa Restaurant to the stormwater catch basin. A third-party spills clean-up company cleaned the catch basin and vicinity hardscape, and tested water in the downstream storm sewer. Oil was contained in the storm catch basin with no evidence the oil contamination downstream of the basin.
5. A transformer failed in a subterranean pit at the Africa pumping station near the Watusi Exhibit. Approximately 20 litres of fluid was released but was contained within the pit and was not considered an environment contaminant. The fluid was removed and tested by Aevitas Inc. and confirmed not to contain PCBs. The old transformers and transformer oil was disposed of by Aevitas Inc. following hazard materials disposal procedures.
6. Erosion occurred in September 2021 along the Rouge River at the old service road near the Moose Exhibit from high water levels and flow rate caused by an extreme rainstorm. TRCA measured an additional 20 cm loss of ground from this event. TRCA will increase monitoring this area to twice per year.
7. A motor oil spill was noticed by Zoo staff on the pathway through the Core Woods. The spill was contained to the hardscape and cleaned up quickly using the spill kit's absorbent material.
8. During the Holiday Market two 5-gallon pails with used cooking oil were left outside overnight by a food truck vendor. The pails were tipped over and the oil entered a nearby stormwater catch basin where it was contained. A third-party spills clean-up company cleaned the catch basin and vicinity hardscape.
9. The Zoo reported various types of damage due to a severe windstorm that came through Ontario in December. Several trees fell across the site with the following notable damage reported: broken glass panels in the Australasia pavilion and damaged fences in the bison exhibit, lower bison paddock, camel exhibit, and kangaroo exhibit. Strong winds ripped up the skylight at the Hippo House and roof panels off the Main Zoomobile Station.

In 2021, all Divisions of the Toronto Zoo conducted a review of all branch instructions. New Spills and Leaks policy and branch instructions were implemented. Members of the Health & Safety branch conducted a complete audit of the Hazardous Materials and WHMIS process, and material's use and storage at the Zoo. The result of the audit was very positive and a few changes to the process of the disposal of hazardous materials were implemented.

Infrastructure Improvement Projects

The Zoo increased efforts to manage water quality of the waterway by installing six additional floating wetlands in 2021, for a total of eight. The project now spans six of the eight ponds. Additional signage installations highlight the value of utilizing nature to maintain the health of ecosystems. Efforts continue to expand these platforms through the series of ponds at the Zoo creating layout designs that are both functional and pleasing to the visitor. As a training tool, the Toronto Zoo Climate Action Learning & Leadership Intern program assisted with the installation of the floating wetlands.



The plumbing team has completed the Beaver/Otter filtration system renovation project. Key features of this project not only improve the efficiency of the system which includes the use of the glass media and makes the system visible to guests. Glass doors into the filter room opens this traditional behind-the-scenes location to the public for viewing. Labelling and signage inside the room will educate the public on the components, function, and efficiency features of the system to educate the public about actions taken by the Zoo to mitigate climate change.

Bluetooth water timers have been purchased to trial on site. These units are app based and can be scheduled and controlled to fill pools, water gardens, and run water features based on the need, required time or flow/volume demand. Not only do these timers allow for greater control on water consumption it reduces staff requirements for these activities.

ZooShare Biogas Cooperative Inc. announced in August 2021 that the biodigester constructed at the Toronto Zoo is now operational and producing electricity. Owned and operated by ZooShare Biogas Cooperative Inc., the facility will accept 15,000 tonnes of inedible food waste from local stores and restaurants and 3,000 tonnes of manure from the Zoo annually. The 500kW biogas plant will generate up to 4.1 million kilowatt hours of renewable energy to supply Ontario's power grid. By diverting the 3,000 tonnes of manure to the biodigester instead of composting it, the Zoo will reduce its greenhouse gas emissions by approximately 333 tonnes annually. During National Waste Reduction Week, Daniel Bida from ZooShare hosted tours of the biodigester for 60 Zoo staff and volunteers. The opening of the biodigester was also picked up by several media outlets; articles appeared in the Globe & Mail, Toronto Star, and AZA's Connect Magazine, as well as spotlights on CBC and CP24.

