APPENDIX C: CASE STUDIES OF EXISTING NATURE-BASED AND HYBRID SOLUTIONS IN WESTERN LAKE ONTARIO

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CONTENTS

1. Grimsby Wetlands | Grimsby, ON 2
2. Fifty Point | Grimsby and Hamilton, ON 4
3. Windermere Basin | Hamilton, ON 6
4. Bayfront Park, Macassa Bay, and Pier 4 Park | Hamilton, ON 8
5. Cootes Paradise | Hamilton, ON 10
6. Grindstone Marsh | Burlington, ON 12
7. LaSalle Park | Burlington, ON 14
8. Northeastern Bird Islands | Burlington, ON 16
9. Beachway Park | Burlington, ON 18
10. Burloak Waterfront Park | Burlington, ON 20
11. South Shell Park Nesting Wall | Oakville, ON 22
12. Coronation Park | Oakville, ON 24
13. Tannery Park and Waterworks Park | Oakville, ON 26
14. Rattray Marsh | Mississauga, ON 28
15. Serson Creek Reconnection and Wetland | Mississauga, ON 30
16. Applewood Creek Extension and Wetland | Mississauga, ON 32
17. Samuel Smith Wetland | Toronto, ON 34
18. Gibraltar Point | Toronto, ON 36
19. Tommy Thompson Park | Toronto, ON 38
20. Don Mouth Naturalization | Toronto, ON 40
21. Woodbine Beach | Toronto, ON 42
22. Bluffer's Park | Toronto, ON 44
23. Frenchman's Bay (South Shore) | Pickering, ON 46
24. Lynde Creek Marsh | Whitby, ON 48
25. Second Marsh | Oshawa, ON 50
26. McLaughlin Bay Marsh | Oshawa, ON 52
27. Bowmanville Westside Marshes | Clarington, ON 54
28. Wilmot Creek Marsh | Clarington, ON 56
29. Wesleyville Marsh | Port Hope, ON 58
30. Victoria Beach | Cobourg, ON 60

1. Grimsby Wetlands | Grimsby, ON

IMAGE CREDIT: TIM BOYD / THE HISTORICAL MARKER DATABASE

The Grimsby Wetlands project is an 11.7-ha coastal wetland restoration initiative located along the south shore of Lake Ontario in Grimsby, ON[1]. Since 2002, this project has transformed the Biggar Sewage Lagoons (which operated between 1960-2001) into diverse, productive wetlands[2]. Four smaller wetlands were created by 2006 – each were designed differently to offer a variety of habitats for plants and wildlife.

The primary design intention was habitat creation, addressing habitat fragmentation through the construction and restoration of wetlands, riparian vegetation and buffers, invasive species control, establishment of habitat connectivity corridors, and installation of engineered habitat structures.

By restoring and enhancing degraded coastal wetland ecosystems through intentional human intervention, the project delivers co-benefits spanning biodiversity gain, climate adaptation, and ecosystem integrity, and has been recognized with the 2023 Brownie Award (Reinvest category) and the J.R. Dymond Public Service Award from Ontario Nature.

Site information:

- Coordinates: 43.21600914098078, -79.61456085768229
- Address: 624 Winston Rd, Grimsby, ON L3M 0H4
- Site area: ~11.7 ha, ~200 m of shoreline
- Project date: Since 2002
- Ecosystem type(s): Coastal wetland
- Site context: Peri-urban
- Proponent: Hamilton Naturalists' Club
- Partners: Niagara Region; Town of Grimsby; Friends of the Grimsby Wetlands; and Grimsby & District Lions Club[3]
- Primary design intentions: Habitat creation, brownfield revitalization
- Recognitions: 2023 Brownie Award in the Reinvest category and the J.R. Dymond Public Service Award from Ontario Nature

Types of NbS and hybrid solutions:

- 3. Constructed or restored wetlands
- 6. Riparian vegetation and buffers
- 8. Invasive species control and removal
- 17. Habitat connectivity corridors
- 20. Engineered habitat structures

Hazard impacts that have affected this site:

Habitat fragmentation

[1] Hamilton Naturalists' Club. (2026). Grimsby Wetlands. https://hamiltonnature.org/projects/grimsby-wetlands/

[2] Mackenzie, B. (2021). Significant, Important: The Grimsby Wetlands. Niagara Escarpment Views: Spring 2021. https://neviews.ca/Samples/54%20grimsby%20wetlands.pdf

[3] The Brownie Awards. (2023). 2023 Winners. https://brownieawards.ca/2023-winners/

2. Fifty Point | Grimsby and Hamilton, ON

IMAGE CREDIT: STACHOPHOTO

Located at the mouth of Fifty Creek, Fifty Point Conservation Area is owned and managed by Hamilton Conservation Authority (HCA)[1]. Land began to be acquired in 1970 and became open to the public in 1978. Along with the Grimsby Wetlands (or Biggar Lagoon Wetlands) to the east, Fifty Point is among the few remaining natural areas in the area that is accessible to the public and an important refuge and habitat for migratory birds and other wildlife.

Across the ~80-hectare property, nature-based solutions have focused on riparian vegetation planting[2], coastal forest management, wetland creation, and channel realignment embedded in a coastal park and greenway system that supports both ecosystem resilience and high-intensity public recreation.

Following the completion of a Class Environmental Assessment (EA) in 2018, HCA began construction of a new wetland in 2024 on the west side of Fifty Point pond to receive water from a realigned watercourse to help reduce flooding of nearby private properties[3]. The new wetland, which outlets into Fifty Point pond, will also support enhanced habitat diversity, including the establishment of a self-sustaining fishery in the pond. Together, these NbS interventions help improve upstream flood storage capacity, improve biodiversity, and sustain recreational access in one of the region's most heavily visited coastal parks.

Site information:

- Coordinates: 43.22629578914545, -79.6210537047315
- Address: 69GH+6F, Grimsby, ON L3M
- Site area: ~80 ha, ~1 km of shoreline
- Project date: Since 1970
- Ecosystem type(s): Beaches, dunes, wetlands
- Site context: Peri-urban
- Proponent: Hamilton Conservation Authority
- Primary design intentions: Riverine flood control, support high-intensity recreation (access)
- Site constraints or challenges: Large numbers of visitors, shared governance
- Recognitions: Clean Marine Eco Rating Award[4]

Types of NbS and hybrid solutions:

- 2. Channel naturalization and realignment
- 3. Constructed or restored wetlands
- 6. Riparian vegetation and buffers
- 7. Coastal forests or windbreak planting
- 18. Coastal parks and greenways

Hazard impacts that have affected this site:

Coastal/urban inundation
Wetland loss/function decline
Habitat fragmentation
Property/infrastructure risk

[1] Hamilton Region Conservation Authority. (2022). Fifty Point Conservation Area Master Plan 2020. https://conservationhamilton.ca/wp-content/uploads/2022/02/Final-Fifty-Point-Master-Plan.pdf

[2] Mackenzie, B. (2021). Wetland Makers – Beavers at Fifty Point. The Wood Duck, April 2021. https://hamiltonnature.org/wp-content/uploads/2021/04/WD-volume-74-08-copy.pdf

[3] Hamilton Region Conservation Authority. (2024). Fifty Point Wetland Creation. https://conservationhamilton.ca/fifty-point-wetland/

[4] Conservation Areas Workshop. (n.d.) Fifty Point Conservation Area- Clean Marine Eco Rating Award. https://www.conservationareasworkshop.ca/awards/fifty-point-conservation-area-clean-marine-eco-rating-award

3. Windermere Basin | Hamilton, ON

IMAGE CREDIT: COLE ENGINEERING

Windermere Basin is located at the mouth of Red Hill Creek in the southeast corner of Hamilton Harbour[1]. Prior to 1950, the area was home to a productive coastal wetland, which has become degraded due to historic contamination, dredging, and other human activities. In 1992, Windermere Basin was identified as a potential site for rehabilitation by the Hamilton Harbour Remedial Action Plan[2].

Since 2010[3], the basin has been remediated through a $20.5 million project with funding from the City of Hamilton, in partnership with provincial and federal governments. Approximately 15.4-ha of the basin has been restored, including the re-creation of an 11-ha coastal wetland using multiple nature-based solutions to improve water quality, regenerate habitat, support biodiversity, and contribute to the delisting of Hamilton Harbour as an Area of Concern (AOC).

NbS techniques include channel naturalization and realignment, wetland creation, invasive species removal, beneficial re-use of dredged sediment, sediment capture, engineered habitat structures (including a fish passage structure), Common Tern nesting islands, and vegetated buffers, addressing issues such as sediment mobilization, wetland function decline, and turbidity. Contaminated sediment was dredged and capped, enabling safe ecological restoration and increased habitat complexity through spawning shoals, coarse woody debris, and restoration plantings. Together, these measures strengthen habitat connectivity, support wildlife recovery, and contribute to the long-term resilience of Hamilton Harbour.

Site information:

- Coordinates: 43.26557629238268, -79.78115277174578
- Site area: ~15.4 ha
- Project date: Since 1992
- Ecosystem type(s): Constructed wetland
- Site context: Urban
- Proponent: City of Hamilton
- Partners: Federal and provincial governments, Hamilton Conservation Authority, Electrical Safety Authority, Alectra Utilities (formerly Horizon Utilities)
- Primary design intentions: Ecological restoration and delisting of Hamilton Harbour as an Area of Concern
- Site constraints or challenges: Contaminated sediment
- Recognitions: 2012 Hamilton-Halton Environmental Engineering Project of the Year Award and Hamilton Public Works Project of the Year, Environment $10 to $50 million category

Types of NbS and hybrid solutions:

- 2. Channel naturalization and realignment
- 3. Constructed or restored wetlands
- 6. Riparian vegetation and buffers
- 8. Invasive species control and removal
- 14. Sediment re-use
- 15. Sediment capture and accretion
- 16. Habitat islands or mounds
- 18. Coastal parks and greenways
- 20. Engineered habitat structures
- 23. Constructed or artificial islands

Hazard impacts that have affected this site:

Sediment mobilization
Wetland loss/function decline
Habitat fragmentation
Invasive species spread
Turbidity increase/water quality impairment

[1] Cole Engineering and City of Hamilton. (2013). Enhancement of Windermere Basin. https://www.canadianconsultingengineer.com/awards/pdfs/2013/D3_WindermereBasinEnhancement.pdf

[2] City of Hamilton. (2025). Clean Harbour Program Successes: Windermere Basin Restoration. https://www.hamilton.ca/home-neighbourhood/environmental-stewardship/our-harbour/completed-clean-harbour-projects#windermere-basin-restoration

[3] Metric Contracting Services Corporation. (n.d.). Windermere Basin. https://www.metricgroup.ca/windemere-basin/

4. Bayfront Park, Macassa Bay, and Pier 4 Park | Hamilton, ON

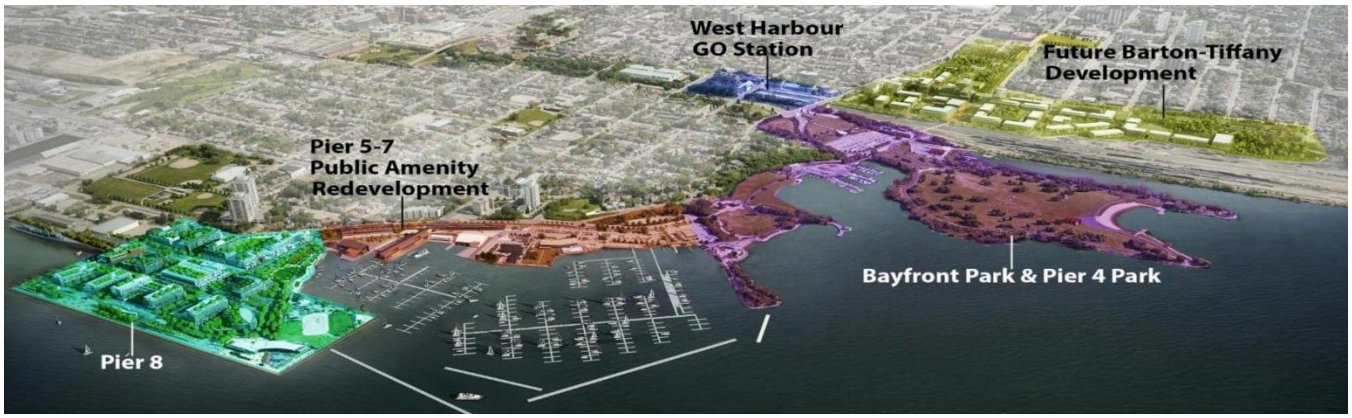

IMAGE CREDIT: CITY OF HAMILTON

Opened in 1993, Bayfront Park and Pier 4 Park are located in the West Harbour area in the City of Hamilton[1]. Formerly an industrial landfill, Bayfront Park was remediated and transformed into a 16-ha waterfront park[2]. The City began purchasing the land in 1985 and has since removed approximately 20,000 tonnes of industrial waste and contaminated soil as part of the $9 million project[3]. Pier 4 Park is located just east of Bayfront Park and includes a small human-made beach and recreational public spaces. Currently, the City is working to revitalize the underutilized open space between Bayfront Park and Pier 4 Park to re-naturalize the shoreline and provide continuous public access along the waterfront[4].

Hazards addressed include bluff retreat, habitat fragmentation, property/infrastructure risk, and harmful algal blooms (HABs), with Canada geese and ring-billed gull fecal loading identified as the dominant source of E. coli. NbS techniques include constructed wetlands, riparian buffers, coastal forest planting, beach restoration, shoreline regrading, engineered habitat structures, hybrid revetments, and dense shoreline shrub planting as behavioural deterrents for waterfowl. Bayfront Park beach was permanently closed in 2017, while Pier 4 remains open and under weekly monitoring.

The site is notable as a case where shoreline and habitat co-benefits have been substantially achieved, while the primary public health goal remains unmet, illustrating the limits of in-situ NbS where the dominant stressor (harbour-wide eutrophication) is not locally controllable.

