Living in Niagara – 2020 Report
Environment

Niagara is known for its unique geography and environment. To ensure a sustainable future, it is essential for residents to see their role in protecting and restoring our natural assets; in reducing and recycling household waste; and in responding to climate impacts.

Happening Now

- Through development of Niagara's new Official Plan, the Niagara Region is examining climate change effects in Niagara, and policies to support mitigation and adaptation in our community. The Niagara Peninsula Conservation Authority (NPCA) is at the table, and similarly is looking at climate effects in policy and planning.
- The Mood Walks program promotes the role of parks and recreation in mental health and well-being. It is led by the Canadian Mental Health Association (CMHA) in Ontario, in partnership with Hike Ontario, Conservation Ontario, the provincial government and local social service agencies. Local Mood Walks participants include CMHA Niagara Branch, the Niagara Bruce Trail Club, the Niagara Region Mental Health Program, and Brock University.
- Through Geospatial Niagara, community members have submitted an expression of interest to the Canadian National Committee for Geoparks, for Niagara to establish itself as a UNESCO Global Geopark. The proposed name, Ohnia:kara is the Mowhawk word for 'neck between two bodies of water'. Already, across all 12 municipalities of the region, 78 geosites of geological, environmental, or cultural interest have been identified.
- The Niagara River offers several ecological, recreational and economic beneficial water uses, such as power generation, tourism, recreation; it is a source of drinking water; and it supports over 1200 species. The work of the Niagara River Area of Concern Remedial Action Plan (RAP) is progressing. Significant improvements have been made in water quality, habitat, and the clean-up of contaminated sediments.
- The Niagara River Ramsar Binational Steering Committee is pursuing a transboundary Ramsar Site designation. This would commit, under the global Ramsar Convention, Canada and the US to continue to work together to ensure advancement of environmental progress achieved in the past 50 years. In October, 2019, the Niagara River (US) Corridor was officially designated as a Ramsar Site (Wetland of International Importance).

What's Emerging

- Understanding is increasing about the important role Conservation Authorities play in Ontario, regarding protecting watersheds and their natural features. The Niagara Peninsula Conservation Authority (NPCA) encompasses the entire Niagara region, 21% of the City of Hamilton and 25% of Haldimand County. The Niagara Peninsula is one of

the most complex watersheds in the province. Its climate, biodiversity and growing zones are unique in North America. The Peninsula includes lands drained by the Niagara River, Twenty Mile Creek, the Welland River and the Welland Canal; is nestled between Lake Erie and Lake Ontario; and is traversed by the Niagara Escarpment.

- The COVID-19 pandemic is highlighting the connection between mental wellness promotion and people in our community having access to enjoy outdoor spaces.
- The work of making restoration improvements in Niagara River Remedial Action Plan continues. Focus areas are: restrictions on fish and wildlife consumption; degradation of fish and wildlife populations; beach closings; and degradation of benthos (benthic invertebrates, a source of food for fish and aquatic birds).
- The Niagara Food Security Network is building its foundation, with over 100 individuals and community organizations working together to make Niagara more food secure for everyone. A Food Resources in Niagara webpage and Niagara Food Assets Map are now available.
- Taking a smart growth approach to engaging the community in land use planning in Niagara is being encouraged. The intent is to balance perspectives and enhance the effectiveness and legitimacy of the process.

Suggested Community Action Steps

- Encourage residents in Niagara to better appreciate green spaces and nature-based solutions for their value as green infrastructure, which is part of a healthy and sustainable community.
- Engage residents in local planning for improved resource management and green space protection and restoration. This will lead to improved decision-making that is based on diverse ideas and opinions.
- Inspire more citizen science in Niagara, in order to build base awareness, a feeling of ownership, and to complement local decision-making.
- Share knowledge, and build consensus about the state of the environment in Niagara.

Indicators

- **Air**
- **Biodiversity**
- **Climate Impacts**
- **Land**
- **Waste**
- **Water**

Indicator: Air

Quality

Environment and Natural Resources Canada provides provincial Air Quality Health Index (AQHI) Summary information and forecast maximums for Ontario (and sub-locations within the province – eg. St. Catharines and Hamilton) at: https://weather.gc.ca/airquality/pages/provincial_summary/on_e.html .

A Guide to Air Quality Health Index (AQHI) forecasts is available at: https://www.canada.ca/en/environment-climate-change/services/weather-health/publications/guide-air-quality-index-forecasts.html

Air Quality Ontario is provided by the Ontario Ministry of the Environment, Conservation and Parks. This table shows the health risk categories and related index levels and health messages.

Air Quality Health Index (AQHI) Categories and Health Messages			
Health risk	**Air Quality Health Index**	**Health messages At risk population****	**Health messages General population**
Low	1-3	Enjoy your usual outdoor activities	Ideal air quality for outdoor activities.
Moderate	4-6	Consider reducing or rescheduling strenuous activities outdoors if you are experiencing symptoms.	No need to modify your usual activities unless you experience symptoms such as coughing and throat irritation.
High	7-10	Reduce or reschedule strenuous activities outdoors. Children and the elderly should also take it easy.	Consider reducing or rescheduling strenuous activities outdoors if you experience symptoms such as coughing and throat irritation.
Very high	Above 10	Avoid strenuous activities outdoors. Children and the elderly should also avoid outdoor physical exertion.	Reduce or reschedule strenuous activities outdoors, especially if you experience symptoms such as coughing and throat irritation.
**People with heart or breathing problems are at greater risk. Follow your doctor's usual advice about exercising and managing your condition.			
Source: Environment and Climate Change Canada			

- In 2018, based on the AQHI categories, Ontario reported low risk air quality 92.9% of the time, moderate risk 7% of the time, and high risk 0.04% of the time.
- In 2018, very high risk AQHI was reported for one hour in North Bay due to forest fire smoke.
- The percentage distribution of hourly AQHI readings for each of the 38 monitoring sites around Ontario, by AQHI value and the number of high risk AQHI days is detailed in the Appendix: 2018 Air Quality Health Index summary.

Source: Air quality Ontario
Retrieved from: http://www.airqualityontario.com/ and https://www.ontario.ca/document/air-quality-ontario-2018-report/air-quality-health-index-overview

Heat Alert information is provided on the Niagara Region website. Health effects during a high heat alert include: heat stroke; heat exhaustion; sun safety. Niagara Region Public Health (NRPH) refers residents to Environment Canada for Heat Alert information, at: https://weather.gc.ca/warnings/report_e.html?on17 . NRPH recommends that residents check with their local municipality to see if cooling centres are available.

Source: Niagara Region Public Health
Retrieved from: https://www.niagararegion.ca/living/health_wellness/inspection/highheat.aspx

Niagara Parks Commission Air Emissions Reduction Program

In 2001, the Niagara Parks Commission entered into a partnership with the Ontario Ministry of the Environment to launch the Spare the Air Emissions Reduction Program. This initiative uses public awareness activities to encourage motor coach and truck drivers to turn off their engines when parked and has resulted in measurable reductions in hazardous air emissions.