The Toronto Zoo started two projects to install EV charging stations. Working with the City of Toronto Fleet Services, the electrical infrastructure was installed for 2 dual charging stations at the Administrative Building parking lot for Zoo vehicles, business visitors and staff. Installation of the units will be completed in the spring of 2022 once purchase has been finalized by the City of Toronto. The Zoo also initiated the

installation of 20 dual EV charging stations for Zoo guests in parking lot 1. With support from the Natural Resources Canada ZEVIP Funding Program, the Zoo has purchased the stations, and upgraded the electrical infrastructure to support them. The project will be completed in spring 2022 upon receipt of electrical panels on back order due to supply chain issues.

During the final year of the Water Bottle Filling Station project, an additional five units were purchased. Installation is scheduled for spring 2022 by Zoo staff. This will bring the total to fourteen water bottle filling stations at the Zoo. Records at the end of 2021 showed that more than 35,500 water bottles were not used in 2021 and more than 130,000 single use plastic water bottles have not been used at the Zoo since the start of the initiative. This is a significant underrepresentation of the actual bottles not used as the outdoor units (which account for 70% of the active stations) do not keep count. In the first three years, the Zoo predicted the filling stations would have reduced the use of water bottled by 500,000 single use plastic bottles. However, this number is also lower than expected because for most of the 2020 and 2021 years the water bottle filling stations were closed for COVID health & safety protocols.

Facilities & Infrastructure has been investigating the transition of the Toronto Zoo fleet to a low carbon fleet to meet the TransformTO requirement that 75% of the City's fleet uses low carbon energy sources by the year 2030. To date, 36 of the 78 vehicles (46%) are categorized as green vehicles, with 23% being full electric vehicles. On four separate occasions, Transit staff arranged opportunities for electric and hybrid vehicles to be onsite for trial use and comment by Zoo staff.

Environmental Awareness/Public Outreach

Environmental awareness and public outreach continued on a virtual platform for 2021.



The Zoo participated in the 2021 AZA's Gorillas on the Line...Answer the Call Campaign; an awareness and fundraising to help Gorilla Conservation in Africa. From February through September, the Toronto Zoo collected 2,397 cellphones, the highest number of cellphones collected during the campaign. This initiative collected 10,116 cellphones and over \$2,400 for gorilla conservation in the Dominican Republic of Congo. Different branches of the Zoo held cellphone collection challenges such as Health & Safety, Strategic Communications, Wildlife Care and Guest Operations. Unfortunately, the planned e-waste events were cancelled for health & safety accommodations as result of COVID-19.

The Conservation Programs & Environment office hosted Waste Free Wednesdays at the Zoo again by taking over Facebook Live every Wednesday from July 1 to August 31. Each week, the Zoo reached our Facebook Live fans with tips, tricks, animal and habitat facts and interviews to increase awareness of what the Zoo is doing to reduce,

reuse and recycle its waste. The program launched with the launch of the Plastic Free July EcoChallenge and ended with green hacks for kids returning to school. Topics covered during Facebook Live Waste Free Wednesday include reducing plastics, reusing items with the Zoo's behavioural enrichment programs, a tour of the ZooShare biodigester and setting up a new habitat for the new fox. To reach guests on site, signage in the restaurants and gift shops highlighted ways the Zoo is reducing waste for our guests.

Toronto Zoo volunteers and staff participated in a workshop sponsored by our community partner, Second Harvest, to learn more about food wastage in Canada and steps they could take to reduce food waste in their homes. Focus was on learning how to read food labels properly so that we could all minimize the amount of good food discarded.

The Toronto Zoo continues to update our Orangutan-Friendly Shopping Guide, a list of recommended brands that use sustainable palm oil, using the latest Roundtable on Sustainable Palm Oil reports. The Shopping Guide was switched to a digital format and is now available on our website.



The Climate Action Learning and Leadership (CALL) Program, aims to engage and inspire youth from historically excluded communities, including low-income neighbourhoods, Black, Indigenous, People of Colour (BIPOC) community members, and new Canadians to take action to combat climate change. The CALL Program was funded by a grant received from Environment & Climate Change Canada's Climate Action & Awareness Fund. As part of the CALL Program, participants were tasked with creating community projects to implement at the zoo and in the surrounding area. Each project had a direct

tie to climate change and included outreach components that aimed to help educate the communities involved on the connection of various issues to climate change and provided them with accessible changes they can implement at home to help reduce their personal impact. The CALL Community Projects collectively engaged with 2667 members from local community groups.