Site information:

- Coordinates: 43.271949279074896, -79.8723622423654
- Location: 200 Harbour Front Dr, Hamilton, ON L8L 1C8
- Site area: ~18 ha; ~2.6 km of shoreline
- Project date: Since 1985
- Ecosystem type(s): Coastal parks
- Site context: Urban
- Proponent: City of Hamilton
- Primary design intentions: Public access, ecological restoration, E coli. and harmful algal bloom control
- Site constraints or challenges: Contamination, former landfill site
- Recognitions: Numerous design awards at the local, national and international level

Types of NbS and hybrid solutions:

- 3. Constructed or restored wetlands
- 6. Riparian vegetation and buffers
- 7. Coastal forests or windbreak planting
- 9. Beach restoration
- 12. Shoreline regrading
- 18. Coastal parks and greenways
- 20. Engineered habitat structures
- 26. Vegetated armour and revetments

Hazard impacts that have affected this site:

Bluff retreat/structural undermining
Habitat fragmentation
Algal bloom risk
Property/infrastructure risk

[1] Phillips, C. (2023). West Harbour Development Sub-committee. PED23123. https://pub-hamilton.escribemeetings.com/filestream.ashx?DocumentId=364437

[2] City of Hamilton. (2025). Clean Harbour Program Successes: Bayfront Park, Pier 4 Park and Waterfront Trail. https://www.hamilton.ca/home-neighbourhood/environmental-stewardship/our-harbour/completed-clean-harbour-projects

[3] Library and Archives Canada. (n.d.). Bayfront Park. https://epe.lac-bac.gc.ca/100/205/301/ic/cdc/hamilton/bayfront.html?nodisclaimer=1

[4] City of Hamilton. (2023). Indigenous-Focussed Macassa Bay Public-Space Design Process (PED23123) (Ward 2). Staff Report. https://pub-hamilton.escribemeetings.com/filestream.ashx?DocumentId=364435

5. Cootes Paradise | Hamilton, ON

IMAGE CREDIT: ROYAL BOTANICAL GARDENS

Cootes Paradise is a 600-ha nature sanctuary at the western end of Hamilton Harbour, constituting the largest and most diverse nature sanctuary of the Royal Botanical Gardens (RBG)[1]. Site access is found at the eastern end at Princess Point on the south side, and the RBG Arboretum on the north side.

Established in 1927 for its significance as a stopover for migratory birds, Cootes Paradise features one the largest remaining river mouth coastal marshes in Western Lake Ontario. Spanning 320 ha, Cootes Paradise Marsh stretches 25 km of shoreline and is fed by 16 creeks.

Restoration of Cootes Paradise Marsh has been active since the 1990s as part of "Project Paradise" and the Hamilton Harbour Remedial Action Plan, which also includes the restoration of Grindstone Marsh[2]. The Hamilton Harbour Remedial Action Plan's primary focus is on habitat restoration and conservation against four compounding hazards: wetland function decline, invasive species spread, turbidity, and harmful algal blooms.

The site's defining NbS intervention is the Cootes Paradise Fishway, the first two-way carp barrier and fish passage structure on the Great Lakes, which opened in 1996 at the outlet narrows connecting Cootes Paradise to Hamilton Harbour[3]. This structure has blocked the entrance of more than 10,000 non-native carp annually and over 100,000 carp at the outset, while allowing native Lake Ontario fish to migrate to and from the marsh and enabling native aquatic vegetation to progressively recolonize the marsh. Complementary techniques include wetland restoration, floodplain reconnection, channel naturalization of Chedoke and Spencer Creeks, invasive species control through carp gates and controlled burns, riparian buffers, sediment capture and accretion, habitat connectivity corridors, coastal parks and greenways, and the creation of biodegradable floatable wetlands[4].

Cootes Paradise is one of the most significant and scientifically documented large-scale freshwater NbS projects in Canada, and a cornerstone of the broader Hamilton Harbour Area of Concern delisting process.

Site information:

- Coordinates: 43.273362176876745, -79.91926073069287
- Site area: 320 ha coastal marsh (part of the overall ~600 ha nature sanctuary); ~25 km of shoreline; 27,000 ha watershed area
- Project date: Since 1927, with wetland restoration efforts active since the 1990s
- Ecosystem type(s): Coastal wetland
- Site context: Urban
- Proponent: Royal Botanical Gardens
- Primary design intentions: Habitat restoration and conservation
- Site constraints or challenges: Contamination, carp activity, combined sewer overflows (including Chedoke Creek sewer spill between 2014-2018[5]), extensive watershed urbanization and ditching of tributaries, and algal blooms[6]
- Recognitions: Provincially Significant Wetland and part of the Cootes Paradise Drowned Valley Provincial Life Science ANSI[7]

Types of NbS and hybrid solutions:

- 2. Channel naturalization and realignment
- 3. Constructed or restored wetlands
- 4. Floating wetlands
- 5. Floodplain reconnection
- 6. Riparian vegetation and buffers
- 8. Invasive species control and removal
- 15. Sediment capture and accretion
- 17. Habitat connectivity corridors
- 18. Coastal parks and greenways

Hazard impacts that have affected this site:

Wetland loss/function decline
Invasive species spread
Turbidity increase/water quality impairment (including sewage and industrial effluent)
Algal bloom risk

[1] Royal Botanical Gardens. (2023). Trail Guide: Cootes Paradise. https://www.rbg.ca/app/uploads/RBGCootesTG23tabular.pdf?x40684

[2] Royal Botanical Gardens. (n.d.). Conservation Projects. https://www.rbg.ca/plants-conservation/nature-sanctuaries/conservation-projects/

[3] Royal Botanical Gardens. (1998). The Cootes Paradise Fishway. https://www.rbg.ca/app/uploads/Fishway-Factsheet-1998.pdf?x18335

[4] Theijsmeijer, T., and Bowman, J. (2022). Wetlands Conservation Plan 2022-2026. Natural Lands Department. Internal Report No. 2022-3. Royal Botanical Gardens. Hamilton, Ontario. https://www.rbg.ca/app/uploads/Wetland-Restoration-Plan-RBG-2022-2026.pdf?x40684

[5] Royal Botanical Gardens. (n.d.). Watersheds & Marsh Water Quality. https://www.rbg.ca/plants-conservation/nature-sanctuaries/conservation-projects/wetland-restoration/watersheds-marsh-water-quality/

[6] Theijsmeijer, T. (2025, June 19). Cootes Paradise Marsh Recovery: 2025 Milestone. https://www.rbg.ca/cootes-paradise-marsh-recovery-2025-milestone/

[7] North-South Environmental Inc. et al. (2018). Cootes Paradise Heritage Lands Management Plan: Inventory, Issues and Opportunities. Prepared for Cootes to Escarpment EcoPark System. https://static1.squarespace.com/static/.../Cootes+Paradise+Inventory+Issues+Opportunities+Public.pdf

6. Grindstone Marsh | Burlington, ON

IMAGE CREDIT: ROYAL BOTANICAL GARDENS

Grindstone Marsh is a 60-ha river mouth wetland located at the mouth of Grindstone Creek in the Royal Botanical Gardens (RBG), behind the Carrolls Point peninsula in Hamilton Harbour[1]. Access is via a large boardwalk spanning the valley connecting RBG Centre and Laking Garden.

Historically, this area was the natural river channel connecting into Cootes Paradise Marsh and served as a shipping entrance to Dundas. This connection was eliminated and relocated when the railway was constructed along the western edge in the 1850s. Restoration activities have been ongoing since the 1990s as part of "Project Paradise" and the Hamilton Harbour Remedial Action Plan, which also includes the restoration of Cootes Paradise Marsh[2]. As a key objective of the Hamilton Harbour Remedial Action Plan, the primary NbS intent is focused on reducing turbidity and stabilizing the channel, the two conditions most responsible for the loss of native aquatic vegetation within the marsh. Low water levels during 2012 eliminated the last remnants of native vegetation. Today, within the carp exclusion sections, vegetation is thriving again and waters are often clear.

NbS techniques employed include channel naturalization and realignment, invasive species management, wetland restoration, bioengineering and live staking, habitat connectivity corridors, and coastal greenway integration, with one of the most inventive interventions being the use of over 100,000 Christmas trees bundled into stream bank structures within the marsh to restrict carp access, while maintaining hydrological connectivity for native fish[3].

The marsh remains an active restoration site where watershed-scale sediment and nutrient inputs from upstream areas continue to impact in-marsh progress, underscoring how the NbS value of Grindstone Marsh is inseparable from stewardship across its 89-km² contributing drainage area[4].

Site information:

- Coordinates: 43.28995541332899, -79.88228771429817
- Address: 1163 Spring Gardens Rd, Burlington, ON L7T 1J6
- Site area: ~60 ha
- Project date: Wetland restoration efforts have been active since the 1990s
- Ecosystem type(s): Coastal wetland
- Site context: Peri-urban
- Proponent: Royal Botanical Gardens
- Primary design intentions: Reduce turbidity and stabilize channel
- Site constraints or challenges: Sedimentation, carp activity

Types of NbS and hybrid solutions:

- 2. Channel naturalization and realignment
- 3. Constructed or restored wetlands
- 8. Invasive species control and removal
- 11. Bioengineering and live staking
- 17. Habitat connectivity corridors
- 18. Coastal parks and greenways

Hazard impacts that have affected this site:

Sediment mobilization
Turbidity increase/water quality impairment (including sewage and industrial effluent)
Algal bloom risk

[1] Theijsmeijer, T. (2025, August 7). Grindstone Marsh Then and Now. https://www.rbg.ca/grindstone-marsh-then-and-now/

[2] Royal Botanical Gardens. (n.d.). Conservation Projects. https://www.rbg.ca/plants-conservation/nature-sanctuaries/conservation-projects/

[3] Royal Botanical Gardens. (n.d.). Hendrie Valley Trails. https://www.rbg.ca/gardens-trails/by-attraction/trails/trail-maps/hendrie-valley-trails/

[4] Royal Botanical Gardens. (n.d.). Watersheds & Marsh Water Quality. https://www.rbg.ca/plants-conservation/nature-sanctuaries/conservation-projects/wetland-restoration/watersheds-marsh-water-quality/

7. LaSalle Park | Burlington, ON

IMAGE CREDIT: MARINAS.COM

Created in 1915, LaSalle Park is one of the oldest and most popular parks in the City of Burlington, located on the north-central shoreline of Hamilton Harbour[1]. Five large shoals, a submerged reef, and two artificial islands were constructed along the park's shore in 1996 as part of a harbour restoration project[23]. The $2.5 million restoration project sought to increase fish and wildlife habitat, reduce turbidity, and increase passive recreation opportunities, naturalizing the shoreline with vegetated coves, a restored beach and wetland, offshore reefs, and emergent shoals to mimic natural wetland conditions[4].

With a focus on habitat creation and erosion control, the restoration project addresses sediment mobilization, wetland loss, and habitat fragmentation through reefs, shoals, habitat islands, constructed and artificial islands, engineered habitat structures (including 125 fish structures), beach restoration, and integration into a coastal park and floodable park network. Research using 30 years of electrofishing data confirmed that the shoals generally support higher Index of Biotic Integrity (IBI) scores, greater species richness, and increased numbers of pollution-intolerant fish relative to unenhanced areas, with the LaSalle shoals specifically identified as providing intermediate levels of sheltered shallow habitat in an otherwise exposed mid-harbour location[5].

Serving a community that includes active recreational boating and sailing, the five large shoals also exemplify how NbS habitat creation can be co-located with recreational infrastructure in an urban harbour context, delivering co-benefits across biodiversity gain, climate adaptation, and economic and social development.

Site information:

- Coordinates: 43.302362470191454, -79.83998851650819
- Address: 50 North Shore Blvd E, Burlington, ON L7T 4A4
- Site area: ~18 ha, ~1.4 km of shoreline
- Project date: 1996
- Ecosystem type(s): Beach, wetland, offshore reefs and shoals
- Site context: Urban
- Proponent: Conservation Halton
- Partners: Bay Area Restoration Council, federal and provincial governments, Friends of the Environment Foundation, Hamilton Harbour Remedial Action Plan, Hamilton Naturalists' Club, Hamilton Region Conservation Authority, McMaster University, Royal Botanical Gardens, the Regional Municipality of Halton, City of Burlington, City of Hamilton, Waterfront Regeneration Trust, and others
- Primary design intentions: Habitat creation and erosion control

Types of NbS and hybrid solutions:

- 6. Riparian vegetation and buffers
- 9. Beach restoration
- 11. Bioengineering and live staking
- 12. Shoreline regrading
- 15. Sediment capture and accretion
- 16. Habitat islands or mounds
- 18. Coastal parks and greenways
- 19. Floodable parks
- 20. Engineered habitat structures
- 21. Beach nourishment and dynamic cobbleĚ berms
- 23. Constructed or artificial islands
- 24. Hybrid breakwaters and shoals
- 25. Artificial reefs

Hazard impacts that have affected this site:

Sediment mobilization

Wetland loss/function decline

Habitat fragmentation

[1] City of Burlington. (2020). Future of LaSalle Park. Staff Report. https://burlingtonpublishing.escribemeetings.com/filestream.ashx?DocumentId=44125

[2] Caulk, A.D., Gannon, J.E., Shaw, J.R., and Hartig, J.H. (Eds.). (2000). Best Management Practices for Soft Engineering of Shorelines. Greater Detroit American Heritage River Initiative. https://www.semcog.org/wp-content/uploads/2025/08/BestManagementPracticesForSoftEngineeringOfShorelinesSeptember2000.pdf

[3] Smokorowski, K.E., Stoneman, M.G., Cairns, V.W., Minns, C.K., Randall, R.G., and Valere, B. (1998). Trends in the Nearshore Fish Community of Hamilton Harbour, 1988 to 1997, as Measured Using an Index of Biotic Integrity. Canadian Technical Report of Fisheries and Aquatic Sciences No. 2230. https://publications.gc.ca/collections/collection_2014/mpo-dfo/Fs97-6-2230-eng.pdf

[4] Patterson, T.S. (1999). Comparison of Soil Bioengineering and Hard Structures for Riverine and Shoreline Erosion Control in Ontario: Costs and Effectiveness. https://publications.gc.ca/collections/collection_2021/eccc/en164/En164-61-1999-eng.pdf

[5] Maynard, D., Boston, C. M., & Midwood, J. D. (2022). Fish community structure varies by location and presence of artificial islands: A case study in Hamilton Harbour, Lake Ontario. *Environmental Biology of Fishes*, *105*(11), 1557–1573. https://doi.org/10.1007/s10641-022-01348-z

8. Northeastern Bird Islands | Burlington, ON

IMAGE CREDIT: HAMILTON HARBOUR REMEDIAL ACTION PLAN

Neare and Farre Islands are located in the northeast corner of Hamilton Harbour[1]. Originally constructed in the 1920s to support hydro poles, the islands were transformed into bird islands[2] with three additional nesting islands (North, Centre, and South Islands) added between 1995 and 1996 as a direct deliverable of the Hamilton Harbour Remedial Action Plan[3]. These islands were designed to provide nesting habitat for colonial waterbirds, while supporting the growth of submerged vegetation between the islands and the shore[4]. Due to flooding and erosion from high water levels, the Hamilton Harbour Remedial Action Plan and partners are currently seeking to rehabilitate up to four of the islands.

