

# *Floods* or *Food*

Smart choices for healthy communities



Possibility grows here.



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# **Floods or Food?**

**Smart choices for healthy communities**

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## Overview

"Lake Ontario was our playground, but now it's so polluted we can't swim or water ski there anymore," says Janis Mitchell of Ajax, Ontario. Urban runoff carries bacteria into Lake Ontario, fouling beaches on the Ajax waterfront which are now closed 33-76% of the time<sup>1</sup>. "I don't want to see urbanization in the headwaters of our creeks because the polluted runoff would kill fish and damage the lake," she says.

"I've lived near the Carruthers Creek Marsh for 22 years and over that time there's been an increase in turbidity and flooding and less birdlife," says Ajax resident Gordon McKay. He and his neighbors are worried about more flooding occurring if the headwaters of Carruthers Creek are paved over. "Some political leaders are not attuned to the need for preserving forest cover and agricultural land to serve as a sponge to soak up runoff," he notes.

Sadly, Janis Mitchell and Gordon McKay are not alone in their concerns. Polluted runoff and flooding endangers more Ontarians each year. Flooding in Canada has caused 260 known disasters since 1900, resulting in the loss of 235 lives and \$8.7 billion in damage, according to Natural Resources, Canada<sup>2</sup>. The 2005 downpour that flooded the GTA cost \$500 million in insurance claims for sewer backups alone<sup>3</sup>. The floodwaters don't just damage homes, but also contain a nasty brew of fecal bacteria, nutrients, salt and pesticides.

A big portion of the blame for floods can be laid at the doorstep of "impervious cover," a dry term that means roads, parking lots and roofs. These hard, water repellent surfaces don't allow rainwater to soak into the ground but instead send it pummeling into the nearest stream. The streams aren't adapted to the fast and furious influx of water and quickly flood their banks.

The problem is that government leaders are not linking storm water problems to land use and impervious cover. Durham Region's population grew by 24% from 1994-2004<sup>4</sup>, but none of that growth was planned in a way to prevent the production of storm water at its source. Across North America, storm water managers have focused only on end-of-pipe controls and treatment after the fact.

Now, as Durham Region considers developing the headwaters of Carruthers Creek in Northeast Pickering, we have an opportunity to not repeat the costly mistakes of the past. It's time to engage the community in a discussion about where and how development should occur. Why not craft policies and incentives to direct development to already disturbed or degraded land? Redeveloping a parking lot, abandoned mall or already degraded site allows a community to enjoy the benefits of growth without creating more polluted runoff.

Keeping urban development out of the Carruthers headwaters also opens the door for enhancing food security in Durham Region. More and more of the food

on our plate comes from thousands of miles outside our borders. Local farmers are struggling while our food dollars go overseas.

Enhancing local food production in the Carruthers headwaters will pump more money into the Region's coffers over the long run than urbanization. Avoiding the costs of storm water runoff while providing fresh food and jobs is a winner for society, the economy and the environment.

But to create those winning conditions, we need to do our planning right. This report recommends funding a comprehensive watershed plan for Carruthers Creek before development occurs. A plan that compares outcomes for urbanization versus local food production will help citizens make the right choices for a healthy and wealthy future.

"You can't get any better agricultural land than what we have in our area and it's a shame to lose that to subdivisions," says Gordon McKay. "I think it would be great if the politicians were cognizant of the modern idea that there should be a close relationship between the consumers of food and the producers of food," he says. That type of thinking promotes the health and well-being of citizens and job opportunities for farmers. "The official plan and policies should preserve our agricultural areas in Northeast Pickering," McKay adds.

Because headwaters of streams are sensitive areas whose health is essential for providing clean drinking water, the Sierra Club recommends that the headwaters of Carruthers Creek be added to the provincial Greenbelt. This area meets all the criteria for growing the Greenbelt: it is adjacent to the Greenbelt; it would expand Greenbelt natural heritage, agricultural and water resource systems; and it meets the goals of the Places to Grow Act and the goals of drinking water source protection.

McKay and Mitchell, along with many other citizens would like to see the Carruthers Creek headwaters included in the Greenbelt. "If it were preserved as a Greenbelt, it would be possible for farmers to maintain farming operations close to where people are and it would reduce transportation costs of food and provide a higher quality of goods," McKay concludes.

## **Flooded Families**

The strain and heartbreak of flooding is a growing threat for millions of Canadians. The number of flood disasters has increased since 1900 with about 70% occurring after 1959, according to Natural Resources Canada<sup>5</sup>.