Projects developed and implemented by the Youth Climate Champions include:

1. Climate Change Awareness TCH BBQ – At the Toronto Community Housing BBQ in Malvern, the Youth Climate Champions shared the Zoo's conservation message and introduced their community to initiatives and programs the Zoo engages in to combat climate change and preserve biodiversity locally. Attendees engaged in quizzes and contests that tested their sustainability knowledge and were awarded sustainable prizes including solar lights and reusable items to replace single use items.

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2. Polar Bear and Wolves Awareness – Through the use of educational brochures, they developed relevant biofacts at their table, they educated guests on the impacts of climate change on the Tundra ecosystem particularly through the lens of the charismatic species of wolves and polar bears. Interested Zoo guests could answer trivia questions related to the messaging they just received to win sustainable prizes.
3. Climate Change Experiment - Through two simple DIY science experiments, youth showed the effects of global warming with respect to the Tundra landscape as well as the melting of sea ice and how this has impacted many wildlife species, including the Polar Bears. Zoo guests were educated in ways they can help mitigate these effects in their daily lives to collectively have a positive impact and make a difference.
4. Orangutan Awareness – At a booth inside the Indomalaya Pavilion youth engaged Zoo guests with information on Orangutans, the important role they play in their ecosystem and the impacts of palm oil production on climate change. They provided guests with resources on how to reduce their impact through shopping for sustainable palm oil products and tips for how to look for these products in their own grocery stores, as well as providing prizes that help reduce their own carbon footprint.
5. Saving the Toads – Kids were able to create their own toad homes with reused plant pots to involve/teach them about sustainability. While creating the homes they learned new facts about toads and easy ways that they can combat deforestation and climate change at home.
6. Planting Seeds of Sustainability – This program raised awareness of the severity of deforestation occurring across the globe and the resulting impacts on the climate. Zoo guests were provided with packets of an assortment of vegetable and native flower seeds to encourage them to grow their own vegetables in their own backyards. This will ultimately reduce carbon emissions in our communities as locally grown vegetables won't require transportation emissions, reducing plastic packaging as well as being cost friendly
7. Kids Zoo Plastics Tour – A community project designed to target and inspire the youth in making more ecofriendly and sustainable choices to help protect the parks and natural areas that they are surrounded by. It included a tour that highlighted the impacts of plastic litter in our environments and how that has impacted the native wildlife here in Toronto. Participants learned about ways to reduce, reuse, and recycle the plastics they encounter and were gifted some reusable and ecofriendly items that can help reduce their own plastic usage.
8. Deforestation Awareness – The goal of this project was to help raise awareness of the ongoing deforestation problem occurring around the world. It demonstrated the many ways that people can adopt easy and sustainable options that help

reduce the need and pressure for deforestation. Zoo guests planted 25 trees at the Zoo, while another 20 trees were taken home to be planted in their own community.

9. Plastic Pollution Carnival – Climate Champions reused plastic products to create games for guests to play and learn about the impacts of plastics on biodiversity and their impacts on the climate. Participants could win sustainable alternatives to single use plastics. O & D provided an animal demonstration focused on recycling.

Projects developed and implemented by the CALL Interns include:

1. Save Our Water- A large scale water mural was created and displayed at the Lake Ontario waterfront to engage and educate the public on issues affecting our waterbodies and ultimately the climate. Members of the public were encouraged to join a shoreline cleanup and were entered to win sustainable prizes to reduce the water consumption and carbon footprint.
2. The Effects of Climate Change on Native Species – This event educated participants on the impacts of climate change on native species through a scavenger hunt at Tommy Thompson Park.
3. Increasing Precipitation and Water Pollution – This project focused on tackling the increasing precipitation and water pollution occurring at the Scarborough Bluffs through education and providing rain barrels to residents living near the Bluffs.
4. Recycling Project – An intern created an educational booth within his apartment building to help educate his fellow residents on the benefits of recycling and how to properly sort recyclable materials. Residents were provided with recycle bins for their apartments and posters providing information on how to sort.
5. The Great Lakes Water Project - In addition to community education and outreach at Ripley's Aquarium, the interns purchased two Seabins that are to be installed and maintained through Ports Toronto. The Seabins collect and will reduce the amount of micro plastics and trash within Lake Ontario which can increase water temperature and contribute to climate change. The removal of the trash will be monitored by the University of Toronto Trash Team who will report the numbers to the International Trash Trap Network.
6. Eco Fair - Provided 150 sustainably sourced, zero waste meals to project participants along with 40 hydroponic gardens to households attending the event which will allow families to grow food at home, reducing carbon emissions from transportation and reducing waste by providing access to fresh produce.

