

2020 Marsh Status

Plant Species

Emergent Species

American Bulrush
Blueflag Iris
Broad-leaved Cattail
Broad-leaved Arrowhead
Common Reed
Lakebank Sedge
Giant Burreed
Hardstem Bulrush
Narrow-leaved Cattail
Narrow-leaved Arrowhead
Pickerel Weed
River Bulrush
Prairie Cordgrass
Softstem Bulrush
Southern Wild Rice
Sweetflag
Water Arum
Watercress
Water Plantain
Water Smartweed
Water Willow
Yellow Iris

Submergent Species

Brittle Naiad
Common Bladderwort
Canada Waterweed
Coontail
Curly-leaved Pondweed
Eurasian Milfoil
Flat stemmed Pondweed
Floating-leaved Pondweed
Horned Pondweed
Leafy Pondweed
Long-leaf Pondweed
Sago Pondweed

Floating Leaf

Greater Duckweed
Lesser Duckweed
Star Duckweed
White Water lily
Yellow Water Lily



Quick Facts

Two Wetland Systems, Cootes Paradise and Grindstone Marsh

Total Wetland Area: 410 hectares

Total Shoreline: ~30km

Most Common Species

Sago Pondweed

Amphibian: Green Frog

Fish: Gizzard Shad

Bird: Red-winged Blackbird

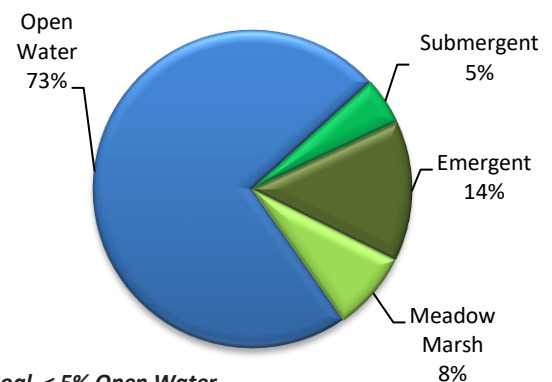
Wetland Restoration Progress

By 1990 virtually all submergent and emergent plants were lost from Cootes Paradise and Grindstone Marsh, the water was hypereutrophic and muddy and the ecosystems had collapsed with past attempts of Common Carp management abandoned. A century of inflowing sewage, watershed erosion and invasive species had destroyed the two coastal marshes of the Royal Botanical Gardens Nature Reserves. Under the Great Lakes Water Quality Agreement cleanup (started 1985) that includes these wetlands is occurring. The waters are still degraded but are gradually improving. The first onsite project was implemented in 1994 in Grindstone Marsh, Most projects occur upstream of RBG.

2020 found further decreased plant area with only pockets of restored habitat and clear water found in each wetland. Wetland vegetation area in 1990 was 38 hectares (mostly meadow marsh) and was 86 hectares in 2020. Water quality trends during the past 5 years are negative, impacted by sewage spills and increasing upstream urbanization. Average water quality is still degraded and highly eutrophic during the summer months. With the

habitat declining, fish and wildlife are also in decline. Fishway spawning runs from Lake Ontario in 1997 totaled 3,199 fish and 18 species, while in 2020 totaled 9,511 fish and 18 species. All fish populations remain well below historical levels (once in the 100,000s). Common Carp densities in 2020 continued the general trend of decline. Major water quality projects still to complete are; upgrade or relocation of the Dundas WasteWater Treatment Plant, trackdown/repair of other urban sewage sources, capture and control of multiple sewer overflow points, and improved urban runoff conditions following rain events.