Since that time, Spare the Air has been expanded to include truck and motor coach drivers operating along the entire length of the Niagara River corridor, with the support and participation of numerous local partners. Each partner distributes educational flyers and posts signs to remind drivers to “Turn off your engine when parked”.

Source: Niagara Parks Commission
Retrieved from: https://www.niagaraparks.com/corporate/about-us/environmental-protection/

Indicator: Biodiversity

Niagara Escarpment Biosphere (NEB)

The Niagara Escarpment Biosphere (NEB), formerly named the Niagara Escarpment Biosphere Reserve, is designated by the United Nations Educational Scientific and Cultural Organization (UNESCO). The name change addresses a conflict in terminology and a negative historical connotation for many Indigenous peoples.

The Niagara Escarpment Foundation and the Niagara Escarpment Commission have initiated a project to encourage and facilitate a more collaborative, community-based governance structure for the NEB, which includes meaningful engagement with Indigenous Peoples/Communities. This project is funded by the Friends of the Greenbelt Foundation.

The Great Niagara Escarpment Indigenous Cultural Map is available at: http://www.thegreatniagaraescarpment.ca/ . It identifies important Indigenous historic, cultural, and natural world locations along more than 750 kilometres from Niagara Falls to the western region of Manitoulin Island.

The NEB is one of four UNESCO Biosphere Reserves in Ontario. Biosphere Reserves involve local communities and all interested stakeholders in planning and management. They integrate three main "functions":

- Conservation of biodiversity and cultural diversity
- Economic development that is socio-culturally and environmentally sustainable
- Logistic support, underpinning development through research, monitoring, education and training

These three functions are pursued through the Biosphere Reserves' three main zones:

- Core Areas
  - It comprises a strictly protected zone that contributes to the conservation of landscapes, ecosystems, species and genetic variation
- Buffer Zones
  - It surrounds or adjoins the core area(s), and is used for activities compatible with sound ecological practices that can reinforce scientific research, monitoring, training and education.
- Transition Area
  - The transition area is where communities foster socio-culturally and ecologically sustainable economic and human activities.

Source: Niagara Escarpment Commission and UNESCO
Retrieved from:
https://www.escarpment.org/NiagaraEscarpment/UnescoWorldBiosphereReserve ; and
https://en.unesco.org/biosphere/about

Niagara River Ramsar Designation

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The Niagara River Ramsar Binational Steering Committee is pursuing a transboundary Ramsar Site designation. This would commit, under the global Ramsar Convention, Canada and the US to continue to work together to ensure advancement of environmental progress achieved in the past 50 years. In October, 2019, the Niagara River (US) Corridor was officially designated as a Ramsar Site (Wetland of International Importance).

The Ramsar Convention is a voluntary Treaty, committed to promoting the conservation and wise use of water-based ecosystems through international engagement and collaboration. The Treaty was signed in Ramsar, Iran; in 1971. Canada signed the Treaty in 1981, and has 37 Ramsar sites. The United States signed the Treaty in 1987 and, with the recent designation of the American side of the Niagara River, now has 40 Ramsar sites. There are 169 member countries that have designated more than 2,227 Ramsar Sites (215,000,000 ha) around the world.

Source: Niagara River Remedial Action Plan
Retrieved from: https://ourniagarariver.ca/ramsar/

OHNI : KARA Proposed UNESCO Global Geopark

Through Geospatial Niagara, community members have submitted an expression of interest to the Canadian National Committee for Geoparks, for Niagara to establish itself as a UNESCO Global Geopark. The proposed name, Ohnia:kara is the Mowhawk word for 'neck between two bodies of water'. Already, 78 geosites of geological, environmental, or cultural interest in all 12 municipalities of the region have been identified.

Source: OHNI : KARA An Aspiring Global Geopark, NCO Policy Brief, January, 2019.
Retrieved From: https://www.niagaraknowledgeexchange.com/wp-content/uploads/sites/2/2019/02/NCO-37-OHNIAKARA-ASPIRING-GEOPARK-web-FINAL-JAN-2019.pdf

Threat of Invasive Species

Invasive Species are non-native species whose introduction or spread threatens the environment, the economy, or society.

The September, 2019 Niagara Environmental Background Study report was prepared to inform development of the Niagara Region 2041 Official Plan. The report includes a section on

Invasive Species. It also includes examples of policies and guidance to support the management of invasive (or non-native) species, and reduce the impact to the natural environment in Niagara. The report cites prevention as the most effective way to manage the spread of invasive species.

In addition to the cost to ecosystem services, there is a direct economic cost resulting from managing the impact of invasive species. The Ontario Invasive Species Strategic Plan (Ministry of Natural Resources, 2012) provides two examples of costs resulting from invasive species impacts:

- $37 million to cut and replace ash trees affected by Emerald Ash Borer (Agrilus planipennis) (EAB) in the City of Toronto over five years
- $30 million spent up to 2012 by the Canadian Food Inspection Agency (CFIA) to cut ash trees to slow the spread of EAB

The background study report suggests Niagara Region has the opportunity to consider including policies in the new Niagara Official Plan that support the management of invasive species including:

- supporting management initiatives on public and private land
- limiting the use of invasive species on public land
- restricting the use of plantings for new developments approved through the planning process.

The Region could also consider the development of an Invasive Species Plan to be coordinated and implemented with the area municipalities, the Niagara Peninsula Conservation Authority, other interested agencies, and landowners.

Some of the invasive species of most concern in Niagara include:

Terrestrial Invasive Flora

- Garlic Mustard
- European Buckthorn
- Common Reed
- Dog-strangling Vine

Terrestrial Invasive Fauna

- Emerald Ash Borer
- Gypsy Moth
- Beech Bark Disease

Aquatic Invasive Species

- Eurasian Water Milfoil
- European Frog-bit
- Yellow Iris
- Round Goby
- Zebra and Quagga Mussels
- Rusty Crayfish
- Golden Mussel
- Asian Clam
- Sea Lamprey

Source: Natural Environment Background Study, Niagara Region, September 26, 2019. New Niagara Official Plan – Sustainable Region.
Retrieved from: https://www.niagararegion.ca/projects/rural-and-natural-systems/pdf/natural-environment-work-program-study.pdf

Species at Risk

A “species at risk” is any naturally-occurring plant or animal in danger of extinction or of disappearing. Reasons for species becoming at risk include habitat loss and fragmentation, pollution, resource management activities, changing land use activities, and spread of invasive species or disease. When species are at risk in a region, it threatens the amount of biodiversity (the variety of different habitats and types of plants, animals, fish and insects) in that region.

In Canada, species at risk (SAR) are listed both provincially and federally. A provincial list of SAR is available on the Ontario Ministry of Natural Resources and Forestry’s website at www.ontario.ca . Information on the federal Species at Risk Act can be found at www.sararegistry.gc.ca .

Land Care Niagara (LCN) states that there are about 20,000 wild species of plants and animals in Niagara, and more than 65 species are at risk.