7. Operation Green - Provided 10 households from Toronto Community Housing with care packages designed to help reduce their carbon footprint through rental-friendly infrastructure upgrades. The infrastructure pieces in the kits included items such as: low flow shower heads, low flow toilet kits, space heaters, smart power plugs, etc. The impact of the changes will be determined by comparing pre and post surveys that include a household carbon score and hydro bill data.

Renaturalization/Biodiversity Improvement Projects

Ten thousand saplings were planted at the Zoo's Browse Farm on Beare Road in the spring of 2021 by Toronto Zoo staff and their families.

The Invasive Species Management Assistant position returned for the 2021 summer season to continue the site wide inventory of invasive plant species and conduct observations on two management strategies implemented to control invasive species on site. Phragmites, garlic mustard, dog strangling vine (DSV), Japanese knotweed, burdock, loosestrife, grape vine, Russian olive, Autumn olive, buckthorn, burning bush, Canada thistle, honeysuckle, Norway maple, Himalayan balsam and poison ivy have all been identified on the zoo site. The invasive species inventory is now complete with a site wide inventory of the invasive plant species, their locations, and densities. With this information the Zoo has developed an Invasive Species Management Plan. The plan defines specific biocontrol programs, removal activity and monitoring over the next five years with set targets for control of spread and percent reduction in density.

Zoo staff conducted several mechanical removal events of phragmites, DSV, garlic mustard, Russian olive, and Autumn olive. Data collected between 2020 and 2021 indicated a 47% decrease in volume of phragmites in areas being managed and an 80% decrease in the time required to harvest the phragmites for browse. A partnership with the University of Toronto has outlined an invasive species biocontrol research project at the zoo. Psyllids were released in the fall of 2020 at the Zoo to research their effect on Japanese knotweed. Observational data from 2021 shows an initial defoliation of Japanese knotweed by the psyllids. Ongoing monitoring will continue to evaluate success of the program. In the spring of 2021, the hypena moth was released at designated areas of the zoo as a biocontrol for DSV. Observational data during the summer also indicates successful defoliation by the hypena moth caterpillar. Ongoing monitoring over years will evaluate the success of this biocontrol for DSV. Horticulture and Conservation & Environment staff are working with the Applied Ecology Resources Centre at UTSC to implement research level protocols to properly evaluate the field application of this biocontrol for DSV as well as other possible field applications for other biocontrols.

Partnerships/Collaboration

To achieve the goals of the 2007 Green Plan and the Strategic Plan, Toronto Zoo has reached out to create partnerships and collaborations with like-minded organizations. These partnerships and collaborations have been instrumental in achieving project

goals, developing a resource base of knowledge and materials, and developing a network from which to learn and share.

Kyla Greenham represents the Toronto Zoo as a member of the Ontario Biodiversity Council (OBC), AZA Green Scientific Advisory Group and Partners in Project Green. The Ontario Biodiversity Council hosted the Biodiversity Summit which consisted of 14 virtual sessions from May through November addressing the themes of biodiversity in Ontario.

Toronto Zoo believes every action counts towards saving and protecting wildlife and wild spaces. Modifications to facilities and mechanical systems to improve energy efficiencies may be one step the Zoo is taking to reduce its energy consumption and greenhouse gas emissions; it is also purchasing carbon offsets from Bullfrog Power. The Zoo increased the amount of renewable energy by 9% which offsets the zoo's GHG emissions by 9.3 tonnes and continues to power the exhibits, Conservation Breeding Programs, and guest experiences with renewable energy.



