

Summary of Lake Impacts 2019

Toronto and Region Conservation Authority

As the International Joint Commission is charged with regulation of Lake Ontario outflows so as to balance upstream and downstream risks and industry considerations, and the Great Lakes Adaptive Management Committee is charged with evaluating regulation plans and decisions, this document is meant to summarize the tangible and significant impacts that have occurred to shoreline areas within the Toronto and Region Conservation Authority (TRCA) jurisdiction over the last three years. This information can support a fulsome understanding and consideration of the lake-based risks to the Greater Toronto Area and to also support consideration of additional regulation plan deviations that may help to further reduce the risk to Lake Ontario shorelines.

In both 2017 and 2019, TRCA provided support to our municipal partners, by providing forecast updates, highlighting potential impact areas, tracking existing impacts, and supporting municipal partners in their operational response. A real-time GIS tracking tool of impacts within TRCA's jurisdiction was shared with staff from the International Lake Ontario St. Lawrence River Board (ILOSRLB) as well as the Great Lakes Adaptive Management (GLAM) Committee throughout the 2019 event. On September 6, 2019, staff from TRCA, the City of Toronto, the City of Pickering and the Town of Ajax met with staff from the ILOSRLB and GLAM Committee to share a timeline and description of impacts. The second section of this document provides a summary of impacts to areas within TRCA's jurisdiction.

Summary of impacts

In the spring of 2017, water levels in Lake Ontario reached levels higher than had been measured since record keeping began in 1918, and these levels were once again surpassed in 2019 where TRCA issued a shoreline Hazard Warning for 115 days throughout the spring/summer. The effect of this flooding was significant across TRCA's jurisdiction which includes the Toronto Waterfront, Toronto Islands, and Pickering/Ajax waterfront sections.

The Toronto Islands are home to over 800 residents, almost 30 businesses, and two schools. The 2017 closure of the Islands during peak season due to high water presented a major disruption in tourist and recreational activity which is an important source of revenue to the City and local businesses. The flooding resulted in the activation of the City of Toronto Emergency Operations Centre and approximately \$8 million in direct and indirect damages related to the closing of Toronto Island Park. In response to the 2017 flood conditions, TRCA and the City of Toronto deployed over 45,000 sandbags, 1,000 meter bags, and over a dozen industrial pumps to mitigate the effects of the rising water. In 2018, interim mitigation measures were installed on the Islands which helped keep portions of the Islands open despite the worse water level and wave conditions experienced in 2019. The main access road along the island was submerged for many weeks and deemed impassable, which resulting in the suspension of public access to the Hanlan's Point sections of the island. In 2019, an additional 22,000 sand bags were procured, and additional 60 meter bags were placed (in addition to re-using those from 2017), 14 aqua dams were installed, and 14 pumps were deployed.

The Toronto Waterfront includes many beaches and recreational infrastructure to the east and west of the downtown core, as well as marina and port-related infrastructure. As much of the Downtown Toronto waterfront is lake-fill, high lake levels result in poor drainage and sewer back-up onto roads and underpasses during times of wet weather. In 2019, portions of Lakeshore Blvd were frequently closed as the storm sewer system could not achieve positive drainage for rainfall. The overtopping of offshore erosion protection structures due to high-lake levels left many areas along the entire waterfront subject to erosion during times of high waves, including the Scarborough Bluffs. Submerged boardwalks, festival ground closures, damaged trails and long-submerged tree root systems are just some of the impacts of note.

For the City of Toronto alone (waterfront and Islands) the estimated cost of repairs due to the 2017 High Lake Level Impacts was \$16.2 Million, while the 2018 ice/wind storm triggered an additional \$12.1 Million in repairs. Full costing for the damage from the 2019 high-lake level is not yet available as surveying of erosion damage has only recently begun now that water levels have somewhat receded.

Impacts to the waterfront areas in **Pickering/Ajax** included significant trail erosion and damage to recreational infrastructure, as well as high water table impacts (seepage to basements) for properties surrounding Frenchman's Bay, as well as overland flooding of streets in the Paradise Park neighbourhood of Ajax. Previously buried infrastructure was exposed due to the erosion, and a public play structure had to be removed as the shoreline crept towards it.

