

Hamilton Harbour Remedial Action Plan

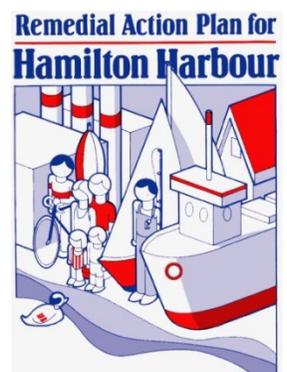
Rural Runoff

Report and Recommendations



Prepared by: Rural Runoff Task Group

Dated: June 27, 2017



Rural Runoff Task Group Report

June 2017

Executive Summary

For the first time in 100 years the quality of the water in Hamilton Harbour will soon be determined by its watershed runoff. By 2021 upgrades to wastewater treatment plants will be complete and no longer will impacts from the watershed be masked by wastewater effluent. The hundreds of millions of dollars invested in wastewater treatment upgrades will not on their own be enough to make sustainable changes in Harbour water quality. If Hamilton Harbour is to delist as an Area of Concern, urban runoff will also need to lower phosphorus and sediment levels.

For this reason the Hamilton Harbour Remedial Action Plan (HHRAP) Watershed Nutrient & Sediment Management Advisory Group set up a series of four Task Groups with municipal, conservation authority, provincial, federal, RBG, and community stakeholder representatives. The four Task Groups were: the Urban Runoff Hamilton Task Group, the Urban Runoff Burlington Task Group, the Sediment Control on Active Construction Sites Task Group, and the Rural Runoff Task Group.

The key categories of recommendations from the Rural Runoff Task Group include:

- Phosphorus and Sediment Runoff from Rural Land Uses
- Large-Scale Fill Activities Recommendations; and
- Rural Road and Ditch Contributions to Hamilton Harbour Eutrophication

These improvements are in line with the visions of the municipalities, conservation authorities, and the Hamilton Harbour Remedial Action Plan. **Hamilton Harbour will benefit from improvements in rural runoff management practices as the Harbour continues to strive to achieve delisting and become a vibrant centrepiece for the community.**

Rural Runoff Task Group Recommendations

Phosphorus and Sediment Runoff from Rural Land Uses Recommendation

The Rural Runoff Task Group for Nutrient and Sediment Management recommends that Hamilton Conservation Authority, Conservation Halton and the City of Hamilton undertake the recommendations identified below for phosphorus and sediment targeted rural initiatives in the Spencer Creek and Grindstone Creek watersheds and that the Hamilton Harbour Watershed Stewardship Project strategically focus its work with landowners in subwatersheds contributing highest levels of phosphorus and sediment.

Large-Scale Fill Activities Recommendations

- 1) The Rural Runoff Task Group for Nutrient and Sediment Management recommends and supports the ongoing efforts of provincial ministries, municipalities, and conservation authorities to better control the impacts associated with large fill activities.
- 2) The Rural Runoff Task Group for Nutrient and Sediment Management recommends that an outreach and education program regarding large-scale fill be developed and implemented for rural landowners within the Hamilton Harbour Watershed.
- 3) The Rural Runoff Task Group for Nutrient and Sediment Management recommends that provincial ministries, municipalities and conservation authorities develop guidelines and programs to address the impacts of small scale fill activities (less than 1000m³).

Rural Road and Ditch Contributions to Hamilton Harbour Eutrophication Recommendations

The Rural Runoff Task Group for Nutrient and Sediment Management recommends that the City of Hamilton, in co-operation with the Hamilton Conservation Authority and Conservation Halton, undertake monitoring to examine the relationship of the City's roadside ditch maintenance program with the level and extent of sediment and phosphorus loadings on receiving watercourses and water bodies and ultimately, Cootes Paradise and Hamilton Harbour.

ISSUE: Phosphorus and Sediment Runoff from Rural Land Uses

TASK GROUP: Rural Runoff Task Group for Nutrient and Sediment Management

DATE APPROVED BY TASK GROUP: June 27, 2017

Task Group Recommendation:

The Rural Runoff Task Group for Nutrient and Sediment Management recommends that Hamilton Conservation Authority, Conservation Halton and the City of Hamilton undertake the recommendations identified below for phosphorus and sediment targeted rural initiatives in the Spencer Creek and Grindstone Creek watersheds and that the Hamilton Harbour Watershed Stewardship Project strategically focus its work with landowners in subwatersheds contributing highest levels of phosphorus and sediment.