Source: Land Care Niagara; and the Ontario Soil and Crop Improvement Association 2018 Species at Risk Farm Incentive Program
Retrieved from: https://landcareniagara.com/programs/species-at-risk/ and https://www.ontariosoilcrop.org/wp-content/uploads/2018/05/SARFIP-2018-BROCHURE-FINAL-small_v1.pdf

Biodiversity Monitoring

The Ontario Biodiversity Council leads Ontario’s 2011 Biodiversity Strategy (2011). This helps to advance both the UN Convention on Biological Diversity and the Canadian Biodiversity Strategy. The Ontario strategy Framework for Action encompasses 4 strategic directions:

- Engage People
- Reduce Threats
- Enhance Resilience
- Improve Knowledge

Source: Ontario Biodiversity Council
Retrieved from: http://ontariobiodiversitycouncil.ca/

Niagara College Sustainability (NCS) provides information about species monitoring and threats to biodiversity in Niagara. A listing of Sensitive Species in Niagara is provided on the NCS website. Of the 53 species that are classified as either Endangered, Threatened or Special Concern, the type of species breakdown is as follows:

- Birds – 17
- Fish Insects, Mammals, Lizards and Mussels – 9
- Plants – 18
- Snakes and Turtles – 9

Source: Niagara College Sustainability
Retrieved from: https://sustainability.niagaracollege.ca/project/species-monitoring/

The Niagara Parks Commission, Niagara College and the Niagara Peninsula Conservation Authority (NPCA) have formed an Environmental Alliance to combine their combined efforts in environmental stewardship and protection.

Niagara Parks and the NPCA are working in partnership to address local water quality concerns stemming from the substantial number of Canada Geese living along the Niagara River, specifically near Fort Erie where goose droppings were unsightly and unpleasant and had the potential to pose health concerns.

To assist in resolving the problem, NPCA staff maintain a buffer of vegetation along the Niagara River to deter the geese from accessing adjacent land. Buffer strips are a proven technology that contribute to water quality improvements by filtering surface runoff; and they provide bank stabilization, erosion control and increased habitat for many types of wildlife.

The Parks Commission partners in various projects that provide educational experiences for Niagara College and Brock University students, to survey and monitor fish, aquatic insects and vegetation habitats.

Source: Niagara Parks Commission – Environmental Protection
Retrieved from: https://www.niagaraparks.com/corporate/about-us/environmental-protection/

Indicator: Climate Impacts

Climate Change Planning

► Niagara Region New Official Plan

Through development of Niagara's new Official Plan, the Niagara Region is examining climate change effects in Niagara, and policies to support mitigation and adaptation in our community. The Niagara Peninsula Conservation Authority (NPCA) is at the table, and similarly is looking at climate effects in policy and planning.

A November, 2019 Niagara Region Climate Change Discussion Paper identifies impacts and risks in terms of: Flooding; Human Health; Agriculture; Ecosystems; and Infrastructure. Climate Change has been identified at both the Provincial and Regional level as a key area for land use planning policy development. Municipalities have been identified by the Government of Canada as being key partners in the fight against climate change, as they influence 50% of Canada's greenhouse gas emissions.

Key sectors where climate change adaptation and mitigation intersect with land use planning:

- Complete communities - neighbourhoods that are compact and mixed-use, providing amenities closer together.
- Infrastructure - assessing infrastructure risks and vulnerabilities; encouraging the use of green infrastructure and low impact development.
- Transportation - reducing automobile use through planned transit and active transportation.
- Energy - promoting alternative energy systems and energy efficiency through building design and orientation.
- Natural Environment - protecting the natural heritage and water resource systems; recognizing the importance of watershed planning for the protection of water; managing natural hazards; and undertaking stormwater management planning.
- Agriculture - protecting the agricultural land base; promoting local food, food security, and soil health.

The 2019 discussion paper builds on prior work completed by Niagara Region, including the 2012 report, Adapting to Climate Change: Challenges for Niagara.

Source: Niagara Region Climate Change Discussion Paper, November, 2019.
Retrieved from: https://www.niagararegion.ca/projects/rural-and-natural-systems/pdf/climate-change-discussion-paper.pdf

and https://www.niagararegion.ca/official-plan/

and https://niagaraknowledgeexchange.com/resources-publications/adapting-to-climate-change-challenges-for-niagara/

► Perspectives on Climate Change: A Report on the 2019 Benchmarking Survey of Canadian Professional Planners

In 2019, the Canadian Institute of Planners (CIP) undertook a survey of planners in partnership with Natural Resources Canada (NRCan). The survey was adapted from previous surveys carried out in 2009, 2011, and 2012.

The 2019 survey covers 4 broad themes: Awareness of the Impact of Climate Change on Planning Issues; Climate Change Sources of Knowledge and Information; Climate Change Tools; and Barriers to Incorporating the Effects of Climate Change Planning into Planning Work.

Key findings include:

- Awareness: Planners' awareness of the impact of climate change on planning issues has increased significantly since 2009, with the number of respondents reporting they are very aware, doubling from 18% to 38%.
- Climate Change Sources of Knowledge and Information: Professional networks (interaction with colleagues), provincial agencies, and Environment and Climate Change Canada are the most frequently consulted sources of information by planners when seeking to incorporate a climate change lens to their planning work.
- Climate Change Tools: For those who consider that climate change has a significant impact on their planning work, national data, modelling and mapping tools, and national non-governmental guides are the most frequently used tools for applying a climate lens to their work. More generally, comparing national, provincial, local, and neighbourhood tools, most planners look to local plans (eg. operational plan/municipal development plans) when applying a climate lens to their work.
- Barriers: Competing priorities (eg. financial viability), lack of political support, and lack of information are seen as the main barriers to incorporating a climate change lens into planning work.

Source: Perspectives on Climate Change – A Report on the 2019 Benchmarking Survey of Canadian Professional Planners.
Retrieved from: https://www.niagaraknowledgeexchange.com/wp-content/uploads/sites/2/2020/03/CIP-FINAL-report_2019-Benchmarking-Survey_Perspectives-on-Climate-Change.pdf

► Local Municipalities in Niagara are developing climate adaptation plans.

- Niagara Adapts is a partnership between seven municipalities in the Niagara region and the Environmental Sustainability Research Centre at Brock University. The intent is to support collaborative climate change adaptation assessment, planning and implementation. Participating municipalities include Grimsby, Lincoln, Niagara Falls, Niagara-on-the-Lake, Pelham, St. Catharines and Welland.

  In the fall of 2019, a baseline climate vulnerability survey was conducted, to ask people in the seven participating local municipalities in Niagara what 'adaptation to climate change' means to them. A total of 1,087 people completed the survey (63% female; 37% male). Survey results include:

  - 74% of respondents believe climate change is impacting their community
  - Only 21% of respondents feel that their community is prepared to adapt to climate change
  - 87% of respondents believe humans have the capacity to address climate change
  - For 53% of respondents, adapting to climate change is a top priority for their households
  - 85% of respondents support municipal resources being used for climate change adaptation

  Source: Environmental Sustainability Research Centre, Brock University
  Retrieved from: https://brocku.ca/esrc/niagara-adapts/ and https://brocku.ca/esrc/wp-content/uploads/sites/75/Niagara-Adapts-Combined-Regional-Climate-Vulnerability-Fact-Sheet-2020.pdf

- The City of St. Catharines Climate Change Adaptation Plan contains 6 goals to prepare for the future. The goals closely follow the trends of climate projections and are the high-level intentions of the plan.

