



Section 2

Implementation

2.1 City of London

2.1.1 Sewer Separation Program

Location

Located in the City of London, in the Upper Thames River Watershed.

Funders

- Clean Water and Wastewater Fund
- City of London

Transferability

Other municipalities within the region have combined sewers in their conveyance systems. The City Centre Servicing Study developed for the City of London may direct other municipalities in the development of similar implementation/ phasing plan

Contact Information

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519-661-2489 x 4662

Project Goals

The Sewer Separation program is dedicated to eliminating the remaining combined sewers around the City of London. To date, there remains approximately 20 km of combined sewer. Each year, through the City's Infrastructure Renewal Program and/ or System Improvement Program, portions of this sewer are removed and separated.

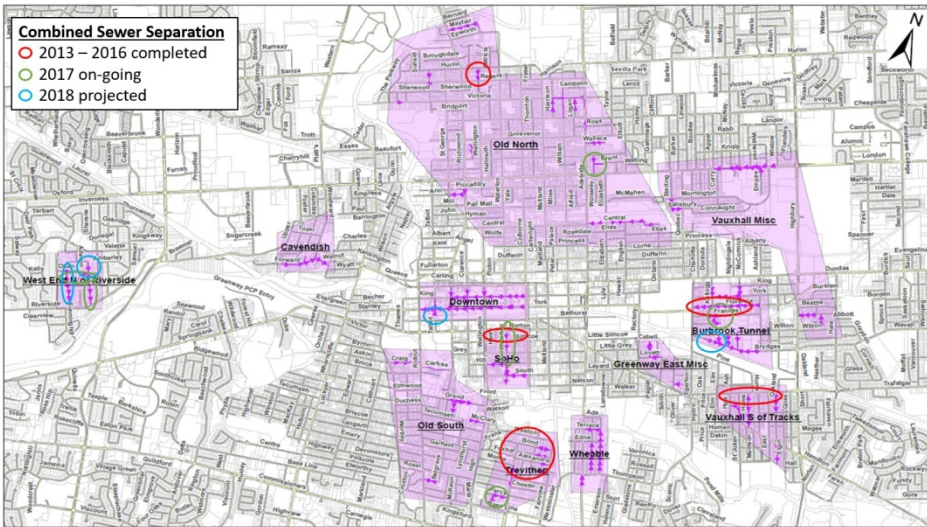
Project Description

- The City of London's combined sewer infrastructure has been gradually separated over time through the lifecycle capital replacement program. The discharge from combined sewer infrastructure is a source of untreated wastewater discharge to receivers when these combined sewers discharge to storm sewer infrastructure/ outlets.
- A City Centre Servicing Study was initiated in 2017 and focused its priority on sewer separation the downtown core area that is currently serviced by combined sewers. A phased approach for replacement of these sewers is highlighted in the study. Priority areas included York Street, Richmond Street, Talbot Street, King Street, Clarence Street and Wellington Street.
- Under the current financial plans, the City of London plans to replace approximately 80% (17 km) of the remaining combined sewer over the next 10 years. Funding from senior level government could accelerate these plans.
- Two notable projects include:
 - Burbrook Tunnel Project
 - York Street Sewer Separation Phase 1

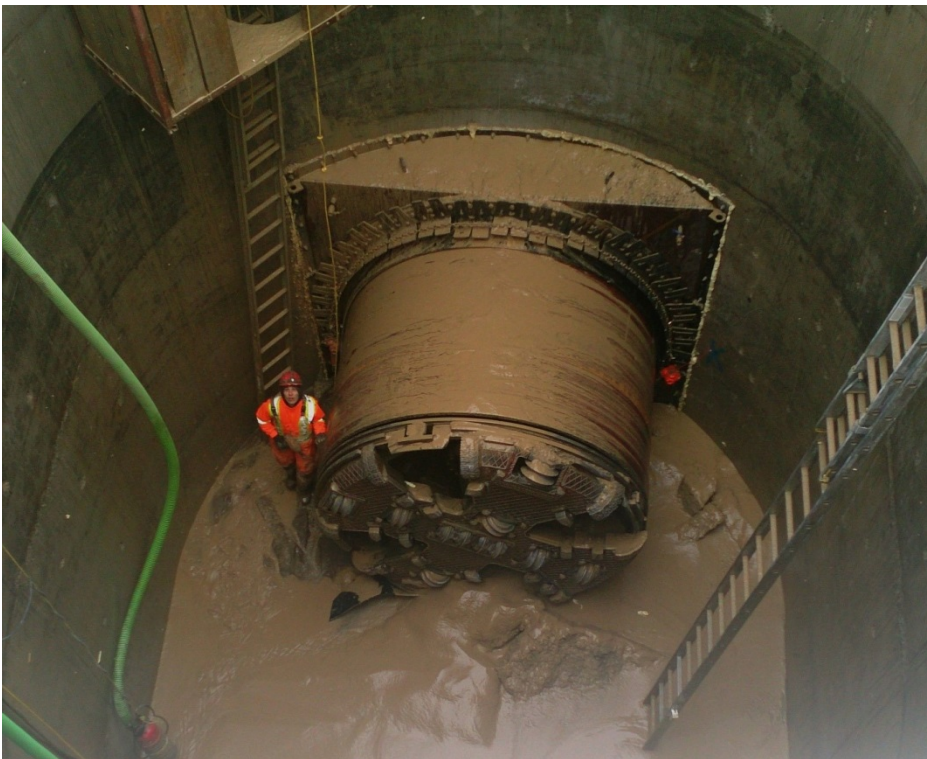
Results Summary / Expected Outcomes

- See map below which shows the sections of combined sewer replaced since 2013 through the City of London's Infrastructure Renewal Program. Proposed phasing sequencing was completed as part of the City Centre Servicing Study.
- The Burbrook Trunk storm sewer was installed in 2016 and enabled the separation of sewers north of the Canadian National Railway (CNR) yard in an area of Old East London (Vauxhall Sewershed). This was a massive undertaking and included a sewer pipe 2.5 m in diameter installed at a depth of 7 m below ground, making it the largest diameter micro-tunneling project in Ontario as of fall 2016. In addition, it crossed under 22 sets of railroad tracks and poor soil conditions in the area created challenges that delayed its completion and added to the overall cost of \$9.5 million. This project provided a new stormwater trunk sewer 40 m in length from the north side of the CNR railway yard to the south side in the area east of the Western Fair District, in order to provide an outlet to the South Thames River.

- Phase 1 of the York Street Sewer Separation Project will commence in spring 2018 with the separation of sewers along York Street from Thames Street to Talbot Street and Talbot Street (South of York Street). This will be the first of nine phases within the downtown core to achieve separation of the combined sewers



Areas of combined sewer replacement since 2013 (photo credit: City of London)



Burbrook Tunnel Installation (photo credit: City of London)

Next Steps

Continue to remove and separate combined sewers

Lessons Learned

- Sewer separation programs within the downtown core can present major challenges:
 - Limited space within the street to replace a single pipe with two pipes. Additionally, there exist a high number of utilities that crowd the already limited space.
 - Limited availability and size of existing stormwater outlets.
 - Traffic constraints limit the amount of sewer separation projects that can occur within a study area in a given year.
 - Restricted drop off zones for businesses.
 - Restricted access to parking lot entrances.

2.1 City of London

2.1.2 Sewer System Overflow Reduction / Pollution Prevention Control Plan

Location

- City of London; Upper Thames River Watershed
- The Pollution Prevention Control Plan (PPCP) is a City-wide Master Plan study.

Partners

- The Steering Committee for the PPCP included:
 - The City of London,
 - MOECC
 - UTRCA

Funders

City of London

Transferability

- Many Ontario municipalities are completing Pollution Prevention Control Plans to comply with MOECC Procedure F-5-5.
- The City's PPCP will be presented by Jacobs-CH2M at the WEAO conference in April, 2018 in London

Contact Information

- Marcy McKillop, P.Eng.
Environmental Services
Engineering, Wastewater and
Drainage Engineering
City of London
mmckillop@london.ca
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Project Goals

- The key goal/ strategy for the City of London is the mitigation of sewer system overflows through removal and/ or reduction of these overflows to the Thames River and other watercourses. This is to be completed through Pollution Prevention Control Plan (PPCP) and its infrastructure work.
- Achieving a reduction in overflow locations and corresponding volume will reduce the loading of phosphorus to watercourses.