Background:

This recommendation relates to Hamilton Harbour Remedial Action Plan impaired beneficial use viii: Eutrophication or Undesirable Algae. Beneficial use viii will be considered not impaired when there are no persistent adverse water quality conditions attributable to cultural eutrophication for a period of three consecutive years, and when the annual net loading targets have been met (for example: the total phosphorus concentration in the harbour is $\leq 20 \mu\text{g/L}$). (Hamilton Harbour Remedial Action Plan Beneficial Uses 2012 Fact Sheets). Although some reductions of sediment and phosphorus in surface waters of the harbour have been achieved, annual net loading targets have not been met due to rural and urban non-point sources, and municipal and industrial point-sources.

Within the context of rural land uses, the rural areas of Grindstone and Spencer Creeks contribute sediment and phosphorus loadings to Hamilton Harbour particularly during precipitation and snow melt events.

To reduce the sediment and phosphorus loadings from rural areas, rural stewardship programs have been implemented within the Hamilton Harbour watersheds since 1993; uptake by landowners in water quality improvement and watershed stewardship programs has been voluntary.

From 1993 to 1995 the Clean Up Rural Beaches Program, worked with landowners to implement projects to improve water quality coming from agricultural properties upstream of public beaches at Valens Conservation Area and Christie Lake Conservation Area. In 1994 the Hamilton Harbour Watershed Stewardship Project began working with landowners in the Spencer Creek and Grindstone Creek watersheds to protect water quality by addressing agricultural non-point source pollution, e.g. limiting phosphorus and suspended solids levels and to enhance and increase fish and wildlife habitat.

Like the Clean Up Rural Beaches Program, the Hamilton Harbour Watershed Stewardship Project has a cost share component where grants are available to landowners through Conservation Halton and Hamilton Conservation Authority to assist with the cost of eligible water quality and/or habitat improvement projects. The source of funds for the cost share component may vary from year to year depending upon the success of the conservation authorities' annual funding applications to various granting agencies.

As of December 31, 2015 in the Hamilton Harbour Watershed, on over 200 properties, most of which are in the rural areas of Grindstone Creek and Spencer Creek, over 24 kilometres of riparian buffer, over 7 kilometres of instream habitat, and over 106 hectares of habitat have been created or improved. In addition, 131 site specific projects, some of which include livestock access restriction, alternate watering systems, clean water diversion, new or improved livestock creek crossings, erosion control, improved manure storage have been undertaken.

Other projects within the Hamilton Harbour watershed will also have been undertaken by landowners, funded through the Canada-Ontario Farm Stewardship Program (COFSP) delivered by Ontario Soil and Crop Improvement Association, as well as projects funded through the Wellington County Rural Water Quality Program administered by the Grand River Conservation Authority for the portion of Spencer Creek Watershed in Wellington County.

Stewardship initiatives by the Hamilton Harbour Watershed Stewardship Project in the Grindstone and Spencer Creek watersheds have not been exclusively focused on specific areas with high levels of soil erosion and phosphorous runoff; current uptake of the program is spread throughout the watersheds based on landowner interest and demand.

The Hamilton Harbour watershed has faced changing demographics over the past 20 years as absentee landowners and non-farm rural residents have purchased farms. Ownership turnover is always a challenge in maintaining on-going stewardship. While the need for large scale projects such as fencing to restrict livestock access and improved manure storage has declined, the impact of nutrients and sediment in surface run-off still exists.

Recommendations for phosphorus and sediment targeted rural initiatives in the Spencer Creek and Grindstone Creek Watersheds:

Water Quality Monitoring and Modelling

- Identify watercourses with the highest concentrations of phosphorus.
- Identify watercourses with the highest concentrations of sediment.
- Identify additional water quality monitoring required to isolate the watercourses contributing the highest concentrations of phosphorus and sediment as described above.

Land Uses and Phosphorus

- Identify the types of rural land uses and specific sites known to contribute the most phosphorus runoff to watercourses.

Land Uses and Sediment

- Identify the types of rural land uses and specific sites known to contribute the most sediment runoff to watercourses.

Information Sharing- targeting areas which contribute high concentrations of phosphorus and sediment to Hamilton Harbour.

- Present and share water quality monitoring results with rural watershed land user groups.
- Present and share water quality monitoring results with agencies and organizations of the various land user groups such as Ontario Soil and Crop Improvement Association, Ontario Ministry of Agriculture, Food and Rural Affairs, Landscape Ontario, Canadian Fertilizer Institute, Certified Crop Advisors.
- Seek advice from agencies and organizations re: identifying remedial actions and Best Management Practices most effective in reducing phosphorus runoff.
- Seek advice from agencies and organizations re: identifying remedial actions and Best Management Practices most effective in reducing sediment runoff.
- Present and share recommended remedial actions and Best Management Practices most effective in reducing phosphorus runoff and sediment runoff to land user groups.
- Identify and engage local landowners willing to be Ambassadors to share their success stories with other landowners to encourage actions to reduce phosphorus and sediment runoff.
- Deliver workshops geared towards the different watershed land user groups that offer sound advice for managing their properties and reducing sediment and phosphorus.