Management efforts have focused on the nesting preferences of six target species (Caspian Tern, Common Tern, Black-crowned Night-Heron, Double-crested Cormorant, Ring-billed Gull, and Herring Gull), including elevated sand and pea gravel mounds for terns and topsoil and native shrub plantings for night-herons. The harbour has since become one of the most significant colonial waterbird nesting sites in the Great Lakes, supporting populations that represent meaningful proportions of both North American and global breeding populations for several species.

Ongoing adaptive management and the proposed rehabilitation of the islands to address erosion from record high lake levels confirm the site's long-term commitment to NbS-aligned biodiversity gain and ecosystem restoration as core to the Remedial Action Plan’s objectives.

Site information:

- Coordinates: 43.30596506656118, -79.8032779010604
- Address: 854W+8M, Hamilton, ON L3M 1R0
- Site area: ~1.5 ha
- Project date: Since 1995
- Ecosystem type(s): Habitat islands
- Site context: Urban
- Proponent: Hamilton Harbour Remedial Action Plan
- Primary design intentions: Habitat creation

Types of NbS and hybrid solutions:

- 16. Habitat islands or mounds
- 23. Constructed or artificial islands

Hazard impacts that have affected this site:

Coastal/urban inundation

Habitat fragmentation

[1] Birds Canada. (n.d.). Hamilton Harbour Waterbird Colonies (ON020). https://www.ibacanada.org/mobile/site.jsp?siteID=ON020

[2] Hamilton Harbour Remedial Action Plan. (2022). Draft Re-designation Report: Degradation of Wildlife Populations (BUI 3B) in the Hamilton Harbour Area of Concern. Prepared for the International Joint Commission. https://hhrap.ca/wp-content/uploads/BUI-3b-Wildlife-Populations-Re-designation-2022-DRAFT.pdf

[3] Hamilton Harbour Remedial Action Plan. (2022). Celebrating a Diverse Colonial Waterbird Community. https://storymaps.arcgis.com/stories/d5c39c8f3ae3481c97ede4374ae5541b

[4] Canada Water Agency. (2025). Rehabilitation of Bird Habitat Islands - Hamilton Harbour, Ontario. https://iaac-aeic.gc.ca/050/evaluations/proj/89095?culture=en-CA

9. Beachway Park | Burlington, ON

IMAGE CREDIT: PETE ZUZEK

Beachway Park is a 2.75-ha[1] Regional Waterfront Park[2] with a natural lakefront beach in Burlington, ON. The sand beach is part of a baymouth bar that has formed through natural processes of erosion and deposition[3]. The natural beach and dune system found in the park is a rare ecosystem[4] and the only dune habitat found in Halton Region[5].

Between 2012 and 2016, BurlingtonGreen (a community-driven charity) led 6 habitat restoration events in partnership with the City of Burlington, Conservation Halton, and Halton Region to remove invasive species and plant over 3,000 native grasses, shrubs, and trees[6]. Between 2021 and 2023, additional work was completed by Halton Region to transplant beachgrass plants to restore the fore dunes and enhance beach resilience against future high lake level events[7]. Currently, Halton Region is leading a multi-year project with grant funding from the Canada Water Agency to restore the shoreline and dune ecosystems and implement additional nature-based solutions[8].

The site's primary hazards are beach loss and dune destabilization, coastal inundation, and public infrastructure exposure, the latter complicated by hydro transmission towers that constrain restoration options along the beach strip[9]. Interventions have been guided by the Burlington Beach Waterfront Master Plan[10], employing beach and dune restoration, invasive species control and removal, sediment capture and accretion, and beach nourishment and dynamic cobble berms to rebuild and stabilize the fore dune system – work that became critical after record Lake Ontario water levels in 2017 and 2019, which completely inundated the beach for extended periods.

As Halton's sole dune ecosystem supporting rare and climate-sensitive species, Beachway Park represents a high-priority and ecologically distinctive NbS site where beach resilience, biodiversity, disaster risk reduction, and public access objectives are deeply intertwined.

Site information:

- Coordinates: 43.31348012866244, -79.80066217116462
- Address: 1100 Lakeshore Rd., Burlington, ON L7S 1A7
- Site area: ~2.75 ha, 2.2 km of shoreline
- Project date: Since 2012, with waterfront studies and master planning efforts dating back to the 1970s and 1980s
- Ecosystem type(s): Beach and dune
- Site context: Urban
- Proponent: Halton Region
- Partners: City of Burlington, Conservation Halton, BurlingtonGreen
- Primary design intentions: Ecological restoration, beach resilience, and recreation
- Site constraints or challenges: Hydro infrastructure
- Recognitions: 2017 Waterfront Center Award, Long Range Plan Honor[11]

Types of NbS and hybrid solutions:

- 6. Riparian vegetation and buffers
- 7. Coastal forests or windbreak planting
- 8. Invasive species control and removal
- 9. Beach and dune restoration
- 15. Sediment capture and accretion
- 18. Coastal parks and greenways
- 21. Beach nourishment and dynamic cobble berms

Hazard impacts that have affected this site:

Beach loss/dune destabilization
Coastal/urban inundation
Property/infrastructure risk

[1] City of Burlington. (2022). Downtown Waterfront. https://www.burlington.ca/en/arts-culture-and-events/downtown-waterfront.aspx

[2] City of Burlington. (2025). 2026 Proposed Budget: Parks and Open Space. https://www.burlington.ca/en/council-and-city-administration/resources/Budget-and-Finances/Proposed-Budget-Book/2026/2026-Proposed-Budget-Book-14-Parks-Open-Space.pdf

[3] Burlington Gazette. (2013, April 11). Plant shrubs on the 20th, come back in 2020 and see them still growing: BurlingtonGreen looking for real environmentalists. https://burlingtongazette.ca/plant-shrubs-on-the-20th-come-back-in-2020-and-see-them-still-growing

[4] The Regional Municipality of Halton. (2023). Burlington Beach Regional Waterfront Park Update. Staff Report. https://edmweb.halton.ca/OnBaseAgendaOnline/Documents/ViewDocument/CS-09-23_CA-09-23_Burlington_Beach_Update

[5] Bird Friendly Hamilton Burlington. (2022). Bird Friendly Burlington: Application for Consideration. https://naturecanada.ca/wp-content/uploads/2022/06/BFC-Application-Burlington.pdf

[6] BurlingtonGreen. (2026). Protecting Lake Ontario. https://www.burlingtongreen.org/programs/nature-friendly-burlington/

[7] City of Burlington. (2024). Appendix A: Climate Resilient Burlington (CRB) Year 2 Progress Update. Appendix A of Report EICS-05-24. https://burlingtonpublishing.escribemeetings.com/filestream.ashx?DocumentId=78465

[8] Canada Water Agency. (2026). Projects funded under the Great Lakes Freshwater Ecosystem Initiative. https://www.canada.ca/en/canada-water-agency/funding/funded-projects/great-lakes.html#toc2

[9] Delong, K. (2025). Burlington Beach Regional Waterfront Park. Great Lakes Freshwater Ecosystem Initiative (GLFEI) Second Annual Symposium. https://trcaca.s3.ca-central-1.amazonaws.com/app/uploads/2025/12/19164216/Dec10_GLFEI_Symposium_Slides

[10] The Regional Municipality of Halton. (n.d.). Implementing the Waterfront Park Master Plan. https://www.halton.ca/the-region/explore-and-enjoy-halton/burlington-beach-waterfront-park-master-plan

[11] Brook McIlroy. (n.d.). Burlington Beach Master Plan. https://www.brookmcilroy.com/projects/burlington-beach-master-plan

10. Burloak Waterfront Park | Burlington, ON

IMAGE CREDIT: MCNALLY INTERNATIONAL, INC.

Burloak Waterfront Park is a 5.6-ha Regional Waterfront Park that straddles the City of Burlington's eastern border with the Town of Oakville[1]. Recent improvements have been guided by an updated master plan approved in 2014, including major shoreline erosion protection works[2], invasive species control and removal, the planting of trees and shrubs, and live staking[3].

NbS techniques centred on constructed islands[4], a mix of riparian trees and meadows, bioengineering, vegetated revetments, invasive species management, and integration into a coastal park network, reflecting a design approach that uses offshore landforms to attenuate wave energy, creates sheltered nearshore habitat, and supports biodiversity along an otherwise exposed urban shoreline. The park's significant Queenston shale cliff formation hosts one of the largest Bank Swallow nesting colonies in the Western Lake Ontario basin[5], lending additional ecological value to the site beyond its engineered features. The primary NbS intent centres on shoreline erosion protection, ecological restoration, and public amenity improvements, consistent with IUCN NbS principles.

With ongoing construction phases planned for 2026, improvements at Burloak Waterfront Park integrate recreational access, ecological enhancement, and inter-jurisdictional collaboration along a key node of the Lake Ontario Waterfront Trail.

Site information:

- Coordinates: 43.367761095940445, -79.72733847792651
- Address: 5420 Lakeshore Rd., Burlington, ON L7L 1C9
- Site area: ~5.6 ha, 800 m of shoreline
- Project date: Since 2014
- Ecosystem type(s): Coastal park
- Site context: Urban
- Proponent: Halton Region
- Partners: City of Burlington, Town of Oakville, Conservation Halton
- Primary design intentions: Shoreline protection, ecological restoration, and passive recreation

Types of NbS and hybrid solutions:

- 6. Riparian vegetation and buffers
- 8. Invasive species control and removal
- 11. Bioengineering and live staking
- 18. Coastal parks and greenways
- 23. Constructed or artificial islands
- 24. Hybrid breakwaters and shoals
- 26. Vegetated armour and revetments

Hazard impacts that have affected this site:

Invasive species spread

Property/infrastructure risk

[1] The Regional Municipality of Halton. (2014). LPS13-14 - Burloak Regional Waterfront Park Master Plan Update. Staff Report. https://edmweb.halton.ca/OnBaseAgendaOnline/Documents/ViewDocument/LPS13-14_-_Burloak_Regional_Waterfront_Park_Master

[2] The Regional Municipality of Halton. (2019). LPS108-19 - Burloak Regional Waterfront Park 2019 Update. Staff Report. https://edmweb.halton.ca/OnBaseAgendaOnline/Documents/ViewDocument/LPS108-19_-_Burloak_Regional_Waterfront_Park_2019_Update.pdf

[3] City of Burlington. (2019). Take Action Burlington: An Update on Our Local Environment. https://www.burlington.ca/en/home-property-and-environment/resources/Environment/2018-Environment-Update.pdf

[4] McNally International, Inc. (2026). Burloak Shoreline Remediation Project. https://www.mcnallycorp.com/projects/projects-details/burloak-shoreline-remediation-project/

[5] TransCanada FoundLocally Inc. (2026). Burlington, Ontario. https://transcanadahighway.com/ontario/burlington/

11. South Shell Park Nesting Wall | Oakville, ON

IMAGE CREDIT: TOWN OF OAKVILLE

South Shell Park is a 2.8-ha waterfront park located in southwest Oakville, ON[1]. The record high lake levels in 2017 and 2019 caused significant deterioration of the shoreline along Shorewood Promenade and South Shell Park, including extensive erosion along a 5-m bluff at Shorewood[2]. In order to undertake the $1.3 million shoreline rehabilitation project, compensatory works were required to offset environmental impacts on trees and vegetation, and endangered Bank Swallows. The cost of the compensatory works was estimated at approximately $750,000 and included the creation of an artificial nesting wall for Bank Swallows that was incorporated into the rehabilitation at South Shell Park.

Completed in 2024, the 18-m long concrete wall consists of over 200 burrow holes that are filled with sand and soil to mimic the natural nesting habitats of Bank Swallows along vertical banks and cliffs[3]. Overall, this project addressed bluff retreat, sediment mobilization, coastal inundation, and habitat fragmentation through bluff stabilization, shoreline regrading, coastal park integration, and the use of an engineered habitat structure with eco-engineered materials and surfaces. A 10-year collaborative research study is currently underway with Conservation Halton to monitor nesting occupancy and habitat effectiveness.

While compact in scope relative to other projects in this portfolio, South Shell Park demonstrates how regulatory species-at-risk compensation requirements can be integrated into shoreline rehabilitation as a genuine NbS co-benefit, contributing to biodiversity gain, climate adaptation, and disaster risk reduction within an urban Lake Ontario context.

Site information:

- Coordinates: 43.37654938945581, -79.71821039945154
- Address: 3376 Lakeshore Rd W, Oakville, ON L6L 6S6
- Site area: 18-m nesting wall
- Project date: 2024
- Ecosystem type(s): Coastal park
- Site context: Urban
- Proponent: Town of Oakville
- Partner: Conservation Halton
- Primary design intentions: Habitat creation, shoreline rehabilitation

Types of NbS and hybrid solutions:

- 10. Bluff stabilization
- 12. Shoreline regrading
- 18. Coastal parks and greenways
- 20. Engineered habitat structures
- 27. Eco-engineered materials and surfaces

Hazard impacts that have affected this site:

Bluff retreat/structural undermining
Sediment mobilization
Coastal/urban inundation
Habitat fragmentation
Property/infrastructure risk

[1] Town of Oakville. (2026). Destination Parks. https://www.oakville.ca/parks-recreation-culture/parks-gardens-trails/parks/destination-parks/

[2] Town of Oakville. (2021). Shorewood Promenade Shoreline Rehabilitation Study. Staff Report. https://pub-oakville.escribemeetings.com/filestream.ashx?DocumentId=4617

[3] Town of Oakville. (2026). Bank Swallow Overall Benefit Project at South Shell Park, Shorewood Promenade and Riverview Park. https://www.oakville.ca/home-environment/environment/environmental-projects-studies/bank-swallow-overall-benefit-project-at-south-shell-park-shorewood-promenade-and-riverview-park/

12. Coronation Park | Oakville, ON

IMAGE CREDIT: GOOGLE EARTH

Coronation Park is a popular[1] waterfront park located in a mature, residential neighbourhood in Oakville, ON[2]. This neighbourhood has experienced well-documented drainage deficiencies where standing water, ditch erosion, and inadequate outlet capacity created chronic flood risk, compounded by debris blockages of Lake Ontario drainage outlets. Between 2014 and 2017, a Municipal Class Environmental Assessment (EA) study was completed to investigate possible drainage improvements within and around Coronation Park[3], which led to channel improvements within Coronation Park to receive stormwater flows[4].