Project Description

- The City of London's PPCP is a multi-year master planning project split into three phases designed to provide a long-term solution to address conveyance system sewer overflows and bypasses as well as to mitigate the associated impacts of these discharges on receiving watercourses, including the Thames River, Pottersburg Creek, Medway Creek, the Coves and Dingman Creek. Sewer system overflows and bypasses that exist in the sewer system were originally built to provide sewer system relief during extreme wet weather events thus protecting homes from basement flooding.
- MOECC Procedure F-5-5 requires that the municipality or operating authority develop a Pollution Prevention and Control Plan. Procedure F-5-5 outlines the need to eliminate the occurrence of dry weather sewer overflows and to minimize the potential for impacts of sewer overflows on human health and aquatic life.

Results Summary / Expected Outcomes

- All sewer system overflow locations were identified and classified by type.
- A Thames River water quality characterization was completed (i.e., classified sections as impaired, transitional, unimpaired).
- Twelve modelling assignments were completed to better understand selected overflow locations and determine compliance with MOECC Procedure F-5-5.
- Prioritization of selected overflows was completed based on BioMap impairment of reach and annual overflow volume.
- An implementation plan was developed (Phase 3) for prioritized groups of overflows.
- The Master Plan is to be updated and revisited every 5 to 10 years.

Lessons Learned

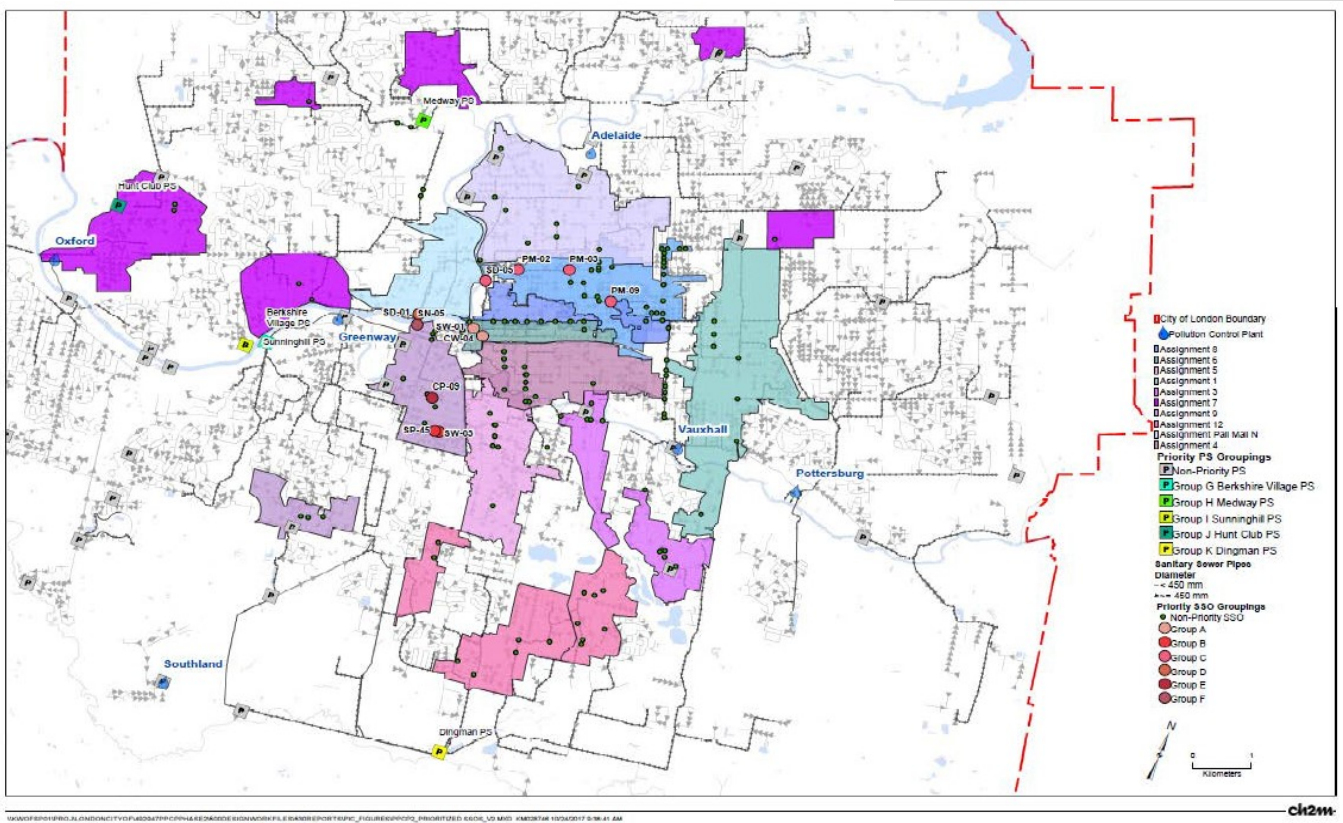
- Confirm the method and criteria for prioritizing overflows and bypasses with the appropriate agencies to ensure an integrative PPCP.
- Refer to a common Terms of Reference when several consultants are developing the models to ensure a level of trust and uniformity when finalizing the models.
- The consideration of source control strategies when evaluating alternatives for inflow and infiltration reduction can provide long-term solution to collection system capacity problems, reduce flow to the wastewater treatment plant and potentially be economically beneficial. An integrated model can help identify areas where source control may have little impact.
- Identifying the age of homes and simulating the impact of inflow and infiltration reduction with weeping tile disconnections can be used as an efficient method to target weeping tile disconnection programs.
- Combining individual models to reduce the impact of boundary conditions allows the impacts of each mitigation alternative on downstream and upstream sewer system overflows to be efficiently evaluated and preferred alternatives to be integrated.

Next Steps

- PPCP Phase 2 report will be available this month on the City's website
- PPCP Phase 3 is currently being finalized by Jacobs – CH2M. The Phase 3 report will outline the recommended PPCP Implementation Plan. It is expected to be finalized by the end of February, 2018

For More Information

- [City of London website's Pollution Prevention and Control Plan page](#)



Prioritized Sewer System Overflows and Pump Stations (photo credit: CH2M, 2018)

2.1 City of London

2.1.3 Stormwater retrofits

Location

- Located in the City of London; Upper Thames River Watershed.
- Assumed Stormwater Management facilities

Funders

- Clean Water and Wastewater Fund
- City of London

Transferability

Results found from Phase I during sampling of existing stormwater management facilities for legacy phosphorus will be applicable to other municipalities within the watershed. Results may direct other municipalities to adopt a similar sampling/ retrofit program to improve functionality of their facilities.

Contact Information

- Rick Pedlow, C.E.T. (Division Manager),
Sewer Operations Division
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Project Goals

This project is comprised of two goals; the first goal includes confirmation of the presence of phosphorus in existing City owned stormwater management facilities. The second goal, provided phosphorus had been detected, establishes and implements appropriate mitigating measures to reduce or eliminate phosphorus through enhancements to the City's current stormwater management rehabilitation program.

Project Description

- The goal of the Stormwater Retrofit project is to increase treatment capacity and improve the functionality of existing stormwater management facilities.
- Phase I of this project is intended to confirm whether or not legacy phosphorus exists in the City of London's assumed stormwater management facilities and quantify the impact of these levels on the Thames River Watershed. Field samples will be taken by and analyzed at a certified lab. Conclusions will be drawn under standardized laboratory practices and recommendations and projected budget implications will be revealed. Phase II implementation will commence pending the results determined in Phase I.
- Phase II will focus on mitigating measures to reduce or eliminate the presence of phosphorus, if detected in Phase I. A potential solution may include the design and construction of a stormwater sediment handling facility to repurpose excavated sediment material.

Results Summary / Expected Outcomes

Anticipated potential expected outcomes will vary based on Phase I field sampling/ laboratory results and recommendations.

Next Steps

2018 – Implementation of Phase I.

Lessons Learned

Project is conceptual at this point. Project is contingent on funding.

For More Information

[City of London website's Stormwater Management Facilities page](#)



*Maintenance of a Stormwater Management facility
(photo credit: City of London)*

2.2 *Essex Region Conservation Authority*

2.2.1 **Clean Water, Green Spaces**

Project Goals

In an effort to ‘share in the responsibility’ of a clean and healthy environment, ERCA has a comprehensive Clean Water – Green Spaces program aimed at improving regional water quality and enhancing natural areas and biodiversity.