Cost Share Programs

- Because grants need to be available to landowners when they are ready to undertake projects to improve water quality and/or habitat, the City of Hamilton should develop an annual fund available to landowners to support water quality and habitat improvement projects in the Hamilton Harbour Watershed.

ISSUE: Large-Scale Fill Activities

TASK GROUP: Rural Runoff Task Group for Nutrient and Sediment Management

DATE APPROVED BY TASK GROUP: June 27, 2017

Task Group Recommendations:

- 1) The Rural Runoff Task Group for Nutrient and Sediment Management recommends and supports the ongoing efforts of provincial ministries, municipalities, and conservation authorities to better control the impacts associated with large fill activities.
- 2) The Rural Runoff Task Group for Nutrient and Sediment Management recommends that an outreach and education program regarding large-scale fill be developed and implemented for rural landowners within the Hamilton Harbour Watershed.
- 3) The Rural Runoff Task Group for Nutrient and Sediment Management recommends that provincial ministries, municipalities and conservation authorities develop guidelines and programs to address the impacts of small scale fill activities (less than 1000m³).

Background:

The Terms of Reference for the Rural Runoff Task Group for Nutrient and Sediment Management does not specifically mention large fill activities as an issue that requires a recommendation. However, the Terms of Reference do note that the Task Group is to develop an understanding of our knowledge of nutrient and sediment issues and analyze situations to reduce nutrients and sediments. As such, fill activities in the rural areas of the Hamilton Harbour watershed, specifically large-fill issues were noted as a specific concern. The concern is the potential sediment source to creeks from truck tracking onto roads and erosion from fill piles.

In recent years, many municipalities and Conservation Authorities (CAs) in Ontario have been dealing with increasing instances of large-scale fill movement between municipal jurisdictions and an increase in both fill permit applications as well as unauthorized fill operations involving large quantities of material. A variety of activities may result in the generation of excess soil, or fill, including excavation work associated with infrastructure projects and commercial and residential development. With continued growth and development expected in the Greater Toronto Area (GTA) and surrounding areas, it is anticipated that the generation of large quantities of fill and demand for fill placement sites will continue well into the future.

Several GTA Conservation Authorities have been creating or up-dating their regulation policies to recognize the large-scale fill issue and to ensure that these projects do not negatively impact natural

heritage and hazard lands. Municipalities are encountering challenges associated with the movement of large quantities of fill, including issues related to truck haul routes, road damage, noise, and dust. While some municipalities have adopted or updated site-alteration by-laws to try and control some aspects of fill and grading activities where CA regulations do not apply, large-scale fill activities in some jurisdictions have nonetheless proven to be difficult for municipalities to control.

Over the last several years there have been on-going discussions, meetings and workshops among CAs, municipalities, provincial government agencies, industry, etc. to discuss the status of large-scale fill issues and opportunities for improving the management and regulation of fill placement activities. Most recently, in response to a request made through the Ontario *Environmental Bill of Rights* legislation for a provincial review of large-scale fill placement activities, the Ministry of Environment and Climate Change (MOECC) announced in a policy framework in January 2016 they will be developing new provincial regulations and policy tools to strengthen the management and oversight of excess soil/fill movement related activities. Local CAs and municipalities reviewed and provided comments on the MOECC policy framework. Comments were generally supportive as it is felt that this issue is best addressed at the provincial level given the inter-jurisdictional nature of fill movement in Ontario. The policy framework was finalized in December, 2016 and includes a series of policy needs, actions and priorities for implementation. The final policy framework is posted on the Environmental Bill of Rights (EBR).

<https://www.ebr.gov.on.ca/ERS-WEB-External/displaynoticecontent.do?noticeId=MTI2OTM0&statusId=MTk2MTA1&language=en>

In October, 2016, the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) posted a comprehensive fact sheet on its website entitled *Importation of Soil onto Agricultural Land*. The fact sheet covers many important aspects of fill placement including beneficial uses, potential environmental impacts, legal and insurance considerations, applicable legislation governing fill placement within the province, and best management practices (BMPs) for soil importation and management on agricultural lands. <http://www.omafra.gov.on.ca/english/engineer/facts/16-055.htm>

ISSUE: Rural Road and Ditch Contributions to Hamilton Harbour Eutrophication

TASK GROUP: Rural Runoff Task Group for Nutrient and Sediment Management

DATE APPROVED BY TASK GROUP: June 27, 2017

Task Group Recommendation:

The Rural Runoff Task Group for Nutrient and Sediment Management recommends that the City of Hamilton, in co-operation with the Hamilton Conservation Authority and Conservation Halton, undertake monitoring to examine the relationship of the City's roadside ditch maintenance program with the level and extent of sediment and phosphorus loadings on receiving watercourses and water bodies and ultimately, Cootes Paradise and Hamilton Harbour.