Local farmers and businesses donated 200+ Christmas trees, 10+ skids of pumpkins, and other food product to the Wildlife Conservancy for behavioural enrichment opportunities for the animals.



In 2020, the Toronto Zoo completed an Ocean Wise sustainable seafood audit and became an Ocean Wise Partner. During the audit, more than 50% of the items previously purchased were Ocean Wise approved products. With the assistance of Ocean Wise, the Zoo's Nutrition unit transitioned the unapproved items to approved Ocean Wise Sustainable products in January 2021. Nutrition staff also successfully negotiated price matching between the unapproved and approved options to avoid an increase in cost.

Toronto Zoo Camp and Earth Rangers broke the world record with the longest paper snowflake chain. Hosted at the Zoo the Snowflake Challenge was for awareness of climate change and the impact it is having on the arctic. Zoo Camp participated making snowflakes each week of camp using as much GOOS (good on one side) paper as possible. It took two days to assemble the chain of snowflakes which came from Zoo Camp participants, families from across Canada and other participating camps / community groups. A representative from the Guinness World Record team signed off that they had broken the record with 403.66 m (1,324 ft. 4.13 in.) length chain. The chain was hung in the Polar Bear weather station viewing area for the media event, where it was announced they had broken the record by almost double the original length.

Leadership

Toronto Zoo has been named one of Canada's Top Green Employers for 2021.

Toronto Zoo maintains its active member status with AZA's Green Scientific Advisory Group, providing mentorship to members of the sustainability staff at other Canadian zoos and aquariums.

Employee Engagement

The Toronto Zoo once again participated in the Plastic Free EcoChallenge. A series of games, resources, pledges, and action were offered through a virtual platform to engage staff both working on-site and from home in the Challenge. Toronto Zoo staff and volunteers completed 101 advocacy actions, participated in three community events, picked up 700 pieces of litter, saved over 1,000 pieces of single-use plastics from being used, and spent more than 1,300 minutes learning about plastic waste and recycling.



The Zoo's Gift Shop continues to move towards reducing plastic content. Plush made from 100% recycled water bottles was not new for 2021 but each year more and more regular plush lines are being replaced with recycled content. In 2021 the gift shops sold 5,148 plush toys made from 100% recycled materials. We also sold 183 shirts made from recycled water bottles (each shirt is made from 6.5 bottles) so we saved over a thousand water bottles from landfills just in shirt sales alone. Sales also continued for items such as reusable tote bags, water bottles and coffee tumblers, beeswax wraps and bamboo toothbrushes.

All branches of the Toronto Zoo are assessing their internal processes and adopting new initiatives to promote environmental sustainability. These initiatives range in focus, but are all meant to improve employee efficiency, offering more sustainable options to the visitors, and reaching the zoo's sustainability targets. Human Resources has reported that 100% of permanent Zoo staff have signed up and have access to their paystub electronically and implementation of electronic docu-sign processes to reduce paper use.

The Schools' Field Trip program brochure (8 coloured pages, double sided) was also switched to an electronic format and is now available on the Toronto Zoo website. This reduces printing by 20,000 pieces of paper.

Sustainability Plan Objectives

Waste Management

The Toronto Zoo Material Collections branch working with the City of Toronto Waste Management Division in 2008 set a target of diverting 70% of all Zoo waste from landfill. Since 2009 the Zoo has been successful in achieving 70% waste diversion for most years. There was a significant decrease in the waste diversion of materials in 2021 despite efforts to increase diversion opportunities. This lower diversion rate is partly due to lower attendance in 2021, changes in internal procedures such as conversion to digital processes and less printing, decreases in purchase of single use items in response to COVID-19, and sorting required to send organic material to the ZooShare biodigester. A specific highlight in waste management at the Zoo in 2021 is the significant reduction in overall waste generated producing 120 tonnes less waste in 2021 than in 2020.