The 2019 event was the worst experienced thus far in terms of still-water level, duration of high level, and concurrent wind-storms causing significant wave action and lake seiche. Impacts are still being tallied but it is critical to understand that levels even a few cm higher would have triggered an entire new set of impacts with drastic consequences as outlined below. While TRCA continues to work with municipal partners towards the implementation of resilience measures in certain specific areas, it is important to recognize the significant risk prior to the implementation of such measures, and the significant and widespread risk that will continue to exist in other shoreline areas. The most recent ILOS RB forecast through April 2020 displays the potential for high lake levels again in 2020.

TRCA would like to emphasize that static lake levels of 76.0m IGLD and above trigger further potential impacts, **in addition to a repeat of impacts already experienced this year**. These [occur at various levels above 76.0m and] *may* include, but are not limited to, the following:

- Flooding of portions of Billy Bishop Toronto City Airport facilities, including access roads, as well as taxiways and runways
- Ferry docking operational concerns; despite the retrofits, even higher lake levels could limit ferry service
- Flooding of Toronto Hydro non-submersible assets and requirement to de-energize portions of Toronto Islands, which in-turn would likely trigger secondary impacts such as the evacuation/public closure of Toronto Islands, and potential impacts to the Toronto Island Water Treatment Plant, which may not be able to support peak loads for the Enwave Deep

Lake Water Cooling system's provision of air conditioning to the downtown core during summer months.

- Impacts to Toronto Islands wastewater treatment pumping stations and potential sewer servicing suspension
- Significant drainage issues during rainfall events for underpasses and low-lying areas throughout downtown Toronto
- Insufficient freeboard under Liverpool Road to pass flows from Krosno Creek in Ajax
- Reduced capacity of river mouths, including the Humber and Don River, in turn reducing the freeboard to Don Valley Parkway for flooding during riverine flooding events on the Lower Don River.
- Potential impacts to other wastewater treatment facilities along the waterfront

The following sections detail impacts experienced within the TRCA jurisdiction in 2019

1) Impacts at 75.5m – 75.7m lake level (IGLD85 datum)

General impacts approaching critical water levels for Lake Ontario included ponding of water, closure of some trails and increased erosion along the most vulnerable shoreline areas.

Impacts – May 1 to May 12, 2019

O Eastern Beaches

- **Flooding and inland ponding** at Woodbine Beach due to breaching of sandbar - impacting recreational beach, volleyball courts, public viewing areas for Victoria Day fireworks
- **Flooding** and impacts to Silver Birch Boathouse structure and adjacent boardwalk trail; sandbags and armourstone overtopped
- **Extensive erosion** to southern points of Ashbridge's Bay Park Spit due to undercutting

O Rouge Beach

- **Closure to public** - parking lot gates and washrooms due to flooding, this persisted for months

O Scarborough Bluffs

- **Landslides and active shoreline erosion** near *Guild Inn Shoreline* causing deployment of crews for repair and implementation of closures to public trail and access road
- TRCA also issued a Notice of Caution for the Scarborough Bluffs due to increased risk of landslides on May 7th, 2019.
- **Erosion** along waterfront park at Bluffers Park

O Lakeshore Blvd

- **Flooding to lanes** on Lakeshore Blvd due to reduced storm drainage during and after rainfall on May 10th - this continued to occur at other times

O Port Union

- **Erosion** at lakeside trail at Highland Creek mouth
- **Toronto Islands**
 - **Flooding/pooling** of water in low lying areas
 - **Flooding of Roadway** due to storm surge and waves breaching at Gibraltar Point
- **Pickering/Ajax Waterfront**
 - **Flooding/pooling** of water at Paradise Park Beach in Ajax, including ditches up to Ebony Rd.
 - **Closure** of Ajax Waterfront Trail at Rotary Park in Ajax from Rotary Park to west of pedestrian bridge due to erosion

2) Impacts at 75.7m - 76.0m lake level (IGLD85 datum)

Lake Ontario water levels between 75.7m to 76m (IGLD85 datum) in 2019 resulted in significant and prolonged inundation, erosion, and debris washup leading to closure and significant degradation of major roads, trails, boardwalks, residential buildings, Yacht Clubs, playground and park structures, Ferry Docks, boat launches and docks, shoreline protection structures, turf and trees and innumerable areas of the Toronto, Pickering, and Ajax waterfronts, as well as the Toronto Islands. Conditions were exacerbated during times of heavy wind or wave activity which often overtopped preventative measures such as sandbags, meter bags, aquadams, armourstone, etc.