  1) Prepare for hotter summers
  2) Prepare and respond to extreme weather events
  3) Develop a flood prevention strategy
  4) Improve stormwater management including the use of green infrastructure
  5) Prepare for high Lake Ontario water levels
  6) Re-think how the city addresses Climate Change

  Retrieved from: https://www.engagestc.ca/ClimateAdaptation and https://www.stcatharines.ca/en/livein/resources/Climate-Change/ClimateAdaptionPlan_FINAL.pdf and https://www.stcatharines.ca/en/livein/resources/Climate-Change/Appendix-C.-Niagara-Adapts-Vulnerability-Infographic---St.-Catharines.pdf

- Town of Lincoln Collaboration with Brock University Shoreline & Climate Change Research Project- In 2018, the Town of Lincoln joined a research collaboration with Brock University, to examine how coastal communities can deal with the impacts of climate change. The Town of Lincoln is one of the communities included in the project, with a funding grant of $280,000 from the Marine Environmental Observation Prediction and Response Network (MEOPAR). Lincoln suffered around $1 million in damage as a result of back-to-back spring storms in 2017 that caused massive flooding from Lake Ontario. The storms led to the Town's first-ever voluntary evacuation notice for residents living near the Lake Ontario shoreline, and caused significant damage to Charles Daley Park and sewer systems in Jordan Station and Campden.

  Source: Brock University News, May 03, 2018.
  Retrieved from: https://brocku.ca/brock-news/2018/05/brock-lincoln-living-lab-research-project-to-examine-lake-ontario-shoreline-flooding/

Climate Change Community Action

► The Climate Change Toolkit for Health Professionals is provided by the Canadian Association of Physicians for the Environment (CAPE). The toolkit is designed for health professionals and students in the health care and public health sectors who want to engage more directly on the issue of climate change as educators with their patients, peers and communities; and/or as advocates for the policies, programs and practices needed to mitigate climate change and/or prepare for climate change in their workplaces and communities.

Examples of climate change effects on health in North America include: increased heat-related mortality risk and urban floods in riverine and coastal areas.

Source: Canadian Association of Physicians for the Environment (CAPE)
Retrieved from: https://niagaraknowledgeexchange.com/resources-publications/climate-change-toolkit-for-health-professionals/

► Unflood Ontario - In 2019, the Durham, Toronto, and Niagara Community Foundations wanted to inform more people about the many benefits of natural infrastructure, particularly about its role in reducing the harm done by flooding. These foundations, supported by The Small Change Fund, created Unflood Ontario, which is also part of the Great Lakes One Water Initiative (GLOWI). The GLOWI is dedicated to improving Great Lakes water quality through community action across the Great Lakes Basin.

Unflood Ontario seeks to bring public attention to the growing flooding concerns in the province. Water has to go somewhere. Urbanization while necessary, when done without consideration for the environment, leads to spaces that cause more harm than good.

Unflood Ontario focuses on Natural Infrastructure as a simple, affordable solution that also produces multiple social, economic, and environmental benefits. Natural Infrastructure includes

trees, green roofs, rain barrels, and de-paving (replacing low-traffic paved areas with permeable pavement). All of these interventions result in cleaner air, more beautiful urban spaces for social enjoyment, mental health and physical activity, and less flooding.

Benefits to communities and residents include:

- Reducing localized flooding
- Improving community aesthetics
- Encouraging neighbourhood socialization
- Increasing property values
- Decreasing the economic and community impacts of flooding

Source: Unflood Ontario - https://unfloodontario.ca/
Retrieved from: https://niagaraknowledgeexchange.com/resources-publications/unflood-ontario/

► Improving Flood Resilience through "Whole of Society" Actions - Flooding is considered to be the costliest extreme weather disaster affecting Canadians. A 2020 University of Waterloo report, "Under One Umbrella: Practical Approaches for Reducing Flood Risks in Canada", points out that the technical knowledge about ways to improve Canada's flood resilience already exists. What's been lacking, until now, is a summary of a 'whole of society' approach to practical actions and best practices that can be taken by diverse people, organizations and entities affected by flood risks. It is important to include:

- residents;
- governments at all levels;
- the building construction and renovation industry;
- insurance brokers;
- mortgage lenders and brokers;
- real estate agents;
- home inspectors;
- retailers;
- landscapers;
- the commercial real estate industry;
- conservation authorities;
- environmental and neighbourhood organizations;
- local utility companies;
- institutional investors; and
- professional regulatory bodies.

Source: Moudrak, N. and Feltmate, B. 2020. "Under One Umbrella: Practical Approaches for Reducing Flood Risks in Canada." Intact Centre on Climate Adaptation, University of Waterloo.
Retrieved from: https://www.intactcentreclimateadaptation.ca/wp-content/uploads/2020/11/Under-One-Umbrella-1.pdf and https://www.intactcentreclimateadaptation.ca/

Indicator: Land

Agriculture

► Niagara Region provides two research reports using information from the 2016 Census of Agriculture: Niagara Agriculture Profile and Niagara Agriculture Economic Impact. The Economic Impact document states:

- Agriculture is an economically significant sector in Niagara, the Golden Horseshoe and Ontario. Although numbers of farms and farmland area has decreased, the economic value of the agriculture sector has increased.
- In 2016, Niagara was home to 1,827 farms generating $838.1 million in total gross far receipts, $3.1 billion in gross output impact, $1.4 billion in gross domestic product impact, and 19,892 jobs. From 2011 to 2016, agricultural gross domestic product increased by 15.5%.
- During the same year, the Golden Horseshoe was home to 5,531 farms generating $2 billion in total gross farm receipts, $7.2 billion in gross output impact, $3.3 billion in gross domestic product impact, and 46,500 jobs. From 2011 to 2016, agricultural gross domestic product increased by 14.2%.
- During 2016, Ontario was home to 49,600 farms, generating $15.1 billion in gross farm receipts, $25.4 billion in GDP impact, $55.3 billion in gross output impact and 359,025 jobs. From 2011 to 2016, Ontario agricultural gross domestic product increased by 27.2%

Source: Niagara Region
Retrieved from: https://www.niagararegion.ca/living/ap/pdf/niagara-agricultural-profile.pdf and https://www.niagararegion.ca/living/ap/pdf/niagara-agricultural-impact.pdf

► Niagara is part of the Golden Horseshoe Food and Farming Alliance (GHFFA). The Alliance is a partnership among municipalities, agricultural groups, educational institutions and provincial ministries. It coordinates projects and efforts to support the agri-food sector in the Golden Horseshoe area of Ontario. In 2020, the GHFFA updated its 5-year Action Plan.