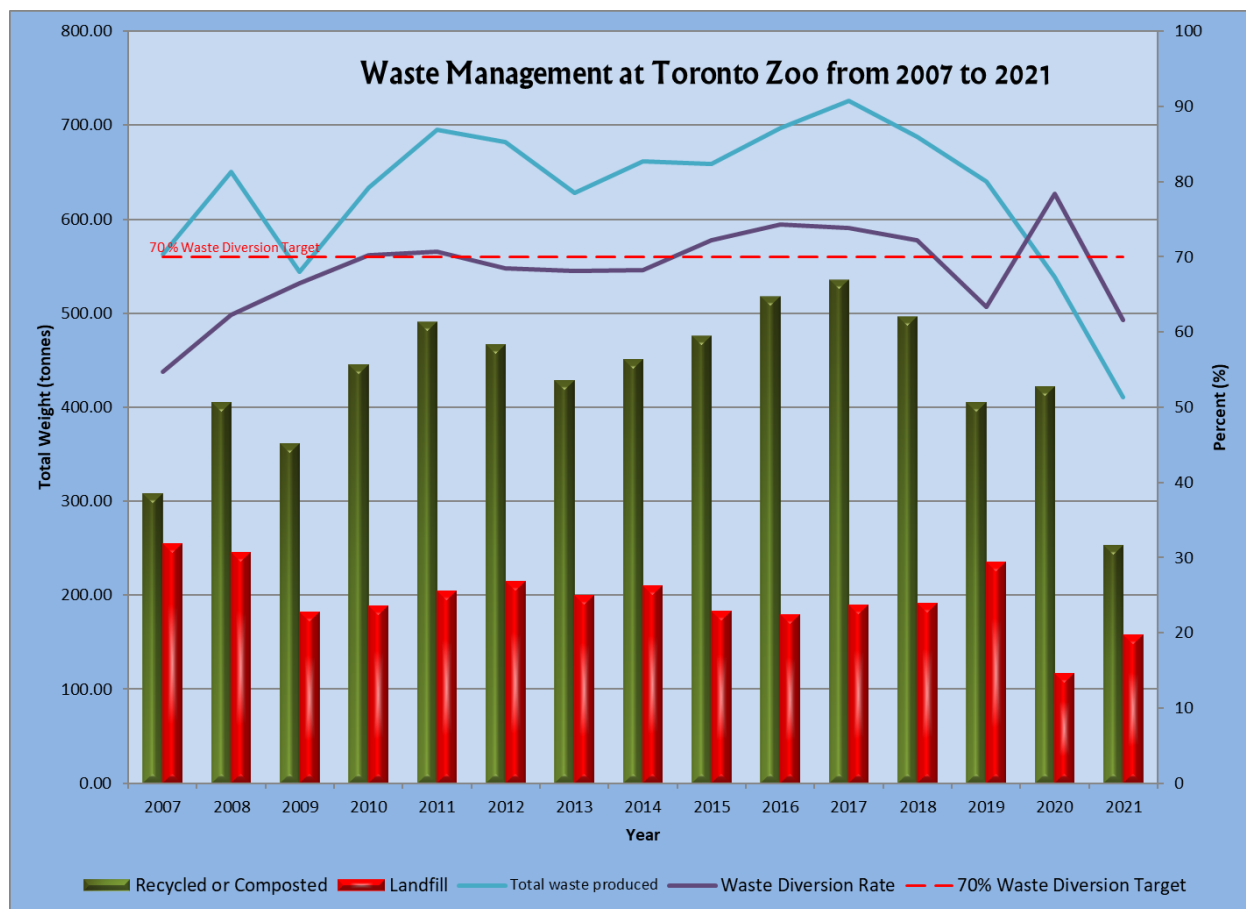


Figure 1. Actual waste disposal from the Toronto Zoo in the years 2007 to 2021. This graph shows the total annual volume of waste generated at the Toronto Zoo, the annual volume of waste diverted from landfill using alternative methods such as recycling and composting, the volume of waste sent to landfill, and the annual calculated waste diversion rate.

Greenhouse Gas Emissions and Energy Management

Great headway was achieved in 2021 in reducing greenhouse gas emissions at the Toronto Zoo. The ZooShare Biodigester Project realized 333 tonnes of GHG emission reductions for the Zoo, accounting for 33% of the reduction seen. However, most of the reductions (67%) were realized through reduced consumption of energy via energy efficiency projects, media swaps, and reduced operations due to COVID-19 protocols.