New Impacts – May 13 to August 1, 2019

- **Western Beaches**
 - **Power shut-offs** in electrical cabinets for Toronto Golf Club at Marie Curtis Park
 - **Flooding of parkland** at Marie Curtis Park, Colonel Sam Smith Park and Humber Bay Park West
 - **Urban drainage** issues (catch basins beyond capacity) at Marie Curtis Park and Lakeshore Blvd (WB & EB lane closures on June 10th)
 - **Flooded/submerged/closure of walking paths/trails/boardwalks** at Humber Bay Arch Bridge (at Humber River Mouth), Sunnyside Park, Budapest Park and Marilyn Bell Park
 - **Flooded/submerged boat launches** at Humber Bay Park West
 - **Flooded docks** at Sunnyside Beach and Ontario Place Marina docks
 - **Flooded/submerged trees** at Sunnyside Beach
 - **Erosion to walking paths/trails/boardwalks** at Sunnyside Pavillion
 - **Erosion to beaches, shorelines and parklands** at Marie Curtis Park, Humber Bay Park East, Sunnyside Park and Budapest Park
 - **Damage to new fishing nodes** at Humber Bay Park East
 - **Wave damage to boardwalk/trail** at Budapest Park and Marilyn Bell Park
 - **Rowing/Canoe/Paddle and Dragonboat programming** activities cancelled or delayed at Sunnyside Paddling Club, The Boulevard Club, Toronto Sailing and Canoe Club as well as the Argonaut Rowing Club

- **Stream gauging equipment and data quality impacted** (Lower Humber at Old Mill) by prolonged high water levels on Lake Ontario due to backwater effects
- **Flooding impacts to outdoor concert venue** at Ontario Place (Live Nation's Budweiser Stage) with main venue building and stage impacted
- **Inner Harbour**
 - Toronto Music Garden – flooding of docking wall and electrical chamber
 - Peter Street basin – water cresting on south side
 - HTO Park – beach and dock/boardwalk area closed to the public due to flooding and continuous wave action
 - Harbour Square and Harbour Square Park – boardwalks closed due to flooding; significant damage due to prolonged submergence of boardwalk structures
 - Sugar Beach – promenade and electrical chamber flooded
 - Stream gauging equipment and data quality impacted (Don at Dundas) by prolonged high water levels on Lake Ontario due to backwater effects
- **Eastern Beaches**
 - **Power shut-offs** at Rouge Beach Park (for 4 months)
 - **Urban drainage** issues (catch basins beyond capacity) at Eastern Avenue on May 23rd and June 12th
 - **Increased debris washing up along shorelines** at Woodbine Beach (due to increased wave activity and municipal water infrastructure being overwhelmed or bypassed)
 - **Flooding/ponding of beaches** at Woodbine Beach (10-80m into beach area including lifeguard stations, volleyball courts and fireworks viewing area), Bluffer's Park Beach (half of beach is underwater) and Rouge Beach
 - **Flooded/submerged/closure of walking paths/trails/boardwalks** at Ashbridge's Bay Park (Coatsworth Cut) and Rouge Beach (including parking lot)
 - **Flooded/submerged boat launches** at Bluffer's Park
 - **Flooded/submerged wave decks/breaks** at Woodbine Beach
 - **Flooded structure** at Kew Beach – Silver Birch Boathouse, required constant pumping as sandbags were constantly being breached)
 - **Erosion of beaches and shoreline causing damage and/or closures to trails/pathways/boardwalks** at Ashbridge's Bay Park, Woodbine Beach, Kew and Balmy Beaches, Bluffer's Park, Doris McCarthy trail along Scarborough Bluffs, Port Union (East Point Park and Port Union waterfront trail) and Rouge Beach
 - **Damaged/submerged/lost trees** at Ashbridge's Bay
 - **Stream gauging equipment and data** quality impacted (Rouge at Glenrouge Campground) by prolonged high water levels on Lake Ontario due to backwater effects
- **Toronto Islands**
 - **Flooding and Significant Erosion of beaches** at Hanlan's Point Beach, Ward's beach, and Manitou Beach