Vision - GHFAA Action Plan 2021-2026:

The Golden Horseshoe is globally renowned as a vibrant and sustainable agri-food cluster, characterized by profitable farming operations of all sizes, a thriving hub of food processing and food retail, extensive research capacity, and innovative technology.

Goals:

- The GHFFA is recognized as the leading organization with expertise on food and farming issues and opportunities in the Golden Horseshoe Region of Ontario
- Establish the Golden Horseshoe as Canada's leading innovative agriculture and agri-food cluster

- Enable the agri-food cluster to support sustainability outcomes

The full report is available at https://foodandfarming.ca/

Source: Golden Horseshoe Food and Farming Alliance presentation to Niagara Region Agricultural Policy and Action Committee, February 26, 2021
Retrieved from: https://pub-niagararegion.escribemeetings.com/FileStream.ashx?DocumentId=14642 and https://foodandfarming.ca/food-and-farming-action-plan/

► Growing Canada's Value-Added Food Sector is a July 2019 report by Canada's Standing Senate Committee on Agriculture and Forestry. The report makes nine recommendations for increasing international and interprovincial trade, inspiring innovation, and breaking down barriers to economic growth for the value-added food sector:

1. Review program requirements, processing fees for program applications, and access to permanent residence for Temporary Foreign Workers.
2. Address issues related to transporting agricultural and agri-food products by maintaining and expanding an efficient road network, harmonize regulations for the trucking industry, modernize the Canadian Food Inspection Agency and Canada Border Services Agency inspection and registration systems, and modernize the Canada Maritime Act.
3. Examine ways to support the development of the food processing sector in Western Canada.
4. Reform regulatory agencies' mandates to include innovation, growth and overall agri-food sector competitiveness as a core consideration, as well as establish a permanent and independent panel of industry experts and other stakeholders to advise regulators.
5. Support innovation, growth, and competitiveness in the value-added food sector by:
    - Developing initiatives similar to the innovation superclusters to support the development of key agriculture and agri-food industries
    - Exploring options to fund innovation and adapt to changing market conditions
    - Strengthening and providing increasing support and funding for basic, applied and market focused research
    - Modernizing traceability systems for agri-food products
6. Engage with trading partners to bolster an open and rules-based approach to international trade.
7. Support supply management to improve competitiveness.
8. Develop and fund an effective global marketing program.
9. Work with provincial/territorial governments to ensure that laws, regulations, and policies enhance trade.

Source: The Standing Senate Committee on Agriculture and Forestry, July, 2019
Retrieved from: http://www.niagaraknowledgeexchange.com/resources-publications/made-in-canada-growing-canadas-value-added-food-sector/

► The Niagara Food Security Network (NFSN) is building its foundation, with over 100 individuals and community organizations working together to make Niagara more food secure for everyone. A Food Resources in Niagara webpage and Niagara Food Assets Map are now available on the INCommunities website. The Niagara Food Assets Map has several asset categories:

- Community Gardens
- Community Meals
- Farmers Markets
- Food Banks and Pantries
- Good Food Box
- Home Delivered Meals
- School Nutrition Programs
- Seniors' Meals

In 2020, the NFSN conducted a series of conversations to gather the voices of individuals who are experiencing food insecurity and living in the Niagara region of Ontario. A total of 33 individuals engaged in sharing their lived experience. The goal for the lived experience conversations was to gather information about "food-related access experiences including challenges/barriers as well as effective factors/strategies, as seen through the eyes of individuals experiencing food insecurity". The conversations were also seen as an opportunity for the NFSN to gather Niagara-focused evidence to inform COVID-19 response policy and planning, for all levels of government.

Highlights of the NFSN Lived Experience Engagement Report on Findings include:

Rate of Food Insecurity:

- In 2017-18, 12.7% of households in Canada experienced some level of food insecurity (marginal, moderate or severe). This represents 1.8 million households, or 4.4 million individuals, including over 1.2 million children under the age of 18.
- In 2017-18, 15.1% of households in the Niagara region experienced food insecurity.
- Food insecurity is more prevalent among households with children than those without children. Children First Canada has identified food insecurity as one of the top ten "threats" to the well-being of children in Canada.

Rate of Poverty:

- In 2018, based on the Low Income Measure (LIM), 5.9 million Canadians (16.5%) lived in poverty and in the Niagara region, 15.6% (63,740 persons) lived in poverty.

What We Learned:

- The voices of Niagara residents who shared their day-to-day experiences facing uncertainty and challenges around accessing healthy (or just daily) food for themselves and/or family demonstrated how food insecurity impacts them beyond not having access to enough food. Other impacts include:

  - on-going anxiety,
  - depression,
  - low self-esteem,
  - poor health status and outcomes; and
  - negative impacts on child development.
- Food insecurity and poverty in Canada continue to be persistent in our country of plenty and have been further exacerbated as a result of the current COVID-19 pandemic.
- Research in Canada, both quantitative and qualitative, as evident in the voices heard in this Engagement, demonstrate that for individuals and families who do not have enough money to cover their basic necessities in life, they will most likely be experiencing on-going food insecurity.
- Thus, to effectively and equitably address food insecurity is to address inadequate income for individuals and families.
- There has been a pointed and renewed focus within social policy research in Canada on the feasibility and viability of how a guaranteed basic income could be provided effectively for Canadians in need and would have a significant impact on reducing food insecurity and, overall, raising individuals and families out of poverty.

Considered Next Steps and opportunities for the NFSN include:

- To add its support to the call to the federal government, to work with provincial and municipal/regional governments, social policy advocates and researchers in the field of income assistance and support programs, to build on the work undertaken during the COVID-19 pandemic in creating the CERB, toward developing a basic income.
- To support Niagara Regional Council progress, as identified in its Public Health and Social Services Committee's Report (PHSSC 6-2020), in advancing its recommendation "that the federal and provincial governments engage in pilot projects to study policy innovations that can address poverty and income inequality, including the study of a basic income guarantee project in Niagara region".
- To support the pursuit of further research and evaluation on the impact and effectiveness of "wrap-around" services for individuals and families in need, in recognition of how food banks/community service agencies that support food security needs of individuals can (and many do) provide additional and "wrap-around" services.

Source: Niagara Food Security Network – Lived Experience Engagement, November 2020 Report on Findings February 2021
Retrieved from: https://www.unitedwayniagara.org/wp-content/uploads/2021/03/2021_02_28_FINAL-REPORT_NFSN-Lived-Experience-Findings-Report_JWhite683-2733.pdf

Greenbelt Plan

The Greenbelt Plan is designed to protect agricultural lands, water resources and natural areas in Ontario's Greater Golden Horseshoe region.

The Greenbelt is the cornerstone of Ontario's Greater Golden Horseshoe Growth Plan, which is an overarching strategy that provides clarity and certainty about urban structure, where and how future growth should be accommodated and what must be protected for current and future generations.