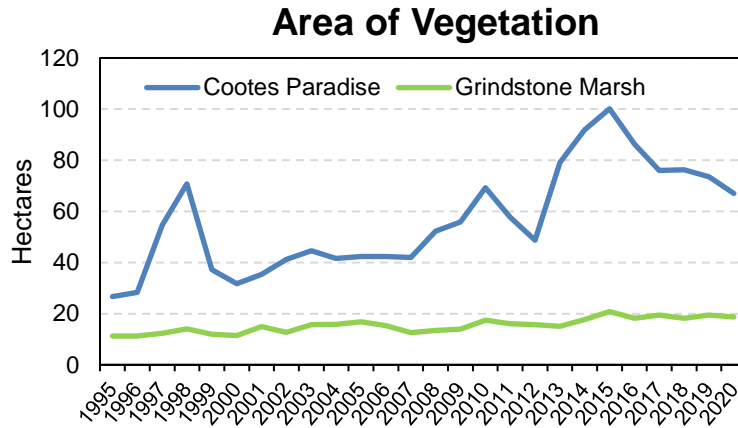
2020 Wetland Habitat Areas



Goal < 5% Open Water
2020 Water Clarity – Avg 33 cm

Marsh Vegetation Trends

In a healthy marsh, water level fluctuations create the pattern of submergent and emergent plants. However, in Cootes Paradise Marsh until 1997 and carp exclusion via the Fishway at the marsh outlet, only the occasional submergent plant remained and emergent plants were reduced to above the average summer water line. Grindstone Marsh was only in slightly better condition, with submergent plants and water lily patches found only in the outer marsh (Carroll's Bay). Cootes Paradise Marsh submergent plants have been increasing since 1997, although extensive rafts of algae still overwhelm these plants due to an overload of nutrient inflow. Currently 12 species are found and 20 hectares of submergent plants have returned. The common species change over the season. In spring a pondweed



(*Potamogeton foliosus*), is dominant, while later in the season it is replaced by Brittle Naiad (*Najas minor*). White water lily (*Nymphaea odorata*) had been increasing annually, but in 2020 suffered further declines and now cover less than 1% of the marsh. Recovery continues to be assisted by plantings, as is Wild Rice (*Zizania aquatica*) a species once totally lost. Substantial localized patches occurred in the sheltered pond areas in 2020. In the effective carp exclusion areas of

Grindstone Marsh submergent plants fill the wetland areas. White Water Lily dominates, with 14 plant species present. In 2020 several restoration areas were flooded and impaired by carp. In Carroll's Bay were carp are not excluded all but small patches of yellow water lily (*Nuphar variegatum*) have been lost. Throughout the marsh system emergent plants now increase annually, dominated by cattails (*Typha sp.*). Phragmites a once abundant invasive plant essentially eliminated.

Remedial Action Plan

The Remedial Action Plan (RAP) is a plan to delist Hamilton Harbour from a list of 43 Areas of Concern (AOCs). Hamilton was designated as an AOC in 1987 under the Canada-United States Great Lakes Water Quality Agreement. This promotes bi-national consultation and cooperative action to restore, protect, and enhance the water quality of the Great Lakes Basin. The GLWQA recognizes the importance of the Great Lakes to the social, environmental health and economic livelihood of both countries. In order to address issues facing the Great Lakes, the partners work to find solutions to past damages and limit future threats to the waterways. Through recognizing the entirety of the ecosystem, actions can be undertaken sustainably. Work on defining the "State of the Harbour" was first initiated in 1985, and remedial action was initiated in 1992. Locally the Bay Area Implementation Team (BAIT), a group of 15 area agencies reviews information and directs the remedial actions in five year work plans. Completion dates for all actions is undetermined.

Wetland Recovery Targets and Status

Measure	Location	Objective	1995 Averages	2020 Averages
Vegetated Area	Cootes Paradise	230 ha	26.59 ha	67 ha
	Grindstone Marsh	40 ha	11.26 ha	18 ha
Water Clarity	Cootes Paradise	> 100 cm	< 30 cm	32 cm
	Grindstone Marsh			35 cm
Total Phosphorus	Cootes Paradise	< 30 µg/L	270 µg/L	145 µg/L
	Grindstone Marsh			148 µg/L
Total Suspended Sediment	Cootes Paradise	< 25 mg/L	65 mg/L	41 mg/L
	Grindstone Marsh			27 mg/L
E. coli	Cootes Paradise	< 200 coliforms/100 mL	> 10,000 coliforms/100 mL	17/100 mL
	Grindstone Marsh			64/100 mL
Water Cycle	Cootes Paradise	Natural Pattern	Plan 2014	Plan 2014
	Grindstone Marsh			Flooding deviations
Carp Density	Cootes Paradise	< 20 kg/ha	800 kg/ha	30 kg/ha
	Grindstone Marsh			20-150 kg/ha