WHY DOES BIODIVERSITY MATTER?

The term biodiversity describes the wide variety of living organisms that inhabit the earth and their interdependent ecosystems. The benefits provided by ecosystems and ecological processes are called ecosystem services and include processes essential to human survival, such as the production of oxygen and clean water, crop pollination, and buffering against floods and storms. Biodiversity is a reflection of ecosystem health, which is essential to our own health and well-being, both locally and globally.
**FISH**

Pollution tolerant fish are taking over our waterways.

**WHAT'S HAPPENING?**

Stormwater runoff is fast, warm, and polluted. In many parts of the GTA, stormwater flows directly into streams.

Sensitive stream fish such as Redside Dace and Brook Trout are found in fewer areas due to urbanization.

**WHY IS THIS IMPORTANT?**

Fish biodiversity reflects the health of our streams and lakes.

Non-native, invasive fish can devastate aquatic ecosystems. Round Goby and Grass Carp have been found in our waterways.

**WHAT CAN WE DO?**

- Improve stormwater management
- Protect & restore coldwater streams

Fish biodiversity in Lake Ontario is INCREASING.
Fish (TRCA)

Fish species that are more tolerant of high water temperatures and pollution are thriving in urban streams and expanding their range, while more sensitive species appear to be declining in both population size and locations found. Diverse fish communities signify healthy stream ecosystems. Current changes in the fish community reflect declining ecological conditions. Stormwater runoff rushing into streams and rivers can raise water temperatures, increase pollutants and degrade fish habitat. Rigorous state-of-the-art stormwater control must be required in all new developments, while the systems serving older city neighbourhood must be upgraded using innovative solutions.

THE CURRENT SITUATION

Changes in fish biodiversity reflect changes in the function and health of aquatic and terrestrial ecosystems. While the scores for stream fish biodiversity have increased in several watersheds since the last report card, this does not necessarily mean that conditions have improved. Rather, several stream species that are more tolerant of warm water temperatures and pollution – including the Fathead Minnow and Creek Chub – are being found in a larger number of sampling sites across the jurisdiction. There is some concern about our more sensitive stream fish species. For example, Brook Trout, a popular native game fish, requires cold, clean water. They are restricted to the headwaters of the Humber River and Rouge River and much of Duffins Creek, in areas of the watershed that have not been heavily urbanized (at least not yet). The provincially endangered Redside Dace have been captured in the Humber River, Rouge River and Duffins Creek watersheds and are also known to exist in the Carruthers Creek and Don River watersheds. Because their habitat is limited, they may be threatened by future development and the impacts of climate change.

In Lake Ontario along Toronto’s waterfront, the abundance of fish appears to be increasing. The abundance of Northern Pike and Walleye, two popular game species, has remained steady over the past few years while the abundance of non-native fishes such as Alewife, Common Carp, and Round Goby continues to increase across all habitat types along the Toronto Waterfront. Round Goby were first found in Lake Ontario at the Toronto waterfront in 2000. While no Round Goby were collected by TRCA in the watersheds during the 2001-2006 sampling period, they were found at six sites close to Lake Ontario (in the Etobicoke Creek, Duffins Creek, Carruthers Creek, Humber River, and Don River watersheds) during the most recent sampling period (2007-2012). While some of these watersheds have barriers that might prevent the Round Goby from increasing its range upstream, others do not.
WHAT NEEDS TO BE DONE

• Stormwater rushing into streams and rivers can raise water temperatures, increase pollution levels and degrade fish habitat. Stormwater controls including Low Impact Development (LID) must be incorporated into all new developments, while the systems serving older city neighbourhood must be upgraded.

• The use of road salt, the main contributor of chloride to our streams, needs to be reduced. Chloride has a negative impact on aquatic life and concentrations in streams and rivers have been increasing steadily. Several monitoring stations show increased chloride levels even during the summer months. We need to raise awareness of this water quality issue as it is not mitigated by improved stormwater management. It is a delicate balance between the need to reduce hazards with the need to protect watershed ecosystem health.

