

Checklist of Warmwater Fishes of Toronto

Fish Status: (N) Native (I) Introduced or Invasive (XP) Extirpated

Fish Statistics: (Average Ontario Length, Record Ontario Length, Maximum Age)

Common Name	Status	Comments
North American Catfishes		
<input type="checkbox"/> Black Bullhead (15.5 cm, 26.0 cm, 10 yrs)	N	The Black Bullhead was documented in Toronto in 1927, but has not been recorded since. Black Bullhead and Brown Bullhead are difficult to distinguish and it is possible that the fish was misidentified.
<input type="checkbox"/> Brown Bullhead (28.0 cm, 44.6 cm, 12 yrs)	N	The Brown Bullhead is Toronto's most common catfish. The eight fleshy "whiskers" or barbels around the head of the bullhead are filled with taste buds that allow it to taste its food before it eats it.
<input type="checkbox"/> Channel Catfish (44.5 cm, 88.9 cm, 16 yrs)	N	Canada's largest catfish, this species is sometimes sought by anglers. It is the only catfish in Toronto with a forked tail. This tail and its more streamlined body adapt it for life in swifter waters. Its species name, <i>punctatus</i> , refers to the scattered dark spots on the body.
<input type="checkbox"/> Stonecat (17.5 cm, 26.7 cm, 7 yrs)	N	The largest madtom in Canada. Madtoms are small catfishes that have their adipose fin fused to their tail fin. It is usually found under stones in fast-flowing segments of streams throughout Toronto. Its fin spines can deliver a painful venomous sting if handled carelessly.
<input type="checkbox"/> Tadpole Madtom (7.0 cm, 11.7 cm, 3 yrs)	N	The Tadpole Madtom resembles a tadpole. Like most madtoms, its spines are venomous and, when it stabs, can cause pain similar to a bee sting for up to two hours.
Pikes		
<input type="checkbox"/> Muskellunge (96.5 cm, 147.3 cm, 30 yrs)	N, XP	The Muskellunge began to decline in the Toronto Harbour and area in the 1840s from commercial and subsistence fishing. By 1854, stocks had collapsed and have never recovered.
Suckers		
<input type="checkbox"/> Northern Hog Sucker (19.0 cm, 37.0 cm, 11 yrs)	N	The Northern Hog Sucker is a small sucker with its eyes located high on, and behind the middle of, the head. The snout is long and similar in appearance to a pig.
Sunfishes		
<input type="checkbox"/> Black Crappie (21.5 cm, 43.2 cm, 15 yrs)	N	The Black Crappie is sometimes angled for because it can grow to over a kilogram in weight and its flesh is sweet-tasting. It congregates in schools in the spring and begins spawning when the water temperature reaches 13°C. Like other sunfishes, the male scours out a depression in the bottom, which is used for spawning.
<input type="checkbox"/> Bluegill (19.0 cm, 28.2 cm, 11 yrs)	N	A reproducing <i>parental</i> male matures at age 7 and builds/defends a nest against intruders. A <i>sneaker</i> male may mature at 1 year and attempts to fertilize the eggs of a female already mating with a <i>parental</i> male. A <i>satellite</i> male can mature at 3 years and mimics the colouration and movement of a female to gain access to the nest and fertilize the eggs laid in the nest of a <i>parental</i> male. See page 29.
<input type="checkbox"/> Green Sunfish (9.0 cm, 13.8 cm, 5 yrs)	I	The Green Sunfish is a recent arrival to Toronto. It was first discovered in the lower Humber River in 1993 and is slowly expanding its range farther upstream and into other streams.
<input type="checkbox"/> Largemouth Bass (30.0 cm, 55.9 cm, 23 yrs)	N	The species name of the Largemouth Bass, a popular sport fish, is <i>salmoides</i> , which means trout-like. Like trouts and salmon, this fish has a large mouth and a streamlined, moderately deep body. See page 28.
<input type="checkbox"/> Pumpkinseed (18.0 cm, 25.4 cm, 10 yrs)	N	The Pumpkinseed is Toronto's most common sunfish and often the first fish caught by young anglers. It can be distinguished from the Bluegill by having a red spot or bar on its ear flap.
Temperate Bases		
<input type="checkbox"/> White Bass (28.0 cm, 48.5 cm, 9 yrs)	N	The White Bass is very similar in appearance to the White Perch. It has more prominent stripes on the body and more than 10 soft anal rays (versus 10 or fewer in White Perch). It sometimes hybridizes with White Perch. Hybrids produced with the Striped Bass, called Wipers, are cultured, and occasionally caught in Lake Ontario, probably from unauthorized releases.
<input type="checkbox"/> White Perch (15.5 cm, 29.0 cm, 7 yrs)	I	The White Perch first appeared in Lake Ontario around 1950, likely gaining access to the lake through the Oswego and Erie Canals that connect the Hudson River with Lake Ontario. It has slowly been colonizing the upper Great Lakes and in 2003 was discovered in Lake Superior around Thunder Bay.

Spawning Calendar – Toronto and Southern Ontario

Spawning is a time when fishes congregate and are most vulnerable to capture or disruption. It is also the time when they should not be disturbed until after they have spawned and their young are independent. Many species spawn in shallow streams or near the lakeshore, so this provides a good time to observe them in the wild. Most fish species leave their eggs unprotected. To prevent egg predation, some fishes bury them in the stream or lake bed, or deposit them over rocks and gravel where many of the eggs fall into gaps and are protected. Other species deposit their eggs over vegetation, where the eggs adhere to aquatic plants until they hatch. Some, like sunfishes, catfishes, and several minnow species, are nest builders and the male will protect the eggs and fry from predators until they are ready to leave the safety of the nest.

[illegible]

“No man ever steps in the same river twice, for it’s not the same river and he’s not the same man.” – Heraclitus

Safe Consumption of Ontario Sport Fish

The *Guide to Eating Ontario Sport Fish* provides information on the safe consumption of sport fishes (meals per month) from over 1,850 lakes and rivers in Ontario, with separate recommendations for both the general and sensitive population (women of child-bearing age and children under 15 years of age). Fish samples are collected by the Ministry of Natural Resources (MNR), the Ministry of the Environment (MOE) and other partners. Fish tissue is analyzed for a variety of contaminants, including mercury, PCBs, mirex, DDT, and dioxins/furans at the MOE laboratory in Toronto. Consumption advisories are calculated based on health protection guidelines provided by Health Canada. Copies of the Guide are available at select government offices and retail outlets. It is also available at www.ontario.ca/fishguide, or by calling 416-327-6816 or 1-800-820-2716.

For fishes caught in the Toronto waterfront area, the 2011-2012 Guide lists many species as safe to consume, including Northern Pike, Largemouth Bass, Yellow Perch, and Brown Bullhead. Grenadier Pond, the Humber River and Marsh, Eglinton Flats Pond, and the Rouge River and Marsh are but a few of the other Toronto locations the Guide indicates as having many different sizes and species of fishes that are safe for eating. Always remember to refer to the most recent *Guide to Eating Ontario Sport Fish* before deciding to fry up your catch.



Toronto Waterfront Fish Community Monitoring
photo: TRCA



Cindy Hignett, a TRCA fisheries technician, holds a Walleye caught in the lower Don River in the summer of 2010. A long-term fish community monitoring program for the Toronto waterfront was launched by TRCA in 1989; Toronto was designated as one of the 43 Areas of Concern within the Great Lakes in the mid 1980s (see page 54). Fishes are collected using various types of nets and electrical shocking (electrofishing). The specimens caught are identified, counted, weighed, and measured before being released. This intensive monitoring program has tracked changes in the structure, population dynamics, growth rates, contaminant loads, reproductive capability, and reproductive success of the Toronto waterfront fish community. Fishes are sensitive to a wide array of environmental stressors, and the long-term assessment of community characteristics provides valuable information on the ecological health of the Toronto waterfront.

Exceptional Sport Fishing Locations in Toronto

Over the last 15 years, fish communities residing along the Toronto waterfront have increased in both diversity and abundance. Waterfront park development projects, shoreline rehabilitation work, and management techniques with an ecosystem based approach are thought to be the catalysts. Today there are numerous Toronto waterfront parks, walking trails, and naturally occurring habitat features that have created great fishing opportunities for both the avid shore and boat angler, as well as nature viewing enthusiasts. In this section we offer details on some of the City's most productive areas to fish. Fishing tips are provided by Mike Correa, an Environmental Technician with TRCA and an accomplished tournament angler. Unless otherwise noted, all of the fishing locations are near public parking and are also accessible by public transit.

1 COLONEL SAMUEL SMITH PARK

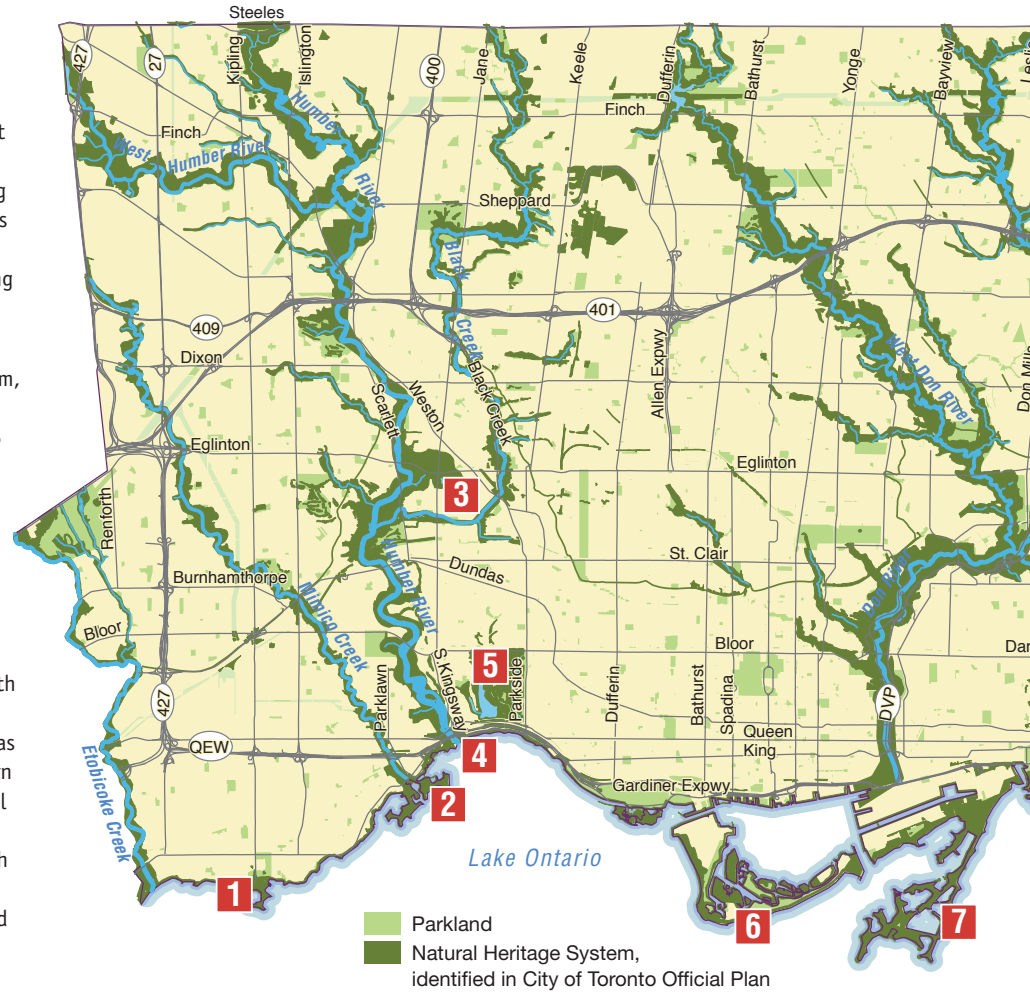
At the start of Kipling Ave., south of Lake Shore Blvd. You can find Freshwater Drum, Largemouth Bass, White Sucker, Common Carp, Pumpkinseed, Yellow Perch, and Walleye. TRCA has carried out fisheries monitoring work at this location since 1985 and has observed an increase in the Walleye populations within the boat basin. *Fishing Tips:* Fishing the inside boat basin is your best bet. Look for Largemouth Bass close to sporadic weed patches. Anglers can cast for Chinook Salmon, Brown Trout, and Rainbow Trout at the mouth of the boat basin, as well as directly out into the lake. Northern Pike are always present, especially early in the season.