Analysis of data from southern Ontario reveals a significant increase in rainfall amounts and intensity for our region. The findings have major implications for how we deal with storm water, say University of Western Ontario researchers<sup>6</sup>.

Floods are terrifying calamities that can force people from their homes, destroy property and roads, shut down business and take lives. Flooding in Canada has resulted in the deaths of at least 235 people and over \$8.7 billion in damage<sup>7</sup>.

The citizens of Durham Region are not immune from these threats. The province has designated the towns of Ajax, Pickering, Oshawa and Uxbridge to be at high risk for inundation<sup>8</sup>.

In a new floodplain map for Carruthers Creek in Ajax, the Toronto Region Conservation Authority has dramatically increased the area in danger from an event like the 1954 Hurricane Hazel floods. The updated map adds an entire neighborhood of 93 homes to the danger zone, bringing the total number of homes impacted to 323<sup>9</sup>.

Our intensifying precipitation events come with a hefty price tag. The insurance industry reports that basement flooding costs governments, homeowners and insurance companies millions of dollars each year<sup>10</sup>.

On the afternoon of August 19, 2005, a line of thunderstorms unleashed a downpour of biblical proportions over the GTA. The insurance claims for damage from this storm exceeded \$500 million, making it the second-largest loss event in Canadian history<sup>11</sup>. The \$500 million cost must be considered a minimum, since it doesn't include the expense of repairing infrastructure such as the 30 meters of Finch Avenue West that was washed out.

Peterborough's downtown was swamped on July 15, 2004 after five hours of rain in the early morning dumped 14 billion liters of water on the region<sup>12</sup>. Insured losses exceeded \$88 million. The province donated \$25 million to repair washed out sidewalks and roads. Consultants advised the city to spend \$30 million over five years to improve storm water and sewer systems.

Insurance payouts and road repairs aren't the only costs we have to pay for paving our open spaces. The cost of building and maintaining dykes, dams and other flood defenses is enormously expensive. Richmond Hill is investing \$6 million in a system to deal with flood water and prevent road washouts during rainstorms<sup>13</sup>.

## **The Perils of Pavement**

Big storms like the ones that slammed southern Ontario in 2004 and 2005 aren't the only causes of flooding. Smaller "gully washers" that take out a sidewalk or flood a home cause problems all over the GTA each year. Increasing urbanization boosts the risks of gully washers because of impervious cover<sup>14</sup>.

Impervious cover includes roads, parking lots, roofs and any hard surface that prevents water from soaking into the ground. When rain falls on undeveloped land, plants slow its descent to the surface and soil has a chance to soak it up like a sponge and slowly release it to streams. But rain hitting impervious cover strikes at full force, runs into sewers and drainage channels and hits streams like a tsunami<sup>15</sup>.

A large body of work has shown that when impervious cover exceeds 10% of a watershed, stream health begins to decline and when impervious cover tops 25%, stream health becomes severely degraded. Impervious cover means that more annual rainfall is converted to runoff. For instance, a parking lot produces more than 15 times more runoff than a similar-size meadow for the same storm event. During storms, excessive runoff makes urban streams reach their peak flow higher and faster than in undeveloped areas. The pollutant load delivered by storm water runoff to streams and lakes increases in direct proportion to watershed impervious cover<sup>16</sup>.

In a study of London, Ontario, scientists have made a direct link between urbanization and elevated flood risk<sup>17</sup>. The researchers found that urbanization in London more than doubled from 1974-2000. In 1970 a rainfall of 400 mm resulted in 350 m<sup>3</sup> per second of peak flow in the Thames River. But in 1997, a rainfall half that size, or 200 mm, drove the peak flow over 800 cubic meters per second.

Flooding isn't the only problem caused by impervious cover. Storm water runoff also degrades water quality with nutrients, bacteria, sediment, heavy metals, oils, grease and salt<sup>18</sup>. Durham region is feeling the pain of this polluted runoff, especially in Pickering and Ajax.

Recent University of Toronto studies of Frenchman's Bay in Pickering paint a picture of a Lake Ontario estuary in trouble. A five-year study reports that enhanced stream bank erosion as a consequence of "flashy" storm runoff from road surfaces moves about 100 tonnes of contaminated sediment to Frenchman's Bay each year<sup>19</sup>. Suspended sediment concentrations in storm runoff are as high as 1600 g per cubic meter. The sediment smothers fish and insect eggs, clogs fish gills and promotes diseases (GL's Fact Sheet). Before 1970, extensive wetlands fringed the Frenchman's Bay lagoon, but 30% of the area has eroded due to high quantities of runoff and sediment<sup>20</sup>.