Project Description

Grants of up to 90% of project costs are available to qualifying landowners to implement projects which will help improve local water quality, reduce soil erosion, and increase natural areas cover. Projects include agriculture soil erosion structures, windbreaks, tree plantings, wetland creation and buffer strips.

Results Summary / Expected Outcomes

The Clean Water Green Spaces program has been in place since 1999. Each year ERCA completes several projects with landowners resulting in the restoration of almost 100 acres/year. ERCA has completed 70 projects over the last 3 years.

Location

Throughout the ERCA area.

Partners

Landowners in the Essex Region

Funders

- Environment Canada
- ERCA
- MNR
- OMAFRA
- Trees Ontario

Contact Information

- Michael Dick (Agricultural Technician),
ERCA
mdick@erca.org

Next Steps

ERCA is committed to our Clean Water Green Spaces programs and continues to offer grants to landowners.

2.2 Essex Region Conservation Authority

2.2.2 Lebo Creek wetland restoration

Location

Lebo Creek in the Municipality of Leamington.

Partners

- DUC
- University of Windsor

Funders

- ECCC
- ERCA
- MNRF

Transferability

If the new treatment options are successful, there may be opportunities to apply them in other wetlands around the region or to incorporate them in any new projects.

Contact Information

- Kevin Money (Director, Conservation Services), ERCA

Project Goals

A large wetland is being built near the mouth of Lebo Creek, which drains directly to Lake Erie. Water in the wetland will receive basic treat to reduce total phosphorus. Beyond water quality, our goal is to restore wetlands in the Essex Region through the implementation of wetland restoration/creation projects to increase the overall amount of wetland habitat and associated riparian habitats in the Essex Region. Projects will provide benefits to wildlife (including species at risk), lead to improved water quality and biodiversity and increase overall natural areas cover in the Essex Region. The projects will include riparian buffers and a connection to diverse, Carolinian habitats comprised of forest and/or tallgrass prairie/meadow habitats.

Project Description

ERCA is in the process of creating a 10 acre wetland with a total of 20 acres of wetland riparian habitat, located in a 30 acre farm field adjacent to Lebo Creek. This wetland feature will be designed to receive field runoff and water from Lebo creek. This water will pass through the wetland and be discharged further downstream. The water will receive basic treatment to reduce total Phosphorus before being returned to Lebo creek. Different treatment options will be applied and monitored to better understand potential phosphorous reducing technologies that can be incorporated into wetlands to improve Lake Erie water quality.

Results Summary / Expected Outcomes

Please contact the ERCA for more information.

Next Steps

The wetland is being built in the winter of 2018 and is expected to be operational in the Spring of 2018.

2.3 Ontario Ministry of Agriculture, Food and Rural Affairs

2.3.1 Great Lakes Agricultural Stewardship Initiative Farmland Health Check-Up

Project Goals

The Check-Up will be used to identify BMPs that will aim to improve the health of one's farm.

Project Description

- In partnership with Ontario's CCAs, the Farmland Health Check-Up (FHCU) facilitates an assessment of challenging areas on-farm, focused on soil and pollinator health.
- Three key fields on your farm will be assessed to establish both baseline farm health levels, and target levels.
- The FHCU provides farmers with a unique opportunity to work with a CCA free of charge.
- The Check-Up will be used to identify BMPs that will aim to improve the health of your farm.
- Completing the Check-Up with a CCA is a prerequisite for the Farmland Health Incentive Program.
- Specifics of one's farm to be discussed include:
 - Water Erosion, Wind Erosion, Tillage Erosion, Subsurface Compaction, Organic Matter, Soil Life, Soil Chemistry, Phosphorus, Pollinator Health

Results Summary / Expected Outcomes

The GLASI FHCU program allowed farmers to work directly with CCA's free of charge to discuss and identify agri-environmental topics related to farmland health including but not limited to crop rotation, soil compaction, soil cover and cover crops, water, wind and tillage erosion, soil sampling, fertilizer application, manure and organic amendments application and best management practices more generally.

Next Steps

As Growing Forward 2 ends and we move into the Canadian Agricultural Partnership, initiatives that aim to improve environmental stewardship will continue to be supported and promoted to further increase the adoption of BMPs that improve the soil health of Ontario's farmland and reduces nutrient loss, particularly phosphorus, from agriculture production into Ontario's Great Lakes with a focus on Lake Erie.

For More Information

- FHCU [webpage](#)
- OMAFRA's Environmental Stewardship Programming Overview [webpage](#)

Location

Lake Erie, Lake St. Clair and Lake Huron southeast shores watersheds.

Partners

- OSCIA
- Select CCAs

Funders

AAFC and OMAFRA through Growing Forward 2

Contact Information

- OSCIA
glasi@ontariosoilcrop.org
- OMAFRA
1-877-424-1300
ag.info.omafra@ontario.ca

2.3 Ontario Ministry of Agriculture, Food and Rural Affairs

2.3.2 Great Lakes Agricultural Stewardship Initiative Farmland Health Incentive Program

Location

Western and Central Lake Erie Basins.

Partners

OSCIA

Funders

AAFC and OMAFRA through Growing Forward 2.

Contact Information

- OSCIA,
glasi@ontariosoilcrop.org
- OMAFRA,
ag.info.omafra@ontario.ca

Project Goals

To provide financial support to encourage adoption of select BMPs that have the greatest potential to improve soil health and reduce edge of field phosphorus loss.

Project Description

The Farmland Health Incentive Program (FHIP) offers financial support to implement select BMPs. This innovative stewardship program supports actions with the greatest potential to impact the landscape, offering funding to address key issues to improve soil health and reduce edge of field phosphorus loss. The combined impact of projects completed will help to improve the health of our Great Lakes, and in particular support Ontario's commitments to achieve reductions in phosphorus loss in these high priority areas.

Results Summary / Expected Outcomes

Through the FHIP, producers were able to access cost share funding to implement BMPs to improve soil health and reduce edge of field phosphorus loss

Next Steps

As Growing Forward 2 ends and we move into the Canadian Agricultural Partnership, initiatives that aim to improve environmental stewardship will continue to be supported and promoted to further increase the adoption of Best Management Practises that improve the soil health of Ontario's farmland and reduces nutrient loss, particularly phosphorus, from agriculture production into Ontario's Great Lakes with a focus on Lake Erie

For More Information

- FHIP [webpage](#).
- OMAFRA's Environmental Stewardship Programming Overview [webpage](#).

2.3 Ontario Ministry of Agriculture, Food and Rural Affairs

2.3.3 Nutrient Management Program

Project Goals

The purpose of the Ontario Nutrient Management Act, 2002 (NMA) is to “provide for the management of materials containing nutrients in ways that will enhance protection of the natural environment and provide a sustainable future for agricultural operations and rural development.”

In practical terms, the Nutrient Management Program works to protect surface and ground water through the proper management of land applied nutrient sources on agricultural operations, including manure, fertilizers, sewage biosolids and other off-farm materials. It also regulates the on-farm management and disposal of livestock mortalities (deadstock) and certain other on-farm activities (some anaerobic digesters and vegetated filter strip systems, as well use of Greenhouse Nutrient Feedwater (GNF)).

Project Description

The program is to implement regulatory requirements. The NMA is administered by both OMAFRA and the MOECC. OMAFRA’s responsibilities under the NMA include:

- Review, approval, and registration of Nutrient Management Strategies
- Review, approval, and registration of Non-Agricultural Source Material (NASM) Plans, for the use of off-farm materials for nutrient benefit (primarily sewage biosolids)
- Review, approval, and registration of GNF Registration documents, Strategies and Plans
- Issuance of certificates and licenses required under the regulations, included any associated training.
- Issuance of emergency authorizations for livestock mortalities, typically for major events.
- General outreach, education, and program assistance.

Results Summary / Expected Outcomes

Over 6300 livestock farms in Ontario are “phased-in” and need to manage nutrients in accordance with regulatory requirements to enhance protection of the environment. Additional farms are phased-in when they apply for a building permit for a barn or manure storage, or if they exceed a certain number of animals on the farm. Since 2011, Almost 3000 NASM Plans have been reviewed and approved for the land application of sewage biosolids and other NASMs in Ontario. OMAFRA continues to administer these area, as well as other parts of the program, to ensure ongoing improvements to nutrient management on farms in Ontario

For More Information

OMAFRA’s Nutrient Management [webpage](#).