2 HUMBER BAY PARK

At the foot of Parklawn Road just off Lake Shore Blvd. This waterfront park offers angling access from its east and west peninsulas and in the boat basin at the mouth of Mimico Creek. Fish for Smallmouth Bass, Freshwater Drum, Common Carp, White Sucker, Yellow Perch, Black Crappie, Bluegill, and Pumpkinseed. The western bay has a big, sporadic weedbed that holds Northern Pike and Largemouth Bass. The eastern bay has easier access with weed lines spread out from shore. There is also potential for large Walleye. In the fall, Chinook Salmon, Brown Trout, and Rainbow Trout action can be good depending on water temperatures. *Fishing Tips:* Look for panfish (small edible fishes that usually fit in a fry pan) in shallow water around the small islands. Northern Pike and bass reside on the deeper drop-offs or weed lines around the islands, south shore, creek mouth, and off the eastern point.

3 EGLINTON FLATS POND

Located on the south side of Eglinton Avenue West, just east of Jane Street and west of Weston Rd. TRCA recently completed substantial enhancements of a large portion of shoreline and in-water habitat. The restoration works included irregular shoreline profiles, log/stump placement, and boulders for shoreline stabilization and fish



habitat. In addition, viewing areas/"fishing nodes" were incorporated into the overall Enhancement Plan, making Eglinton Flats easily accessible to shoreline anglers. The pond is great for fishing with kids who may catch Largemouth Bass,

"The finest gift you can give to any fisherman is to put a good fish back, and who knows if the fish that you caught isn't someone else's gift to you?" – Lee Wulff



Black Crappie, Pumpkinseed, Brown Bullhead, Common Carp, and even Northern Pike. As with most small urban ponds, catch and release fishing becomes an important tool to help sustain these fisheries.

Fishing Tips: Black Crappie can be a little trickier to catch than most of the other fishes found in the pond. Begin by clipping a small bobber onto your line. Instead of live bait, try a pink or white plastic mini tube jig inserted into a small jig head. Crappie look up to feed, so a trick that really pays off is to place the tube jig only 30 cm or so from the bobber. Fishing close to the surface, in the shallow water near the shore, results in a fun visual experience for kids.

4 LOWER HUMBER RIVER

Visit Etienne Brulé Park to fish above Bloor Street. For fishing downstream of Bloor, access King's Mill Park. To fish near the mouth of the Humber, go to Sir Casimir Gzowski Park, just west of Toronto's Sunnyside Beaches. Common species include: Rainbow Trout both in the spring and fall; Brown Trout and Chinook Salmon in early autumn; resident populations of Largemouth Bass, Smallmouth Bass, Northern Pike, Common Carp, White Sucker, Yellow Perch, and even a few Black Crappie and Walleye. The weirs north of Bloor Street offer exciting views of jumping salmon and trouts as they migrate up the Humber River in the fall months. *Fishing Tips:* **Anglers cannot fish within 25 m (75 ft) of any dam.** Work upstream or downstream from Bloor St. for warmwater species in spring and summer. Fish deep pools for Smallmouth Bass when the season opens.

5 GRENADIER POND

Right in the heart of Toronto's famed High Park. Shoreline fishing access exists on both the east and south sides of the pond. The pond contains Brown Bullhead, Black Crappie, Bluegill, Pumpkinseed, Common Carp (including Koi and giant Goldfish), Largemouth Bass, and even a few Northern Pike. Many young city anglers get hooked on fishing after spending summers at this big pond. Thanks to some terrific habitat restoration work by TRCA and the City, anglers can target sunken wood, fallen trees, and weed edges that hold many fishes. High Park also has nature trails, a swimming pool, picnic areas, a playground, and a small zoo. *Fishing Tips:* There are some really nice Largemouth Bass here. Fortunately, more people are realizing how important it is to live release these fish – which helps keep the population healthy for all to enjoy.

6 TORONTO ISLANDS

Unless you have your own boat, the Islands are ferry access only; with the terminal at the foot of Bay Street. The Islands are a great destination to combine angling and family fun with walking paths, an amusement park, and four world class lifeguarded beaches. The Islands have numerous Yellow Perch, Black Crappie, Bluegill, Pumpkinseed, Brown Bullhead, Bowfin, Freshwater Drum, Walleye, and big Common Carp. A real bonus is the plentiful and oversized Northern Pike and Largemouth Bass. Through routine fisheries monitoring, TRCA has also observed a rise in Walleye presence throughout the many waterways adding to the angling opportunities within this fishing hotspot. On the open lake side, you occasionally catch Brown Trout, Rainbow Trout, and Chinook Salmon. Shore fishing is great at Centre Island's boathouse where you can borrow a rod and reel, buy a license, and get some free fishing advice. The Island's waterways, bays, and lagoons hold many fishes for those fishing from shore, and anglers in boats can try the many deep water points. *Fishing Tips:* The bass fishing is so good, professional anglers fish the Islands during local tournaments. Look for Largemouth Bass around sunken trees or weed edges.

7 LESLIE STREET SPIT/TOMMY THOMPSON PARK (TTP)

This active lakefill spit at the foot of Leslie Street was started in 1950 and now extends 5 km out into the lake. TTP is accessible by transit, and there is parking near the front gate. TRCA operates a free shuttle van between the park gates and the pedestrian bridge (about 3 km inside the park). It is open weekends and most holidays during the day (check for hours before visiting). Shoreline anglers can catch Pumpkinseed, Bluegill, Northern Pike, Largemouth Bass, White Bass, Yellow Perch, Common Carp, White Sucker, Freshwater Drum, Black Crappie, and increasing numbers of Walleye. *Fishing Tips:* There is untapped potential for boat anglers to ply the outer harbour and the west side of the spit for these fishes as well as Brown Trout and Chinook Salmon. In addition, May and June can offer some phenomenal Northern Pike action within the embayments.

8 ASHBIDGE'S BAY PARK

At the foot of Coxwell Avenue, south of Lake Shore Blvd., there is shoreline fishing for late-summer and fall Brown Trout and Chinook Salmon. Huge Common Carp are always present. Yellow Perch action is sporadic, but there are jumbos along weed edges. The outer and inner basins produce Northern Pike, Largemouth Bass, Freshwater Drum, and the occasional Walleye. Brown Bullhead and Pumpkinseed in the shallow warmer parts of the bay can keep children entertained. The current lakefill park extends into relatively deep water, and outside rocky points can be productive fish habitat. The Inner Boat Basin can be fantastic angling for Brown Trout in the fall. *Fishing Tips:* Use caution when fishing from the steep rubble shorelines as footing can be tricky!

9 BLUFFER'S PARK

This park is hidden at the foot of Brimley Road. Boat launch ramps are available. The park offers views of the spectacular Scarborough Bluffs and a beautiful beach. Common species include Chinook Salmon, Brown Trout, Common Carp, Northern Pike, Smallmouth Bass, Largemouth Bass, Brown Bullhead, Yellow Perch, and other panfish. *Fishing Tips:* Some of Toronto's best summer trouts and salmon action occurs right here; that's why several charter boat captains use this as their home base. Shoreline anglers can catch fishes from rocky breakwalls inside the west harbour and at the entrance to the east harbour. There's a small bridge in the middle of the complex where they can fish too. Water temperatures can change drastically here, due to wind direction, disrupting fish locations; so look for steady warm days without a strong wind pushing cold water into the area.

10 HIGHLAND CREEK

Excellent angling opportunities occur in much of the lower portion of Highland Creek. Or, to fish near the mouth of Highland Creek, access East Point Park and walk east along the Chesterton Shores Trail to the creek mouth. Follow the trail north along the west side of Highland Creek for other great spots. This stream is a sleeper for angling opportunities and many anglers overlook Highland Creek when planning their fishing trips in the Toronto area. There is a sizeable run of Chinook Salmon in the fall, and Rainbow Trout runs occur in both the spring and fall. Other fishes you may encounter seasonally are White Sucker, Northern Pike, Smallmouth Bass, and Common Carp. *Fishing Tips:* Fishing deep pools in the outside edge of channel bends are your best bet for both salmon and trouts.

11 LOWER ROUGE RIVER

Rouge Beach Park is located at the end of Lawrence Ave. East and includes the river mouth and adjoining marsh. Fish for Smallmouth Bass, Largemouth Bass, Brown Bullhead, Black Crappie, Yellow Perch, White Sucker, Northern Pike, Chinook Salmon, and numerous Common Carp. From the fall through to the spring Rainbow Trout run upstream, especially after heavy rain or spring thaws. If fishing for migratory salmon or trouts near Hwy. 2 (Kingston Rd.) park outside the Glen Rouge Campground. *Fishing Tips:* The marsh area at the mouth can be tops for carp. Try using kernels of cooked corn presented near the bottom on a single hook.

OFFSHORE FISHING – The offshore Lake Ontario fishing is also fantastic. You can launch your boat from many locations along the Toronto waterfront and go fishing for Rainbow Trout, Brown Trout, Lake Trout, and three species of salmon – including the huge Chinook Salmon that grow to over 20 kg. For those who don't have access to a boat, there are many fishing guides and charter boat operators in the Toronto area. They are sure to provide customers with an enjoyable experience while fishing on the open waters of Lake Ontario. For families, this is a great adventure where everyone can participate and have lots to talk about. For the experienced angler, you'll learn the local tricks and get in some great fresh water action. For business entertainment, you will find that this adventure gives you a great way to build and maintain relationships.

The City of Toronto Parks, Forestry & Recreation Division partners with other agencies and volunteer groups to host **Family Fishing Events** throughout the year. At the Toronto Islands, there is a popular Fishing Camp for kids in the summer, and the public can also come here and borrow a rod and reel courtesy of the OFAH Tackle Share Program. Contact PF&R at www.toronto.ca/parks or, if within the City, call 311 to inquire about existing and future fishing related opportunities.

Threats to Fishes of Toronto

Invasive Species

Invading species are one of the greatest threats to the biodiversity of Ontario's waters, wetlands, and woodlands. Originating from other regions of the world, and in the absence of their natural predators or controls, invading species can have devastating effects on native species, habitats, and ecosystems.

More than 185 non-indigenous animal species have become established in the Great Lakes aquatic environments. Invading species, such as the Zebra Mussel and Round Goby, are extremely adaptable and have high reproduction rates enabling them to flourish. Unchecked, these invaders will outcompete native fishes and other wildlife and unbalance natural ecosystems.

Invading species are introduced to Ontario waters through a variety of pathways such as the construction of canals (see Sea Lamprey on pg. 35), ballast water from ships, aquarium and horticultural trades, live food fish trades, and unauthorized fish introductions or transfers. These species can be further spread into Ontario's inland lakes by boaters and anglers. Leftover live baitfishes and unwanted aquarium fishes must never be released into local waterbodies.

Zebra Mussel (*Dreissena polymorpha*)

The Zebra Mussel, while not a fish, is one of the most well-known of the Great Lakes invaders, its initial introduction being roughly 20 years ago. The Zebra Mussel is from the Black Sea and Caspian Sea region and was carried in the ballast water of ocean going vessels to the Great Lakes in 1988. Since that time, Zebra Mussel have spread to all of the Great Lakes, as well as a host of inland lakes in Ontario.