The Greenbelt Plan, together with the ORMCP (Oak Ridges Moraine Conservation Plan) and the NEP (Niagara Escarpment Plan), identifies where urbanization should not occur in order to provide permanent protection to the agricultural land base and the ecological and hydrological features, areas and functions occurring on this landscape.

Source: Government of Ontario
Retrieved from: https://www.ontario.ca/document/greenbelt-plan-2017

Green Space

► The Niagara Peninsula Conservation Authority (NPCA) manages 41 Conservation Areas within the Niagara Peninsula watershed, held in public trust for recreation, heritage preservation, conservation and education. These natural and shared greenspaces are available for residents and visitors to Niagara to enjoy recreational opportunities such as birding, hiking, swimming and fishing.

The NPCA provides a conservation area location map at: https://npca.ca/parks-recreation/conservation-areas

Source: Niagara Peninsula Conservation Authority
Retrieved from: https://npca.ca/parks-recreation/conservation-areas and https://npca.ca/parks-recreation/conservation-areas

► Through Geospatial Niagara, community members have submitted an expression of interest to the Canadian National Committee for Geoparks for Niagara to establish itself as a UNESCO Global Geopark. The proposed name, Ohnia:kara is the Mowhawk word for 'neck between two bodies of water'. Already, 78 geosites of geological, environmental, or cultural interest in all 12 municipalities of the region have been identified.

Source: Ohni:kara An Aspiring Global Geopark. Policy Brief, February, 2019, Niagara Community Observatory, Brock University
Retrieved from: https://niagaraknowledgeexchange.com/resources-publications/ohnikara-an-aspiring-global-geopark-policy-brief-37/

► The COVID-19 pandemic is highlighting the connection between mental wellness promotion and people in our community having access to enjoy outdoor spaces.

Ontario Parks promotes the “Healthy Parks Healthy People” movement, stating that a rapidly growing body of scientific and health literature shows that spending time in nature has measurable positive benefits on your health.

Source: Ontario Parks
Retrieved from: https://www.ontarioparks.com/hphp/engage

► The Mood Walks program promotes the role of parks and recreation in mental health and well-being. Mood Walks is led by the Canadian Mental Health Association (CMHA) in Ontario, in partnership with Hike Ontario, Conservation Ontario, the provincial government and local social service agencies. Local participants in the program include CMHA Niagara Branch, the Niagara Bruce Trail Club, the Niagara Region Mental Health Program, and Brock University.

Source: Mood Walks: The Role of Parks and Recreation in Mental Health Promotion. Policy Brief, June, 2020, Niagara Community Observatory, Brock University
Retrieved from: https://niagaraknowledgeexchange.com/resources-publications/mood-walks-the-role-of-parks-and-recreation-in-mental-health-promotion/

Land Use Planning

A Brock University NCO policy brief examining land use planning in Niagara calls for land use planning players in the region to think about planning processes in a new way. It calls for consideration of:

> “*the administrative and institutional mechanisms by which land-use planning can more fully engage all tiers of government as well as leverage the voices and expertise of local non-state actors to enhance the effectiveness and legitimacy of the process. It will mean rethinking current institutional structures, behaviours, and relationships that transcend the conventional vertical and horizontal boundaries of the public sector”.*

Source: Land-Use Planning in Niagara: A Study in Multilevel Governance and Smart Growth, NCO Policy Brief, January, 2021, Brock University.
Retrieved from: https://brocku.ca/niagara-community-observatory/wp-content/uploads/sites/117/NCO-49-Land-Use-Planning_Jan-2021.pdf

Niagara Region is creating a new Niagara Official Plan. The plan is a long-range policy planning document to shape Niagara’s physical, economic and social development. Background studies relating to rural and natural systems, as well as those pertaining to growth management will inform the plan. Information about Rural and Natural Systems is presented on the Niagara Region website, at: https://www.niagararegion.ca/projects/rural-and-natural-systems/default.aspx

Indicator: Waste

The 2019 Municipal Benchmarking Network Canada (MBN) 2019 Performance Report includes measures comparing Niagara Waste Management statistics to that of 14 other Canadian municipalities. The performance report states that residents want waste to be collected in a reliable manner, as scheduled; and for it to be managed in an environmentally sustainable way. Influencing factors for each municipality include: diversion efforts; education; geography; government structure; infrastructure and organizational form.

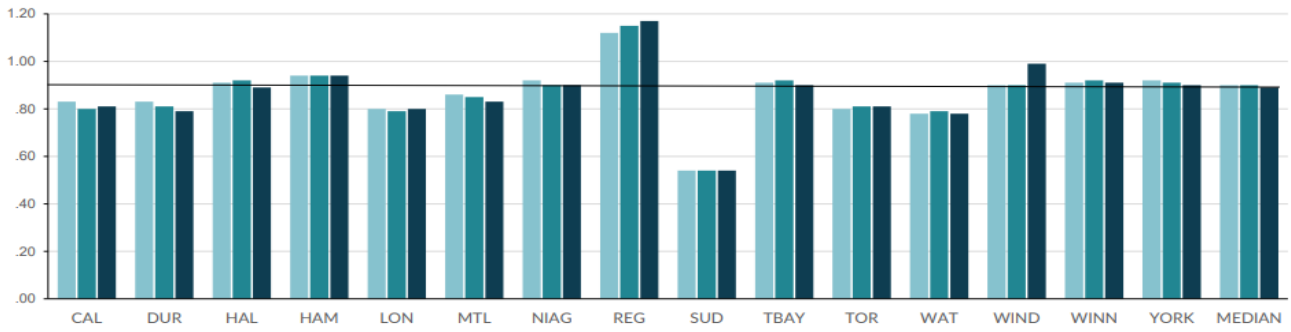
A total of 7 Waste Management graphs in the MBN 2019 Performance Report include statistics reported by Niagara Region, compared to 14 other municipalities in Canada:

- Figure 34.1 Tonnes of All Residential Material Collected per Household
- Figure 34.2 Tonnes of Residential Solid Waste Disposed per Household
- Figure 34.3 Tonnes of Residential Solid Waste Diverted per Household
- Figure 34.4 Percent of Residential Solid Waste Diverted
- Figure 34.5 Total Cost for Garbage Collection per Tonne - All Property Classes
- Figure 34.6 Total Cost for Solid Waste (All Streams) Disposal per Tonne-All Property Classes
- Figure 34.7 Total Cost for Solid Waste Diversion per Tonne - All Property Classes

In 2019, Niagara Region collected 0.90 Tonnes of residential waste material per household, just above the 0.89 Tonnes median for 15 Canadian municipalities. Residential waste includes organics, blue box, leaf and yard, municipal hazardous or special waste, other recyclable materials such as wood, metal and tires, as well as construction and demolition materials.

Figure 34.1 Tonnes of All Residential Material Collected per Household

Residential waste includes organics, blue box, leaf and yard, municipal hazardous or special waste, other recyclable materials such as wood, metal and tires, as well as construction and demolition materials.