• Cold, groundwater fed streams found within the TRCA jurisdiction provide essential habitat for Brook Trout. We need to maintain and improve remaining Brook Trout populations and their habitat. This requires better documentation of Brook Trout locations, population sizes, stream temperatures, and groundwater contributions. Understanding the relationship between surface and groundwater is essential to ensuring the survival of Brook Trout within our jurisdiction.

• We need to look for opportunities to remove or modify barriers to fish migration to improve connectivity, habitat quality and access to spawning habitats.

• We also need to assess the impacts of invasive species and climate change on the health of aquatic ecosystems across the entire TRCA jurisdiction and develop strategies to manage these impacts.

WHAT WE ARE DOING

• Over the last five years, approximately $20 million has been invested by municipalities, provincial and federal partners in coastal wetland and estuary improvements and waterfront fisheries habitat associated with waterfront park development. We are also working together on the Toronto and Region Remedial Action Plan to eliminate environmental impairments and reverse the loss of fish and wildlife habitat.

• Community groups, such as Ontario Federation of Anglers and Hunters, Task Force to Bring Back the Don, Trout Unlimited, Ontario Streams and the Black Creek Conservation Project, invest money and thousands of volunteer hours every year to protect and restore habitats.

• The new Lake Ontario North Shore Urban Recreational Fisheries Management Plan, developed with our federal and provincial partners and fellow conservation authorities, incorporates a number of planning tools to improve the access to the recreational fishery.

• Over the last five years, about $5 million has been invested by municipalities and TRCA to implement natural channel design concepts and restore highly degraded or altered streams at over 30 project sites. TRCA is also developing a guidance document for designing valley and stream crossing structures that maintain habitat connectivity for fish and wildlife populations throughout our watersheds.

• Aquatic Habitat Toronto, a partnership of regulatory agencies led by TRCA, works with proponents of waterfront projects in the early planning stages to help design habitat compensation projects, to improve the aquatic habitat of the Toronto waterfront, and to facilitate environmental permits and approvals by TRCA and the provincial and federal governments.
• TRCA and the Ministry of Natural Resources and Forestry have worked closely together to prepare fisheries management plans and aquatic habitat management plans. These plans employ planning tools to improve ecological conditions.

• In 2003, the Toronto City Council adopted a Wet Weather Flow Management Plan which is a long term plan that includes a 25-year implementation plan to reduce and ultimately eliminate the adverse effects of wet weather flow, which is runoff generated by rain and melted snow. The City of Toronto has been implementing multiple projects such as the construction of the wet weather flow system to control combined sewer overflow (CSO) discharges to the Don River and central waterfront.

TARGETS

2016 Target: No further loss of fish biodiversity across TRCA’s jurisdiction.

Achieved? Yes. No stream fish species were lost across the jurisdiction as a whole since the last report card.

Target for 2021: No loss of fish biodiversity across TRCA’s jurisdiction.

Long-term target: No loss of fish biodiversity across TRCA’s jurisdiction, no loss of Brook Trout and Redside Dace populations and habitat, and natural recruitment of Atlantic Salmon to be re-established in the Duffins Creek and Humber River.

MEASURE

Stream fish data were collected through TRCA’s Regional Watershed Monitoring Program (RWMP). For each monitoring station, the number of native fish species collected was compared to the number of native species we would expect to find in a healthy river or stream.
TERRESTRIAL BIODIVERSITY
Development is reducing biodiversity across the region

WHAT'S HAPPENING?
Biodiversity scores for plants, birds, and frogs were similar for this time period compared to the last.

WHY IS THIS IMPORTANT?
Biodiversity is an indicator of ecosystem health. Every species depends on other species to survive.

Biodiversity

Urban Sites Rural Sites
poor fair excellent

Most sensitive bird species don't call the city "home" any longer.