Location

Province wide, including Thames River watershed.

Partners

- Building permit officials
- Local municipalities
- MOECC
- OMAFRA
- Regulated community

Funders

Ontario government (administration costs, currently no direct funding)

Transferability

Regulatory framework existing province wide.

Contact Information

- Trevor Robak (Environmental Specialist),
OMAFRA,
Trevor.Robak@ontario.ca
519-873-4094

Next Steps

Two actions were included under the Canada-Ontario Draft Action Plan (Feb 2017) that may have next step associated with them for the Nutrient Management Program:

- Ontario will consider further restrictions on the application of nutrients during the non-growing season.
- Ontario will continue to phase in farms under the Nutrient Management Act through building permit approvals.

2.4 Ontario Soil and Crop Improvement Association

2.4.1 Great Lakes Agricultural Stewardship Initiative

Location

Agricultural lands within the Lake Erie and Lake St. Clair watersheds and the southeast shores of Lake Huron watershed.

Partners

- OMAFRA
- AAFC
- Ontario's Certified Crop Advisors
- ABCA
- ERCA
- LTVCA
- UTRCA
- University of Guelph
- Yarrow Consulting

Funders

Funding for GLASI is provided by AAFC and OMAFRA through Growing Forward 2, a comprehensive federal-provincial-territorial initiative

Transferability

- Targeting agricultural stewardship can continue to be refined in future programming
- The results of the PSP could be used several ways. The challenge with the PSP results will be ensuring they are taken as an initial effort with a short data set, and not as a final cost estimate.

Contact Information

- Karen Jacobs (Programs Coordinator),
OSCIA,
519-826-4340,
kjacobs@ontariosoilcrop.org,

Project Goals

The Great Lakes Agricultural Stewardship Initiative aims to make measurable improvements to soil health, water quality, and pollinator health by supporting and accelerating the adoption of BMPs on agricultural lands within the Lake Erie and Lake St. Clair watersheds and the southeast shores of Lake Huron watershed.

Project Description

- Farmland Health Check-up
 - The FHCU offers producers a unique opportunity to work with a CCA to develop BMPs tailored to the specific needs of their operation.
- Farmland Health Incentive Program
 - The FHIP offered financial support to implement select BMPs identified during the FHCU. This innovative stewardship program aimed support actions with the greatest potential to impact the landscape, offering funding to address key issues to improve soil health and reduce edge of field phosphorus loss. Funding support was offered for the following BMPs; cover crops, adding organic amendments, crop nutrient plans, buffer strips, windbreaks, equipment customization, erosion control structures, fragile land retirement.
- Priority Subwatershed Project
 - The PSP is an applied research project that aims to place a dollar figure on what it costs to use agricultural stewardship to make edge-of-field water quality improvements in six small, highly targeted subwatersheds. This is a partnership of OSCIA, OMAFRA, The ABCA, ERCA, LTVCA, UTRCA, the University of Guelph and Yarrow Consulting.
 - The project encouraged high rates of BMP implementation (similar BMPs to FHIP) through a cost-share program and allowed the conservation authorities to install extensive water quality monitoring networks so that any changes to phosphorus levels could be measured. The data from the project is being modeled by the University of Guelph, and a cost-benefit analysis will complete the project.

Results Summary / Expected Outcomes

- Approximately 850 FHCUs were completed
- Between 2015 and 2018, approximately 1000 projects were supported by FHIP
- Between 2015 and 2018, approximately 300 projects were supported by PSP
- Estimates of the cost of using agricultural stewardship to improve edge-of-field water quality will be made available in 2018

Lessons Learned

- Targeting programming to meet specific objectives can be an effective program model to support projects that will have a greater impact to reach program goals in a targeted geography
- Effective partnerships can enhance program delivery and allow for improved local engagement
- There is a strong appetite for soil health focused programming, addressing water quality through the lens of soil health was an effective message to the agricultural community.

Next Steps

- Continue to build on the partnerships established through GLASI
- Complete cost-benefit analysis and modelling efforts to use data collected to better understand the estimated costs of reduced phosphorus loss from agricultural land.

For More Information

ontariosoilcrop.org

2.5 St. Clair Region Conservation Authority

2.5.1 Healthy Watersheds Program & Healthy Lake Huron Clean Water Clean Beaches program

Location

The SCRCA includes the Sydenham River watershed and smaller watersheds draining into southern Lake Huron, the St. Clair River and northeastern Lake St. Clair.

Partners

Healthy Watersheds Program:

- Lake Erie CAs

Healthy Lake Huron:

- ABCA
- MVCA
- SVCA
- Pine River Watershed Network
- Lake Huron Coastal Centre for Conservation

Organizational collaborations:

- Lambton Soil & Crop Improvement Association
- St. Clair SCIA
- Lambton Cattleman's Association
- Municipality of Lambton Shores
- Local Agri-services companies

Funders

- ECCC
- OMAFRA
- MNRF
- Forests Ontario
- OSCIA
- DUC
- Ontario Trillium Foundation
- TD Friends of the Environment
- Middlesex Stewardship Trust Fund
- Corporate Sponsors

Contact Information

- Jessica Van Zwol (Healthy Watershed Specialist), SCRCA
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519-245-3710 ext 241

Project Goals

- To keep soil on the field and not in adjacent watercourses – thereby benefiting the farmer and water quality
- Reduce wind and water erosion through buffers and windbreaks
- Use wetlands as a natural filtration system to prevent nutrients from reaching watercourses
- Reduce overland runoff through buffers, windbreaks, erosion control structures and cover crops
- Encourage year-round cover of soils to reduce nutrient loss
- Encourage best management practice uptake across our watershed
- Encourage shoreline residents to reduce invasive species and erosion
- Encourage rural residents to participate in community events, thereby increasing awareness of nutrient loss, sources of runoff, actions individuals can partake in to reduce human impacts to water quality

Project Description

Our Healthy Watersheds Program is an initiative that provides landowners with technical and financial assistance to improve and protect rural water quality and soil health. Our staff actively seeks grants that will bring funding into the region to support the conservation efforts of landowners. Projects include wetland creation/rehabilitation, sediment traps, agricultural erosion control structures, cover crops, buffer strips, riparian/stream bank protection, wildlife habitat creation, windbreaks, reforestation, and native grassland habitat. In addition, our staff obtain funding to develop outreach material and workshops to increase awareness on topics including soil health, water quality, pollinator habitat, and reducing nutrient loss.

Results Summary / Expected Outcomes

In 2017 alone, our staff secured \$273,210 in grants with participating landowners contributing an additional \$50,665 to the success of 27 projects. Over the last 16 years, the Conservation Authority has distributed more than \$2.7 million in grants to landowners, resulting in over 850 projects. Projects included 14 tree planting projects (20.1 ha), 8 wetland projects (6.93 ha), 2 cover crop projects (198.4 ha), and 4 equipment modification grants.



Excerpt from SCRCA's Water Quality Handout (photo credit: SCRCA)

With respect to outreach, our staff have coordinated the following events since January 2017:

- Cover crop workshop with Dave Brandt (65 attendees)
- Soil Health Panel Discussion (40 attendees)
- Soil Health Workshop with Compost Council of Canada (10 attendees)
- 6th Annual Shoreline Cleanup at Centre Ipperwash Beach (10 attendees)
- Dunes & Gardens workshop (40 attendees)
- Farmshed talk at a champion landowner's farm (10 attendees)
- 3 Ag in the Classroom events (150 students at each one)
- Twilight Pasture Tour (over 100 attendees)
- Guest lecture by David R. Montgomery (over 120 attendees)
- Soil Health Conference (over 165 attendees)

Additionally, we have attended many events to support our partners and to network.

Next Steps

Our goal is to continue and expand this program by working with neighbouring Conservation Authorities, industry partners, and ministry extension staff and representatives. We are expanding our presence on the local landscape with an OMAFRA COA funded Soil Health Conference February 15, 2018 that has already generated requests for SCRCA advice & input for BMPs on individual farms. We have been invited to collaborate on two workshops coming up in 2018 because of our networking over the past few years.