The primary NbS intent was to improve drainage, mitigate erosion, and reduce upstream flooding through channel improvements to receive flows from proposed storm sewers, vegetated buffers, sediment capture and accretion, and integration into a coastal park network. Rather than relying solely on hard infrastructure, the project uses the park's low-lying topography as a functional landscape to direct stormwater through a naturalized channel and improve stormwater conveyance.

Addressing stormwater management and nuisance flooding as primary hazards, and delivering co-benefits across climate adaptation, disaster risk reduction, and economic and social development, Coronation Park represents a municipally-anchored NbS approach to urban drainage that uses park space as working green infrastructure at the interface between the land and the lake.

Site information:

- Coordinates: 43.40723498983757, -79.69129539105069
- Address: 1426 Lakeshore Rd W, Oakville, ON L6L 1G2
- Site area: ~200 m of channel reconstructed
- Project date: 2019
- Ecosystem type(s): Coastal park
- Site context: Urban
- Proponent: Town of Oakville
- Primary design intentions: Improved drainage, erosion mitigation, upstream nuisance flooding mitigation

Types of NbS and hybrid solutions:

- 2. Channel naturalization and realignment
- 6. Riparian vegetation and buffers
- 15. Sediment capture and accretion
- 18. Coastal parks and greenways

Hazard impacts that have affected this site:

Sediment mobilization

Coastal/urban inundation

[1] Swim Drink Fish Canada. (2026). Coronation Park East. https://www.theswimguide.org/beach/69

[2] Amec Foster Wheeler Environment & Infrastructure. (2017). Coronation Park Drainage Improvements Class Environmental Assessment: Final Report. Project No. TP114001. Town of Oakville. https://www.oakville.ca/getmedia/1571a48c-de0c-4ff3-b96e-8abc08876eb5/transportation-roads-coronation-park-drainage-final.pdf

[3] Town of Oakville. (2026). Coronation Park Drainage Environmental Assessment. https://www.oakville.ca/transportation-roads/transportation-roads-studies-and-plans/environmental-assessment-studies/coronation-park-drainage-ea/

[4] Town of Oakville. (2022). Appendix A: Roadmap for Town-wide Rainwater Management Strategy. https://pub-oakville.escribemeetings.com/filestream.ashx?DocumentId=40331

13. Tannery Park and Waterworks Park | Oakville, ON

IMAGE CREDIT: TOWN OF OAKVILLE

Tannery Park and Waterworks Park are located on the west shores of Oakville Harbour at Sixteen Mile Creek[1]. In 2019, a $4.5 million park and shoreline redevelopment project was completed, improving waterfront access along 600 m of shoreline between the two adjacent parks, while enhancing terrestrial and aquatic habitat and public and cultural amenities. This project was undertaken as Phase 3 of the broader Oakville Harbour West Shore Master Plan, which was approved in 2009[2].

The project's primary NbS intent was erosion mitigation and public access restoration. Key NbS techniques employed include cobble beach creation, hybrid breakwaters and shoals, sediment capture and accretion, habitat connectivity corridors, and integration into a coastal park and greenway network. Delivered through an extensive multi-agency consultation process involving provincial and federal governments and the Mississaugas of the Credit First Nation, the project incorporated Indigenous placemaking elements alongside rehabilitated aquatic habitat, naturalized slope plantings, and accessible shoreline infrastructure[3].

While relatively focused in its NbS technique palette compared to the larger wetland projects in this portfolio, Tannery Park demonstrates how urban shoreline rehabilitation can integrate erosion control, habitat enhancements, public access improvements, and Indigenous cultural recognition within a compact urban park setting, consistent with IUCN NbS co-benefit principles.

Site information:

- Coordinates: 43.43973732290121, -79.66681473115771
- Address: Waterfront Trail, Oakville, ON L6K 3R7
- Site area: ~600 m of shoreline
- Project date: 2019
- Ecosystem type(s): Coastal park
- Site context: Urban
- Proponent: Town of Oakville
- Primary design intentions: Erosion mitigation, improved public access

Types of NbS and hybrid solutions:

- 6. Riparian vegetation and buffers
- 9. Beach restoration (cobble beach creation)
- 12. Shoreline regrading
- 15. Sediment capture and accretion
- 17. Habitat connectivity corridors
- 18. Coastal parks and greenways
- 24. Hybrid breakwaters and shoals

Hazard impacts that have affected this site:

Sediment mobilization
Coastal/urban inundation
Property/infrastructure risk

[1] The MBTW Group. (n.d.). Shoreline Promenade & Waterworks Park. https://www.mbtw.com/design-portfolio/oakville-harbour-shoreline

[2] Town of Oakville. (2019). Oakville Harbour West Shore Master Plan - Walkway Lighting. Staff Report. https://pub-oakville.escribemeetings.com/filestream.ashx?documentid=26676

[3] Oakville News. (2020, August 7). Tannery and Waterworks Park Officially Opens. https://www.oakvillenews.org/local-news/tannery-waterworks-park-officially-opens-8475629

14. Rattray Marsh | Mississauga, ON

IMAGE CREDIT: CREDIT VALLEY CONSERVATION

Rattray Marsh Conservation Area is one of the most visited[1] conservation areas owned and managed by Credit Valley Conservation (CVC), located in Mississauga, ON[2]. Acquired in 1975, the 38-ha area consists of one of the last remaining baymouth bar coastal wetlands between Toronto and Burlington[3] and features a rare shingle bar beach formation[4]. While Rattray Marsh is designated as an Environmentally Significant Area, a Provincially Significant Wetland, and an Area of Natural and Scientific Interest (ANSI), with international recognition dating to 1969, it has become degraded due to urbanization, sediment buildup from Sheridan Creek, and invasive common carp.

A Class Environmental Assessment (EA) was completed in 2009 to develop a restoration plan for Rattray Marsh[5]. The primary NbS intent was to restore open water habitat, improve water clarity, and restore the marsh substrate by removing excess sediment and installing 21 habitat structures. Strategic carp exclusion fencing was also installed to protect restored marsh areas, with early monitoring confirming successful deterrence and persistence of aquatic vegetation. NbS techniques employed include wetland restoration, floodplain restoration, riparian buffers, coastal forest planting, invasive species control (including Emerald Ash Borer management and carp exclusion), engineered habitat structures, and sediment capture and accretion.

The marsh supports 428 plant species, 227 bird species, 26 mammals, 18 reptiles and amphibians, and 11 fish species, reflecting the biodiversity co-benefits central to its IUCN NbS alignment. Long-term stewardship is supported through community engagement via the Rattray Marsh Protection Association and ongoing monitoring through the Great Lakes Coastal Wetlands Monitoring Program, making it one of the region's most mature examples of adaptive, community-anchored coastal wetland management.

Site information:

- Coordinates: 43.517937906244256, -79.60255801257348
- Address: 1180 Lakeshore Rd W, Mississauga, ON L5H 1A1
- Site area: ~38 ha, ~400 m of shoreline
- Project date: Since 1975
- Ecosystem type(s): Coastal wetland
- Site context: Urban
- Proponent: Credit Valley Conservation
- Partners: Federal and provincial governments, Region of Peel, Rattray Marsh Protection Association, Enbridge, Shell, South Peel Naturalists' Club, Mississauga Bassmasters
- Primary design intentions: Restore open water habitat, improve water clarity, restore marsh substrate
- Recognitions: Environmentally Significant Area, Provincially Significant Wetland, Area of Natural and Scientific Interest, and international recognition

Types of NbS and hybrid solutions:

- 3. Constructed or restored wetlands
- 5. Floodplain reconnection
- 6. Riparian vegetation and buffers
- 7. Coastal forests or windbreak planting
- 8. Invasive species control and removal
- 15. Sediment capture and accretion
- 17. Habitat connectivity corridors
- 18. Coastal parks and greenways
- 20. Engineered habitat structures

Hazard impacts that have affected this site:

Sediment mobilization
Wetland loss/function decline
Habitat fragmentation
Invasive species spread

[1] Biscaia, P. (2022). Coastal Wetland and Creation and Restoration in the Credit River Watershed Rattray Marsh and Jim Tovey Lakeview Conservation Area. Great Lakes Coastal Wetlands Webinar Series. https://trcaca.s3.ca-central-1.amazonaws.com/app/uploads/2022/06/03162521/Great-Lakes-Coastal-Wetlands-Webinar-Series-Session-3-Slides.pdf

[2] Credit Valley Conservation Foundation. (2021). Restoring Rattray Marsh. https://cvcfoundation.ca/rattray-marsh

[3] Credit Valley Conservation. (2026). Rattray Marsh Conservation Area. https://cvc.ca/discover-our-parks/rattray-marsh/

[4] Credit Valley Conservation. (2025, October 23). 50 Years of Rattray Marsh Conservation Area. https://cvc.ca/conversations/50-years-of-rattray-marsh-conservation-area/

[5] Credit Valley Conservation. (2026). Rattray Marsh Frequently Asked Questions. https://cvc.ca/rattray-marsh-frequently-asked-questions/

15. Serson Creek Reconnection and Wetland | Mississauga, ON

IMAGE CREDIT: CREDIT VALLEY CONSERVATION

At the end of 2021, Serson Creek was reconnected to Lake Ontario for the first time in 60 years[1]. Approximately 500 m of the creek was previously buried through a pipe under the G.E. Booth Wastewater Treatment Facility in Mississauga, ON[2]. Through the creation of the new 26-ha Jim Tovey Lakeview Conservation Area (JTLCA) on the city's eastern shores, approximately 150 m of channel construction has been completed[3], along with the creation of a new wetland at the mouth of the creek. Over 20,000 native wetland plants have been planted, along with 1,000 native trees around the wetland.

Led by CVC, the Region of Peel, and TRCA, the project addressed sediment mobilization, coastal inundation, wetland loss, habitat fragmentation, and invasive species through a multi-technique NbS approach including stream reconnection and channel naturalization of the historically buried Serson Creek, wetland construction, riparian buffers, floodplain reconnection, shoreline regrading, sediment re-use, invasive species control, and integration into a coastal park and floodable park network.

Opening in May 2026, the development of JTLCA involved the beneficial re-use of over 262,000 m^3 of construction rubble and more than 1.5 million m^3 of excess soil to construct the new landform and enhanced shoreline, avoiding the need for long-haul disposal and funding habitat creation simultaneously. Collectively, this demonstrates how beneficial re-use of clean fill (primarily from Region of Peel capital works projects[4]) can serve as both the physical substrate and financing mechanism for large-scale urban coastal habitat creation.

Site information:

- Coordinates: 43.57235240478352, -79.54416246513301
- Site area: Part of 7.7 ha of wetlands at Jim Tovey Lakeview Conservation Area
- Project date: Since 2016
- Ecosystem type(s): Coastal wetland
- Site context: Urban
- Proponents: Credit Valley Conservation, Region of Peel, Toronto and Region Conservation Authority
- Partners: Federal government, City of Mississauga, City of Toronto, Swim Drink Frish, Lakeview Community Partners Limited
- Primary design intentions: Channel reconnection, wetland creation, ecological restoration, public access

Types of NbS and hybrid solutions:

- 1. Reconnected rivers and streams
- 2. Channel naturalization and realignment
- 3. Constructed or restored wetlands
- 5. Floodplain reconnection
- 6. Riparian vegetation and buffers
- 8. Invasive species control and removal
- 12. Shoreline regrading
- 14. Sediment re-use
- 17. Habitat connectivity corridors
- 18. Coastal parks and greenways
- 19. Floodable parks

Hazard impacts that have affected this site:

Sediment mobilization
Wetland loss/function decline
Habitat fragmentation
Invasive species spread

[1] Credit Valley Conservation. (2022, February 10). Serson Creek: Reconnecting a Lost River. https://cvc.ca/conversations/serson-creek-reconnecting-a-lost-river/

[2] O'Reilly, D. (2021, April 30). Lakeview community to finally get…a view of Lake Ontario . Daily Commercial News by ConstructConnect. https://canada.constructconnect.com/dcn/news/projects/2021/04/lakeview-community-to-finally-geta-view-of-lake-ontario

[3] Toronto and Region Conservation Authority. (2026). Jim Tovey Lakeview Conservation Area. https://trca.ca/conservation/infrastructure-projects/jim-tovey-lakeview-conservation-area/

[4] Toronto and Region Conservation Authority. (2018, August 28). New Conservation Area to Be Named in Memory of Jim Tovey. https://trca.ca/news/new-conservation-area-honours-jim-tovey/

16. Applewood Creek Extension and Wetland | Mississauga, ON

IMAGE CREDIT: CREDIT VALLEY CONSERVATION

To the east of Serson Creek at the new Jim Tovey Lakeview Conservation Area (JTLCA), approximately 200 m of new channel has been constructed to connect to the existing Applewood Creek, along with a new 1.5-ha wetland[1]. Applewood Wetland was created through channel realignment of Applewood Creek and restoration of its outlet to Lake Ontario, establishing a functioning creek-mouth wetland with fish spawning habitat features, sediment accretion, and habitat connectivity, including over 30,000 aquatic plantings. Three offshore islands were constructed to protect the shoreline from wave action and create new underwater aquatic habitat.

Consistent with IUCN NbS criteria, the JTLCA project delivers co-benefits spanning climate adaptation, biodiversity gain, stormwater management, and public access, while incorporating Indigenous traditional knowledge through partnership with the Mississaugas of the Credit First Nation[2].