Sensitive forest bird species found in 8% urban forest sites

Threats to biodiversity include:
- habitat loss, damage, and fragmentation
- the invasion of non-native species
- pollution
- climate change

Sensitive forest bird species found in 90% rural forest sites

WHAT CAN WE DO?
Strategically acquire, restore & protect more forest and wetland

Improve local stewardship

Stewardship programs engage local residents, businesses, municipalities, and conservation authorities in on-the-ground projects that protect and manage habitats and species diversity.
Terrestrial Biodiversity (TRCA)

Although there was no overall change in the terrestrial biodiversity indicators (native plants, birds, frogs) since the last report card, there have been declines in the indicators within the rural areas which have traditionally been our healthiest areas. For example, there was a decline in ground nesting bird species such as the Ovenbird, likely the result of too much pressure on the remaining terrestrial habitats. We must continue to develop and implement appropriate conservation and sustainable development strategies that recognize biodiversity as an integral part of The Living City® and build partnerships between communities, local governments, environmental organizations and business to steward and protect our regional biodiversity. This includes investment to secure and restore another 5% or more of the region’s land area in order to achieve a target of 30% natural cover.

THE CURRENT SITUATION

Healthy and diverse populations of plants, birds and frogs are a direct indicator of how well we are protecting and restoring our natural areas. A sustainable natural system, not only maintains habitat but also ensures the ecosystem benefits – clean air and water, nutritious food, climate regulation and natural green spaces – upon which we all rely. There are many threats to biodiversity – habitat loss, the invasion of non-native species, pollution and climate change – and all of these threats are accelerated by urban development and other human activities. Terrestrial biodiversity has steadily decreased across southern Ontario since the first European settlements were founded. Some 10% of the native plant species and 6% of animal species have disappeared entirely from TRCA’s jurisdiction and many others are just “hanging on”. Of the 1,155 species of native plants and animals in the TRCA jurisdiction, 60% are considered Species of Regional Conservation Concern (SRCC). SRCC may be sensitive to disturbance, traffic or impacts from urban development. They may require a specific habitat type. Or they may need a large and intact natural area to maintain their population. These conditions are found mainly in rural areas. The species found in the urban core are more generalist in nature and less sensitive to urbanization pressures. Today, only one-third of all native species can still be found in the urban portions of the jurisdiction.
WHAT NEEDS TO BE DONE

• We need to respond proactively and aggressively to the loss of our native biodiversity; once species and habitat are lost they are extremely difficult to bring back.

• One of the primary threats to biodiversity is habitat loss. Through various stewardship programs, local residents, municipalities, companies and institutions must work to improve the natural habitat on their lands and stop the spread of invasive, non-native species.

• We must invest in conservation. Reaching our long-term target of 30% natural cover would require an investment of more than $500 million.

• We must work with regional and local municipalities to develop and implement strategies, policies and management practices for land securement, invasive species management and safe passageways for wildlife under and over roadways. These important initiatives are needed to maintain diverse populations of species in the landscape over the long-term.

WHAT WE ARE DOING

• Roads can act as barriers between habitats, while traffic can significantly increase wildlife mortality. Local and regional governments are working with TRCA on habitat and wildlife connectivity through the Road Ecology Project. The City of Brampton has been actively working with TRCA on safe crossings for wildlife along a stretch of road along Heart Lake and Region of Peel has been looking at solutions along the Gore Road.

• TRCA is using land securement, watershed plans, stewardship and restoration projects to implement our Terrestrial Natural Heritage System Strategy (TNHSS). In turn, municipalities are using the Strategy’s target system and TRCA’s watershed plans to identify their own natural heritage systems and develop protection policies in their planning documents.

• Bridges and culverts where roads cross river and stream can disrupt the natural movement and migration of wildlife in valley corridors. *The Valley and Stream Corridor Crossings Guideline*, developed by TRCA in partnership with the University of Toronto and Canadian Water Network, will help ensure safe passageways for terrestrial and aquatic species throughout the jurisdiction.