Although it is a small creature (avg. 3 cm), its ecological impact can be huge. The Zebra Mussel is a filter feeder, meaning it feeds on plankton and other organic material. Each Zebra Mussel can filter about one litre of lake water per day. This may not seem like much, but when there are billions of Zebra Mussels in a lake, the amount of organic material consumed is enormous. These large colonies of filter feeding Zebra Mussel increase water clarity, enabling more sunlight to penetrate deeper in the lake resulting in increased growth of aquatic plants and algae, and forcing light sensitive fishes, such as Walleye, to find new habitat. As well, Zebra Mussel attach to native aquatic animals like clams and crayfishes, often resulting in the death of these animals. In doing so, they have caused a decline or disappearance of many native mussels in the Great Lakes region. People are affected by Zebra Mussel because they wash up on beaches causing unpleasant



Zebra Mussels
photo: David Britton

odours, and their sharp shells cut the feet of swimmers and pets. The Zebra Mussel also firmly attaches to hard surfaces; this causes damage to items like boats, motors, and intake pipes; resulting in millions of dollars in control costs. The Quagga Mussel is a similar invasive mussel from the Ukraine/Black Sea region. It is slightly larger, paler in colour, and able to survive in deeper waters.

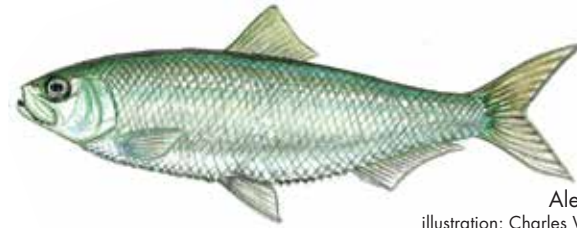
The best defense we have against Zebra Mussel and Quagga Mussel is to prevent their spread to new waterbodies (see page 70). Once they become established in a lake, there is no known way to eradicate them.

Alewife (*Alosa pseudoharengus*)

The Alewife is native to the east coast of North America, and was likely introduced to Lake Ontario in the late 1800s via the Erie Canal. Its invasion was likely successful due to the decline in top predators such as Lake Trout and Atlantic Salmon. By the 1950s, the Alewife had spread to all of the Great Lakes through connecting waterways and canals. In its native range, the Alewife is a marine species that moves into freshwater lakes and streams to spawn. In Ontario, the Alewife has adapted to spend its entire lifecycle in fresh water and spawns in nearshore areas.

Alewife have caused serious declines in native populations of Yellow Perch, Cisco, and Emerald Shiner. They have become an important prey item for many Great Lakes sport fishes. Unfortunately, many of the large predatory fishes that feed on Alewife experience reduced reproductive success (egg and fry mortality) due to an enzyme present in Alewife that destroys an essential amino acid (thiamin).

The Alewife (avg. 15 cm) is not well adapted to freshwater systems. The Alewife's inability to adapt to rapid fluctuations in temperature,



Alewife
illustration: Charles Weiss



resulted in large scale die offs in the past, often leaving recreational beaches littered with thousands of Alewife carcasses. In recent years, Alewife populations have steadily declined in the Great Lakes due to reduced nutrient levels, increased predation, and impacts from invasive Zebra Mussel and Quagga Mussel. As a result, the annual die-offs that were once common are not seen as often today.

“You know when they have a fishing show on TV? They catch the fish and then let it go. They don’t want to eat the fish, they just want to make it late for something.” – Mitch Hedberg

Asian carps

Asian carps (Silver, Bighead, Black, and Grass Carp) have been introduced to North America from Asia. At the time of publication, Asian carps are not established in the waters of Lake Ontario. Individual Grass Carp and Bighead Carp have been found in Lake Ontario, but they are not believed to have come from breeding populations. The two main species of concern, the Bighead Carp and Silver Carp, escaped from aquaculture facilities in the southern United States when the facilities were flooded in the early 1990s. These carp subsequently spread northward up the Mississippi, and Illinois Rivers, approaching Lake Michigan. Specialized electric barriers in the Chicago Ship and Sanitary Canal are currently all that prevent these fishes from entering Lake Michigan and the rest of the Great Lakes, and potentially causing an ecological disaster. Resource managers in the United States are routinely monitoring the spread of these highly invasive fishes and investigating additional control strategies.

Certain species can reach lengths of over 1.2 m (4 ft) and weigh close to 45 kgs (100 lbs). The Silver Carp is infamous for its ability to

leap over 2 m (6 ft) out of the water when startled, often resulting in boaters being struck and injured. Researchers believe that if introduced to the Great Lakes they will be able to survive, reproduce, and spread. Because of both their high reproductive rate and food consumption, it is believed Asian carps will seriously disrupt the Great Lakes’ ecosystem, damaging the multi-billion dollar sport and commercial fisheries. Asian carps are a popular food fish sold in Ontario markets. The possession of live Asian carps was banned in Ontario during 2005 to prevent release or escape.

Goldfish (*Carassius auratus*) and Koi (*Cyprinus carpio*)

Goldfish and Koi are popular ornamental aquarium and pond fishes, which are domesticated versions of wild carp species. Selective breeding has produced the characteristic colour patterns that we see today. Goldfish and Koi will often revert to their more natural ancestral colour over time if released into natural waterbodies. Unfortunately, when Goldfish and Koi are released into lakes and streams in Ontario they can establish reproducing populations, which can cause considerable ecological harm.



As with most invasive species, once Goldfish and Koi have been introduced into a suitable habitat, they are very difficult to control. Water garden escapes, and aquarium releases are the main reasons for the spread of Goldfish and Koi. Both Goldfish and Koi uproot and feed on aquatic plants, degrading fish and other wildlife habitats in wetlands and nearshore areas. These species also carry Koi herpes virus – a virus now detected in Lake Ontario. Everyone should remember that it is illegal to release fishes into a natural waterbody. If you have unwanted aquarium or water garden pets, they should be donated to a pet store, school, or a friend.

Round Goby (*Neogobius melanostomus*)

The Round Goby is a small fish (max. 25 cm) native to eastern Europe that invaded the Great Lakes in the early 1990s from the ballasts of ocean-going ships. First discovered in the St. Clair River in 1990, they quickly spread throughout the Great Lakes system. By 1998 there were established populations of Round Goby in all five Great Lakes, and

several connecting tributaries. They are now an established part of the Lake Ontario ecosystem and have become prey for many predatory fishes.

In addition to the ones in the Great Lakes, there are two established inland populations, one in Rice Lake, near Peterborough, and a second in Lake Simcoe. The spread of the Round Goby in the Great Lakes basin may have been aided by a number of factors including: ballast water transfers, bait bucket transfers, connecting waterways and canals, and an abundant food supply. The Round Goby is now one of the most common fish in the lower Great Lakes, and has caused significant damage to the Great Lakes ecosystem. The Round Goby is a voracious consumer of Zebra Mussel and Quagga Mussel. Unfortunately, they also displace other bottom dwelling fishes and eat fish eggs and very small fishes. They reproduce many times per season and quickly increase their population size and are a nuisance to anglers who repeatedly catch the aggressive goby. In an effort to prevent the spread of these fish to new locations, the Ontario government amended the fishing regulations in 2005, making it illegal to possess live Round Goby, or use them as bait.



Round Goby
photo: David Copplestone

Invading Species Awareness Program

In 1992, the Ontario Federation of Anglers and Hunters (OFAH) and MNR established the Invading Species Awareness Program in order to address the increasing threats posed by invading species in Ontario. The objectives are to raise public awareness of both aquatic and terrestrial invasive species, encourage participation in preventing their spread, and facilitate monitoring and tracking initiatives related to the spread of new invaders found within Ontario through citizen reports to the Invading Species Hotline and the Invading Species Watch program.

For more information about the Invading Species Awareness Program contact the Invading Species Hotline at 1-800-563-7711 or visit www.invadingspecies.com

Urbanization

Water quality, aquatic life, and fish habitat typically suffer negative effects due to increased development within the watershed of a stream or lake. In a natural setting, most rain and snow melt infiltrates into the earth to replenish the groundwater or is taken up by vegetation. In Toronto, as in any modern city, we have changed the way water moves. As so much of a city is paved or covered with buildings, most of the rain that falls cannot be absorbed into the ground. The stormwater runs off the roofs, roads, and parking lots and enters the storm sewer system before discharging untreated into rivers and lakes.

Unfortunately, this stormwater picks up pollutants as it flows across these hard (impervious) surfaces. Oil, grease, dirt, bacteria (from

animal/pet feces), road salt, pesticides, and other toxic pollutants (such as chemical run-off from industrial or commercial storage sites) all end up in the stormwater.

During heavy rainfall, the resulting high and fast flowing water causes erosion to the stream banks. Erosion, combined with the unnaturally high levels of dirt and plant material (like leaves) washing off streets, building sites, and road works contributes to an excessive sediment load – and a muddy (turbid) appearance that is detrimental to most of the plants, insects, and fishes living in the watercourse. The increased sediment and erosion of our watercourses during runoff conditions also results in the burying or destruction of fish habitat and spawning sites.

Sewers and Combined Sewer Overflows

There are three types of sewers in the City of Toronto: Sanitary, Combined, and Storm. Most of the city is serviced by a separate sanitary sewer system that collects wastewater from sources such as washrooms, kitchens, and commercial or industrial processes. This sewage flows to one of Toronto's four wastewater treatment plants where it is cleaned and disinfected before being discharged to Lake Ontario or the Don River.

Rainfall and snow melt flows to a catchbasin (grates on the roads and parking lots) and then travels in the storm sewer system until eventually discharging untreated to the natural environment.

The combined sewer is a type found in some of the older parts of Toronto, including much of the former municipalities of Toronto, York, East York, and southwestern Scarborough. When it rains in these areas, the combined sewer collects both the sanitary wastewater and the stormwater. To protect the treatment plants from excessive flows the combined sewer system was constructed with overflow points. During even moderate rainfall events the sanitary/stormwater mixture overflows (Combined Sewer Overflow or CSO) directly into the rivers, larger creeks, and the Lake Ontario waterfront.

This CSO discharge is a significant source of pollution containing bacteria, excess nutrients, metals, and harmful organic compounds. Eliminating CSO discharges is a major objective of Toronto's Wet Weather Flow Master Plan (WWFMP).



Combined Sewer Overflow Outfall – Taylor Massey Creek
photo: Toronto Water

Stormwater entering the streams after flowing overland typically has a higher temperature than the background spring or groundwater sources. The elevated stream temperatures stress many resident fishes, frequently reducing diversity, leaving only those more tolerant species. Heavy rainstorms cause raw sewage in combined sewers to overflow into surface waters, and force wastewater treatment plants to by-pass (only partially treat much of the sewage prior to discharge).

All this pollution degrades the water quality of our streams and Lake Ontario, causing significant negative impacts to Toronto's natural aquatic life, including the fishes. But read on – the future is looking much better for our watercourses. There are many things you can do to improve stormwater quality, and the City has already initiated a long term wet weather plan to help clean up our streams and the lake and improve and restore fish habitat.

What are current water quality conditions?

Contrary to popular belief the quality of water in Toronto's watercourses and Lake Ontario is generally quite good. Along the waterfront and on the Toronto Islands, the City has 11 official swimming beaches, eight of which are considered world-class based partly on exceptional water quality (see page 55). Since the mid-1980s intensive monitoring and enforcement by City staff regarding wastewater discharges to the sanitary and storm sewers has significantly reduced dry weather pollution sources. Wet weather flow management initiatives have started to have a noticeably positive impact on water quality.

Still, water quality during, and for up to 48 hours after, a significant rainfall is frequently impaired due to the stormwater related issues discussed above. Bacteria, contaminated run-off, and suspended solids (mud, debris, etc.) continue to be a problem and are the target of the City's Wet Weather Flow Master Plan (WWFMP) (see page 57).