Site information:

- Coordinates: 43.58016319101319, -79.5428401979521
- Site area: ~1.5-ha wetland, part of 7.7 ha of wetlands at Jim Tovey Lakeview Conservation Area
- Project date: Since 2016
- Ecosystem type(s): Coastal wetland
- Site context: Urban
- Proponents: Credit Valley Conservation, Region of Peel, Toronto and Region Conservation Authority
- Partners: Federal government, City of Mississauga, City of Toronto, Swim Drink Frish, Lakeview Community Partners Limited
- Primary design intentions: Outlet restoration, wetland creation, ecological restoration, public access

Types of NbS and hybrid solutions:

- 2. Channel naturalization and realignment
- 3. Constructed or restored wetlands
- 5. Floodplain reconnection
- 6. Riparian vegetation and buffers
- 8. Invasive species control and removal
- 14. Sediment re-use
- 15. Sediment capture and accretion
- 17. Habitat connectivity corridors
- 18. Coastal parks and greenways
- 19. Floodable parks
- 23. Constructed or artificial islands

Hazard impacts that have affected this site:

Sediment mobilization
Wetland loss/function decline
Habitat fragmentation
Invasive species spread

[1] Toronto and Region Conservation Authority. (2021). Conservation Matters: 2020 Annual Report. https://trcaca.s3.ca-central-1.amazonaws.com/app/uploads/2021/02/19104934/TRCA-AR-2020-FA-web.pdf

[2] Credit Valley Conservation. (2026). Jim Tovey Lakeview Conservation Area. https://cvc.ca/project/jim-tovey-lakeview-conservation-area/

17. Samuel Smith Wetland | Toronto, ON

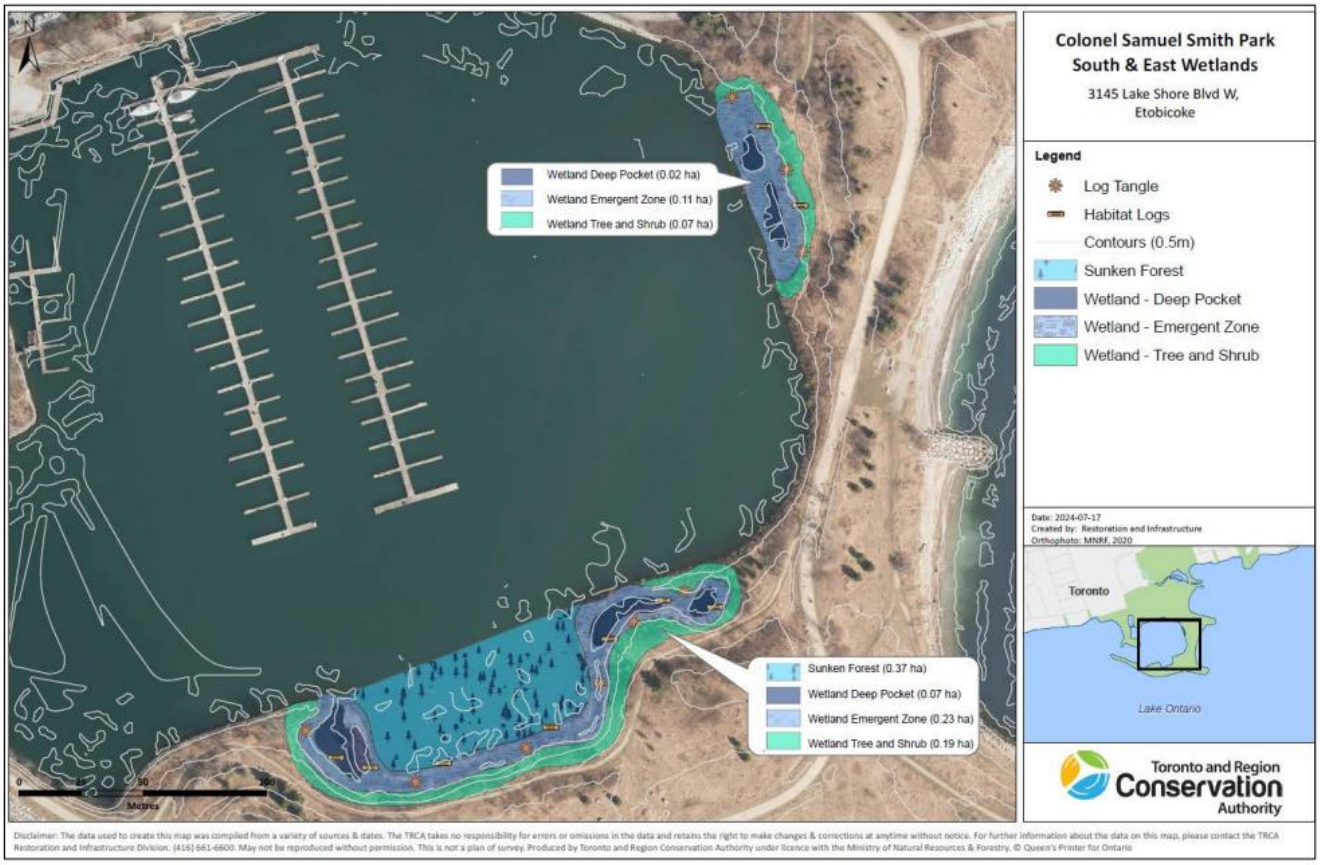

IMAGE CREDIT: TORONTO AND REGION CONSERVATION AUTHORITY

Colonel Samuel Smith Park is a popular waterfront park located in the western end of the City of Toronto, ON[1]. Opened in 1996, much of the park was created from lakefill and has been naturalized through the planting of grasses, shrubs, and trees, the creation of a 3.6-ha wetland[2], and invasive species management[3].

Currently, a major maintenance project is underway to rehabilitate areas of the shoreline that have been damaged by erosion from waves and storms. While the southern shoreline is an open coast environment that requires more engineered approaches to protect the eroding parkland, native trees and shrubs will be planted in protected areas near the shoreline to further reduce erosion and stormwater runoff. Turtle fencing and sand and gravel mounds have been installed to promote turtle crossing and nesting during construction. Permanent habitat features will also be created along the park's interior shoreline by adding riparian and emergent vegetation, creating deeper wetland pockets and larger emergent zones by adjusting the bed contours, and adding habitat structures (including embedded logs, rocky vanes, and a sunken forest feature in off the shore)[4].

NbS techniques include constructed and restored wetlands, riparian vegetation, invasive species control, habitat islands or mounds, and engineered habitat structures, integrated into a coastal park. These interventions support climate adaptation, disaster risk reduction, biodiversity, and economic and social development at this popular waterfront destination.

Site information:

- Coordinates: 43.5939, -79.5108
- Address: 3145 Lake Shore Blvd W, Etobicoke, ON M8V 4B6
- Site area: ~3.6-ha wetland
- Project date: Since 1996
- Ecosystem type(s): Coastal wetland
- Site context: Urban
- Proponent: Toronto and Region Conservation Authority
- Partners: Federal government, Aquatic Habitat Toronto, City of Toronto
- Primary design intentions: Wetland creation and restoration, shoreline erosion protection, public access

Types of NbS and hybrid solutions:

- 3. Constructed or restored wetlands
- 6. Riparian vegetation and buffers
- 8. Invasive species control and removal
- 16. Habitat islands or mounds
- 18. Coastal parks and greenways
- 20. Engineered habitat structures
- 24. Hybrid breakwaters and shoals

Hazard impacts that have affected this site:

Sediment mobilization
Wetland loss/function decline
Habitat fragmentation
Invasive species spread
Property/infrastructure risk

[1] Toronto and Region Conservation Authority. (2026). Colonel Samuel Smith Park Major Maintenance Project. https://trca.ca/conservation/erosion-risk-management/restore/colonel-samuel-smith-park-major-maintenance/

[2] Read The Plaque. (n.d.). Colonel Samuel Smith Park. https://readtheplaque.com/plaque/colonel-samuel-smith-park#gsc.tab=0

[3] Toronto and Region Conservation Authority. (2020). Watershed Moments: Colonel Sam Smith Park, Community-Based Planting with Friends of Colonel Samuel Smith Park. https://trca.ca/app/uploads/2020/01/ET-043-2019ColSamSmithInfillPlantThuSep19FIN.pdf

[4] Toronto and Region Conservation Authority. (2024). Colonel Sam Smith Shoreline Major Maintenance Project: Construction Access Planning Summary. https://trca.ca/conservation/erosion-risk-management/restore/colonel-samuel-smith-park-major-maintenance/construction-access-planning-summary-2024-2/download

18. Gibraltar Point | Toronto, ON

IMAGE CREDIT: TORONTO AND REGION CONSERVATION AUTHORITY

Gibraltar Point is located at the southwesterly tip of the Toronto Islands on Lake Ontario[1]. As part of an erosion control project, over 50,000 tonnes of sand were imported to recreate a natural beach and dune system between 2021 and 2022. The primary intent was to help reduce flood risk inland and buffer against erosion, waves, and high water levels, while providing habitat for wildlife[2].

Over 3,000 native trees and shrubs were planted in the back area of the dune, along with over 5,000 beach marram grass and other native herbaceous species in the mid- and fore dune. Fencing, logs, and other woody debris were installed to protect the fragile dune system and trap sediment.

In addition to the restored sand dune, a large nearshore reef was also installed off the shoreline in 2020 to attenuate waves, reduce shoreline erosion[3], and provide aquatic habitat[4]. Created using approximately 35,000 m^3 of stone of various sizes[5], the artificial reef covers an area of approximately 32,000 m^2 that is visible in Google Earth.

NbS techniques employed include riparian vegetation and buffers, coastal forests or windbreak planting, beach and dune restoration, engineered habitat structures, beach nourishment, hybrid dunes, and artificial reef, integrating the restoration of rare and sensitive ecosystems with flood and erosion risk reduction for long-term coastal resilience.

Site information:

- Coordinates: 43.615, -79.395
- Site area: ~2-ha dune restored, 1 km of shoreline[6]
- Project date: Since 2020
- Ecosystem type(s): Beach and dune
- Site context: Urban
- Proponent: Toronto and Region Conservation Authority
- Partners: Federal and provincial governments, Aquatic Habitat Toronto, City of Toronto
- Primary design intentions: Flood and erosion risk reduction, beach and dune restoration, public access

Types of NbS and hybrid solutions:

- 6. Riparian vegetation and buffers
- 7. Coastal forests or windbreak planting
- 9. Beach and dune restoration
- 20. Engineered habitat structures
- 21. Beach nourishment
- 22. Hybrid dunes
- 25. Artificial reefs

Hazard impacts that have affected this site:

Beach loss/dune destabilization
Sediment mobilization
Habitat fragmentation
Property/infrastructure risk

[1] Toronto and Region Conservation Authority. (2026). Gibraltar Point Erosion Control Project. https://trca.ca/conservation/infrastructure-projects/gibraltar-point-erosion-control-project/

[2] W.F. Baird & Associates Coastal Engineers Ltd. (2015). Draft Gibraltar Point Erosion Control Final Design. Toronto and Region Conservation Authority and City of Toronto. https://trcaca.s3.ca-central-1.amazonaws.com/app/uploads/2016/04/17164957/H.-Gibraltar-Point-Erosion-Control-Final-Design-Report-Draft-2015-08-21.pdf

[3] W.F. Baird & Associates Coastal Engineers Ltd. (2018). Gibraltar Point Erosion Control: Nearshore Reef Design Report. Toronto and Region Conservation Authority. https://trcaca.s3.ca-central-1.amazonaws.com/app/uploads/2016/04/17164958/F.-Baird-Nearshore-Reef-Technical-Design-Report-.pdf

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[5] Dibajnia, M. (2023). Nearshore reef design to control shoreline erosion at gibraltar point. In *Coastal Sediments 2023* (pp. 2059–2070). WORLD SCIENTIFIC. https://doi.org/10.1142/9789811275135_0191

[6] Toronto and Region Conservation Authority. (2024). Conservation Connections: TRCA 2023 Annual Report. https://trca.ca/2023-annual-report/

19. Tommy Thompson Park | Toronto, ON

IMAGE CREDIT: TORONTO AND REGION CONSERVATION AUTHORITY

Tommy Thompson Park is located on the Leslie Street Spit[1] on Lake Ontario, a human-made landform created out of millions of cubic metres of concrete, fill, and dredged sand[2]. Construction of the landform began in 1959, initiated by the Toronto Harbour Commissioners (now Toronto Port Authority) for use as port-related facilities. By the early 1970s, these lands were no longer required for port-related functions and have since been transformed into a popular waterfront park, monitoring and research station, Environmentally Significant Area, and globally significant Key Biodiversity Area[3].

Since 1995, TRCA has created, enhanced, and restored over 70 ha of aquatic and terrestrial habitat at the park, returning some of the habitat that have been lost along the Toronto waterfront since European settlement. A variety of NbS techniques have been used to create habitat where none existed before and support the ongoing management of the park. These include wetland creation, beach and dune restoration, riparian vegetation and buffers, invasive species management (e.g., Black Locust, cormorants[4], and invasive common carp[5]), live staking, shoreline regrading, sills, sediment capture and accretion, habitat islands or mounds, engineered habitat structures, artificial islands, hybrid breakwaters and shoals (e.g., logs and rocky shoals), and artificial reefs (e.g., underwater log piles and log tangles), integrated into a large habitat connectivity corridor and coastal park.

The primary NbS intent has centred on preserving significant species, protecting environmentally significant areas, enhancing aquatic and terrestrial habitat, while enhancing public recreational opportunities[6], creating a public urban wilderness[7] that contributes to biodiversity gain, climate adaptation, water security, and economic and social development along a highly urbanized waterfront.