Lessons Learned

Networking and consistency are keys to success. Each builds trust and opens doors for further connections in the industry and with landowners. Providing a consistent face for the Authority in the community goes a long way in building that trust. That said, in order to maintain a consistent face, consistent funding for Outreach positions is necessary. Once that trust is built or established, SCRCA has noticed that landowners and industry reps come to us on their own, asking to collaborate or seek out advice.

2.6 Thompsons Limited

2.6.1 Thompsons FarmPro

Location

Thompsons Limited has 11 branches throughout Southern Ontario, and deals with customers throughout the Lake Huron, Lake St. Clair, Lake Erie, and Lake Ontario watersheds

Partners

EFC Systems – AgSolver

Funders

AAFC and OMAFRA through Growing Forward 2

Transferability

- Highly transferable from one location to another.
- Profitability will vary zone to zone, field to field, county to county, but the overall learning and discovery process of a field's profitability remains the same no matter the location.

Contact Information

- Colin Elgie (Agronomy Solutions Specialist),
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519-352-6311 ext. 24224,
celgie@thompsonslimited.com

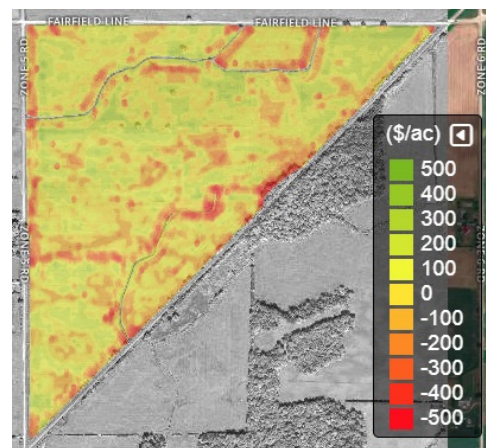
Project Goals

- Thompsons FarmPro is a software program that is built around measuring a farm's variability and profitability within a 10'x10' section of each field to identify areas that are unprofitable.
- Thompsons FarmPro software gives the ability to test different scenarios using a field's Cost of Production to identify how positive changes and BMPs can impact each field's bottom line.

Project Description

Identification of low profitability areas within fields, and using Return on Investment calculations to adjust farm operations for improved profit and reduced risk of nutrient loss by zone. Combined with soil test results, the grower is given an accurate picture of what zones in a field he/she can make fertilizer cutbacks on to eliminate the over-application and higher risk of run-off or leaching. This method can also suggest zones to be taken out of production and turned into grass waterways, pollinator habitats, buffer strips, etc. This holds benefits for both the producer and the environment.

- Farmers need a complete enterprise Cost of Production for each crop and field being evaluated, any As-Applied or As-Planted variable rate files, and any yield data associated with these fields.
- If the farmer does not have adequate machine data or yield data available, or is doing straight rate applications across the entire field, Thompsons FarmPro has a database of NDVI satellite imagery that can be correlated to yield.
- With this, the Thompsons FarmPro software will calculate the profitability of the current field practices within every 10'x10' section of the field.
- Different scenarios can be applied to this actual production map to see how making changes in current practices would impact the field economically.
- In areas of high profit in the field, the grower may be able to make decision to increase the productivity in these zones, knowing that he/she is getting a better Return on Investment.
- In areas of low profit in the field, the grower may decide to cut back on his/her inputs in the field, or to look deeper into the root cause of the issue.

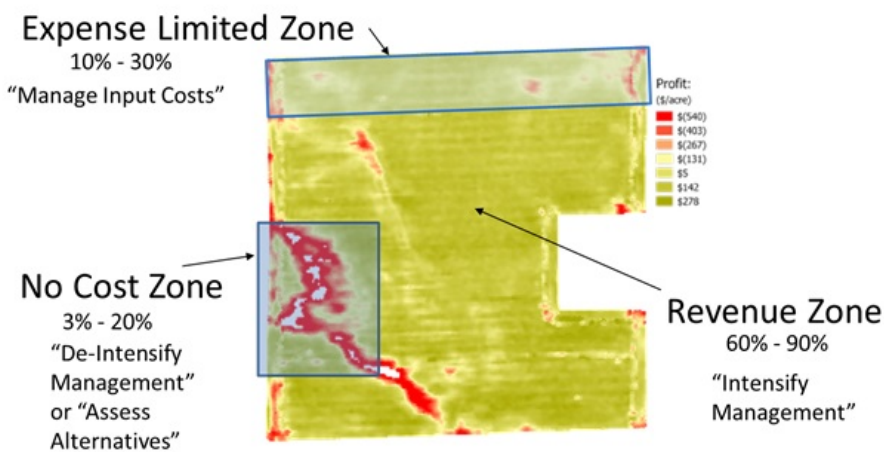


Thompsons FarmPro profitability map showing areas of profit and loss (photo credit: Colin Elgie)

- In areas of extreme low profitability, it may make sense to take that zone of the field right out of production.
 - Even if the grower is paying rent on the entire acreage, it makes more sense economically to lose \$200/ac, for example, than to lose \$400-500/ac through the addition of crop inputs, while still yielding low and unprofitably.
 - In these zones where the field isn't being farmed anymore, the grower can implement different environmental BMPs to keep the area from infestation by noxious or invasive weed species, or to create or improve wildlife habitat, all the while reducing Phosphorus fertilizer application and loss pathways.
 - Grants and cost-share opportunities are available to help in these remediation zones.
 - Although Thompsons FarmPro is focused on the economics of the farming business, increased in-field profitability correlates very highly with improvements on the environmental aspect of the farming operation as well.
 - By cutting back fertilizer inputs, and taking these unprofitable zones of a field out of production, these high-risk areas generally receive less P and other nutrient fertilizers, equating to less nutrient at risk, and less Phosphorus available for loss pathways.

Results Summary / Expected Outcomes

- Thompsons FarmPro was launched in the Fall of 2017.
- Greater awareness within problem areas of fields of the high correlation between poor economics and poor nutrient efficiency.
- Growers currently analyzing field profitability are running different scenarios and looking for changes to implement for positive economic and environmental benefit.



Using profitability zones to help make field management decisions
(photo credit: AgSolver, EFC Systems)

Next Steps

- Continue to work with growers, identifying problem areas and solutions to enact to counter the loss of P and other nutrients, and implement appropriate BMPs.
- After full crop season, assess successes and failures to readjust plans for the following years with Thompsons FarmPro.
- Monitor changes in field productivity, manure and fertilizer application, soil test levels, and overall soil health, to compare to profitability changes within the field.

Lessons Learned

- Much of the time, poor areas in fields aren't caused by a major nutrient problem. Could be caused by a nutrient imbalance, but most of the time there is a deeper underlying issue at hand, involving drainage such as water pooling, or soils drying out in summer.
- Traditionally, these problem areas received any excess fertilizer or manure with the belief that the excess nutrients will boost their productivity.
- Nutrient losses in these areas can be reduced by managing the nutrient rate of application soil remediation or water loss controls.
- Growers care about reducing the Phosphorus load in the Great Lakes, and can work towards this objective while at the same time improving the profitability of their farmland and farming operations.

For More Information

- Thompsons Limited [website](#)
- Thompsons Agronomy on Twitter: @ThompsonsAg

2.7 Upper Thames River Conservation Authority

2.7.1 Clean Water Program

Location

Throughout the Counties of Oxford, Middlesex and Perth; the Town of St Marys; and the Cities of London and Stratford.

Partners

- Ausable Bayfield, Upper Thames River, Kettle Creek, Catfish Creek, Long Point Region, Grand River, Maitland Valley, Lower Thames Region, and St. Clair Region Conservation Authorities.
- Landowners
- MOECC, OMAFRA, AAFC
- Oxford County, Perth County, Middlesex County, Stratford, and London.
- Western University, University of Guelph, University of Windsor and University of Waterloo.

Funders

The municipalities are the major funders, and this varies year-by-year.

Transferability

This type of project can be adapted to all Ontario.

Contact Information

- Brad Glasman (Manager of Conservation Services),
UTRCA,
519-451-2800 ext. 251,
glasmanb@thamesriver.on.ca

Project Goals

Improve and protect water quality by reducing nutrient and bacteria loadings to watercourses through the implementation of BMPs.