Toronto's Ashbridges Bay Wastewater Treatment Plant bypassing after a large rain storm (stormwater collected by the combined sewers dramatically increases the flow entering the plant and forces a portion of the sewage to receive only partial treatment before being discharged)
photo: Rod Anderton, Toronto Water



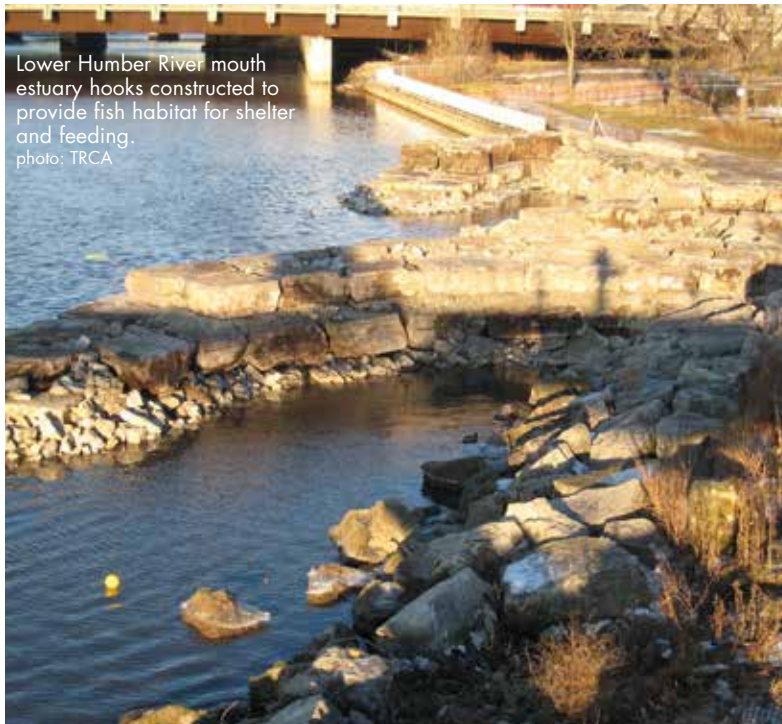
Sediment plume from the Humber River after heavy rainstorm
photo: Toronto Water

Fish-Friendly Policies in Toronto

Protection, restoration, and enhancement of natural habitat in the City is of prime importance to maintaining and enhancing biodiversity.

Toronto's Natural Heritage System

The City's most significant natural heritage features and functions have been identified and mapped and are collectively referred to as a natural heritage system. Toronto's natural heritage system is a connected system of natural features (such as forest, wetlands, meadow areas, stream valleys, and the shoreline of Lake Ontario) and functions (such as riparian zones and floodplains) and includes lands that have the potential to be restored (such as the lower Don River and mouth).



Lower Humber River mouth estuary hooks constructed to provide fish habitat for shelter and feeding.
photo: TRCA

For a major city, Toronto has a relatively healthy system of natural areas. This is primarily due to an extensive network of valleys and ravines, combined with a few remnant natural tableland (above the floodplain) areas such as High Park, and shoreline features such as marshes at the mouths of the Humber and Rouge rivers, and wetlands in the Toronto Islands, and at the Leslie Street Spit/Tommy Thompson Park. Historically these areas exist either because: they were more difficult to develop (valleys and ravines), by design (High Park, Rouge Park), or by habitat restoration/creation (Leslie Street Spit). The largest blocks of habitat, including rare productive forests, are found in the Rouge River and Highland Creek watersheds in the east part of the City. The total area of natural habitat across the city, and the extent of numerous forest and meadow communities with a large diversity of plants and animals, many being rare or threatened, is impressive for a large urban area.

Protecting, restoring and enhancing natural areas

Toronto's important natural areas are protected by a variety of policies including the City's Official Plan policies and land use designations which restrict or prevent development within natural features and areas. The Ravine and Natural Features Protection bylaw also helps to protect forested areas and valley slopes by regulating removal of trees of any size and any changes to grade. The Official Plan policies and municipal bylaws work together with provincial and federal regulations and TRCA policies which also regulate activities within valleys and wetlands and help protect natural areas. There are a wide variety of restoration and enhancement projects within natural areas across Toronto including restoration and enhancement of ravine areas adjacent to development projects, achieved through the development approval process.

Toronto and Region Remedial Action Plan

In the mid-1980s, Toronto and Region was identified as one of 43 locations around the Great Lakes where local environmental conditions may be causing harm to the wider Great Lakes system. These locations are referred to as Areas of Concern (AOCs) and are located in both Canada and the United States. The clean-up, or remediation, of an Area of Concern occurs through a mandated process called a Remedial Action Plan, or RAP. Many of the RAP Goals are similar to Toronto's WWFMP Objectives (see page 57) and include habitat and water quality improvements.

Significant improvements in sewage treatment, stormwater management, pollutant regulation in sewers, and progressively tougher provincial and federal regulations have led to dramatically reduced discharges. Accordingly, the Toronto and Region RAP progress reports show a continuing positive trend in water quality resulting from lower levels of pollutants such as heavy metals. The concentrations of these toxic chemicals (such as copper, zinc, and lead) have decreased significantly over the last few decades, and now meet the provincial objectives at most sampling stations under dry weather conditions.

Intensive urbanization and population growth within the Area of Concern continues to pose its own challenges to environmental conditions. Urban development activities result in decreased water quality both locally and downstream. The losses of lakefront habitat, such as the historic conversion of the extensive Ashbridge's Bay Marsh into the Portlands industrial area, are being slowed and even reversed by several aquatic habitat and wetland restoration initiatives. However, upstream in the watersheds, important habitats such as wetlands and many streams remain disconnected from Lake Ontario, or are being

eliminated or severely stressed by the urbanization taking place on, and around, them.

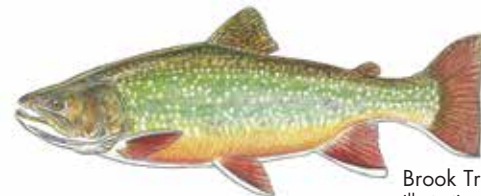
Many environmental challenges remain in the Toronto and Region Area of Concern. The mitigation or removal of dams in the watersheds is an important task associated with restoring and connecting upstream habitat with the lake (see page 60). The adoption of low-impact development practices, and measures to improve the quality of water runoff from developed areas, are critical to protecting the medium – water – in which fishes survive. And fish habitat itself must be protected and restored throughout the region to ensure humans and fishes continue to coexist to the benefit of both species.

(from Toronto and Region 2007 RAP Progress Report. For more information visit www.torontorap.ca)

Reporting Spills!

You should immediately report all spills or illegal discharges to the environment or sewer system.

- The Ontario Ministry of the Environment SPILLS ACTION CENTRE can be reached at 1-800-268-6060
- 311 Information: Toronto offers both customer service and 24/7 spill reporting. Report all spills witnessed within the City of Toronto to 311 and a Toronto Spill Responder will be dispatched immediately
- For spills that are an immediate threat to human health, call 911



Brook Trout
illustration: Charles Weiss



Toronto's Wonderful Beaches

The City of Toronto is very proud of the fact that 8 of its 11 Lake Ontario beaches are recognized as meeting Blue Flag standards. Blue Flag is an internationally recognized eco-label awarded to beaches that achieve high standards in 29 criteria including water quality, environmental education, environmental management, safety, and services.

During the summer, water quality testing is performed 7 days per week (Ontario standards require only once per week). If the water quality is not acceptable for swimming (*E. coli* bacteria more than 100 counts per 100 ml of water), signs are posted recommending visitors do not swim. The decision to post signs is based on the previous day's test results and current beach conditions (waves, weather, water clarity).

E. coli bacteria levels are an indicator of water quality. This bacterium is found in wildlife and human waste and can cause ear, nose, and throat infections, rashes, and other health issues.

Most beach postings against swimming occur after significant rain storms that cause bacteria to be washed into the lake, either from animals or through combined sewer overflow (CSO) discharges. Water fowl (ducks, geese, swans) and seabirds (gulls, cormorants, terns) are major contributors to bacteria levels along the waterfront – DO NOT FEED the birds. It is usually advisable to wait at least 24 hours after a large storm before swimming in any urban waters.

Of significant note is that many of Toronto's Blue Flag beaches are rarely posted, even after large storms – the water quality being extremely good all year round. This is great news for the fishes of Toronto; just as people require unpolluted water for recreation, fish require clean waters for survival.

For more information on Toronto's Beach water quality testing visit: www.toronto.ca/parks/beaches or www.toronto.ca/health/beaches

Cherry Beach
photo: Toronto Water

"If people concentrated on the really important things in life, there'd be a shortage of fishing poles." – Doug Larson

Redside Dace – The Redside Dace has been designated as "Endangered" under Ontario's Endangered Species Act. Urbanization is considered to be a major threat to Redside Dace as it requires cool, clear streams with well-vegetated banks. Urbanization often leads to increased temperatures and increased sedimentation in streams and removal of vegetation along stream banks. The strong erosive forces of flash floods, typical of urban areas, changes the habitat from deep, narrow quiet pools, preferred by Redside Dace, into inhospitable wide shallow riffle areas. The City, TRCA, Ontario Streams, and MNR are working to restore and protect stream habitat with the hope that the Redside Dace may make a comeback.



Redside Dace with the larger, less colourful Common Shiner in a Toronto stream
photo: Dave Lawrie, TRCA

Working to improve and protect fish habitat – what are the City of Toronto and its partners doing?

There are many agencies, organizations, and levels of government involved in both improving and protecting the water quality and aquatic environments within the Toronto area. The City of Toronto and the Ontario Ministry of the Environment are responsible for enforcing water quality regulations and responding to spill events. Both Environment Canada and Fisheries and Oceans Canada enforce legislation and federal acts designed to protect fishes, fish habitat, and the aquatic environment. The Ontario Ministry of Natural Resources is responsible for managing our fishes and other wildlife resources as it works to promote healthy, sustainable ecosystems and conserve biodiversity. Toronto and Region Conservation works to protect and restore the health of the environment along Toronto's Lake Ontario waterfront and within each watershed in the Toronto region. All of the above government agencies work alongside or partner with environmental organizations, educational groups, corporations, and grass roots community groups to increase awareness and achieve a greener, cleaner, healthier environment.

Reducing Road Salt

Salt entering the environment due to road de-icing operations creates a serious risk to plants and animals. Fishes and other aquatic organisms are particularly at risk if harmful salt concentrations increase in their lake and stream ecosystems or impact the quality of the life sustaining groundwater inputs to surface waters.

The City of Toronto has a Salt Management Plan covering the use of salt applied to roads for safety purposes in winter conditions. Equipment upgrades, staff training, and improved use of weather forecasting information are major components of the Plan. The result is a significant reduction in the amount of salt used on City roads and sidewalks.

A recent innovation involves the mixing of salt with water to create a brine solution that is applied to roads as a liquid or used to pre-wet rock salt as it is spread on the roadway. The City's use of brine returns the roadway to normal driving conditions more quickly and helps each application last longer than rock salt alone. It is better for the environment because less salt is required for the same degree of safety. Another advantage is that the brine typically stays on the road as opposed to rock salt which has a tendency to bounce or migrate off the road surface and enter the storm sewers or ditches that direct run-off flow to the streams and Lake Ontario.