- **Substantial and Prolonged Flooding of Roadways** at Lakeshore Ave near Gibraltar Point Lighthouse and Artscape, 500m stretch between the Royal Canadian Yacht Club and Snake Island, and numerous stretches along Cibola Ave. Water was continuous on Cibola Ave from Algonquin bridge to the Royal Canadian Yacht Club. Noticeable deterioration of submerged roads on Lakeshore Ave near Gibraltar point, and Cibola avenue. Condition of submerged roads worsens daily
- **Loss of safe Ingress/Egress on major roads** due to depth of flooding. Toronto Fire Service on delayed response as they have to pass through roads with 40 cm of water on them. Ambulance needed to be towed as a result of bottoming out near the Lighthouse.
- **Substantial and Prolonged Flooding** at southern section and entranceway of Centreville Amusement Park, Toronto Island Marina's eastern edge, Parks yard operational areas and buildings and fuel pump area, Innumerable in-land flooding areas (approximately 1/3 of the islands), and Grandstand boardwalks.
- **Closure of Ferry Service** to Hanlan's Point for vehicles and pedestrians (major accessway to Islands)
- **Closure** of Olympic island, Toronto Islands Grandstand, and Snake Island
- **Shoreline Protection overtopped** due to high lake level in conjunction with wave/surge action, affecting residential area along Seneca Ave on Algonquin Island, the Queen City Yacht Club, and the cove area of Ward's Island.
- **Substantial turf and tree damage** across the islands
- **Gas service shutoff** at meter to 6 Channel Avenue, due to floodwaters in contact with furnace
- **Numerous event cancellations**
- **Pickering/Ajax Waterfront**
 - **Flooding, Erosion, and Debris Washup** of undermining trees, armourstone rocks, benches on pads, and boardwalk at Millennium Square in Pickering
 - **Closure** and removal of two playgrounds at Millennium Square in Pickering (Flooding from waves and debris washup) , and Canoe club in Pickering
 - **Road and Trail Closures** near Paradise Park (Lakefront Trail, Ruthel Rd and Ebony St) due to backwater from Lake, and Frenchman's Bay Beachpoint Promenade due to flooding and debris washup
 - **Exposed Pipe** from Pickering Nuclear Generating Station washed up on beach
 - **Armourstone Displacement** and undercutting of concrete path at Frenchman's Bay Harbour Entrance.
 - **Slope Failure** at 58 Ontoro Blvd Ajax (within Central Lake Ontario Conservation Authority's jurisdiction) involving 38m long failure crest 10m from the residence. Slopes and seawalls for 10-12 homes have been damaged to the point of failure.
 - **Hydrostatic Lake Level seepage** impacting homes/basements along Frenchman's Bay

- **Substantial Erosion** at Beachpoint promenade, Frenchman's Bay harbour entrance pier, and the beach, boardwalk, washroom building adjacent to Nuclear Plant in Pickering. Substantial Erosion and loss of trail and waterfront area near Rotary Park in Ajax.