Project Description

The Clean Water Program (CWP) was initiated in 2001, as a one-window voluntary approach for landowners to access technical and financial assistance to improve and protect water quality.

- Rural landowners in the target locations are eligible to apply to the program through their local Conservation Authority. The implementation of BMPs may be eligible for cost-sharing. BMPs include: Milkhouse Washwater Disposal, Clean water Diversions, Livestock Access Restriction to Watercourses, Nutrient Management Plans, Wellhead Protection, Decommissioning Unused Wells, Fertilizer, Chemical and Fuel Storage or Handling, Septic Systems, Erosion Control Structures, Fragile Land Retirement, and Woodlands and Wetlands Conservation and Enhancement.
- A committee of local farm representatives and municipal staff provide direction to the program and review and approve all projects.
- The CWP provides an umbrella to facilitate BMP related research and demonstration projects.



Erosion control projects such as grassed waterways are some of the many Clean Water projects completed in the target location (photo credit: Brad Glasman)

Results Summary / Expected Outcomes

- Over 3500 projects completed
- \$14.5 million in total project value
- \$4.4 million in grants

Water quality benefits associated with the CWP projects (Brad Glasman)

Project Type	No. Priority Sites*	No. Projects Completed	Avg. Annual Total P Load per Site (kg)	Total Annual Total P Load (kg)	Total P Removed (kg)
Septic System Discharges	7671	646	1.39	10662.69	897
Milkhouse Washwater Disposal	418	40	35	14630	1400
Manure Runoff/ Storage	584	137	4.41	2575.44	604
Livestock Access	620	102	1.026	636.12	105
Soil Erosion	68,485 (ha)	14,798 (ha)	.51	34927.36	7547
Abandoned Wells	3058	460			

**As identified by the Clean Up Rural Beaches Program (CURB) at the onset of the CWP.*

Next Steps

Attempt to maintain the CWP through continued municipal partnerships and other agency, foundation and private sector funding.

For More Information

CWP [website](#).

Lessons Learned

- Importance of strong technical assistance - one project often leads to more projects on that property, ability to offer the best advice with many specialists available, work with many other technical agencies, understand water quality impacts locally and within Lake Erie watershed, have good rapport with local contractors, CCAs, academia and others.
- Locally guided programs have the ability to adjust to local environmental needs
- Ability to share technical resources amongst Conservation Authorities
- One-window approach to all farm and non-farm landowners
- Minimal paperwork for applicants with one-on-one, on site assistance
- Blending demonstration and research projects into CWP allows for better understanding and BMPs and opportunities

2.7 Upper Thames River Conservation Authority

2.7.2 Low impact development in the upper Thames River watershed

Location

Ingersoll, London, St. Marys, Stratford, Sebringville.

Partners

- City of London
- Credit Valley Conservation
- Dillon Consulting
- Clen Cairn Community Partners
- Great Lakes Commission
- Luckhurst Development
- MTE Consultants Inc.
- Perth County
- Stratford-Perth Museum
- Thames Valley District, London District Catholic, and Huron-Perth Catholic District school boards
- Town of Ingersoll
- Township of Perth East
- Warren Sinclair Homes

Funders

- ECCC
- MOECC
- Ontario Power Generation
- Orr Insurance & Investment Group
- RBC Blue Water Project
- Stratford Perth Community Foundation
- TD Friends of the Environment Foundation

Transferability

LID practices can be transferred to other watersheds

Contact Information

- Vanni Azzano (Community Education Supervisor), UTRCA
519-451-2800 ext. 312,
azzanov@thamesriver.on.ca

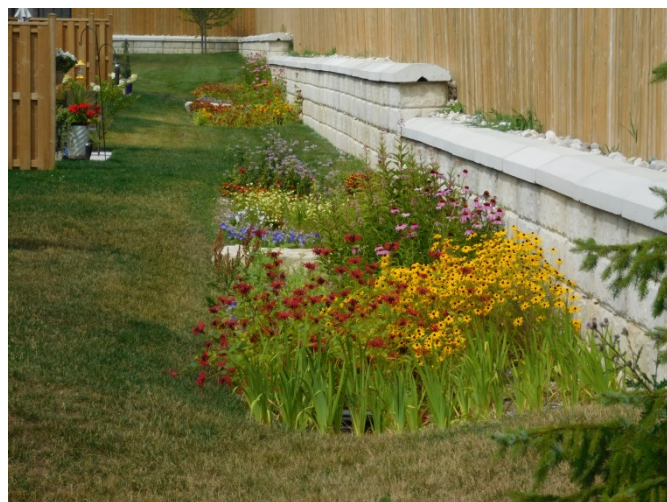
Project Goals

- Act as a lead agency in facilitating the promotion and implementation of low impact development for stormwater management within the upper Thames River watershed
- Implement pilot projects to demonstrate the benefits of low impact development compared to conventional stormwater practices
- Encourage developers, consultants and municipalities to implement low impact development for stormwater management
- Provide ongoing LID professional development and training opportunities for developers, consultants, agencies and municipalities

Project Description

Urbanization has increased impervious surface cover and changed the flow of water during storms and snow melt events. The volume and velocity of water running off land, combined with increasingly frequent events, result in erosion and increased flood risk.

The water picks up contaminants from roads, sidewalks and yards and transports them into creeks and streams. Preliminary results of a Thames River Water Quality Assessment identify urban runoff as the source of the increasing amounts of nutrients reaching the river. The Thames watershed is a major source of phosphorus reaching Lake Erie and causing algal blooms. Implementation of low impact development practices in the UTRCA watershed reduces the amount of nutrients reaching the Thames River and eventually, Lake Erie.



Rain garden in Ingersoll (photo credit: UTRCA)

- The purpose of the UTRCA's Stormwater Low Impact Development (LID) Program is to facilitate the promotion and implementation of LID for storm water in the Upper Thames River watershed with the goal of improving water quality and delaying runoff into the Thames River, and ultimately Lake Erie
- Completed literature review to identify barriers and benefits of current LID practices, policies and requirements in various jurisdictions
- Developed survey for professionals from municipalities, agencies, consultants and developers to determine the familiarity and implementation of low impact development in the UTRCA watershed

Results Summary / Expected Outcomes

- Survey results showed a lack of familiarity and implementation of low impact development in the UTRCA watershed
- Twelve recommendations developed based on results of survey
- UTRCA has hosted:
 - Two LID Symposiums
 - Three Construction, Inspection and Maintenance Workshops
 - Three Erosion and Sediment Control Workshops
 - One Green Infrastructure Workshop
 - One LID Treatment Train Tool Workshop
 - Total 415 participants
- Pilot projects:
 - The Enclave at Victoria Hills, Ingersoll – rain gardens, bioswales
 - Glen Cairn Neighbourhood, London – residential rain gardens, bioswales
 - Luckhurst Subdivision, Sebringville – dry bioswale
 - Stratford Perth Museum, Stratford - constructed wetland
 - St. James Anglican Church, St. Marys – rain garden



IDCI students planting a rain garden (photo credit: UTRCA)

Next Steps

- Develop 5 year LID plan
- Increase/strengthen municipal partnerships
- Focus on monitoring

Lessons Learned

- Municipal permits – will municipality approve design?
- Maintenance – who is responsible?
- Staging
- Erosion and sediment control is different for LID projects than other construction projects
- Education very important

For More Information

UTRCA's LID [webpage](#).

2.7 Upper Thames River Conservation Authority

2.7.3 Perth, Oxford and Middlesex Counties Natural Heritage Studies

Location

Counties of Middlesex, Oxford, and Perth.

Partners

- City of London
- Counties of Middlesex, Oxford, and Perth
- MNRF

Funders

Counties of Middlesex, Oxford, and Perth.

Transferability

The methodology is based on ecological principles and fragmentation theory, which is transferable to any landscape where the boundaries of the natural heritage features have been accurately mapped.

The methodology can be used to identify specific natural heritage functions.

Contact Information

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- Cathy Quinlan (Terrestrial Biologist)
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- Tracy Annett (Manager of Environmental Planning & Regulations)
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- Terry Chapman (Geographic Information Systems Specialist)
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Project Goals

County Natural Heritage Systems Studies provide a county-wide determination of significant natural heritage features and provide the science to support natural heritage planning at the County and municipal levels. They address the need for information on the state of the county's natural areas and systems. Natural areas include woodlands/forests, wetland, thickets and meadows.