De-icing truck sprays brine on the roads
photo: Toronto Transportation

Protecting water quality and aquatic habitats – The Wet Weather Flow Master Plan

The City of Toronto's Wet Weather Flow Master Plan (WWFMP) is a long-term, multi-billion dollar initiative launched in 2003. WWFMP projects are successfully improving the water quality and aquatic habitat in the City's streams and waterfront by reducing and collecting contaminated stormwater run-off. Combined sewer overflows are being intercepted and stored in massive underground tanks before treatment at wastewater plants. Sewer-Use By-Law Officers investigate and eliminate illegal discharges and cross connections (sanitary connections to the storm sewer). Numerous stream restoration projects are underway to reduce destructive erosion and improve aquatic habitat, and stormwater ponds are being built to collect and naturally treat wet weather flows. These ponds also help control the volume and velocity of stormwater entering the streams, which reduces the erosion and flushing of fish habitats, and provide aquatic and terrestrial habitat within the stream valleys once natural and planted vegetation takes hold.

The WWFMP has 13 key objectives; including many that have a direct effect on fishes and fish habitat:

- Achieve healthier aquatic communities that include warmwater and coldwater fisheries as appropriate;
- Reduce fish consumption advisories due to local wet weather pollution sources;
- Reduce erosion impacts on stream and riparian (forested stream banks) habitats;
- Re-establish a natural hydrologic cycle (movement of rainwater) based on maximizing permeability and minimizing runoff;

- Protect, re-establish, rehabilitate, and/or restore natural features such as wetlands and streams;
- Virtual elimination of toxic contaminants in groundwater and surface waters through pollution prevention at their source;
- Achieve federal, provincial, and municipal water and sediment quality objectives and guidelines in area watercourses and along the waterfront;
- Eliminate discharges of sanitary sewage to the natural environment from such sources as combined sewer overflows (CSO) and wastewater treatment plant by-passes;
- Contribute to eliminating objectionable deposits, nuisance algae growth, unnatural colour, turbidity, and odour in order to improve the aesthetics of area surface waters.

For more information on the WWFMP visit:

www.toronto.ca/water/protecting_quality/wwfmp/index.htm

www.toronto.ca/involved/projects/archived/wwfmp_archive/index.htm



Stormwater Management
Wetland in High Park
photo: Vicky Shi, Toronto Water

Stream restoration

The City of Toronto, MNR, Ontario Streams, and TRCA continue to be involved in numerous projects to restore or create aquatic habitat in Toronto's streams.

Stream restoration projects are designed to return watercourses to a more natural condition. Restoration projects also attempt to reduce

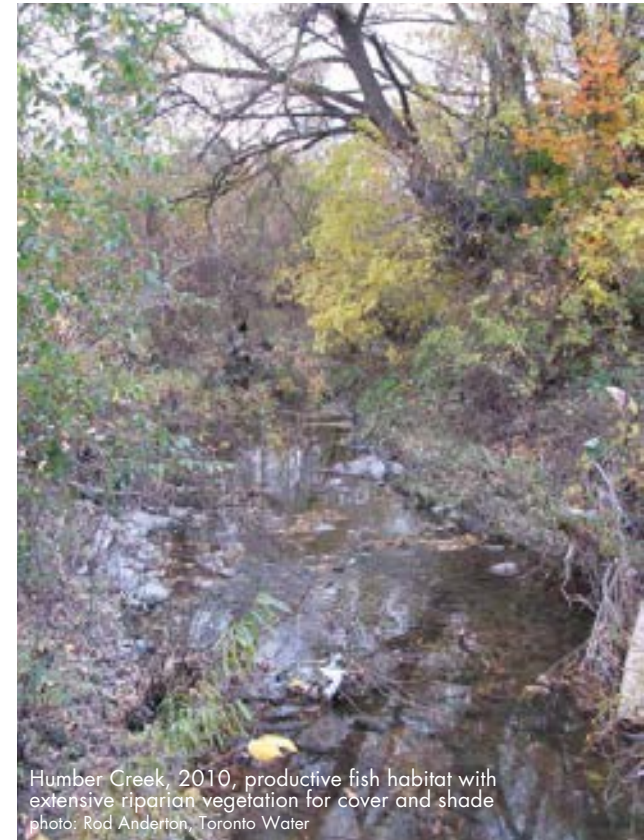
the amount of bank erosion along a watercourse in order to improve downstream water quality, and reduce the loss or burial of fish habitat. During a restoration, in-stream structures (riffles, pools, boulders), substrate (stream bed materials), and cover (logs, woody debris, vegetation) are utilized to provide a variety of habitat for the protection, foraging, and reproduction of fishes and other aquatic life



Humber Creek, 2002, pre-restoration (these three photos show the same location; note the willow tree on the right side)
photo: Toronto Water



Humber Creek, 2007, post-restoration with properly graded banks that have erosion protection and new plantings
photo: Toronto Water



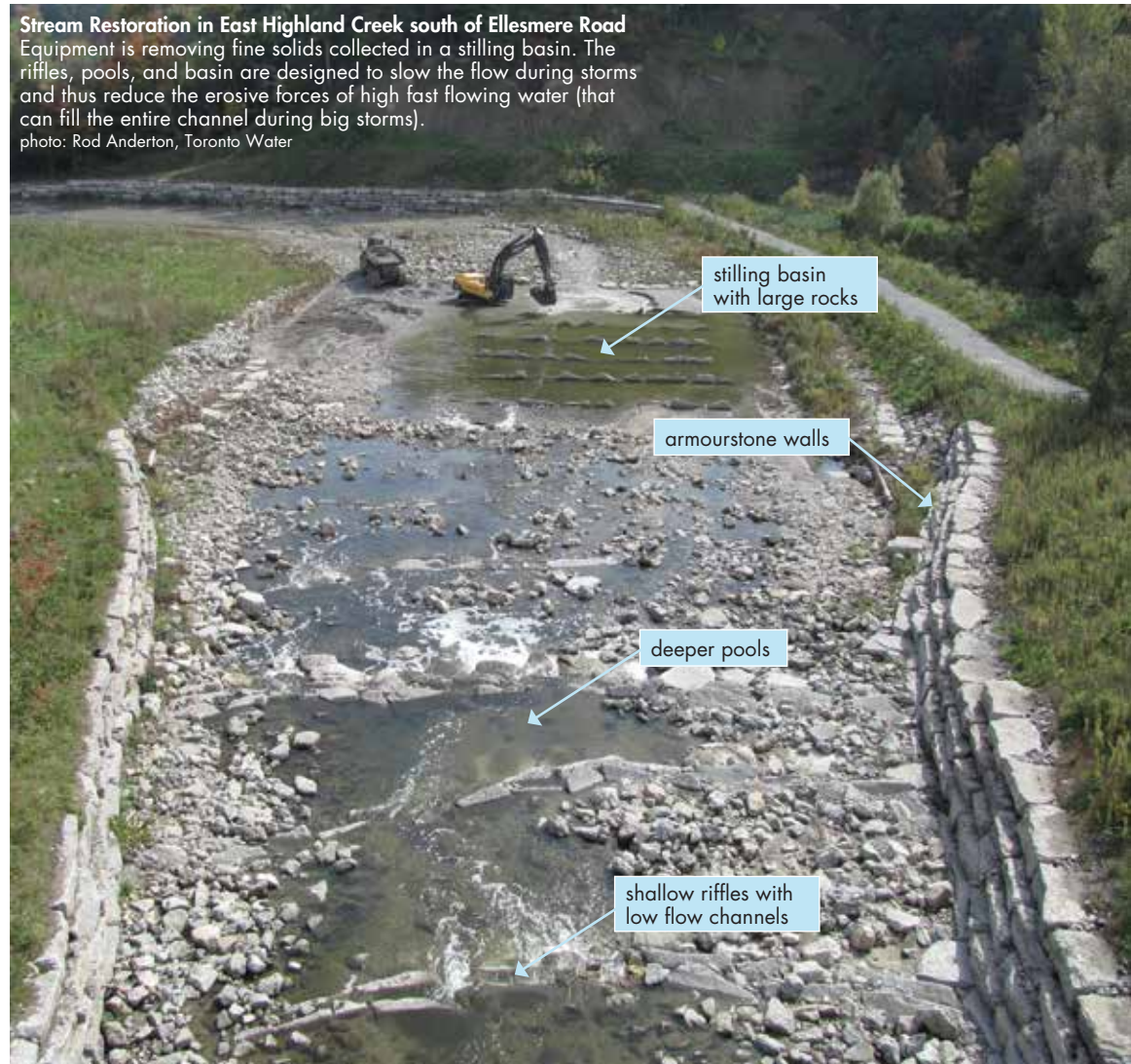
Humber Creek, 2010, productive fish habitat with extensive riparian vegetation for cover and shade
photo: Rod Anderton, Toronto Water

(insects, amphibians, plants, etc.). Large rocks (armourstone, boulders) are placed along the stream banks to prevent erosion. Trees and other vegetation are also planted at the stream edges (riparian zone) to reduce erosion, supply shade to keep water temperatures low, and provide shelter and food for fishes and other wildlife.

A good example of a stream restoration project can be seen in Humber Creek (see previous page), a small tributary of the Humber River that runs between Islington Ave. and Scarlett Road, south of Dixon Road. The creek was typical of a severely degraded urban watercourse and in 2002, a 900 m section near the start of the creek in Alex Marchetti Park was restored to provide stable banks and enhanced aquatic habitat. The riparian shrubs and trees that were planted as part of the restoration have been so successful that within only a few years the creek is difficult to see for all this beneficial bank vegetation.

Another major project is the ongoing restoration of large segments of East Highland Creek in the area south of Ellesmere Road near and within Morningside Park. A massive rainstorm event in August of 2005 damaged huge sections of Highland Creek and the City of Toronto continues to work on restoring these reaches.

Stream Restoration in East Highland Creek south of Ellesmere Road
Equipment is removing fine solids collected in a stilling basin. The riffles, pools, and basin are designed to slow the flow during storms and thus reduce the erosive forces of high fast flowing water (that can fill the entire channel during big storms).
photo: Rod Anderton, Toronto Water



"There's a fine line between fishing and just standing on the shore like an idiot." – Steven Wright

Fish migration barrier removal

The City of Toronto, MNR, and TRCA are involved with the removal of in-stream barriers to fish migration. Barrier examples are bridge structures, culverts, dams, log or debris jams, and weirs. Culverts (large pipes under roads at a stream crossings) with a vertical drop on the downstream side are referred to as "perched" culverts and are very common. Typically an abrupt change in the slope or elevation of the stream surface is what acts as the barrier to fishes and aquatic invertebrates, preventing them from accessing upstream habitat. Even salmonids can be blocked by low barriers because the pool immediately downstream of the barrier must be at least as deep as the barrier is high for them to reach an adequate jumping speed. Many barriers also cause upstream ponding that can result in excessively high water temperatures that are harmful to coldwater fish species. Other barriers may cause habitat fragmentation, interrupt sediment transport down the river, and/or prevent fish movement away from stressful conditions such as spills to the river.