2017	0.83	0.83	0.91	0.94	0.80	0.86	0.92	1.12	0.54	0.91	0.80	0.78	0.90	0.91	0.92	0.90
2018	0.80	0.81	0.92	0.94	0.79	0.85	0.90	1.15	0.54	0.92	0.81	0.79	0.90	0.92	0.91	0.90
2019	0.81	0.79	0.89	0.94	0.80	0.83	0.90	1.17	0.54	0.90	0.81	0.78	0.99	0.91	0.90	0.89

Source: SWST205 (Service Level)

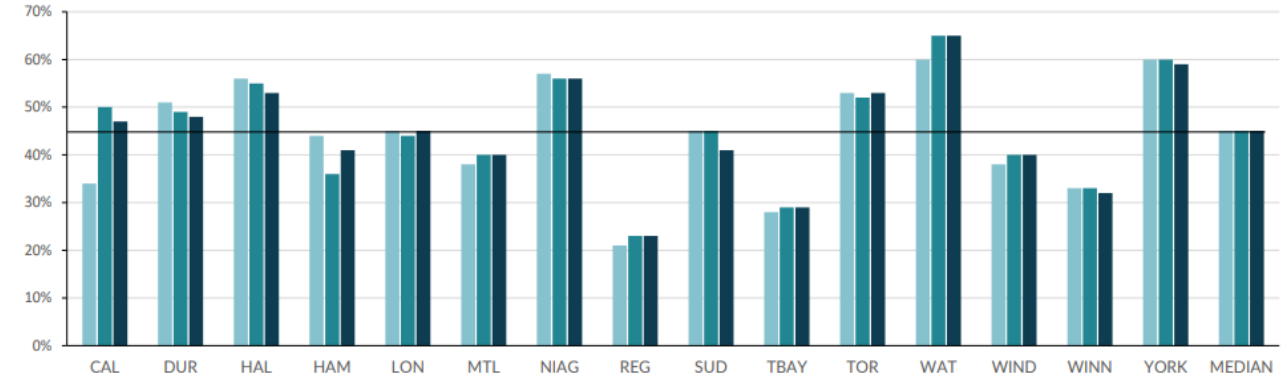
Windsor: An increase in bulk collection frequency as well as waste tonnage from local construction projects contributed to the 2019 increase.

In 2019, Niagara diverted 45% of residential waste away from landfill, on par with the median for 15 Canadian municipalities. This measure demonstrates the percent of residential waste diverted away from landfills and incineration through programs such as organics, blue box, leaf and yard, municipal hazardous or special waste and other recyclable materials, eg. wood, metal, tires.

Waste Management

Figure 34.4 Percent of Residential Solid Waste Diverted

This measure demonstrates the percent of residential waste diverted away from landfills and incineration through programs such as organics, blue box, leaf and yard, municipal hazardous or special waste and other recyclable materials, e.g. wood, metal, tires.



2017	34%	51%	56%	44%	45%	38%	57%	21%	45%	28%	53%	60%	38%	33%	60%	45%
2018	50%	49%	55%	36%	44%	40%	56%	23%	45%	29%	52%	65%	40%	33%	60%	45%
2019	47%	48%	53%	41%	45%	40%	56%	23%	41%	29%	53%	65%	40%	32%	59%	45%

Source: SWST105 (Community Impact)

Calgary: The large increase in diversion in 2018 was due to the implementation of the Green Cart Program and change to every other week garbage collection, which was completed in the second half of 2017. 2018 was the first full year of program results.

Hamilton: The fluctuation in diversion rate is due to the temporary shut-down of the Central Composting Facility in 2018.

2019 MBNCanada Performance Report - 220

Figure 34.5 in the 2019 MBNCanada report shows Total Cost for Garbage Collection per Tonne – All Property Classes. This measure reflects the total cost for garbage collection for all property classes which includes residential, and industrial, commercial and institutional (ICI) locations on a per tonne basis. In 2019, the cost/tonne for Niagara was $98; in 2018 it was $87; and in 2017 it was $94. This is below the median for 15 Canadian municipalities ($149 in 2019; $152 in 2018; and $148 in 2017).

Source: Municipal Benchmarking Network Canada 2019 Performance Report
Retrieved From:https://niagaraknowledgeexchange.com/resources-publications/2019-mbncanada-performance-measurement-report/

Waste Diversion

A new Niagara Region waste collection contract saw changes made to household waste collection as of October 19, 2020. The changes are intended to:

- Help increase diversion
- Preserve landfill space for waste that can't be recycled or composted
- Save natural resources
- Reduce our impact on climate change

Niagara's residential diversion rate (the percentage of waste not going to landfill) is around 56%, meaning that we continue to send 44% of our region's residential waste to landfills. Waste audit results show that 64% of what Niagara residents place in the garbage can be recycled or composted.

Niagara Region Waste Collection Services provides information about garbage and recycling at: https://www.niagararegion.ca/waste/collection/services.aspx ; about Garbage, Recycling and Organics at https://www.niagararegion.ca/waste/default.aspx ; and about about Waste Management Presentation Tools and links to Educational Videos to learn more about waste management topics at: https://www.niagararegion.ca/waste/presentations/default.aspx

Reducing Food Waste

► The National Zero Waste Council states that home food waste in Canada accounts for 21% of the total food waste generated in our country. Of all the food that Canadians are throwing away, 63% of it could at one point have been eaten. For the average Canadian household, that is equal to 140 kilograms of waste per year, at a cost of $1,100 a year.

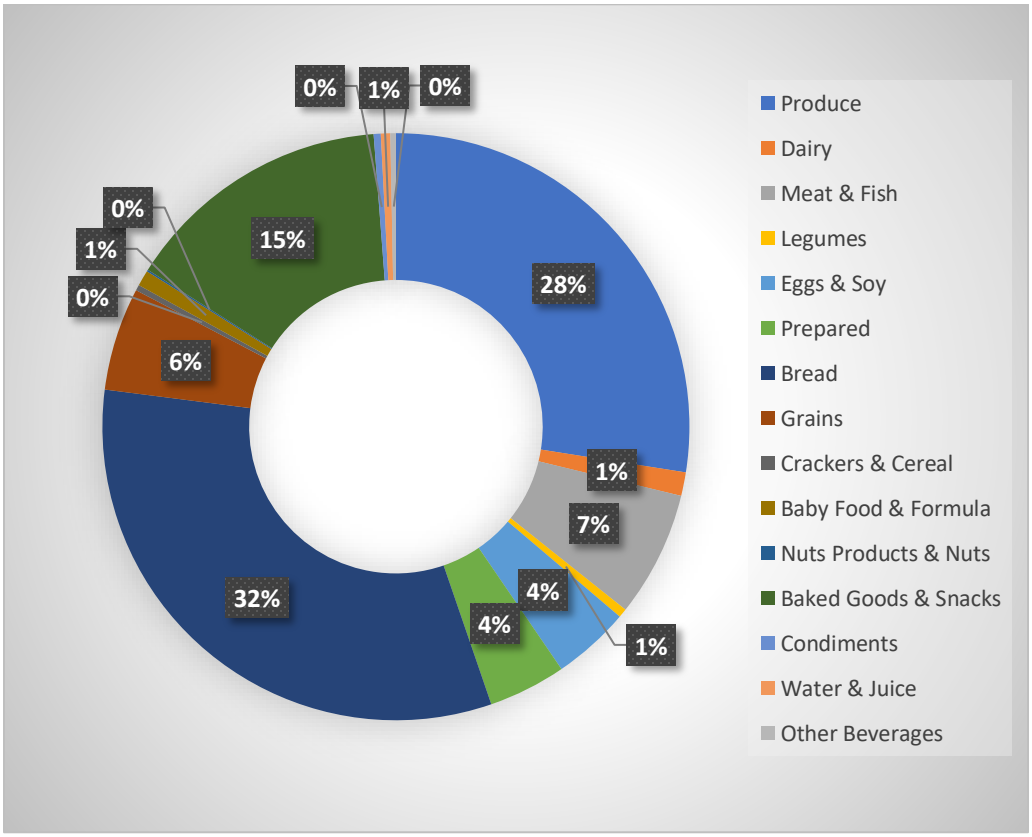
Love Food Hate Waste (LFHW) Canada exists to help Canadians prevent food waste at home, by inspiring and empowering people to make their food go further and waste less. Easy tips and ideas are available at https://lovefoodhatewaste.ca/ LFHW Canada is modelled on a proven UK-based behaviour change campaign that, in its first five years, helped cut avoidable food waste by 21 per cent, saving UK consumers £13 billion ($22 billion Canadian).