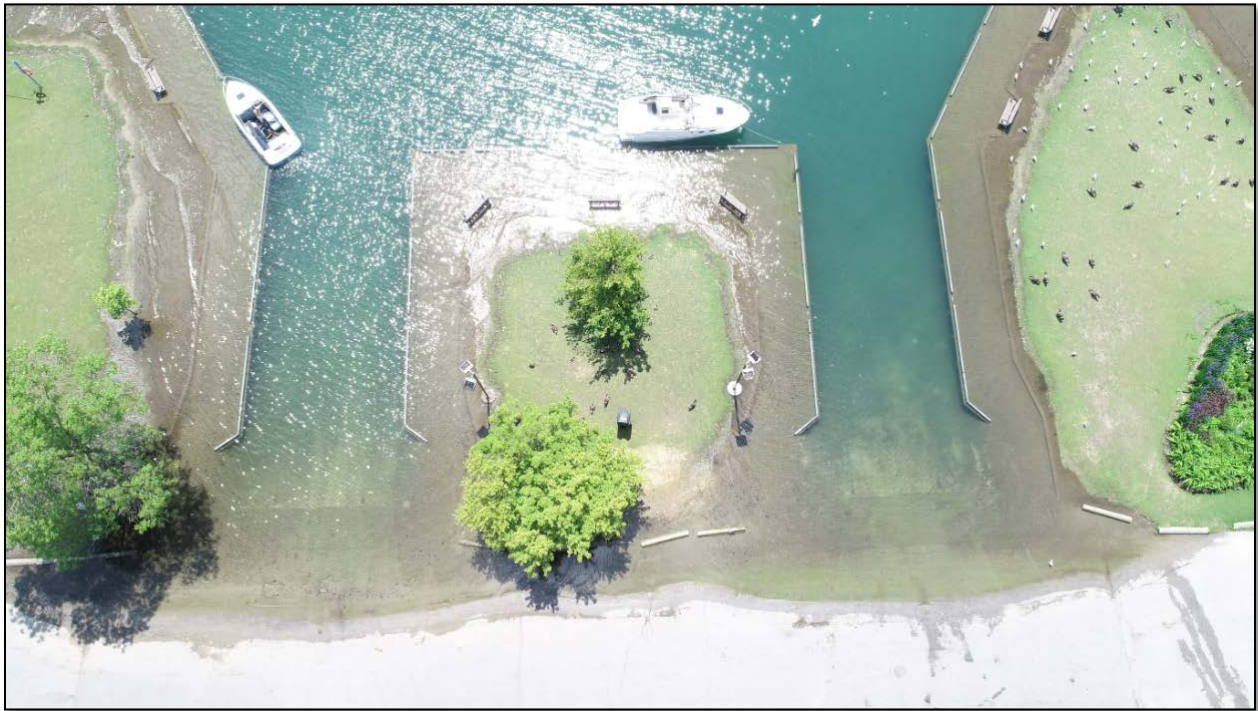


Photo 1: Bluffer's Park Flooded Boat Launch, Toronto – overhead drone view on June 26, 2019



Photo 2: East Point Park (Port Union) waterfront trail erosion, Toronto –June 28, 2019



Photo3: Flooded Rouge Beach Park and parking lot, Toronto – June 27, 2019



Photo 4: Flooded Olympic Island, Toronto Islands – July 24, 2019

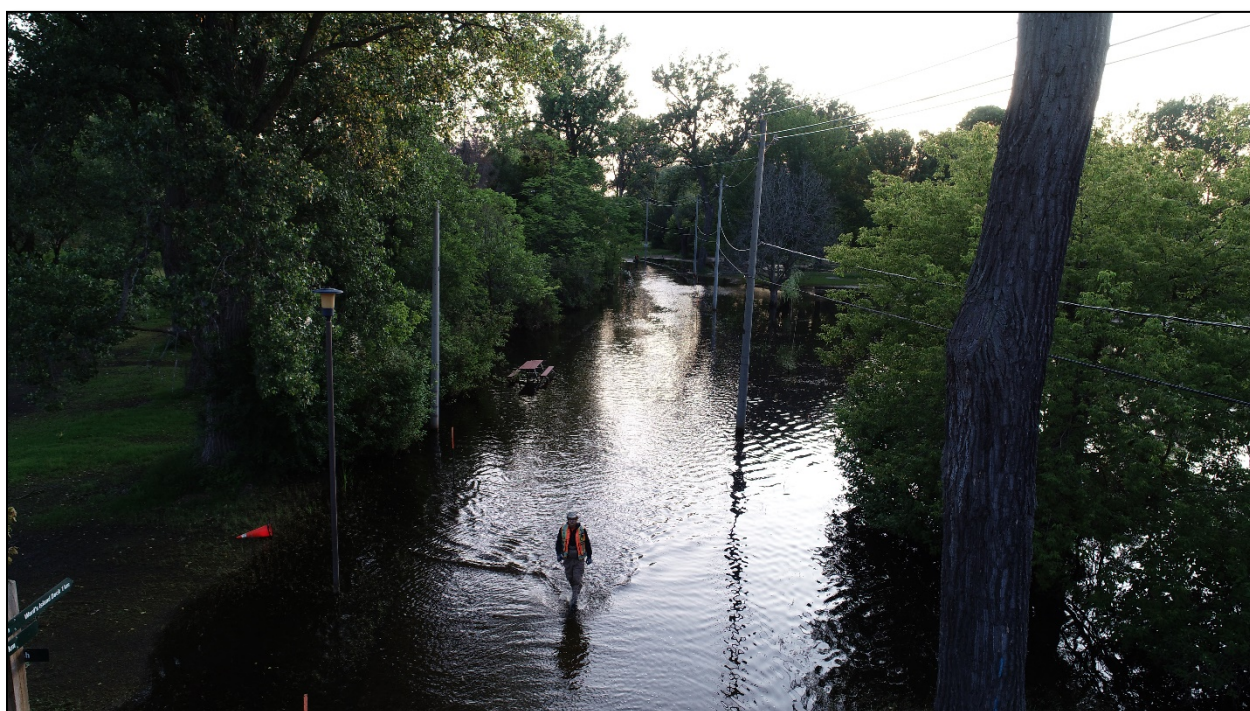


Photo 5: Flooding at Lakeshore Ave, Toronto Islands – July 24, 2019



Photo 6: Erosion at Ajax Waterfront Park near Water Supply Plant, Ajax – June 24, 2019