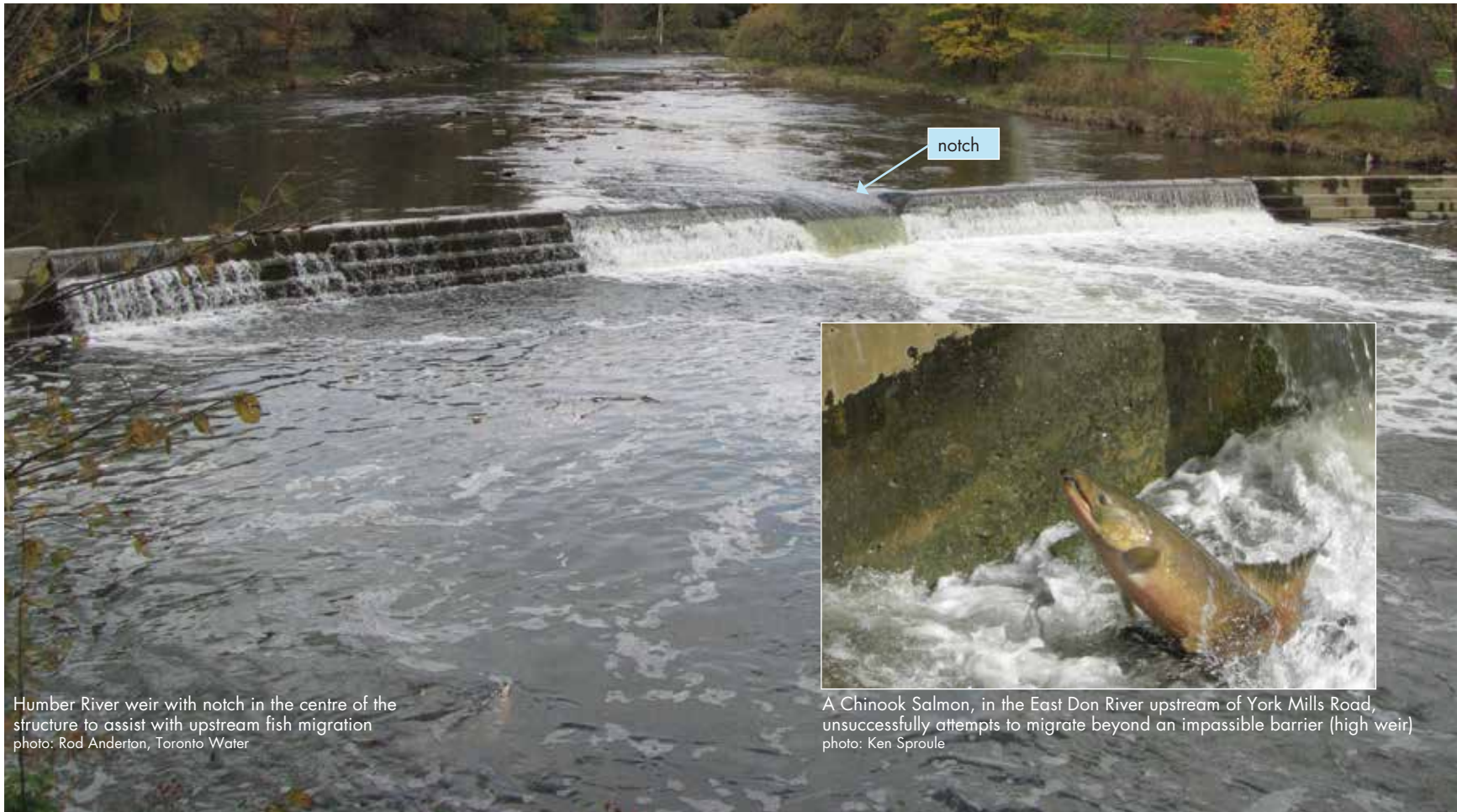
Humber River weir upstream of Eglinton Avenue West. Note the Denil Fishway (a type of fish "ladder") that was constructed to allow both jumping and non-jumping fishes to migrate upstream of the weir (inset shows a side view of the weir and the entrance to the fishway).

photos: Rod Anderton, Toronto Water

However, strategic barriers can also be used for fish management by preventing undesirable invasive fish species such as Sea Lamprey (see pg. 35) or Round Goby from migrating into “unaffected” reaches, or separating introduced migratory species (e.g. Pacific salmon) from resident native fish communities (e.g. Brook Trout).



Sea Lamprey
illustration: New York State Department of Environmental Conservation



Humber River weir with notch in the centre of the structure to assist with upstream fish migration
photo: Rod Anderton, Toronto Water

A Chinook Salmon, in the East Don River upstream of York Mills Road, unsuccessfully attempts to migrate beyond an impassible barrier (high weir)
photo: Ken Sproule

“Give a man a fish and he’ll eat for a day; teach a man to fish and he’ll eat for a lifetime.” – Chinese Proverb

With the removal or modification of undesirable barriers, or the construction of a bypass or fish ladder, new healthy diverse upstream aquatic communities can develop, and migrating fishes can access the clear, cool headwaters they require for spawning.

In the Humber River, between Bloor Street and the St. Phillips Road bridge, there are eight weirs that have been notched. The notching lowers the height of the weir, allowing some jumping species to move up past these structures. Also on the Humber, in Raymore Park just north of Eglinton Avenue West, TRCA and the MNR have constructed a fishway that allows virtually all fish species to migrate upstream of the weir (see page 60). In the Spring of 2000, these barrier mitigation efforts and others farther upstream resulted in the successful migration of Rainbow Trout from Lake Ontario to spawning sites in the headwaters of the East Humber River.

In the Don River, TRCA recently constructed rocky ramps at various weirs that help fishes navigate over some of these weir structures. Rocks and boulders are used to form a type of stepped or terraced path from below the weir up to the lip of the weir. The flow-monitoring weir just downstream of the Pottery Road bridge is an excellent example of a rocky ramp design that now allows migrating White Sucker and Chinook Salmon to move up from Lake Ontario, past the weir, and into tributaries of the upper Don River.



Don River weir and rocky ramp at Todmorden Mills (downstream of Pottery Road)
photo: Rod Anderton, Toronto Water

Waterfront and wetlands restoration

In recent years considerable work has started on the process of restoring natural habitats and improving water quality along or near the Lake Ontario waterfront, and aquatic ecosystems have begun to show signs of recovery.

The restoration of coastal wetlands is a priority as these wetlands provide reproductive habitat for top predators such as Walleye and Northern Pike. Coastal wetlands have been, and are being, created

at various points along the Toronto shoreline. Excellent examples of these restoration projects can be seen at Humber Bay Park and in the embayments at Tommy Thompson Park. Wetland creation often includes measures for excluding the introduced Common Carp, which destroys aquatic vegetation that is essential food and shelter for native fishes. The successful exclusion of Common Carp allows native aquatic plants to flourish, including softstem bulrush, cattail, arrowhead, water lily, dogwoods, and willows.



Tommy Thompson Park – This series of photos illustrates the changes in habitat in Embayment 'A' (farthest SW protected bay) at Tommy Thompson Park before, during, immediately after, and one year after enhancements were installed by Toronto and Region Conservation. While the shoreline in the before picture appears green, it is severely lacking in aquatic habitat. The vegetation community is composed predominantly of Willow, a terrestrial species, with only a few Cattails. During construction sand was added to push the shoreline farther into the embayment, providing space for the creation of backwater lagoons, which creates a warm water refuge for fishes when the water in the open embayment is too cold and provides spawning grounds in the spring and summer. The land between the new shoreline and the backwater lagoons is covered with piles of wood and boulders to provide habitat for perching birds, basking amphibians and small mammals. One year after construction, the new shoreline is covered with vegetation including aquatic species in the water, and wildflowers and shrubs on land. It is a healthy ecosystem that provides habitats for fishes, amphibians, reptiles, birds, and mammals.



Central waterfront – The central waterfront of Toronto has also been the site of numerous restoration projects, both on the land and in the water. For example, within the Inner Harbour over 4000 m² of new aquatic habitat was created in conjunction with the construction of the three new pedestrian walkway Wave Decks at the Spadina, Simcoe, and Rees slips. To create aquatic habitat under the Wave Decks, a variety of different measures were used; boulders, gravel, tree root balls, and large logs were placed on the lake bed to provide an environment for fishes to reproduce, live, and grow.

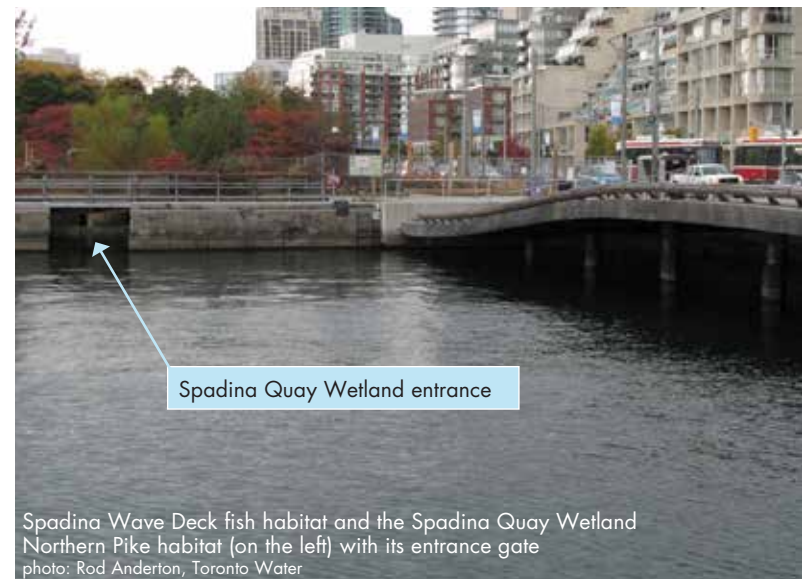
The Spadina Wave Deck is adjacent to the Spadina Quay Wetland. This unique open water marsh habitat, built in 1996 on the site of a former parking lot, offers protection from the harsh wave environment of the Inner Harbour. The sheltered wetland environment is now fostering the development of extensive aquatic plant communities and an emerging fish population. The Northern Pike is known to use this high quality wetland for spawning. To promote the establishment of a healthy fish community numerous underwater features, such as log cribs, were installed to act as both cover and ambush points for the pike to prey on smaller fishes.



Longnose Gar
illustration: Charles Weiss

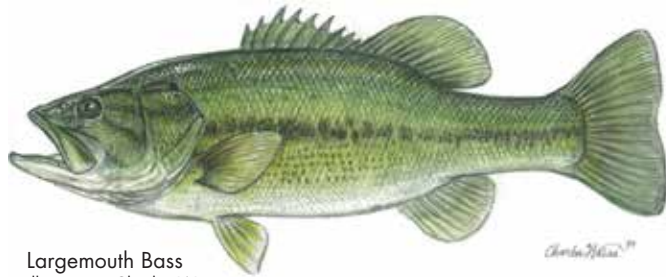


Spadina Wave Deck – constructing and installing root wads to provide cover
photo: TRCA



Spadina Quay Wetland entrance

Spadina Wave Deck fish habitat and the Spadina Quay Wetland Northern Pike habitat (on the left) with its entrance gate
photo: Rod Anderton, Toronto Water



Largemouth Bass
illustration: Charles Weiss

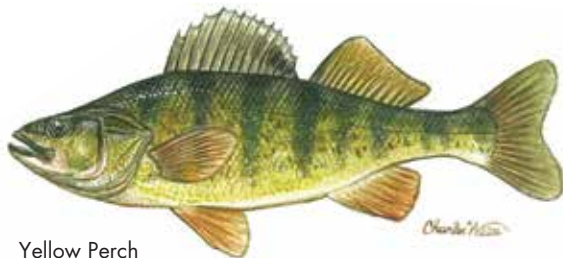
Aquatic Habitat Toronto – Aquatic Habitat Toronto (AHT) is a partnership between agencies with an interest in healthy, sustainable aquatic ecosystems. AHT implements the Toronto Waterfront Aquatic Habitat Restoration Strategy conserving, restoring, and creating aquatic habitat that was historically degraded, and oversees scientific research along the Toronto waterfront. The work is an important step in addressing the environmental challenges that factor into Toronto's listing as an Area of Concern. AHT partners represent three levels of government and include Fisheries and Oceans Canada, Environment Canada, Ontario Ministry of Natural Resources, Toronto and Region Conservation, Waterfront Toronto, and the City of Toronto. For more information visit www.aquatichabitat.ca

Largemouth Bass habitat restoration in Grenadier Pond, High Park
photo: TRCA



Rouge River Marshes – Located at the Toronto-Pickering border, the Rouge River Marshes Wetland Complex supports a variety of plants and animals, many of which are classified as Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and/or as a provincially significant species. Historically, the Rouge River Marshes provided important breeding grounds for fishes and other wildlife. Today, high siltation and turbidity, an influx of invasive species, increased flooding and erosion, encroaching development, and degradation of fish and wildlife habitat threaten the Rouge River Marshes.