Project Description

County Natural Heritage Studies provide a landscape level assessment of natural heritage features and functions. Significant natural heritage features of the county are identified using scientific methods and GIS. Ecological principles such as habitat size, proximity to watercourses, location within Significant Valleylands, proximity to other habitats and others were used to identify county natural heritage systems.

The Provincial Policy Statement states that; "The diversity and connectivity of natural features in an area, and the long term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and groundwater features". One of the reasons it is important to improve and restore natural heritage features in the Thames watershed is to protect and enhance water quality:

- A. Maintaining and restoring natural heritage features in significant groundwater recharge areas ensures a longer flow path and longer percolation time through the aquifer, cooling the water which then feeds cold water to streams in discharge areas. Groundwater dependent ecosystems, such as wetlands, should be protected as they are generally associated with groundwater discharge areas.
- B. Improving and restoring riparian natural heritage features and wetlands can provide additional opportunities for improving water quality by reducing stream bank erosion, filtering nutrients and sediment, and reducing wind erosion. Wetlands, floodplains, and riparian buffers use natural processes to slow runoff, increase infiltration, and utilize nutrients (Hutchinson Environmental Sciences Ltd. 2017). Research indicates that natural channels, flowing through well vegetated riparian zones, produce improved water quality (Dosskey et al., 2010). Vegetated riparian buffer zones slow the velocity of the water, and wetlands absorb runoff, helping to settle out sediment. Slowing down overland flow allows nutrients to be taken up by vegetation or to be filtered through soil. Slowing overland flow runoff will reduce erosion and help keep sediment out of the Thames River.

- C. Maintaining, rehabilitating, and expanding natural heritage features, such as upland woodlands, play a key role in improving water quality and stream health by filtering nutrients and sediment, reducing wind erosion, increasing habitat, and helping to store water in the landscape. Protecting valley lands and associated erosion hazards helps maintain natural functions such as nutrient removal and sediment control. Even naturalized public parklands have been shown to slow water runoff and absorb sediment (Millward et al. 2011). Tree canopies capture and hold a certain amount of precipitation, slowing the pace and speed that water hits the ground. The dense network of plant roots in forests and natural areas also means that these sites are not susceptible to soil erosion the way farm fields are. Forests and natural areas hold snow longer in the spring, releasing it more slowly during melts. Forests also absorb a lot of moisture for plant growth, evapotranspiring it to the atmosphere, maintaining the microclimate, spurring localized summer storms, etc.

Results Summary / Expected Outcomes

Significance criteria were developed to identify significant natural heritage features, including criteria that are associated with principles of water resource systems such as:

1. Any Vegetation Group within or touching a significant valley system
2. Any Vegetation Group located within 30m of an open watercourse
3. All evaluated wetlands and all unevaluated Wetland Vegetation Groups >0.5 ha
4. Any Vegetation Group that contains a groundwater dependent wetland

The studies provide information on which natural heritage features have county significance and how much of the county is in significant natural feature cover.

Next Steps

The County Natural Heritage Studies should be used to inform and update Official Plan Policy. A County public amendment process under the Planning Act will be subject to a public and stakeholder consultation that will include agricultural groups, woodlot owner's association, environmental groups, the development industry, local municipalities, etc. Once County Official Plan policies are adopted, policies will be brought into local official plans during the five year review process.

Lessons Learned

- Natural features have to be mapped consistently across the county.
- Need to consider ongoing GIS data maintenance, updates, and standardization.

For More Information

UTRCA's Natural Heritage Studies [webpage](#)

2.7 Upper Thames River Conservation Authority

2.7.4 Reforestation Program

Location

UTRCA Watershed

Partners

- Landowners
- Tree Nurseries (Somerville, Pineneedle, Sloans, Winkelmolens)

Funders

- Forests Ontario
- Ontario Power Generation
- Clean Water Program
- OSCIA

Transferability

We continue to work with other Conservation Authorities to share information and successes when planting trees

Contact Information

- John Enright (Forester)
519-451-2800 ext. 243,
enrightj@thamesriver.on.ca

Project Goals

To increase tree cover by planting field windbreaks, buffers along watercourses and retiring fragile land.

Project Description

Field windbreaks will reduce windblown soil carrying nutrients that may end up in drainage ditches and other watercourses. Tree buffers along watercourses will filter nutrients before they make it to water. Planting fragile land to trees will also reduce erosion, preventing nutrients from moving to adjacent watercourses. These all have positive impacts on nutrient reduction in the Thames River and western Lake Erie basin.

- Conduct site visits with landowners who have expressed an interest in implementing a tree planting project.
- Prepare a tree planting site plan that outlines required site preparation by landowner
- Order the appropriate seed zone specific nursery stock to complete the project
- Complete grant applications that will assist landowners with some of the total project cost
- Plant and tend the trees with herbicide to control competing vegetation
- Have landowners mow between the tree rows for the first three years
- Conduct survival and growth assessments to determine project success
- Order and plant refill nursery stock when required

Results Summary / Expected Outcomes

Annually we assist approximately 150 landowners with the planting of 40,000-50,000 trees.



UTRCA Machine Planting Buffer along Wildwood Lake (photo credit: UTRCA)

For More Information

- OMAFRA Best Management Practices – Agroforestry Series Volume 2 – Establishing Tree Cover
- UTRCA’s Fragile Land Retirement [webpage](#).
- UTRCA’s Windbreaks [webpage](#)
- UTRCA’s Buffer Strips [webpage](#).
- OMAFRA’s Windbreaks [webpage](#).

Youtube Videos

- Fragile Land Retirement (Landowner Testimonials)
 - Jim Anderson’s [testimonial](#)
 - Tomy Mayberry’s [testimonial](#)
- Field Windbreaks (Landowner Testimonials)
 - Tom Jackson’s [testimonial](#)
 - Matheson Farm [testimonial](#)
- Buffer Strips (Landowner Testimonials)
 - Bob Brickman [testimonial](#)
 - Gerald Kodde [testimonial](#)



UTRCA Windbreak Machine Planting - Norway spruce field windbreak(photo credit: UTRCA)

Next Steps

To continue to look for new ways to promote the tree planting program

Lessons Learned

- High land values and commodity prices are a deterrent to retiring marginal land to trees
- Grants are a real incentive to encourage landowners to retire land to trees
- Proper site preparation and follow up tending is a must to ensure planting success
- A cover crop of Dutch white clove and barley is an excellent form of site preparation
- An over population of deer is resulting in serious deer browse damage on newly planted tree seedlings

2.7 Upper Thames River Conservation Authority

2.7.5 Shared Waters Approach

Location

Thames River Watershed

Partners

- Aamjiwnaang, Caldwell, Chippewas of the Thames, Oneida, and Walpole First Nations
- City of London
- ECCC
- LTVCA
- MNRF
- MOECC
- OMAFRA
- UTRCA

Funders

Funding for several projects was provided by MOECC's Showcasing Water Innovation program.

Transferability

Though each watershed will have its own issues, land uses and environmental conditions that will make the end product somewhat different, the process of a collaborative water management plan is transferable.

Contact Information

- Tara Tchir (Project Manager)
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- Karen Maaskant (Water Quality Specialist)
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Lessons Learned

A successful program provides information about current water uses and establishes priorities for water efficiency improvements, conservation activities, and water-reduction goals.

Project Goals

The goals of the Shared Waters Approach address water quality and quantity issues that affect stream health (phosphorus reduction, improving local stream health, understanding climate change impacts on water quantity, assessing urban and rural BMPs, incorporating Indigenous traditional Knowledge).

Three goals were developed to protect and improve water quality in the Thames River watershed:

1. Reduce total and dissolved phosphorus loads in the Thames River watershed.
2. Reduce soil erosion from land and maintain geomorphic processes across the watershed.
3. Improve water quality to support improved stream health, including aquatic life.

Four goals were developed to encourage a flow regime that provides sustainable environmental flow (eflow) while reducing flood risk:

1. Understand, develop and recommend environmental flow needs in the Thames River watershed.
2. Improve understanding and mitigation of hazards associated with flooding and extreme flows in the Thames River watershed.
3. Research and recommend mechanisms to achieve acceptable eflow while reducing flood and drought risks.
4. Expand water quantity monitoring to improve watershed understanding including understanding of eflow needs, flood and drought risk, and climate change.