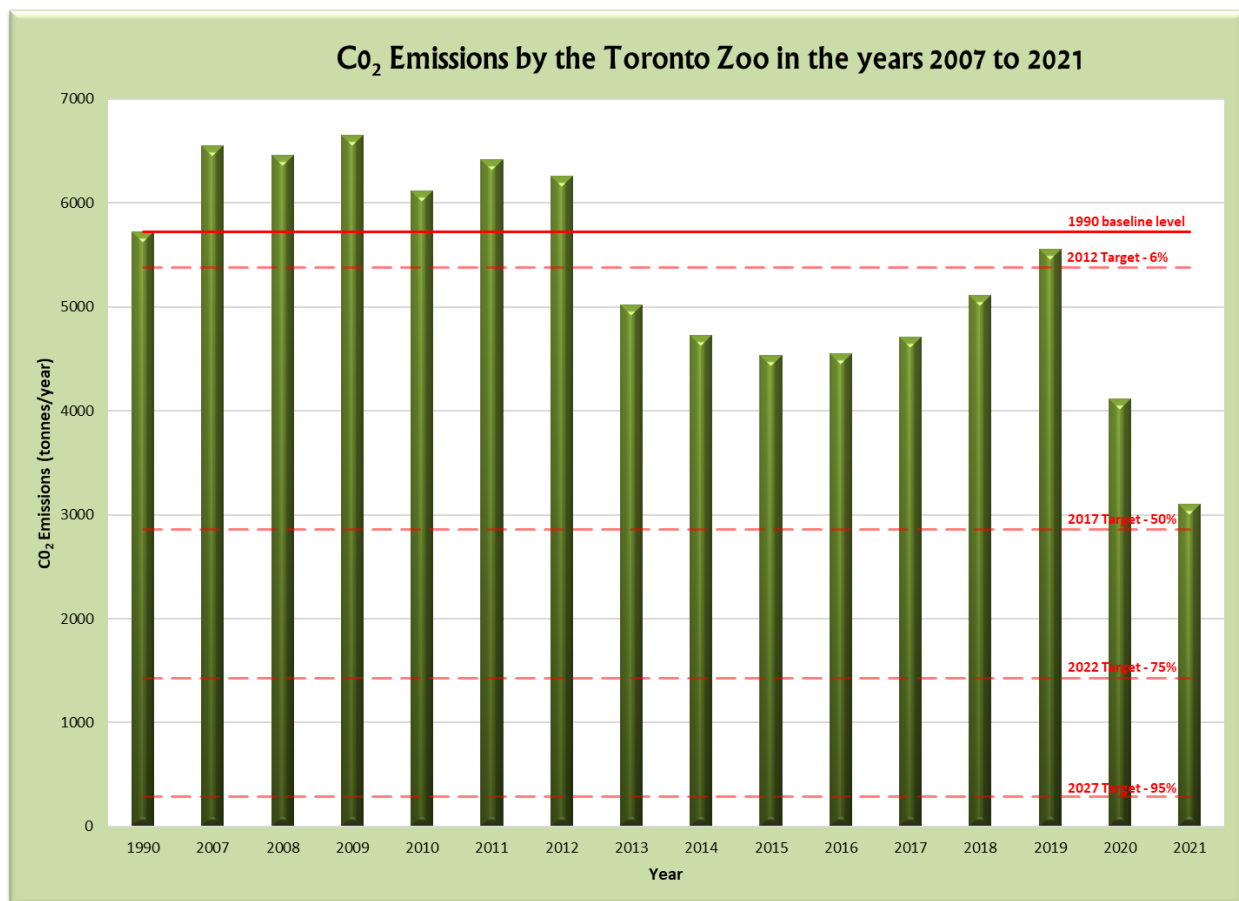


Figure 2. Annual greenhouse gas emissions, as represented by equivalent carbon dioxide emissions, from the Toronto Zoo in the years 2007 to 2020. All greenhouse gas emissions are based on the Zoo's annual energy consumption. Greenhouse gas emissions fluctuate based on the volume of energy consumed and the type of energy source (electricity, natural gas, propane, diesel fuel, gasoline, and heating oil). Annual greenhouse gas emissions are adjusted for carbon offsetting practices of the Toronto Zoo through the purchase of renewable energy from Bullfrog Power and contribution of organic material to the ZooShare biodigester.