Rehabilitation efforts were initiated by Ontario Streams and the MNR in 1998. The restoration involved re-grading the shoreline, adding wetlands, and installing Canada Geese and Common Carp controls. The work included removal of invasive vegetation, such as Purple Loosestrife, and planting of native vegetation to establish a healthy wetland plant community. Bird boxes, an osprey nesting platform, and turtle basking logs were also installed. There is now improved habitat for numerous species of birds, reptiles, mammals, amphibians, and fishes. The addition of native vegetation has created excellent spawning habitat, essential to the survival of many native fish species. Several public fishing access sites were also built for anglers to enjoy the improved marshes and fish populations.



Yellow Perch
illustration: Charles Weiss



Rouge River Marshes, before (above) and after (below) rehabilitation
photos: Ontario Streams



How You Can Help

There are many actions you can take to improve and protect fishes and fish habitat. Below are listed a selection of ways that individuals can improve water quality, reduce the impact of stormwater flows, and protect native aquatic life.

Here are some easy things ...

- Stoop and scoop animal waste.
- Check your car for leaks of fuel, oil, brake, transmission and other harmful fluids. Fix the leaks! Use a drop cloth if you do-it-yourself.
- Reduce usage of your car: ride your bike, take transit, or car pool.
- Eliminate or at least reduce your use of fertilizers and pesticides, and follow application guidelines! (Ontario banned the use of cosmetic pesticides in 2009.)
- Grasscycle! Leave grass clippings on your lawn when you mow (mulch). They'll help your lawn absorb more rain and return nutrients to the soil. This will allow you to cut back on lawn watering, and fertilizing, which frequently contribute to polluted stormwater runoff adding excessive nutrients into surface waters.
- Don't dump toxic substances into the sewer system. ONLY rain or clean water is allowed in the catchbasins on your road.
- Drop-off harmful products such as oil, household cleaners, paint, pesticides, batteries, and prescription medicines at the City of Toronto's Household Hazardous Waste Depots (call 311 for details plus hours and locations).
- Try to limit your use of any hazardous product. Buy only as much as you need and use it all up. If you do end up with leftovers, consider sharing them with a neighbour or donating them to a local community organization. Better still, why not use environmentally safe alternatives for home and laundry cleaning products and gardening/lawn maintenance.
- Don't use soap to wash your car in the driveway. Soap is not allowed to be discharged to the road or catchbasins. If you can, wash your car over a surface that will allow water to soak into the earth, or use a commercial car wash.
- Don't discharge your chlorinated swimming pool water or backwash to the catchbasin. Saltwater disinfection pool water must be discharged to the sanitary sewer or stay on your property.



"FISH: an animal that grows the fastest between the time it's caught and the time the fisherman describes it to his friends." – anonymous

- Use a broom to sweep garbage and soil off driveways, sidewalks and patios – don't use your hose to wash the material to the road and catchbasin. By doing this you're helping reduce pollution picked up in stormwater runoff.
- Get involved in community watercourse restoration or watershed management projects or the Yellow Fish Road Program.

... and some things that need a little extra effort:

- Disconnect your home's eavestrough downspouts from the sewer. Catch the stormwater in a rain barrel and use it to water your lawn and gardens, or redirect the flow to a spot where it can soak into the earth and replenish the groundwater. Visit www.toronto.ca/water/protecting_quality/downspout.htm
- Consider using gravel, well-spaced interlocking bricks, grass or other groundcover instead of impervious (waterproof) surfaces such as pavement or concrete.
- Use landscaping that promotes the filtering of rainwater into the ground or consider xeriscaping, a school of landscape design that promotes water conservation.
- Help keep stormwater on your property and allow it to soak into the earth and replenish groundwater. You can do this by changing the drainage slope of your lawn, by changing the grading or landscaping to stop stormwater runoff.
- Plant trees and shrubs on your property to retain water.



Painting a Yellow Fish beside a catchbasin
photos: TRCA

Yellow Fish Road™ Program

(Toronto and Region Conservation)

The Yellow Fish Road™ program is a free half-day, curriculum-linked, action-oriented experience that gets participants involved in community outreach. Developed by Trout Unlimited Canada, the Yellow Fish Road™ Program offers a PowerPoint presentation, an in-class demonstration and an interactive model helping participants understand how storm drains are linked directly to local water bodies without any purification/treatment. Once educated, participants mark local storm drains with yellow fish symbols and distribute educational leaflets to homes in the area, helping to raise awareness of storm water pollution.

This program runs from the beginning of April until the end of October, and is ideal for schools (grades 2-12 inclusive), Guides and Scouts, and corporate and special interest groups.

www.trca.on.ca/school-programs/facilities-and-programs/watershed-on-wheels
www.yellowfishroad.org



- If you're thinking of adding a bathroom to your home, make sure to connect new plumbing fixtures to your home's sanitary drain (NOT the storm sewer).
- Rooftop gardens can help reduce stormwater runoff. This is a great approach for Toronto businesses or building owners who lack property for other stormwater management techniques. Visit www.toronto.ca/greenroofs

Preventing invasive species

- Inspect your boat, motor, trailer, and boating equipment such as anchors and fishing gear, centerboards, rollers, and axles. Remove

any mussels and other animals and plants that are visible before leaving any waterbody.

- Drain water from the motor, live well, bilge and transom wells while on land immediately before leaving the waterbody.
- Wash and/or dry your boat, tackle, downriggers, trailer, and other boating equipment to kill harmful species that were not visible at the boat launch. Some aquatic species can survive more than two weeks out of water. Therefore, it is important to:
 - rinse your boat and equipment that normally gets wet with hot tap water (greater than 50°C); or
 - spray your boat and trailer with high pressure water (250 psi); or
 - dry your boat and equipment in the sun for at least 5 days before transporting them to another body of water.
- Crayfishes can only be used for bait in the waterbody in which they were caught and they cannot be transported over land. This will help prevent the spread of non-native and invasive species like the Rusty Crayfish.
- DO NOT dump your bait. It is illegal to release live bait into or near any surface waters.
- Never release or flush unwanted aquarium pets, plants, or water into natural waters, drainage ditches or sewers.
- Return or donate unwanted aquarium fishes, reptiles, snails and plants to a pet store or a school.



Removing aquatic plants from a fishing boat and trailer before leaving the site in order to not transport invasive plant species to another watershed.
photo: David Copplestone

Learn how to identify invasive species. Call the province-wide Invading Species Hotline at 1-800-563-7711 to report new sightings, or visit www.invadingspecies.com for more information.

Catch and Release

It has been said that catch and release is the single greatest personal contribution that an angler can make towards the sport fishery. Selective harvest is practised today by conservation minded anglers who occasionally keep a few fishes, but carefully release most they catch. Sport fishes that are caught and released benefit both the species and the fishery for future generations of anglers.

Catch and Release Tips

- Land fishes quickly by using the correct rod and reel for the species you are fishing
- Keep fishes in the water as much as possible
- Wet your hands before handling a fish to avoid excessive loss of the fish's protective slime coating
- Do not touch gills; they are very easily damaged
- Use rubberized or fish-friendly landing nets to protect the fish from abrasion
- Never use abrasive/grippy gloves that both injure and strip slime
- When holding, keep the body of large fishes supported in a horizontal position
- Remove hooks quickly; have pliers handy to cut the hook or help pull it out

For some species like trouts and even small panfishes, barbless hooks (barbs can be pinched down with pliers) help make catch and release quicker and easier for you and the fish. See the web resources at the end of this book for more Catch and Release tips.

Facts about Bait

- The use of live bait is permitted in most Ontario waterbodies – but always refer to the Ontario Recreational Fishing Regulations to confirm if any restrictions apply to the location or waterbody you plan to fish
- Only a limited number of species may be used as bait (example: Yellow Perch cannot be used as bait anywhere in Ontario) – check the regulations to be sure your bait is allowed
- Salamanders cannot be captured, imported, or used as bait in Ontario
- It is illegal to release any live bait or dump the contents of a bait bucket into any waterbody or within 30 m of a waterbody



Brown Trout caught in Ashbridges Bay by TRCA Fish Community Monitoring Program staff
photo: TRCA



Northern Pike released after being caught along the Toronto waterfront
photo: TRCA

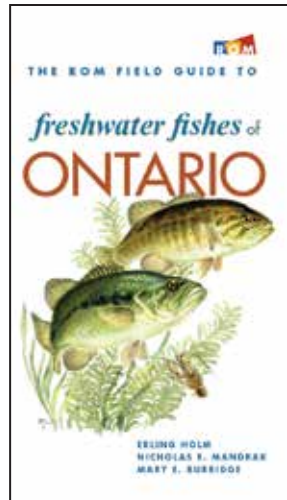
Fishing Regulations in the Toronto Area

Ontario is an angler's paradise. There are over 250,000 lakes in the province and countless kilometres of rivers and creeks. The Toronto area offers anglers many different types of fishing experiences close to home.

Most people between 18 and 64 years of age need to purchase a fishing licence in order to fish in the Toronto area or anywhere in the province. There are some exceptions, such as for disabled Ontario and Canadian residents. Licences can be purchased at Service Ontario outlets or from hundreds of authorized licence issuers around the province.

In order to manage Ontario's fisheries, the Ministry of Natural Resources has divided the province into 20 Fisheries Management Zones. Fishing regulations help manage for healthy fish populations – there are various open and closed seasons, catch and possession limits, and in some cases, size restrictions for the fishes you may catch. Each zone has specific fishing regulations that anglers must follow. Inland waters in the City of Toronto fall within Zone 16, while Lake Ontario waters fall within Zone 20.

To view a summary of Ontario's fishing regulations, visit www.ontario.ca/fishing. You can also pick up a hard copy when you buy your licence. If you plan to fish near the boundary of a zone, you can review the zone maps provided online to determine the boundary between Lake Ontario and various stream mouths and bays.



Royal Ontario Museum's
Field Guide



Hooked-On-Fishing, Alyssa McDonald proudly displays her first Bluegill sunfish with Wil Wegman of the Ontario Ministry of Natural Resources. The MNR and local angling associations coordinate numerous youth fishing events every year, including two Licence-Free Family Fishing periods. Visit the MNR website (see Web References) for more information on fishing with children and other fishing events.
photo: Melanie Quinn, MNR Aurora District

To report resources abuse and fishing violations, call the TIPS-MNR line at 1-877-847-7667.

This *Fishes of Toronto* booklet and the ROM's *Field Guide to Freshwater Fishes of Ontario* will help you become familiar with the numerous fishes that swim in our local waters.

Conclusion

Eels that swim to the Sargasso Sea to reproduce and then die, their offspring spending years making it back to Lake Ontario. A fish that can grow up to 3 m long and live more than a century. The return of a species once so abundant you could have gone to Mimico Creek, or the Don and Humber Rivers, and “walked across a stream dry shod on their backs”. The trophy-sized bass, pike, salmon, and trout that you can catch while having Toronto’s skyscrapers and CN Tower in the background. The minnows and sunfishes you see teeming in a local pond or the salmon jumping by the hundreds at the Old Mill dam on the Humber River.

All of these are amazing anecdotes about the fascinating fishes that this book has tried to highlight. We hope *Fishes of Toronto* will be just a starting point to your connection with Toronto’s fish community. If this book can spark a desire to learn more about our local fish species or to open the door to create your own “Fishing in Toronto” stories, then we’ll be happy. However... if *Fishes of Toronto* can become the gateway to create more lifelong stewards who are determined to conserve our fishes, their habitats, and fishing opportunities for future generations... then we would have all done our jobs that much better.

Remember, the future of our fishes is in your hands!