Site information:

- Coordinates: 43.651, -79.3196
- Address: 1 Leslie St, Toronto,n ON M4M 3M2
- Site area: ~500 ha, ~3.6 km of shoreline
- Project date: Since the early 1970s
- Ecosystem type(s): Coastal park
- Site context: Urban
- Proponent: Toronto and Region Conservation Authority
- Partners: City of Toronto, federal and provincial governments, Aquatic Habitat Toronto, Toronto and Region Remedial Action Plan, Mississaugas of the Credit First Nation, academic partners, and others
- Primary design intentions: Habitat creation, public access, and delisting of Toronto and Region as an Area of Concern
- Recognitions: 2025 New Sustainable Cities and Human Settlements Award for Global Model of Ecological Restoration and Protection and others

Types of NbS and hybrid solutions:

- 3. Constructed or restored wetlands
- 6. Riparian vegetation and buffers
- 7. Coastal forests or windbreak planting
- 8. Invasive species control and removal
- 9. Beach and dune restoration
- 11. Bioengineering and live staking
- 12. Shoreline regrading
- 13. Sills
- 15. Sediment capture and accretion
- 16. Habitat islands or mounds
- 17. Habitat connectivity corridors
- 18. Coastal parks and greenways
- 20. Engineered habitat structures
- 23. Constructed or artificial islands
- 24. Hybrid breakwaters and shoals
- 25. Artificial reefs

Hazard impacts that have affected this site:

Beach loss/dune destabilization
Sediment mobilization
Wetland loss/function decline
Habitat fragmentation

[1] Waterfront Toronto. (2026). Tommy Thompson Park. https://www.waterfrontoronto.ca/our-projects/tommy-thompson-park

[2] Toronto and Region Conservation Authority. (2020). About Tommy Thompson Park. https://tommythompsonpark.ca/about/

[3] Toronto and Region Conservation Authority. (2024, May 2). A History of Tommy Thompson Park. https://trca.ca/news/tommy-thompson-park-history/

[4] Toronto and Region Conservation Authority. (2020). Birds of Tommy Thompson Park. https://tommythompsonpark.ca/park-species/birds/#cormorants

[5] Barnes, K., Cartwright, L., Portiss, R., Midwood, J., Boston, C., Granados, M., Sciscione, T., Gibson, C., and Obembe, O. (2020). Evaluating the effectiveness of aquatic habitat restoration implemented using the Toronto Aquatic Habitat Restoration Strategy. Toronto and Region Conservation Authority. https://trcaca.s3.ca-central-1.amazonaws.com/app/uploads/2021/01/07074413/TWAHRS-assessment-FINAL-technical-document-Nov-2020.pdf

[6] Toninger, R. (2025). 30 Years of Restoration at Tommy Thompson Park. Latornell Conservation Symposium. https://www.latornell.ca/wp-content/uploads/2025/11/30-Years-of-Restoration-at-Tommy-Thompson-Park.pdf

[7] Agard, A., Chipperfield, T., and Locke, G. (Eds.). (2000). Tommy Thompson Park: Public Urban Wilderness Habitat Creation and Enhancement Projects 1995-2000. https://tommythompsonpark.ca/app/uploads/2017/10/TTPHabitatProjects1995_2000.pdf

20. Don Mouth Naturalization | Toronto, ON

IMAGE CREDIT: CREATETO, CITY OF TORONTO

The Don River runs through one of the most urbanized areas in Canada and outlets into Lake Ontario in the southeastern section of downtown Toronto, ON[1]. For thousands of years prior to the 19th century, the Don River used to flow into the lake through one of the largest coastal marshes in the Great Lakes that has since disappeared[2]. Hundreds of years of lakefilling, industrial activity, and urbanization have resulted in the elimination of wetland and terrestrial habitats, surface and groundwater degradation, and soil contamination. Development within the lakefilled lands are vulnerable to flooding and extreme storms.

With grassroots public desires demanding improvements to the Don River Watershed (including the mouth of the Don River) dating back to 1989, collaboration between agencies, the public, Indigenous communities, and private stakeholders resulted in the completion of the new river mouth in 2025, as part of the Port Lands Flood Protection (PLFP) project[3]. This $1.4 billion project was led by Waterfront Toronto, a non-profit corporation established by the Government of Canada, Province of Ontario, and City of Toronto, representing a tri-government partnership to reduce flood risk and revitalize Toronto's waterfront. A new 1.45 km river channel (including spillway) was created, along with over 30 ha of habitat creation and enhancements.

Approximately 1.5 million m^3 of contaminated soil was removed, with approximately 71% of the soil treated and re-used as part of the project. NbS techniques employed include channel naturalization and realignment, wetland creation, floodplain reconnection, riparian vegetation and buffers, windbreak plantings, invasive species control[4], beach restoration, bioengineering (including fiber-encapsulated-soil lifts that employ biodegradable coconut-coir fabric to hold soil that are implanted with seeds), shoreline regrading, sills, sediment re-use, sediment capture, habitat connectivity corridors, engineered habitat structures, habitat and constructed islands, hybrid shoals (shallow rocky shoals and rootwad bank protection), vegetated armour, and artificial reefs (submerged log and rock habitat), integrated into a coastal park and floodable park network.

Together, this project represents one of the largest and most complex engineering projects in North America[5] and demonstrates the value of integrating NbS with flood risk reduction for enhanced resilience and economic and social development. As of 2025, 174 ha of land has been protected and unlocked for development, creating vital new public greenspaces in downtown Toronto, remediating a major brownfield site, and re-creating habitat for wildlife.

Site information:

- Coordinates: 43.65, -79.345
- Project date: Since 2017
- Ecosystem type(s): River mouth, coastal park
- Site context: Urban
- Proponent: Waterfront Toronto (Lead Proponent - Project Delivery)
- Partners: Toronto and Region Conservation Authority (Lead Proponent - Environmental Assessment), City of Toronto, CreateTO, Toronto Port Authority, federal and provincial governments, among others
- Primary design intentions: Flood risk reduction, habitat creation, waterfront revitalization, and public access
- Recognitions: 2021 Brownie Award for Best Overall Project

Types of NbS and hybrid solutions:

- 2. Channel naturalization and realignment
- 3. Constructed or restored wetlands
- 5. Floodplain reconnection
- 6. Riparian vegetation and buffers
- 7. Coastal forests/windbreak planting
- 8. Invasive species control and removal
- 9. Beach restoration (cobble beach creation)
- 11. Bioengineering and live staking
- 12. Shoreline regrading
- 13. Sills
- 14. Sediment re-use
- 15. Sediment capture and accretion
- 16. Habitat islands/mounds
- 17. Habitat connectivity corridors
- 18. Coastal parks and greenways
- 19. Floodable parks
- 20. Engineered habitat structures
- 23. Constructed/artificial islands
- 24. Hybrid breakwaters and shoals
- 25. Artificial reefs
- 26. Vegetated armour and revetments

Hazard impacts that have affected this site:

Sediment mobilization
Coastal/urban inundation
Wetland loss/function decline
Habitat fragmentation
Property/infrastructure risk

[1] Landers, J. (2023, November 9). Toronto waterfront project features naturalized river channel. Civil Engineering Source. https://www.asce.org/publications-and-news/civil-engineering-source/civil-engineering-magazine/article/2023/11/toronto-waterfront

[2] Michael Van Valkenburgh Associates Inc. (n.d.). Port Lands Flood Protection. https://www.mvvainc.com/projects/

[3] Waterfront Toronto. (2024, November 8). Flood Protection Milestone Puts New Waterfront City Within Reach. https://www.waterfrontoronto.ca/news/flood-protection-milestone-puts-new-waterfront-city-within-reach

[4] Dion, K., and Coey, B. (2025). The Dawn Of A New Don: A Naturalized Don River Mouth, City of Toronto. https://www.youtube.com/watch?v=ypDBJJuIYCg

[5] Waterfront Toronto. (2024, July 8). Waterfront Toronto Reaches Construction Milestone in the Port Lands: A Big Step Towards Reconnecting the Don River to Lake Ontario. https://www.waterfrontoronto.ca/news/waterfront-toronto-reaches-construction-milestone-in-the-port-lands-a-big-step-towards-reconnecting-the-don-river-to-lake-ontario

21. Woodbine Beach | Toronto, ON

IMAGE CREDIT: CHRISTIAN HASSE

Located between Beaches Park and Ashbridge's Bay Park[1], Woodbine Beach is located in the eastern part of the City of Toronto and offers access to 3 km of sandy shoreline[2]. On the western limit of the beach, a vegetated lakefill headland at Ashbridge's Bay Park helps trap sand moving westward from the Scarborough Bluffs, making Woodbine Beach one of the largest and most popular beaches in Toronto. The beach is also home to rare sand dunes and a unique patch of habitat (approximately 3.2 ha in size) where over a thousand species of plants and wildlife observations have been reported through iNaturalist[3].

Like many waterfront parks, Woodbine Beach was affected by the record high lake levels in 2017[4] and 2019[5]. Much of the beach was inundated, with water ponding, reducing the size of the beach. In 2017, truckloads of sand were brought to Woodbine Beach Park in an attempt to build a sand berm to prevent erosion and protect the boardwalk and lifeguard station[6]. In 2019, excess water had to be pumped off the beach[7]. Currently, Toronto and Region Conservation Authority (TRCA) is undertaking shoreline maintenance work along Ashbridges Bay Park, in partnership with the City of Toronto, which includes reinforcing the lakefill headland that will continue to support sediment buildup on the beach[8].

Following the high lake levels, invasive Phragmites control and removal was required to protect the beach and dune system[9]. Trees were planted on the southeast corner of the habitat patch in 2020. Overall, NbS techniques include invasive species control, beach restoration, habitat mound, and beach nourishment, integrated into a coastal park network. Together, these measures contribute to climate adaptation, disaster risk reduction, human health, and economic and social development of a dynamic and beloved urban beach system.

Site information:

- Coordinates: 43.664, -79.298
- Address: 1675 Lake Shore Blvd E, Toronto, ON M4L 3W6
- Site area: ~3 km of shoreline
- Project date: Since 2017
- Ecosystem type(s): Beach and dunes
- Site context: Urban
- Proponent: Toronto and Region Conservation Authority and City of Toronto
- Primary design intentions: Erosion mitigation, invasive species management, and beach recreation

Types of NbS and hybrid solutions:

- 7. Coastal forests or windbreak planting
- 8. Invasive species control and removal
- 9. Beach and dune restoration
- 15. Sediment capture and accretion
- 16. Habitat islands or mounds
- 18. Coastal parks and greenways
- 21. Beach nourishment
- 24. Hybrid breakwaters and shoals

Hazard impacts that have affected this site:

Beach loss/dune destabilization
Sediment mobilization
Coastal/urban inundation
Habitat fragmentation
Invasive species advantage
Property/infrastructure risk

[1] City of Toronto. (2009). Toronto Beaches Plan. https://www.toronto.ca/legdocs/mmis/2009/ex/bgrd/backgroundfile-18573.pdf

[2] City of Toronto. (2026). Woodbine Beach Park. https://www.toronto.ca/explore-enjoy/parks-recreation/places-spaces/parks-and-recreation-facilities/location/?id=311&title=Woodbine-Beach-Park

[3] Markus, N., and Robinson, C. (2025). Woodbine Beach, Dunes Ecosystem, Biodiversity, 2025 updated report. https://noam195.wixsite.com/west-woodbine-beach/post/woodbine-beach-dune-habitat-biodiversity-and-damage-report-summer-2022

[4] City of Toronto. (2017). Damages Sustained from Rising Lake Water Levels and Restoration Plans for Waterfront Parks. Staff Report. https://www.toronto.ca/legdocs/mmis/2017/cc/bgrd/backgroundfile-105457.pdf

[5] Hunter, P. (2019, May 19). Water levels rise on Toronto's eastern beaches. Toronto Star. https://www.thestar.com/news/gta/water-levels-rise-on-toronto-s-eastern-beaches/article_827261d4-7eea-558f-b8ae-edc946859352.html

[6] CBC News. (2017, April 12). Toronto beach floods threaten 2 historic landmarks. CBC News. https://www.cbc.ca/news/canada/toronto/toronto-ashbrides-bay-flooding-1.4067490

[7] Shackleton, A. (2019, June 25). City of Toronto pumping out 'pond' on Woodbine Beach. Beach Metro Community News. https://beachmetro.com/2019/06/25/city-of-toronto-pumping-out-pond-on-woodbine-beach/

[8] Toronto and Region Conservation Authority. (2026). Ashbridges Bay Park East Shoreline Maintenance Project. https://trca.ca/conservation/erosion-risk-management/restore/ashbridges-bay-park-east-headlands-major-maintenance-project/

[9] Bream, M.L. (2022, April 13). Hundreds of species and a precious bit of wildness get a reprieve. Toronto Star. https://www.thestar.com/life/hundreds-of-species-and-a-precious-bit-of-wildness-get-a-reprieve/article_ad7b0e8d-74d3-50ca-8a15-f232359a90c8.html

22. Bluffer's Park | Toronto, ON

IMAGE CREDIT: TORONTO AND REGION CONSERVATION AUTHORITY

Bluffer's Park is a 20-ha waterfront park[1] located on the eastern end of the City of Toronto and provides access to the base of the Scarborough Bluffs[2]. The waterfront park was developed in two phases by Metropolitan Toronto and Region Conservation Authority (now Toronto and Region Conservation Authority) as part of an $8.2 million project to provide public open space and public boat-launching facilities, which were completed in 1975 and the early 1980s, respectively.

In response to high levels of E. coli and water quality issues at Bluffer's Park Beach, TRCA and the City of Toronto completed a wetland improvement project in 2008 to redirect stormwater runoff to a dune and wetland system and increase infiltration[3]. This involved deepening the existing marsh behind the beach to increase water retention capacity, creating a dune system at the marsh edge to prevent runoff from flowing into the swimming beach, constructing a small dike at the base of the bluffs and a series of small wetlands to slow the release of stormwater runoff, and the planting of dune and wetland vegetation.

Currently, TRCA and the City of Toronto are undertaking improvements to the West Segment Shoreline as part of the broader Scarborough Waterfront Project[4]. This will involve the expansion of two headlands to promote sand retention and expansion of the beach for wildlife and recreation[5]. These will also help reduce the need for annual dredging of the harbour entrance, where dredgate is re-used on-site and placed along the east beach[6].

Overall, the NbS techniques employed at Bluffer's Park include wetland restoration and creation, riparian vegetation and buffers, beach and dune restoration, bluff stabilization, sediment re-use, sediment capture and accretion, engineered habitat structures, beach nourishment, and hybrid breakwaters and dunes, integrated into a coastal park network. These demonstrate the value of NbS for stormwater management, water quality improvement, while providing recreational opportunities and habitat for wildlife along this unique bluff-backed beach in Toronto.