• TRCA is developing an assessment framework to help identify, monitor and manage the risks associated with climate change. We are also prioritizing invasive plant management plans, and developing detailed strategies for ecological restoration to prioritize projects that will provide the greatest benefits to regional biodiversity.

• The Ontario Ministry of Natural Resources and Forestry is working on recovery planning for species at risk in the Province, as well as mapping landscape connectivity across southern Ontario.

• The Ministry of Transportation has completed their *Environmental Guide for Wildlife Management*.

• The Ontario Invasive Plant Council is working with TRCA and other conservation authorities to develop a framework for the management of invasive plant species.
TARGETS

2016 Target: No further loss of terrestrial plants and animals (maintain current abundance). Complete reforestation and wetland habitat restoration on approximately 750 ha across the TRCA jurisdiction, and manage non-native invasive species to achieve long-term target.

Achieved? Partially. It is unclear at this time if there has been no further loss of terrestrial plants and animals because the monitoring program has not been running long enough; but, the second half of target was achieved with approximately 750 ha of land restored and management of non-native species on TRCA land.

Target for 2021: Reforestation and wetland habitat restoration projects are underway on approximately 750 hectares (over the five-year period) across the TRCA jurisdiction. These projects will improve the quantity and quality of natural cover and, over time, provide habitat for various species of flora and fauna.

Long-term target: Terrestrial Species of Regional Conservation Concern achieve moderate to high abundance.

MEASURE

TRCA surveys, ranks and scores animal species (fauna) and vegetation communities (flora) to assess the relative ecological health and quality of greenspaces. Regional terrestrial biodiversity is based on the combined scores for three indicators: native forest and wetland plants, forest, wetland and meadow birds, and frogs.
NATURAL COVER
The quality of our natural cover is deteriorating

Why is this important?
Natural cover helps maintain biodiversity. It also mitigates floods and improves air quality.

No Cover
17.8% forest & wetland habitat
7.7% meadow habitat
25.5% of TRCA watersheds is natural cover

What's happening?
Quality: The quality of our natural cover is declining.

Impact of urbanization on natural cover:
- Water pollution
- Soil compaction
- Recreational pressures
- Invasive species
- Light and noise pollution

What can we do?
- Prioritize the protection of large tracts of forest and wetland
- Invest in restoring and managing natural cover

Larger patches of natural cover support a wider range of native plants and animals.

Target: 30% natural cover with a higher proportion of forest & wetland.
The quality of our natural cover is declining. The quantity and quality of natural cover are not only important to the biodiversity of plants and wildlife in the Toronto region but also to mitigating impacts related to climate change and maintaining many ecosystem services on which we rely. The goal of the Terrestrial Natural Heritage System Strategy (TNHSS) for TRCA watersheds is to increase natural cover to 30% within the next 90 years. This will require the acquisition and restoration of more than 27,000 hectares. We must continue to advocate for policy that protects our existing natural cover and enables the creation of new natural cover, especially forests and wetlands.

**THE CURRENT SITUATION**

Historically, TRCA watersheds and the Toronto region would have been almost completely covered with natural vegetation; mostly forests and wetlands with some meadows. Today, only 25.5% of this landscape has natural cover, and only 17.8% is forest or wetland. The ability of this remaining natural cover to support regional ecosystems and biodiversity continues to decline, not only because there is so much less of it but also because it is fragmented by urban and agricultural land, and impacted by human activities.

Even if an area of natural cover is preserved while urban development occurs around it, the quality of the natural cover and its ability to support biodiversity will be reduced. Some of the impacts of development on adjacent natural areas and natural cover include:

- changes in water flow to forest and wetland features, and increases in water pollution from stormwater runoff and spills;
- increased recreational use and uncontrolled access by nearby residents, including trampling vegetation and soil compaction, litter, disturbing fauna and collecting plants and animals;
- competition by invasive plants and predation by both pets and urban-adapted animals such as raccoons; and
- light pollution and chronic excessive noise.