Background:

This recommendation directly supports the Hamilton Harbour Remedial Action Plan impaired beneficial use viii: Eutrophication or Undesirable Algae. Beneficial use viii will be considered not impaired when: there are no persistent adverse water quality conditions attributable to cultural eutrophication for a period of three consecutive years, and when the annual net loading targets have been met (for example: the total phosphorus concentration in the harbour is $\leq 20 \mu\text{g/L}$). (Hamilton Harbour Remedial Action Plan Beneficial Uses 2012 Fact Sheets). Although some reductions of sediment and phosphorus in surface waters of the harbour have been achieved, annual net loading targets have not been met due to rural and urban non-point sources, and municipal and industrial point-sources.

As it relates to rural road and ditch contributions to Hamilton Harbour, the Terms of Reference for the Rural Runoff Task Group for Nutrient and Sediment Management.

State that the Group shall:

- Share information and develop a common understanding of our current knowledge with respect to existing maintenance activities and their effectiveness for reducing nutrients and sediment from rural roads,
- Analyse the situation to determine where reductions in nutrients and sediment may occur for the rural road system, and;
- Prepare recommendations for reducing nutrients and sediment from the rural road system.

On March 21, 2017, Ryan Moore, City of Hamilton made a presentation to the Rural Runoff Task Group with the following details conveyed.

Capital Rehabilitation and Technical Operations of the City of Hamilton is responsible for replacing cross road culverts that are under 3.0m in span; culverts having a span of over 3.0m is handled by the

City's Asset Management group due to provincial inspections every two years. In 2016 there were 45 cross-culvert replacements, and there are 80-90 cross culvert replacements planned for 2017. This work is contracted out and the Erosion Sediment Control (ESC) Guidelines are included in tender documents and must be adhered to. In 2016, to replace 45 cross culverts the City of Hamilton spent approx. \$25,000 in consulting fees and close to \$650,000 on construction. In 2017 the construction costs will be closer to \$1 million. In 2016 the contractor completed 62 linear km of ditch work, changing existing V-bottom ditches to flat bottom swale to better trap sediment. To reduce sediment impact on watercourses, work in the ditches is not undertaken within 40m of regulated watercourses and during construction, erosion control techniques such as fibre roll check dams are used to collect loose sediment. All sediment removed is disposed of onto private property which is allowed under the Municipal Site Alteration Bylaw. Prioritization of culverts and ditch work is based on observation before roads are updated and then are not inspected within 5 years of road construction. Ditches are for water conveyance to extend the life of road base, rather than for infiltration.

Through the City and Conservation Authorities, there is no formal monitoring of ditches to determine the phosphorus and sediment load to receiving streams after maintenance excavation has been completed. Neither are the culvert replacements checked after heavy rainfalls for their effectiveness. Rural ditches do not run across private lands. The water flows to the closest stream or creek, following the landscape.

There is currently a lack of engineers and contractors who undertake ditch maintenance. To help address this, the city handles the paperwork and permits in advance to avoid burdening the contractors. Contractors also do not have to do a fill management plan; rather, it is discussed at a pre-meeting and the city inspector follows the contractor to the dumping location. Erosion sediment control measures are left in place until the following spring to see if regrowth has occurred, but they are not maintained. For roads to function properly, effective drainage is key, and there is a higher cost for solutions that work most effectively. Culvert replacements have been like-for-like. Culvert size cannot change the size of the culvert without an evaluation of drainage flow.

The preferred profile for stabilizing ditches is generally 3:1, some are 2:1. Shallower sides would be easier to maintain with mowers but a flatter bottom may promote more ponding. It is an engineering exercise to change to the flatter slope. Two city staff have been trained in erosion and sediment control practices. Water quality monitoring is not specifically being done before and after construction. Concern that sedimentation coming from roadside activities may be having a negative effect on watercourses. The city ensures that erosion and sediment control carried out by contractors, and the appropriate equipment is provided. A pilot monitoring program could be considered to observe sediment impacts on receiving water bodies and look at methods to improve design and maintenance.

In implementing the recommendation, the following aspects should be examined:

- Change in inputs over time as cleaned-out sections revegetate- should revegetation be augmented with plantings in some situations?

- Proportion of inputs coming from the ditch itself as opposed to other sources- if inputs from the ditches themselves are dwarfed by inputs from fields, are we better off focussing elsewhere?
- Pilot study where some change in management practice is compared to another stretch with standard management procedures in place- do we have enough information at this point to propose alternative management practices?

The above noted points will be confounded by factors such as variation in rainfall events, soil type, catchment size draining to the ditch, adjacent land uses, etc. Ongoing monitoring of what is being monitored and will be required to determine future direction regarding status-quo or additional details being required.