Site information:

- Coordinates: 43.709, -79.232
- Site area: 20 ha
- Project date: Since 1975
- Ecosystem type(s): Bluff, beach, dunes, and wetlands
- Site context: Urban
- Proponent: Toronto and Region Conservation Authority and City of Toronto
- Primary design intentions: Water quality improvement, stormwater management, erosion mitigation, and public access

Types of NbS and hybrid solutions:

- 3. Constructed or restored wetlands
- 6. Riparian vegetation and buffers
- 7. Coastal forests or windbreak planting
- 9. Beach and dune restoration
- 10. Bluff stabilization
- 12. Shoreline regrading
- 14. Sediment re-use
- 15. Sediment capture and accretion
- 18. Coastal parks and greenways
- 20. Engineered habitat structures
- 21. Beach nourishment
- 22. Hybrid dunes
- 24. Hybrid breakwaters and shoals

Hazard impacts that have affected this site:

Bluff retreat/structural undermining
Sediment mobilization
Coastal/urban inundation
Turbidity increase/water quality impairment

[1] Toronto and Region Conservation Authority. (2026). Watershed Features – Lake Ontario Waterfront. https://trca.ca/conservation/watershed-management/lake-ontario-waterfront/features/

[2] City of Toronto. (2026). Bluffer's Park and Beach. https://www.toronto.ca/explore-enjoy/parks-recreation/places-spaces/parks-and-recreation-facilities/location/?id=2&title=Bluffer%27s-Park-and-Beach

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[4] Toronto and Region Conservation Authority. (2026). Scarborough Waterfront Project: Detailed Design. https://trca.ca/conservation/infrastructure-projects/scarborough-waterfront-project/detailed-design/

[5] Baker, S., Pinchin, B., and Sturm, M. (2025). Physical modelling studies for the Scarborough waterfront project. Proceedings of the 38th Conference on Coastal Engineering, Rome, Italy, 2024. https://publications-cnrc.canada.ca/eng/view/ft/?id=18ac50d1-884a-40a4-a7fa-6b06e192db11

[6] Toronto and Region Conservation Authority. (2018). Bluffer's Park Channel Dredging. Staff Report. https://pub-trca.escribemeetings.com/filestream.ashx?DocumentId=2848

23. Frenchman's Bay (South Shore) | Pickering, ON

IMAGE CREDIT: TORONTO AND REGION CONSERVATION AUTHORITY

Frenchman's Bay spans 47 ha and includes two Provincially Significant Wetlands (Frenchman's Bay Coastal Wetland Complex and Hydro Marsh)[1] in the City of Pickering to the south of Highway 401. Frenchman's Bay is a barrier beach lagoon with a permanent connection to Lake Ontario through the harbour entrance channel.

The Frenchman's Bay Harbour Entrance Class Environmental Assessment (EA) was completed in 2009[2], which sought to improve the safety and navigability of the harbour entrance, while enhancing the ecological conditions of the Bay and its wetlands. With grant funding from the federal and provincial governments and funding contributions from York Region and the City, the $9-million Harbour Entrance Reconstruction project was carried out between 2013 and 2014[3]. To compensate for the harmful alteration, disruption, or destruction of fish habitat associated with this reconstruction, shoreline habitat improvements were incorporated. NbS techniques include the beneficial re-use of 19,000 m^3 of sand dredged from the channel to restore original dune habitat on the east and west spits; the planting of dune vegetation, trees, shrubs, and emergent vegetation; and the addition of structural habitat features (e.g., log tangles, rootwads) and habitat mounds (e.g., pockets of course sand and pea gravel).

Between 2016 and 2023, enhancements were made to Rotary Frenchman's Bay West Park over two phases[4] – a coastal park located to the west of the harbour entrance. Phase 1 was completed in 2019 and NbS techniques included the installation of bioswales, the removal of hazardous and invasive tree species, and the replanting of more than 800 new shrubs and more than 10,000 plants. Phase 2 was completed in 2023 and included dune restoration, the planting of trees and shrubs, and the installation of bat boxes[5].

These efforts demonstrate the value of integrating nature-based approaches, balancing economic development and environmental protection through habitat enhancements, while enhancing recreation opportunities, access to nature, and shoreline stabilization.

Site information:

- Coordinates: 43.81257626625767, -79.08491574169821
- Site area: 47 ha (Frenchman's Bay); approximately 2 km of shoreline (from Rotary Frenchman's Bay West Park to Beachfront Park)
- Project date: Since 2008 (Class Environmental Assessment)
- Ecosystem type(s): Coastal wetland
- Site context: Urban
- Proponents: City of Pickering
- Partners: Toronto and Region Conservation Authority
- Primary design intentions: Habitat compensation, environmental preservation/enhancement, and enhanced waterfront recreational uses
- Recognitions: Provincially Significant Wetlands

Types of NbS and hybrid solutions:

- 6. Riparian vegetation and buffers
- 8. Invasive species control and removal
- 9. Beach and dune restoration
- 14. Sediment re-use
- 16. Habitat islands or mounds
- 18. Coastal parks and greenways
- 20. Engineered habitat structures

Hazard impacts that have affected this site:

Habitat fragmentation
Invasive species spread

[1] Beacon Environmental Ltd. (2020). 591 Liverpool Road, City of Pickering Environmental Impact Study. Prepared for Pickering Harbour Company Ltd. https://www.pickering.ca/media/4gibfy31/eis_591-liverpool-rd-revised.pdf

[2] City of Pickering. (2012). Frenchman's Bay Harbour Entrance Reconstruction. Special Council Meeting. CS 38-12. https://corporate.pickering.ca/WebLink/DocView.aspx?id=124615&dbid=1&repo=PICKERING&cr=1

[3] Calis, K. (2015, August 17). Entrance to Pickering's Frenchman's Bay inviting to boaters after big makeover. Pickering News Advertiser. https://www.durhamregion.com/news/entrance-to-pickering-s-frenchman-s-bay-inviting-to-boaters-after-big-makeover/article_d6af7995-73fa-5cd4-80e6-2b6c0545108b.html

[4] The MBTW Group. (n.d.). Rotary Frenchman's Bay West Park. https://www.mbtw.com/design-portfolio/rotary-frenchmans-bay-west-park-pickering-ontario

[5] City of Pickering. (2023). 2023 Sustainable Pickering: Year-in-Review. https://www.pickering.ca/media/yachr1vk/2023-sustainable-pickering-year-in-review.pdf

24. Lynde Creek Marsh | Whitby, ON

IMAGE CREDIT: CENTRAL LAKE ONTARIO CONSERVATION AUTHORITY

Lynde Creek Marsh is a 157-ha barrier beach coastal wetland found in the Lynde Shores Conservation Area in Whitby, ON[1]. It is one of two Provincially Significant Wetlands that make up the 272-ha conservation area that is owned and operated by Central Lake Ontario Conservation Authority (CLOCA)[2]. In 2021, a new 1.4-ha wetland was added south of Victoria Street to compensate for the loss of wetland habitat from the widening of Victoria Street, which bisects the wetland[3]. This project also involved the expansion of the Eastern Pond Mussel habitat and the construction of two new wildlife crossing culverts[4]. These new crossings have helped to support wildlife movement and reduce road mortality of amphibians, turtles, and other wildlife[5].

With over $2 million in grant funding from the Canada Water Agency, interspersion (i.e., the mix and arrangement of different habitat types) has been restored within the marsh as of 2025 to re-balance vegetation and open water areas among dense stands of *Typha Glauca* (hybrid cattail). The primary NbS intent was to restore and create new habitats, improve water quality, support biodiversity, and build climate resilience. Through this grant, two new wetlands are being created – one on the west side of the interspersion restoration, with connection to the interspersion, and another below the 1.4-ha wetland constructed in 2021.

NbS techniques employed include wetland restoration and creation, riparian vegetation and buffers, invasive species control, barrier beach restoration, and habitat connectivity corridors. Consistent with the IUCN NbS framework, the project delivers co-benefits across climate adaptation, disaster risk reduction, biodiversity gain, and water security within one of the few remaining coastal wetlands in the Western Lake Ontario basin. Together with the identification of climate resilient protective wetland features at Cranberry Marsh, these efforts form part of the broader Lynde Shores Restoration and Resilience Plan.

Site information:

- Coordinates: 43.857708, -78.963870
- Site area: 157 ha (part of the overall 312 ha Lynde Shores Conservation Area)
- Project date: Since 2021
- Ecosystem type(s): Coastal wetland
- Site context: Peri-urban
- Proponents: Central Lake Ontario Conservation Authority
- Partners: Canada Water Agency, Ducks Unlimited, Town of Whitby, Ontario Power Generation, Toronto and Region Conservation Authority, SJL Engineering, Zuzek Inc., Alderville First Nation, Curve Lake First Nation, Hiawatha First Nation, Mississauga of Scugog Island First Nation
- Primary design intentions: Habitat restoration and creation, water quality improvement, and enhanced biodiversity and climate resilience
- Recognitions: Provincially Significant Wetland

Types of NbS and hybrid solutions:

- 3. Constructed or restored wetlands
- 6. Riparian vegetation and buffers
- 8. Invasive species control and removal
- 9. Beach restoration (barrier beach)
- 17. Habitat connectivity corridors
- 18. Coastal parks and greenways

Hazard impacts that have affected this site:

- Beach loss/dune destabilization
- Sediment mobilization
- Coastal/urban inundation
- Wetland loss/function decline
- Habitat fragmentation
- Invasive species spread
- Turbidity increase/water quality impairment

[1] Central Lake Ontario Conservation Authority. (2026). Watershed Management: Lynde Shores Conservation Area Restoration and Resilience Plan. https://www.cloca.com/lynde-shores-restoration

[2] Central Lake Ontario Conservation Authority. (2026). Conservation Areas: Lynde Shores. https://www.cloca.com/lynde-shores

[3] ConstructConnect. (2016, August 31). Durham embarks on 'environmentally complex' road project. Daily Commercial News by ConstructConnect. https://canada.constructconnect.com/dcn/news/infrastructure/2016/08/durham-embarks-on-environmentally-complex-road-project-1018165w

[4] Parashar, O. (2022, July 13). Durham's works department achieved two awards for excellence in its projects. Oshawa This Week. https://www.durhamregion.com/news/durhams-works-department-achieved-two-awards-for-excellence-in-its-projects/article_035b6bbe-364a-5cb0-8959-a28244affdca.html

[5] Central Lake Ontario Conservation Authority. (2022). Wildlife Corridor Protection and Enhancement Plan. Second Edition. Action Plan No. 5. https://ero.ontario.ca/public/public_uploads/2022-04/Wildlife%20Corridor%20Protection%20and%20Enhancement%20Plan%2C%202nd%20Edition%202022.pdf

25. Second Marsh | Oshawa, ON

IMAGE CREDIT: CENTRAL LAKE ONTARIO CONSERVATION AUTHORITY

Second Marsh is a 137-hectare provincially significant coastal wetland located in southeast Oshawa, ON, near the McLaughlin Bay Wildlife Reserve and Darlington Provincial Park[1]. The marsh is managed by the Second Marsh Management Committee, which is comprised of Friends of Second Marsh, the City of Oshawa, Ducks Unlimited Canada, and Central Lake Ontario Conservation Authority (CLOCA)[2].

With baseline studies dating to 1983 and a management plan established in 1992, the site has undergone two phases of restoration targeting wetland loss, beach loss, habitat fragmentation, invasive species encroachment, sediment mobilization, and turbidity. Key techniques include wetland restoration, invasive species control, and habitat connectivity enhancement via a fish gate[3].

Funded through a diverse mix of sources such as the Great Lakes Local Action Fund, Durham Community Foundation, and corporate partners, these initiatives meet IUCN NbS criteria by delivering co-benefits across climate adaptation, biodiversity, water security, and human health, with adaptive management guiding its long-term stewardship of one of Lake Ontario's largest remaining coastal wetland complexes.

With recent grant funding from the Canada Water Agency, further improvements are anticipated between 2026-2029 to enhance the health and resilience of the marsh[4], including 475 m of new interspersion, bathymetry improvements, hydrological connectivity restoration, and invasive Phragmites removal[5].

Site information:

- Coordinates: 43.87366551904267, -78.81179778960151
- Site area: 137 ha, ~1 km of shoreline
- Project date: Since 1992, with baseline study completed in 1983 and management plan established in 1992
- Ecosystem type(s): Coastal wetland
- Site context: Urban
- Proponent: Central Lake Ontario Conservation Authority
- Partners (historical and current): City of Oshawa, Friends of Second Marsh, Ducks Unlimited Canada, federal and provincial governments, Hamilton Oshawa Port Authority, Ontario Power Generation, Alderville First Nations, MIssissaugas of Scugog Island First Nations, Curve Lake First Nations, Hiawatha First Nations
- Primary design intentions: (Historical) improve conditions within the marsh; (Current) enhanced climate resilience, water quality improvement, bathymetry restoration, interspersion creation, biodiversity enhancement
- Recognitions: Provincially Significant Wetland

Types of NbS and hybrid solutions:

- 3. Constructed or restored wetlands
- 8. Invasive species control and removal
- 17. Habitat connectivity corridors

Hazard impacts that have affected this site:

Beach loss/dune destabilization
Sediment mobilization
Wetland loss/function decline
Habitat fragmentation
Invasive species spread
Turbidity increase/water quality impairment

[1] Friends of Second Marsh. (n.d.). Connecting People with Nature. https://www.secondmarsh.ca/

[2] Martindale Planning Services Heritage Consultants. (2020). Second Marsh Heritage Research Report. City of Oshawa. https://www.oshawa.ca/media/rxmcivs2/heritage-research-rpt-second-marsh-main-report.pdf

[3] Central Lake Ontario Conservation Authority. (2020). 2020 Black/Harmony/Farewell Creek 2020 Watershed Plan Update. https://9a6a6f87-f995-42f9-a3ea-9cabaaccee15.filesusr.com/ugd/6cdd05_7ea9effa56754127b6d42249a1d06c85.pdf

[4] Central Lake Ontario Conservation Authority. (2026, January 13). CLOCA receives $1.6M in federal funding for Improving Climate Resiliency of Oshawa Second Marsh. https://www.cloca.com/post/cloca-receives-1-6m-in-federal-funding-for-improving-climate-resiliency-of-oshawa-second-marsh

[5] Moore, D. (2025). Improving the Climate Resiliency of Oshawa Second Marsh. Waves of Progress: Protecting and Restoring Critically Important Great Lakes Coastal Areas. https://trcaca.s3.ca-central-1.amazonaws.com/app/uploads/2025/11/18154502/GLFEI-Coastal-Areas-Webinar-Slides.pdf

26. McLaughlin Bay Marsh | Oshawa, ON

IMAGE CREDIT: CENTRAL LAKE ONTARIO CONSERVATION AUTHORITY

McLaughlin Bay Marsh is a 44-ha[1] Provincially Significant Wetland located in the McLaughlin Bay Wildlife Reserve in southeast Oshawa, ON, near Second Marsh and Darlington Provincial Park. The marsh is separated from Lake Ontario by a barrier beach and has been plagued by habitat degradation and declining water quality, driven by increased loads of road salt and sediments from surrounding areas[2]. A restoration strategy was developed by Central Lake Ontario Conservation Authority (CLOCA) in partnership with Durham Region and Conservation Ontario in 2013[3].