“Don’t tell fish stories where the people know you; but particularly, don’t tell them where they know the fish.” – Mark Twain



Mike Correa, of TRCA, displays two Smallmouth Bass caught on the open coast side of the Toronto Islands during ‘Nearshore Community Index Netting’; a fish sampling program run in conjunction with the MNR.
photo: TRCA



"Crayfish Slammer" – Smallmouth Bass
illustration: Charles Weiss

2007
Charles Weiss

Select Fishes and Fishing Resources

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Coad, B.W. with H. Waszczuk and I. Labignan. 1995. Encyclopedia of Canadian fishes. Museum of Nature, Ottawa and Canadian Sportfishing Productions, Waterdown, Ontario. viii+928 pp.

Holm, E., N. Mandrak, and M. Burridge. 2009, 2010. The ROM field guide to freshwater fishes of Ontario. Royal Ontario Museum Science Publication. Toronto, Ontario. 462 pp.

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Page, L.M. and B.M. Burr. 2011. Peterson field guide to freshwater fishes of North America north of Mexico. Second Edition. Houghton Mifflin Harcourt Publishing Company, New York, New York xix + 663 pp.

Scott, W.B. and E.J. Crossman. 1973. Freshwater Fishes of Canada. Bull. Fish. Res. Board Can. 184. [1998 Reprint] Galt House Publications Ltd., Oakville, Ontario. xx + 966 pp.

WEBSITES

Identification

FishBase - www.fishbase.org

Ontario Freshwater Fishes Life History Database - www.fishdb.ca

WiscFish - University of Wisconsin, Center for Limnology, Wisconsin Department of Natural Resources, University of Wisconsin Sea Grant - www.wiscfish.org

Agencies and organizations

Ontario Ministry of Natural Resources - www.mnr.gov.on.ca

New York State Department of Environmental Conservation (NYSDEC) - www.dec.ny.gov

Toronto and Region Conservation (TRCA) – www.trca.on.ca

Ontario Federation of Anglers and Hunters - www.ofah.org

Great Lakes Fishery Commission – www.glfc.org

Royal Ontario Museum – www.rom.on.ca

The International Association for Great Lakes Research (IAGLR) - www.iaglr.org

Ontario Streams - www.ontariostreams.on.ca

City of Toronto, Toronto Water - www.toronto.ca/water

American Fisheries Society - www.fisheries.org/afs

Fisheries and Oceans Canada - www.dfo-mpo.gc.ca/index-eng.htm

The North American Native Fishes Association - www.nanfa.org/default.shtml

Lake Ontario Waterkeeper - www.waterkeeper.ca

Conservation Ontario - www.conservation-ontario.on.ca

Ontario Ministry of the Environment - www.ene.gov.on.ca

Fisheries research and management journals

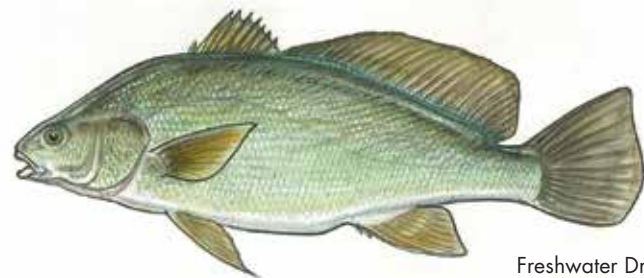
American Fisheries Society Journals - <http://afs-journals.org>

Canadian Journal of Fisheries and Aquatic Sciences - www.nrcresearchpress.com/journal/cjfas

Journal of Great Lakes Research - www.iaglr.org/jglr/journal.php



American Eel
illustration: Charles Weiss



Freshwater Drum
illustration: Charles Weiss

OTHER WEB RESOURCES

Committee on the Status of Species at Risk in Ontario (COSSARO):
www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/244543.html

Committee on the Status of Endangered Wildlife in Canada (COSEWIC):
www.cosewic.gc.ca/eng/sct5/index_e.cfm

Urban Fishing Sites in the Toronto Area - www.mnr.gov.on.ca/en/Business/LetsFish/2ColumnSubPage/STEL02_165643.html

Paddle the Don - www.paddlethedon.ca

Lake Ontario Charter Boat Association -
www.lakeontariocharterboatassociation.com

Ontario Fishing Regulations Summary 2011 - www.mnr.gov.on.ca/en/Business/LetsFish/Publication/STEL02_163615.html

Go Fish in Ontario - www.gofishinontario.com/index.aspx?language=en

The 2011-2012 Guide to Eating Ontario Sport Fish -
www.ene.gov.on.ca/en/water/fishguide/index.php

Aquatic Habitat Toronto - www.aquatichabitat.ca, download the Toronto Waterfront Aquatic Habitat Restoration Strategy and The Fish Communities of The Toronto Waterfront: Summary and Assessment 1989 - 2005)

Toronto Area of Concern Remedial Action Plan - information of Lake Ontario Evenings, Toronto RAP targets, www.torontorap.ca

Lake Ontario Atlantic Salmon Restoration Program - www.bringbackthesalmon.ca

Great Ontario Salmon Derby - www.greatontariosalmonderby.ca

Ontario Sportfishing Guides Association -
www.ontariofishcharters.ca/ontariocent.html
www.ontariofishcharters.ca/ontariowest.html



Brown Bullhead
 illustration: Charles Weiss

Ontario Chinese Anglers Association - www.ocaa.smartanglers.com

Metro East Anglers - www.metroeastanglers.com

MNR Fish Culture - www.mnr.gov.on.ca/en/Business/LetsFish/2ColumnSubPage/STEL02_165904.html

Ontario Family Fishing Weekend - www.familyfishingweekend.com

MNR Kids' Fish Art Contest - www.mnr.gov.on.ca/en/Business/KidsFish/index.html

Ontario Fishing Net - www.ontariofishing.net

Invading Species Awareness Program - www.invadingspecies.com

MNR Youth Fishing - www.mnr.gov.on.ca/en/Business/LetsFish/2ColumnSubPage/STEL02_165419.html

Tackle Share Program - www.tackleshare.com

Catch and Release Fishing -
www.mnr.gov.on.ca/en/Business/LetsFish/2ColumnSubPage/STEL02_166032.html
www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@letsfish/documents/factsheet/stdprod_068934.pdf

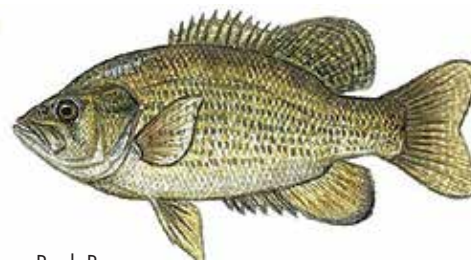
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ROM fish collection records

Strus, R. H. 1994. Metro Toronto Waterfront Fish Communities: Summary and Assessment 1989-1993. Ontario Ministry of Natural Resources, Greater Toronto Area District. Prepared for Metro Toronto Remedial Action Plan.

Whillans, T. H. 1979. Historic transformations of fish communities in three Great Lakes Bays. *J. Great Lakes Research* 5(2):195-215.



Rock Bass
 illustration: Charles Weiss

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Partners

Aquatic Habitat Toronto: www.aquatichabitat.ca

Great Lakes Fishery Commission: www.glfc.org

Ministry of Natural Resources: www.mnr.gov.on.ca

Ontario Federation of Anglers and Hunters: www.ofah.org

Royal Ontario Museum: www.rom.on.ca

Toronto and Region Conservation: www.trca.on.ca

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Charles Weiss – Charles Weiss is a Toronto-based Ontario born artist and writer. He has tried to paint underwater scenes as accurately as possible. He has always felt passionately about nature and wildlife, especially freshwater fishes. These subjects appear in a lot of his artwork. His styles range from realistic to editorial cartoons. www.charlesweissart.com



Photographers

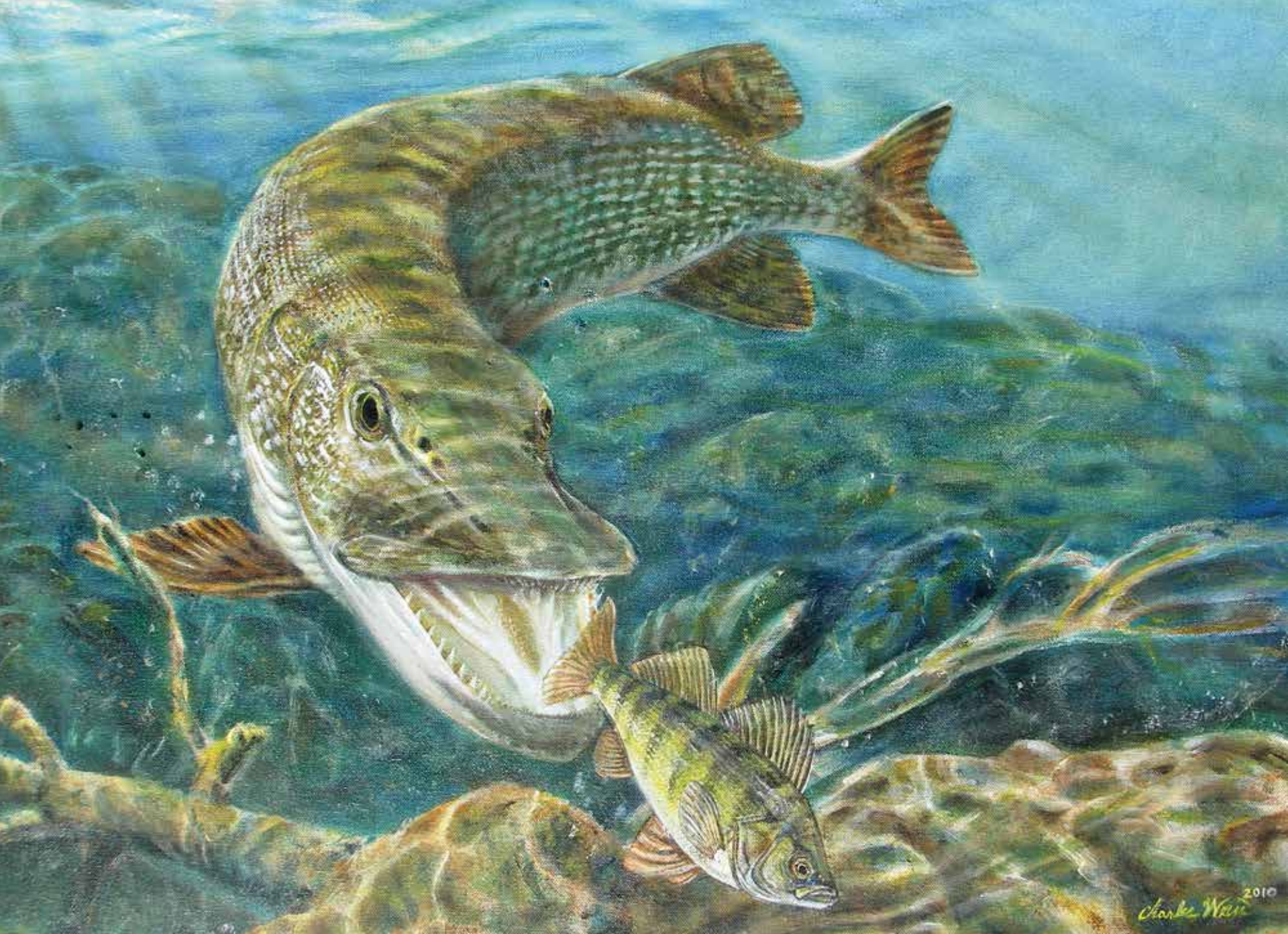
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- Conservation Foundation of Greater Toronto: www.trca.on.ca/foundation
- Toronto and Region Conservation's Paddle the Don Fund: www.paddlethedon.ca
- Ontario Federation of Anglers and Hunters Zone G: www.ofah.org/zoneg

Back cover: "Northern Pike Chasing Yellow Perch"
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