Since the last report card, GTA forests have been devastated by an introduced pest insect, the emerald ash borer (EAB). EAB damages and kills ash trees by feeding beneath the bark and disrupting the flow of water and nutrients within the tree. EAB usually kills trees within four years of infestation. EAB was confirmed in Toronto in 2007 and since then it has killed thousands of trees across the GTA. An ice storm in 2013 also significantly damaged forests across the GTA.
WHAT NEEDS TO BE DONE

The TNHSS, adopted by TRCA in 2007 and supported by its partner municipalities, provides the data, scientific models and mapping needed to guide the Authority and municipalities in the protection of natural cover and natural heritage. In order to sustain the existing biodiversity of species of concern, the TRCA jurisdiction should have at least 30% natural cover. To achieve the 30% natural cover target, approximately 27,000 hectares must be restored. This is a long-term strategy, to be implemented over the next 80-90 years (target year 2100), to create a natural system robust enough to sustain biodiversity and the community benefits of health ecosystems in the face of the impacts of urbanization.

WHAT WE ARE DOING

• Municipalities are working with TRCA and other conservation authorities to update their natural heritage policies and identify areas for protection and enhancement of natural cover.

• TRCA has developed tools to identify the areas in the region where ecological restoration is most beneficial to biodiversity and water management. These help guide investment in restoration to ensure that it provides the maximum degree of benefit.

• The South Central Ontario Conservation Authority Natural Heritage Discussion Group is a forum that brings conservation authority staff together to discuss and collaborate about the science and management of natural systems to ensure for the effective planning, protection and management of natural heritage systems.

• Ontario Nature released *The Best Practice Guide to Natural Heritage System Planning*. The guide was designed to assist municipalities with natural heritage policy development as they update their Official Plans. It helps design natural heritage systems that are spatially and functionally interconnected allowing for maximum ecosystem services benefits.

• The Ontario Ministry of Natural Resources and Forestry (OMNRF) is currently reviewing the wetland conservation framework to ensure that these biologically diverse and productive habitats are protected. OMNRF has developed a draft wetland conservation strategy for Ontario called *A Wetland Conservation Strategy for Ontario 2016-2030*. The strategy identifies a provincial vision for wetlands and set out a series of actions that will be undertaken over the next 15 years to improve wetland conservation across the Province.

• The Region of Peel has undertaken a project to identify priority areas for tree planting both in and outside of the natural system, while York Region is crafting messages to convey the benefits of its urban forest and engage citizens in restoration activities.

• The Ontario Biodiversity Council is a network of 34 members who guide the implementation of the ambitious conservation agenda outlined in Ontario’s Biodiversity Strategy. The Strategy aims to raise awareness of biodiversity values, facilitate the coordination of conservation activities, and support and encourage the efforts of communities and individuals to conserve biodiversity across Ontario.

• The City of Toronto is in the process of developing a Ravine Strategy for the future use, management, enhancement and protection of Toronto’s ravines. The comprehensive strategy brings together various related plans, strategies, regulations, and bylaws and focuses specifically on ravines. It contains a vision for the ravine system, a set of principles to guide planning and policy, and identifies opportunities for stewardship and investment. The strategy is scheduled for completion in the spring of 2017.
TARGETS

2016 Target: Restore or reforest 750 hectares of wetland and forest areas identified in the targeted TNHSS which will improve the quantity and quality of natural cover.

Achieved? Almost! Approximately 750 hectares of land were restored from 2011 to 2015, although some work was completed outside the TNHSS and some land was restored to meadow.

Target for 2021: Restore or reforest an additional 750 hectares of wetland and forest area within the targeted TNHSS.

Long-term target: Increase the quantity of natural cover (forest and wetland) within TRCA’s jurisdiction to 30% within the THNSS and increase quality of natural cover from fair to good.

MEASURE

The quantity and quality of natural cover - using aerial photography, TRCA estimates the percentage of natural cover across the jurisdiction and the quality of that natural cover is an average total score derived from the habitat patch analyses.