Since then, various restoration and habitat enhancement initiatives have been completed, including restoration of parts of the shoreline in the northeast corner of the bay, riparian vegetation planting, invasive species control[4], and installation of engineered habitat structures (including fish cribs)[5].

Funded through a combination of provincial, federal, and Great Lakes-specific programs, these actions align with the IUCN Global Standard for NbS by delivering co-benefits across climate adaptation, biodiversity gain, water security, while supporting adaptive management within an ecologically significant Great Lakes coastal wetland.

Site information:

- Coordinates: 43.869444, -78.794722
- Address: 1908 Colonel Sam Dr, Oshawa, ON L1H 8P7
- Site area: 44 ha wetland; 1.3 km of shoreline
- Project date: Darlington Provincial Park was established in 1959, with wetland restoration spanning 2010-2021
- Ecosystem type(s): Coastal wetland
- Site context: Peri-urban
- Proponent: Central Lake Ontario Conservation Authority
- Partners: Federal and provincial governments, Ontario Parks, Friends of Second Marsh
- Primary design intentions: Wetland restoration, invasive species management, water quality improvement, and biodiversity enhancement
- Recognitions: Provincially Significant Wetland

Types of NbS and hybrid solutions:

- 3. Constructed or restored wetlands
- 6. Riparian vegetation and buffers
- 8. Invasive species control and removal
- 9. Beach restoration (barrier beach)
- 15. Sediment capture and accretion
- 18. Coastal parks and greenways
- 20. Engineered habitat structures
- 21. Beach nourishment

Hazard impacts that have affected this site:

Beach loss/dune destabilization
Sediment mobilization
Wetland loss/function decline
Invasive species spread
Property/infrastructure risk

[1] Hoskin, G. N., Thienpont, J. R., Ha Phuong Do, P., Coleman, K. A., & Korosi, J. B. (2024). Influence of barrier beach dynamics on ecological indicator taxa in north-central Lake Ontario coastal wetlands. *Journal of Great Lakes Research*, *50*(6), 102437. https://doi.org/10.1016/j.jglr.2024.102437

[2] Wittnebel, J. (2016, October 5). Coming to the rescue of McLaughlin Bay. The Oshawa Express. https://oshawaexpress.ca/coming-to-the-rescue-of-mclaughlin-bay/

[3] Central Lake Ontario Conservation Authority, Durham Region, and Conservation Ontario. (2013). McLaughlin Bay Restoration Strategy. https://9a6a6f87-f995-42f9-a3ea-9cabaaccee15.filesusr.com/ugd/b3995f_ad406d2be10f49369829faa77b3a711e.pdf

[4] Hendry, G. (2022, October 17). Province gifts Friends of Second Marsh $34,000 to "De-Phrag" Oshawa's McLaughlin Bay. INdurham. https://durham.insauga.com/province-gifts-friends-of-second-marsh-34000-to-de-phrag-oshawas-mclaughlin-bay/

[5] Ontario Parks. (2021, September 22). Darlington's daring wetland restoration. https://blog.ontarioparks.ca/darlington-wetland-restoration/

27. Bowmanville Westside Marshes | Clarington, ON

IMAGE CREDIT: CENTRAL LAKE ONTARIO CONSERVATION AUTHORITY

Bowmanville Marsh and Westside Marsh are Provincially Significant Wetlands[1] found in the Bowmanville Westside Marshes Conservation Area near Port Darlington in Clarington, ON. Opened in 2006, the conservation area is owned and managed by Central Lake Ontario Conservation Authority (CLOCA). Since then, aquatic habitat structures have been added at Bowmanville Marsh. Meanwhile, NbS interventions at Westside Marsh have focused on channel naturalization, floodplain reconnection, invasive species removal, and riparian plantings. While the total wetland area of Westside Marsh was reduced due to the expansion of the adjacent limestone quarry, the restoration measures have helped to improve the number of aquatic macroinvertebrates and Yellow Perch and decrease turbidity[2].

These measures work together to address environmental degradation and biodiversity loss within a heavily modified peri-urban landscape with active aggregate mining operations. Reconnected floodplain areas improve stormwater attenuation and nutrient retention, while habitat enhancements increase structural complexity for fish and wildlife, leading to overall improvements in wetland condition and function.

Site information:

- Coordinates: 43.8917059752564, -78.6695971469122
- Address: 180 West Beach Rd, Bowmanville, ON L1C 6V1
- Site area: 80 ha; no direct shoreline
- Project date: 2000-2019
- Ecosystem type(s): Coastal wetland
- Site context: Peri-urban
- Proponent: Central Lake Ontario Conservation Authority
- Partner: Municipality of Clarington
- Primary design intentions: Improvements in wetland condition and function, habitat creation, and invasive species management
- Site constraints or challenges: Land was obtained from the cement works; proximity of private residential properties along barrier beach; road crossings (roads encircling the marsh)
- Recognition: Provincially Significant Wetlands

Types of NbS and hybrid solutions:

- 2. Channel naturalization and realignment
- 5. Floodplain reconnection
- 6. Riparian vegetation and buffers
- 8. Invasive species control and removal
- 18. Coastal parks and greenways
- 20. Engineered habitat structures

Hazard impacts that have affected this site:

Beach loss/dune destabilization
Sediment mobilization
Coastal/urban inundation
Wetland loss/function decline
Invasive species spread
Turbidity increase/water quality impairment

[1] Ontario Trails Council. (2026). Bowmanville Westside Marshes Conservation Area. https://www.ontariotrails.on.ca/trail/bowmaville-westside-marshes-conservation-area

[2] Environment Canada. (2011). Durham Region Coastal Wetlands: Monitoring a Changing Environment. https://publications.gc.ca/collections/collection_2012/ec/En164-23-2011-eng.pdf

28. Wilmot Creek Marsh | Clarington, ON

IMAGE CREDIT: GANARASKA REGION CONSERVATION AUTHORITY

Wilmot Creek Marsh is a 26-ha provincially significant coastal wetland[1] located in the 77-ha Samuel Wilmot Nature Area in Clarington, ON[2]. Managed by an advisory committee appointed by the Municipality of Clarington[3], the nature-based approach centres on restoring and maintaining a functioning coastal wetland–riparian system along Lake Ontario[4]. These combine riparian buffer enhancement, invasive species removal, and habitat connectivity improvements to stabilize eroding shoreline and creek margins, while strengthening marsh and swamp vegetation structure.

By reinforcing native plant communities and reconnecting ecological corridors, these measures increase bank stability, reduce sediment mobilization, and improve water quality through natural filtration and nutrient uptake[5]. By working with hydrological and geomorphic processes rather than against them, this allows the wetland to attenuate wave energy, accommodate fluctuating lake levels, and sustain fish and wildlife habitat. The result is a resilient coastal wetland complex that addresses erosion and habitat fragmentation, while maintaining long-term ecological integrity through adaptive, community-supported stewardship.

Site information:

- Coordinates: 43.89612349152629, -78.59644308359819
- Address: 0A6 Waterfront Trail, Newcastle, ON L3R 2J5
- Site area: 77 ha, ~320 m of shoreline
- Project date: Since 1997
- Ecosystem type(s): Coastal wetland
- Site context: Peri-urban
- Proponents: Municipality of Clarington
- Primary design intentions: Ecological conservation and restoration
- Recognitions: Provincially Significant Wetland

Types of NbS and hybrid solutions:

- 6. Riparian vegetation and buffers
- 8. Invasive species control and removal
- 17. Habitat connectivity corridors
- 18. Coastal parks and greenways

Hazard impacts that have affected this site:

Beach loss/dune destabilization
Sediment mobilization
Invasive species spread
Turbidity increase/water quality impairment

[1] Ganaraska Region Conservation Authority. (2009). Wilmot Creek Background Report: Abiotic, Biotic and Cultural Features. https://grca.on.ca/wp-content/uploads/2023/10/Wilmot-Creek-Background-Report.pdf

[2] Ontario Nature Trails. (2022, March 22). Samuel Wilmot Nature Area. https://ontarionaturetrails.com/trail/samuel-wilmot-nature-area/

[3] Durham Newsroom. (2014, August 30). Samuel Wilmot Nature Area in Newcastle offers an escape from urban life. Clarington This Week. DurhamRegion.com. https://www.durhamregion.com/life/samuel-wilmot-nature-area-in-newcastle-offers-an-escape-from-urban-life/article_8541929a-4ccf-5a6b-a5b8-42aaf4a1d9ad.html

[4] Taylor, H. (Ed.). (1997). Newcastle Village & District Historical Society. Newsletter, June-July 1997. https://newcastlehistorical.ca/wp-content/uploads/2022/08/058-NVDHS-Newsletter-Summer-1997.pdf

[5] Samuel Wilmot Nature Area. (n.d.). https://www.clarington.net/media/3dsapuwa/swnamac-presentation-aoda.pdf

29. Wesleyville Marsh | Port Hope, ON

IMAGE CREDIT: ONTARIO POWER GENERATION

Ontario Power Generation's (OPG's) Wesleyville property is located in Port Hope, ON, on the north shore of Lake Ontario[1]. Active conservation and restoration activities have been ongoing in and around the property for over 20 years[2], including restoration of Wesleyville Creek for brook trout, monitoring and research at Wesleyville coastal marsh, installation of engineered habitat structures (nesting boxes and osprey platform)[3], and implementation of a sea lamprey barrier on Wesleyville Creek[4].

In the Wesleyville area, nature-based solutions have centred on the restoration of a pristine coldwater stream[5], maintaining wetland functions, improving water quality, invasive species management, and supporting biodiversity. Dilapidated culverts were removed to restore natural stream flow and enable native brook trout to move freely up and downstream. By restoring river connections and enhancing wildlife habitat, this approach supports climate adaptation, biodiversity, and water security.

Site information:

- Coordinates: 43.91882746191288, -78.4025321892828
- Project date: Since 1998
- Ecosystem type(s): Coastal wetland
- Site context: Rural
- Proponents: Ontario Power Generation
- Partners: Ganaraska Region Conservation Authority, Willow Beach Field Naturalists, Northumberland Land Trust, Municipality of Port hope, Hydro One, Cameco Corp
- Primary design intentions: River reconnection, habitat connectivity
- Recognitions: Gold Certification by the Wildlife Habitat Council (WHC), Ontario Nature Corporate Award, Provincially Significant Wetland, Life Science ANSI

Types of NbS and hybrid solutions:

- 1. Reconnected rivers and streams
- 8. Invasive species control and removal
- 17. Habitat connectivity corridors
- 18. Coastal parks and greenways
- 20. Engineered habitat structures

Hazard impacts that have affected this site:

Habitat fragmentation
Invasive species spread

[1] Ontario Power Generation Inc. (2026). Wesleyville. https://www.opg.com/projects-services/projects/new-generation-opportunities/wesleyville/

[2] Ontario Power Generation Inc. (2019, September 17). Our Stories: OPG's Wesleyville site certified Gold by Wildlife Habitat Council. https://www.opg.com/stories/opgs-wesleyville-site-certified-gold-by-wildlife-habitat-council/

[3] Ontario Nature. (2021, June 7). Conservation Leaders in Ontario Recognized for their Work Protecting Nature. https://ontarionature.org/news-release/2020-conservation-award-recipients-celebrated/

[4] Ontario Power Generation Inc. (2026). Ontario Power Generation New Nuclear at Wesleyville in Port Hope. Initial Project Description. https://iaac-aeic.gc.ca/050/documents/p89802/162725E.pdf

[5] McKenna, G. (2021). Consultation on Growing the Size of the Greenbelt. ERO – 019-3196. Wesleyville Joint Working Group. https://ero.ontario.ca/public/public_uploads/2021-04/Case%20for%20Wesleyville%20inclusion%20in%20Greenbelt%20Rev%2014April21.pdf

30. Victoria Beach | Cobourg, ON

IMAGE CREDIT: NORTHUMBERLAND TOURISM

Cobourg Harbour is dredged each year to remove excess sediment and maintain adequate depths for boaters and recreational users[1]. In 2010, approximately 5000 m^3 of dredged sand was relocated to Victoria Beach[2] on the east side of the harbour, which has been impacted by high water levels[3]. This serves as a nature-based solution by working with natural coastal processes to maintain and enhance the beach environment.

Instead of disposing dredged sediment as waste, the material was strategically placed along the shoreline where wave action and littoral drift can redistribute it, reinforcing the beach against erosion and high water levels. This approach increases the width and elevation of the sand beach, which helps dissipate wave energy, build habitat for coastal flora and fauna, and support recreational uses without relying solely on hard infrastructure.

By reusing sediment in this way, this practice leverages natural geomorphic dynamics to sustain the shoreline, reduce erosion risk, and contribute to the resilience of the coastal system.

Site information:

- Coordinates: 43.95710056533504, -78.16292648650617
- Address: 750 D'Arcy St, Cobourg, ON K9A 4B4
- Project date: 2010
- Ecosystem type(s): Beach
- Site context: Urban
- Proponent: Town of Cobourg
- Primary design intentions: Beach nourishment

Types of NbS and hybrid solutions:

- 9. Beach restoration
- 12. Shoreline regrading
- 14. Sediment re-use
- 21. Beach nourishment

Hazard impacts that have affected this site:

Beach loss/dune destabilization

Sediment mobilization

[1] Town of Cobourg. (2025, March 28). Annual Dredging Operations Underway at Cobourg Harbour. https://www.cobourg.ca/news/posts/annual-dredging-operations-underway-at-cobourg-harbour/

[2] IMS Dredges. (2010, April 30). Sand Dredged from Cobourg Harbour Will be Moved to Victoria Beach (Canada). https://www.imsdredge.com/sand-dredged-from-cobourg-harbour-will-be-moved-to-victoria-beach-canada/

[3] Town of Cobourg. (2020). 2021 Budget Presentation: Community Services Division. https://www.cobourg.ca/media/t1ej0cob/2021-budget-presentation-community-services.pdf