The bay's surface waters are also badly impacted by the intestinal bacterium known as E. coli. Levels of E. coli in the bay greatly exceed Ontario's provincial water quality objectives<sup>21</sup>. Sources include leaking sewer mains and combined storm and sanitary sewers.

Once a freshwater haven with rich habitat that supported fish and birds, Frenchman's Bay is now brackish year-round from road salt pollution<sup>22</sup>. This

pollution has elevated chloride concentrations by 250% over average values in waters of the lower Great Lakes. Runoff from the watershed dumps 3700 tons of chloride into the bay each year<sup>23</sup>.

Salty urban runoff leads to acute and chronic damage to ecosystems. Habitat and biological diversity decline. Salt is toxic to fish, insects and plants. High chloride levels are part of the cause of wetlands loss in the bay. "The current situation in the city of Pickering is not environmentally sustainable in the face of continued urban development and continued increases in population density," says a University of Toronto study<sup>24</sup>.

While industry and sewage plants have cut their loading of chloride to the Great Lakes by 27%, urban streams have been showing a gradual increase in chloride concentrations because of growing road salting accompanying increasing urbanization<sup>25</sup>. Frenchman's Bay is not unique in its pollution woes--every watershed in the GTA faces the same threats, the University of Toronto researchers say.

Although a similarly comprehensive study has not been carried out for the Carruthers Creek watershed, it too shows signs of ill health. Beaches on the Ajax waterfront are now closed 33-76% of the time because of high levels of bacteria<sup>26</sup>. Blooms of the filamentous algae, Cladophora, routinely pile up in stinking rows on the Lake Ontario shoreline.

Will it help the Town of Ajax to meet binational water quality objectives for the Great Lakes if the headwaters of Carruthers Creek are urbanized? Not likely. Do citizens want to dump more salt, nutrients and metals into their drinking water source? Not if they can help it.

## **Linking Stormwater to Landuse**

Historically, Durham Region politicians have allowed our best farmland and forests to be destroyed by developers. These lands were paved and drainage pipes and ditches were installed to allow water to run off faster into streams and ultimately Lake Ontario. Now, the towns of Ajax, Pickering, Oshawa and Uxbridge are at high risk for inundation<sup>27</sup>.

To ensure effective stormwater management, Durham Region must start linking watershed management plans and official plans. But there is not enough data to do this for the headwaters of Carruthers Creek. The current watershed plan<sup>28</sup> is woefully out of date--it was issued in 2003 and based in part from data from the 1990s. Also the watershed plan does not consider what would happen what would happen to water quality and quantity downstream if Northeast Pickering lands were developed.

Typically, Durham Region has requested new watershed plans only after development has been approved for an area. It is time to cast aside this backwards practice. It is simple common sense to thoroughly study an area first, before making decisions about whether or not development should occur there. To do this for the Carruthers Creek watershed, we need a new watershed management plan that utilizes up-to-date data and conducts a modeling exercise to project what would happen to stream water quantity and quality under different development scenarios.

Therefore, the Sierra Club in this report calls for a new comprehensive watershed management plan for Carruthers Creek.

## **Local Food for Health And Wealth**

Less and less of the food on our plate is Canadian. Meanwhile, farmers are struggling to make a living.

This dilemma has an intimate connection to how we use our land. Citizens are concerned over the loss of agricultural land and the encroachment of strip malls and suburbs. Durham Region residents consistently support the concept of "keeping farmers farming." At the same time, there is a growing desire for convenient access to local food<sup>29</sup>.

All these threats, trends and desires point to a clear solution in the debate over the future of the Carruthers Creek headwaters. Instead of paving the headwaters and creating more flooding, the community will gain more in health and wealth by supporting sustainable agriculture in the area. A robust local food economy will save the headwaters from urban encroachment, create jobs for the food production sector and provide fresh healthy food that makes a short quick trip to our tables.

Right now, that trip is neither short nor quick. Food travels an average of 2400 km to reach Durham Region tables<sup>30</sup>. For every \$3 of food we import, we export only \$2 worth of food. That means the province sends \$4 billion each year outside our borders for food<sup>31</sup>.

Outsourcing our food is a growing trend. From 1996-2006, food imports to Ontario grew by 32%<sup>32</sup>.

At the same time, Ontario's farmers and farmland are literally losing ground. Smaller farms earn less and less-- more than half of Ontario farmers gross less than \$100,000 a year. From 1996-2006, Ontario lost 15% of its farms. From 1951-2001, Central Ontario paved 49% of its farmland so the GTA could expand<sup>33</sup>.