Water Management

Water consumption in 2021 increased slightly. Investigations revealed leaks in the Penguin and Hippo habitats, along with water main failures were significant contributors to this. These issues are being address by the Facilities & Infrastructure Division through various operating and capital projects in 2022.

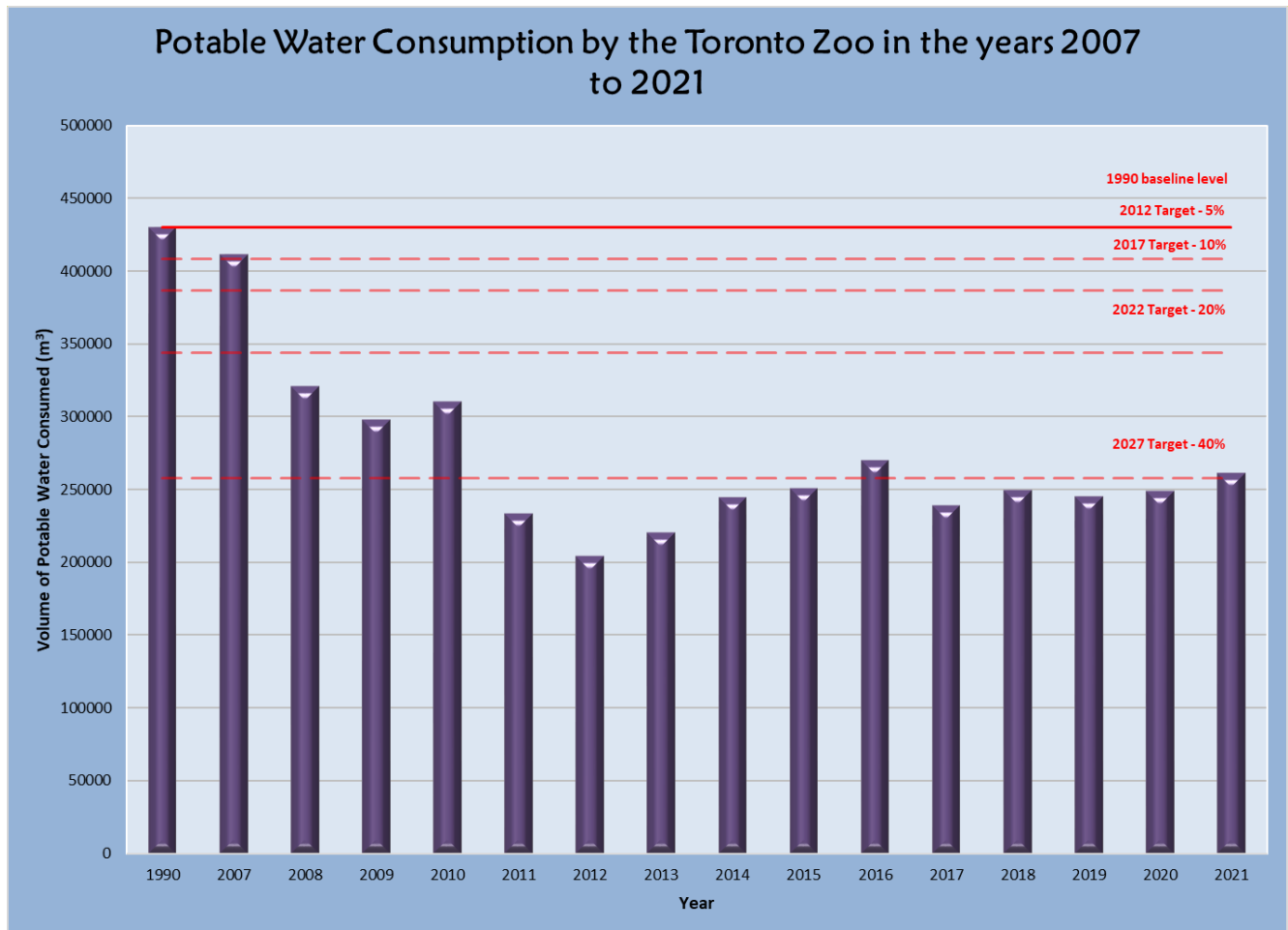


Figure 5. Actual potable water consumption at the Toronto Zoo in the years 2007 to 2021.