Project Description

The Shared Waters Approach is a water management plan that will address key recommendations for the Great Lakes and the Thames River, with a focus on water quality and quantity. It is the first component of an over-arching watershed initiative called the Thames River Clearwater Revival.

Results Summary / Expected Outcomes

The project partners developed three common goals to achieve the water quality mission for the Thames, and four common goals to achieve the water quantity mission for the Thames. Under each common goal, recommendations that reflect various agency mandates and program responsibilities were developed.

Next Steps

Endorsement by the Steering Committee Partners is expected by the spring of 2018. In the meantime, the steering committee will coordinate the development of implementation and outreach plans for all partners.

2.7 Upper Thames River Conservation Authority

2.7.6 Thames River Clear Water Revival

Project Goals

Improve the ecological condition of the Thames River, Lake St. Clair, and Lake Erie by considering interactions between land, water, plants, animals and people.

Project Description

The Thames River Clear Water Revival (TRCWR) is a long-term partnership initiative that is committed to a healthy and vital Thames River, which will ultimately benefit Lake St. Clair and Lake Erie. The TRCWR brings together all levels of government, Conservation Authorities, First Nations and the local community to achieve this common goal.

The TRCWR is a broad watershed approach that considers the interactions of land, water, plants, animals and people, as represented by Jeremiah the Bullfrog. Step 1 is to develop a water management plan, called the Shared Waters Approach, to address key recommendations for the Great Lakes, with a focus on water quality and quantity.

Results Summary / Expected Outcomes

The TRCWR steering committee determined that the first step was to develop a holistic approach to water management, called The Thames River (Deshkan Ziibi) Shared Waters Approach to Water Quantity and Quality, and undertook some studies to better define the issues.

Next Steps

Once the Shared Waters Approach is completed, the steering committee will determine the next step to best improve the ecological condition of the Thames River, Lake St. Clair, and Lake Erie.

Lessons Learned

- The importance of involving First Nations early in the project, at whatever capacity they are able to participate, and to ensure that timelines are flexible to accommodate their input.
- It is important to have commitment from the various leaders of the participants since the process can be very long. Sign-off of a Terms of Reference from Chiefs of the participating First Nations and from directors of agencies was helpful, as was a description of the strategic alignment of the various partners to the goals and objectives of the TRCWR.

Location

Thames River Watershed

Partners

- Aamjiwnaang, Caldwell, Chippewas of the Thames, Oneida, and Walpole First Nations
- ECCC
- OMAFRA
- MNRF
- MOECC
- LTVCA
- UTRCA
- City of London
- Ingersoll

Funders

The project manager and First Nation engagement is primarily funded through MOECC COA, with some additional funding from the City of London.

Transferability

Although each watershed will have its own issues, land uses and environmental conditions that will make the end product somewhat different, the process of a collaborative watershed strategy is transferable

Contact Information

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519-451-2800 x 261

For More Information

- <https://www.thamesrevival.ca/>



2.7 Upper Thames River Conservation Authority

2.7.7 WISKI (Water Information Systems by Kisters) implementation

Location

UTRCA boundary

Partners

- ERCA
- LRCA
- LTVCA
- MVCA
- NDCA
- SCRCA
- SVCA

Funders

- MNRF
- Public Safety Canada NDMP
- MOECC – COA
- UTRCA

Transferability

- With a growing number of organizations adopting WISKI to store their hydrometric and water quality data, the ability to share data is becoming easier.
- WISKI hubs provide a direct linkage of data sets between conservation authorities with standardized standards.

Contact Information

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- Laura Flynn (Water Management Data Specialist),
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Project Goals

- Develop WISKI as the standard program for storing and reporting hydrometric, water quality, and ecological data.
- Increase data and resource sharing between studies, departments and external partners. This includes conservation authorities and government organizations as well as the general public

Project Description

Utilizing WISKI for water quality data provides a time saving method for importing, analyzing and reporting nutrient conditions across the watershed, and across neighbouring watersheds in south western Ontario. Storing benthic sampling data in WISKI allows for enhanced reporting and analytical capabilities in for assessing stream health based on varying tolerance levels to nutrient dynamics. Hydrometric data includes information such as discharge values at various stations throughout the watershed. WISKI provides an effective method for accessing hydrometric and water quality data for extended analysis potential (e.g. load calculations based on phosphorus sampling data and discharge time series data).

- Hydrometric data already stored within WISKI will be reviewed for the creation of standard practices and naming conventions. Hydrometric data not currently stored within WISKI will be imported into WISKI and made available to other users.
- Water quality and ecological monitoring projects have been prioritized and importing of sampling data has been underway since late 2016. Both long-term and study based monitoring projects have been incorporated into WISKI with increased effort made to coordinate new monitoring efforts with nearby sampling sites or monitoring devices.
- Automation of importing and reporting. This will reduced data entry and reporting effort, allowing more time for collecting, analyzing, and communicating nutrient conditions and stream health.
- Establish a western WISKI hub in the same manner as the eastern hub hosted by Quinte Conservation Authority. With a common database that is shared between conservation authorities, using a standardized structure and conventions, the ability to efficiently access nutrient and hydrometric data without watershed borders has been made possible. The WISKI hub allows for resource and cost sharing amongst the conservation authorities involved.
- Ongoing training and support for WISKI users to take advantage of all available features, enhance analysis potential and time saving practices.
- Development of both an internal and external web application for pulling data out of WISKI and made available for graphing, tables, reports, and information requests has been going on since late 2016 using the WISKI application KiWIS.
- In 2017 work began on linking station and sampling site information in WISKI with desktop and web based GIS applications

Results Summary / Expected Outcomes

- Initial standards and conventions for WISKI users have been developed and will undergo additional review to take into account the expanding range of users and types of data being stored within the software.
- The hydrometric network stored within WISKI has been expanded to include new devices and logger data from water quality projects not originally included prior to 2016.
- Water quality projects monitoring nutrient levels, including PWQMN, City of London, PSPs, and UTRCA-based Reservoir and Long-Term Monitoring have been incorporated in WISKI.
- Water quality guidelines and objectives have been incorporated into the WISKI software. These guidelines can be directly applied to sample results for rapid analysis and exceedance reporting.
- Ecological monitoring projects, including benthic, fish, and mussel surveying have been established in WISKI with links to a WISKI based taxonomic tree for hierarchical taxonomic analysis. Additional attributes, such as biotic index tolerance values for benthic taxa, have been associated with the taxonomic records providing the ability to assess stream health.
- Automation of importing and reporting has been continually developed as new monitoring projects or devices have been included in WISKI.
- The western WISKI hub has been formed with seven other conservation.
- Ongoing training and support has been provided to WISKI users including small internal sessions between staff, large hub-based training sessions, attendance and presentations at the 2018 Canadian WISKI user-group conference, and expert group collaboration and knowledge sharing between WISKI users across Ontario conservation authorities and ministries.
- A preliminary web application has been established for reporting on hydrometric time series data. The application features the ability to visualize, access, and export data directly. There is also future potential for web-based data importing into the database.
- SQL based tasks are currently in development to link scheduled exports of WISKI station and sampling site information with UTRCA's GIS applications

Photos

- UTRCA's WISKI Training Flickr [album](#)



WISKI training at the UTRCA (photo credit: UTRCA)

Next Steps

- Finalize standards and conventions for WISKI users, both internal and throughout the western WISKI hub.
- Continue to expand the use of WISKI by incorporating outstanding data sets from water quality and ecological monitoring projects.
- Incorporate new/recent hydrometric data that is not yet set up within WISKI.
- Continued development and training for WISKI-based analysis and reporting features including the integration of external data.
- Expand the use and features of the WISKI web application to include water quality sampling data.

Lessons Learned

- Implementing a new software application for managing a wide-range of data sets across departments and conservation authority boundaries is a complicated task requiring a high level of support and collaboration.
- The automation, analytical capacity, and reporting abilities WISKI provides can save a large amount of staff time and help to advance projects more efficiently.
- WISKI requires frequent use in order to be an effective user. Developing tools to make data more accessible via web applications will allow infrequent users easier access to data, and potentially the ability to also upload information to the database.

For More Information

<https://www.kisters.net/NA/>