Nevertheless, there is huge promise for bringing our food supply back home. Ontario has 52% of Canada's best farmland<sup>34</sup>. Farmers in Ontario's Greenbelt have 8 million hungry consumers within half a day's drive<sup>35</sup>.

The convergence of prime farmland and urbanites eager for local food translates into economic opportunity. Ontario's Greenbelt generated over \$5.3 billion in farm and agribusiness sales in 2000. In 2001, Greenbelt farms sparked \$4.1 billion in economics spin-off activity related to employment of 50,000 workers and sales jobs in farm services and supplies<sup>36</sup>.

In the U.S., a local food initiative in an 8 county area of Iowa created \$2.2 million of new food sales in 2007. Iowa State University research showed that if consumers in a Northern Iowa County ate just five local fruits and vegetables for only three months, it would lead to \$6.3 million of income, and 475 new jobs<sup>37</sup>.

Durham Region has made some strides with the Durham Region Food Charter just adopted last December, and the newly formed Durham Food Policy Council. But the region is not using the charter and the food council to their full potential. Durham Region government is not realizing the win-win of doing ecologically-based and agriculturally-based urban planning.

Durham Region residents have already proposed a suite of initiatives for growing the local food economy<sup>38</sup>. Just a few of these include:

- local food processing
- a local food procurement policy for regionwide institutions
- year-round farmer's markets
- diversity in production

In the face of rising oil prices and higher transportation costs, isn't it time that we preserve farmland in Northeast Pickering as a legacy to feed our children and grandchildren?

## **Conclusion**

Durham Region politicians continue to thumb their noses at our laws guiding land use. Despite a warning from the province, these politicians are persisting in short-sighted efforts to pave over the headwaters of Carruthers Creek in Northeast Pickering. This would be a calamity, for not only would it lead to more flooding and polluted runoff, but we would permanently lose an opportunity to grow sustainable agricultural jobs and fresh healthy food close to home.

Citizens know that urbanites and farmers share the benefits of a food secure future. Those benefits include a growing farm economy, sustainable jobs, and good food that is at its best since it hasn't had to travel far. Because food security

also preserves healthy ecosystems, it means we protect the source of our drinking water. Healthy water translates to healthy farms and food.

Our headwaters are the deciding factor in the cleanliness of our water and flood control. Pristine headwaters, a clean environment and a food-secure future are best protected by the values of the provincial Greenbelt. Therefore, the Sierra Club in this report recommends that the headwaters of Carruthers Creek be added to the Greenbelt as a legacy for generations to come.

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<sup>1</sup> Town of Ajax, *Environmental Assessment Master Plan for Stormwater Quality Study—Contract Award*, (November 5, 2009), <http://www.townofajax.com/AssetFactory.aspx?did=8338>

<sup>2</sup> Natural Resources Canada, *The Atlas of Canada*, <http://atlas.nrcan.gc.ca/auth/english/maps/environment/naturalhazards/floods/majorfloods>

<sup>3</sup> Environment Canada, *Historical Flood-Related Events*, [http://ontario.hazards.ca/historical/Flood\\_Ontario-e.html](http://ontario.hazards.ca/historical/Flood_Ontario-e.html)

<sup>4</sup> Benjamin Earle, *Snapshot of Food Security in the Region of Durham*, (Community Development Council Durham, 2006).

<sup>5</sup> Natural Resources Canada, *Flood Disasters in Canada*, [http://gsc.nrcan.gc.ca/floods/database\\_e.php](http://gsc.nrcan.gc.ca/floods/database_e.php)

<sup>6</sup> Predrag Prodanovic and Slobodan Simonovic, “Development of rainfall intensity duration frequency curves for the City of London under the changing climate,” *Water Resources Research Report No. 058*, November 2007.

<sup>7</sup> Natural Resources Canada, *The Atlas of Canada*, <http://atlas.nrcan.gc.ca/auth/english/maps/environment/naturalhazards/floods/majorfloods>

<sup>8</sup> Environment Canada, *Ontario*, <http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=D1B2A92B-1>

<sup>9</sup> Toronto Region Conservation Authority, presentation to Town of Ajax council on April 22.

<sup>10</sup> Private communication with Dan Sandink, Manager, Resilient Communities & Research, Institute for Catastrophic Loss Reduction, Toronto, Ontario, March 23, 2010.

<sup>11</sup> Environment Canada, *Historical Flood-Related Events*, [http://ontario.hazards.ca/historical/Flood\\_Ontario-e.html](http://ontario.hazards.ca/historical/Flood_Ontario-e.html)

<sup>12</sup> Ibid.