Source: National Zero Waste Council
Retrieved from: https://niagaraknowledgeexchange.com/resources-publications/food-waste-in-canadian-homes-in-2020/

► The Second Harvest food rescue program (formerly known as FoodRescue.ca) is coordinated in Niagara by Community Care of West Niagara (CCWN). The following summary is provided by CCWN:

- FoodRescue.ca is a new way to donate excess food. It is the safe and secure way for businesses to support communities and for non-profit organizations to access food to help feed individuals in need. FoodRescue.ca in Niagara is coordinated through Community Care of West Niagara, based in Beamsville.

- 2019- Volume of Food Donated in Niagara - FoodRescue.ca calculates rescued food at a 1:1 ratio, meaning that 1 lb. of food donated is the equivalent of 1 meal provided in our community. Meals are easier for people to imagine than volume, so it's a great way to share the amount of food we've rescued.
  - 40,895 - equivalent meals provided to our community (equivalent in lbs)
  - $106,327 - value of rescued food given back, locally
  - 38,525 – greenhouse gas emissions averted (kg)
  - 39 Businesses & 47 Non-Profit Agencies registered as FoodRescue.ca participants
- In 2020, an additional 20 donors and 25 not-for-profits were active in the Niagara region. Nearly 600 posted donations allowed the donors and rescuers in the community to save food valued at around $ 146,121 and divert 51,407 lb of greenhouse gas emissions from entering the atmosphere, for an equivalent of 54,396 meals served.
- Overview of types of foods being diverted from Landfill and redistributed in Niagara:



Source: Community Care of West Niagara, 2020. Foodrescue.ca in Niagara [data files]

Indicator: Water

Water Quality

The Niagara Peninsula Conservation Authority (NPCA) encompasses the entire Niagara region, 21% of the City of Hamilton and 25% of Haldimand County. The Niagara Peninsula is one of the most complex watersheds in the province. Its climate, biodiversity and growing zones are unique in North America. The Peninsula includes lands drained by the Niagara River, Twenty Mile Creek, the Welland River and the Welland Canal; is nestled between Lake Erie and Lake Ontario; and is traversed by the Niagara Escarpment.

NPCA Watershed Health programs include Water Quality Monitoring. The water quality report card is an annual check up on the health of the Niagara Peninsula watershed, focusing on surface and groundwater quality, forest conditions, and wetland cover. The 2018 Report Card shows that in 2018, the Niagara Peninsula watershed scored well with respect to groundwater quality, and the amount of wetland cover within its area. There is still some work to do regarding the quality of surface water and forest cover.

Highlights from the Summary Report of the Year 2019 include:

- For surface water in 2019, the biological and chemical monitoring results indicate that most of Niagara's watersheds have poor water quality. Total phosphorus, E. coli, suspended solids, and chlorides from non-point sources (agricultural/livestock runoff, faulty septic systems) and point sources (combined sewer overflow, urban stormwater) continue to be the major causes of impairment in the NPCA watershed. Twelve Mile Creek continues to have the best water quality rating in the NPCA watershed.
- For groundwater, 2019 results indicate that water quality generally meets Ontario Drinking Water Standards. Reported groundwater quality exceedances were mainly related to naturally occurring bedrock conditions; however, two groundwater monitoring stations were found to have elevated nitrate concentrations. These nitrate exceedances have been investigated thoroughly by the NPCA, Niagara Public Health and the MECP are likely attributed to surrounding agricultural land use and/or faulty septic systems.
- The Water Quality Monitoring Program continues to provide valuable information about the health of the NPCA watershed. Often the way the land is managed is reflected in the health of our water resources. The fact that the water quality is generally poor in the NPCA watershed has been caused by decades of environmental degradation. However, water quality improvement programs that improve how nutrients are managed, increase riparian buffers, and improve forest cover can begin to address these impacts. It will likely take many years of implementing these programs before the water quality in the NPCA watershed improves to the point where it is able to meet federal and provincial water quality guidelines and objectives. As such, it is recommended that the NPCA continue to monitor both our surface water and groundwater to ensure that there is up-to-date current water quality information available, be able to quantify trends, and continue to identify sources of contamination within the NPCA watershed.

Other NPCA watershed health programs include:

- Stream Flow Monitoring
- Watershed Studies
- Natural Areas Inventory (volume 1) and volume 2
- Source Water Protection
    - Protecting water at its source, and stopping contaminants from getting into sources of drinking water, ensures we are protecting our environment and our health.
    - Access more information at: http://www.sourceprotection-niagara.ca/
- Niagara River (Ontario) Remedial Action Plan (RAP)
    - Since the RAP process began in 1987, significant improvements have been made in water quality, and the clean-up of contaminated sediments. The Niagara River offers several ecological, recreational and economic beneficial water uses, such as power generation, tourism, recreation; it is a source of drinking water; and it supports over 1200 species.
    - Learn more at www.ourniagarariver.ca
- Yellow Fish Road - A national environmental education initiative launched by Trout Unlimited Canada in 1991

Source: Niagara Peninsula Conservation Authority
Retrieved from: https://npca.ca/watershed-health#water-quality-monitoring and https://npca.ca/watershed-health#source-water-protection

Niagara Region Water Quality Reporting

Water quality reports for the 6 water treatment plants operated by Niagara Region are available at: https://www.niagararegion.ca/living/water/Water-Quality-Reports/default.as

Niagara Region Public Health provides beach water testing updates for 19 locations in Niagara at: https://www.niagararegion.ca/living/water/beaches/default.aspx