<sup>13</sup> Adam McLean, “Richmond Hill's stormwater run-off project like few others in Canada,” *YorkRegion.com*, September, 24, 2009, <http://www.yorkregion.com/YorkRegion/Article/549864>

<sup>14</sup> Environment Canada, *Causes of Flooding*, <http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=E7EF8E56-1#stormwater>

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<sup>15</sup> Environment Canada, *Reducing Flood Damage*, <http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=72FDC156-1#stormwater>

<sup>16</sup> Tom Schueler et. al., *Impacts of Impervious Cover on Aquatic Systems*, (Ellicott City, MD: Center for Watershed Protection, Watershed Protection Research Monograph No.1), [http://www.cwp.org/Resource\\_Library/Center\\_Docs/IC/Impacts\\_IC\\_Aq\\_Systems.pdf](http://www.cwp.org/Resource_Library/Center_Docs/IC/Impacts_IC_Aq_Systems.pdf)

<sup>17</sup> N. Nirupama and Slobodan P. Simonovic, “Increase of Flood Risk due to Urbanisation: A Canadian Example,” *Natural Hazards*, Volume 40, Number 1, January 2007 , pp. 25-41(17).

<sup>18</sup> Environment Canada, *Reducing Flood Damage*, <http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=72FDC156-1#stormwater>

<sup>19</sup> Nick Eyles and Mandana Meriano, “Road-impacted sediment and water in a Lake Ontario watershed and lagoon, City of Pickering, Ontario, Canada: An example of urban basin analysis,” *Sedimentary Geology*, 224 (2010) 15-28.

<sup>20</sup> Ibid.

<sup>21</sup> Ibid.

<sup>22</sup> Ibid.

<sup>23</sup> Mandana Meriano, Nick Eyles and Ken W.F. Howard, “Hydrogeological impacts of road salt from Canada’s busiest highway on a Lake Ontario watershed (Frenchman’s Bay) and lagoon, City of Pickering,” *J. of Contaminant Hydrology*, 107 (2009) 66-81.

<sup>24</sup> Nick Eyles and Mandana Meriano, “Road-impacted sediment and water in a Lake Ontario watershed and lagoon, City of Pickering, Ontario, Canada: An example of urban basin analysis,” *Sedimentary Geology*, 224 (2010) 15-28.

<sup>25</sup> Mandana Meriano, Nick Eyles and Ken W.F. Howard, “Hydrogeological impacts of road salt from Canada’s busiest highway on a Lake Ontario watershed (Frenchman’s Bay) and lagoon, City of Pickering,” *J. of Contaminant Hydrology*, 107 (2009) 66-81.

<sup>26</sup> Town of Ajax, *Environmental Assessment Master Plan for Stormwater Quality Study—Contract Award*, (November 5, 2009), <http://www.townofajax.com/AssetFactory.aspx?did=8338>

<sup>27</sup> Environment Canada, *Ontario*, <http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=D1B2A92B-1>

<sup>28</sup> Toronto Region Conservation Authority, *Carruthers Creek State of the Watershed Report*, 2003, <http://trca.on.ca/protect/watersheds/duffins-carruthers-creeks/resources.dot>

<sup>29</sup> Community Development Council Durham, *Durham Lives Food Charter Working Group Report*, May 14, 2009.

<sup>30</sup> Benjamin Earle, *Snapshot of Food Security in the Region of Durham*, (Community Development Council Durham, 2006).

<sup>31</sup> Wally Seccombe, *A Home-Grown Strategy for Ontario Agriculture: A new deal for farmers, a new relationship with consumers*, Toronto Food Policy Council, <http://www.rverson.ca/foodsecurity/definition/resources/OMAFRApolicysshift.pdf>

<sup>32</sup> Ibid.

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<sup>33</sup> Ibid.

<sup>34</sup> Ibid.

<sup>35</sup> Shelley Petrie et. al., *Greenbelt Agriculture: A Breakdown of Agricultural Facts and Figures in the Greenbelt*, Toronto, ON: Friends of the Greenbelt Foundation Occasional Paper Series, 2008), <http://www.greenbelt.ca/greenbelt-agriculture-a-breakdown-of-agricultural-facts-and-figures-in-the-greenbelt>

<sup>36</sup> Ibid.

<sup>37</sup> Ken Meter and Angie Tagtow, *Local Food Systems: Building Health and Wealth in Metro Denver*, a brochure from Denver Health and Wellness Commission, December 2008, <http://www.crcworks.org/MDHWC08.pdf>

<sup>38</sup> Community Development Council Durham, *Durham Lives Food Charter Working Group Report*, May 14, 2009.