



VISION 2016 – 2020

Conservation Ontario will be the leader in engaging Conservation Authorities in matters of common interest and in shaping effective policy related to Conservation Authorities

Conservation Ontario Council Report

From: Bonnie Fox, Manager Policy and Planning

Date: November 21, 2016

Subject: Great Lakes Water Quality Agreement Executive Committee and Annex Sub-Committees Updates and Decision Items

Summary

This report provides highlights of the activities under the Great Lakes Water Quality Agreement Executive Committee and the binational Annex sub-committees that have Conservation Ontario representatives including: Lakewide Action and Management Plans; Nutrients; Groundwater; Climate Change; and, Science. A highlight includes the September 27th release of the Annex 2 report: *The Great Lakes Nearshore Framework*. There are two associated decision items and the background information on the Decision Items are bolded in the report text:

- i) endorsement of Kate Hayes (Credit Valley Conservation) as the CO representative on the Nearshore/Baseline Assessment Advisory Panel
- ii) endorsement of CO's submission dated November 20th, 2016 on *Reducing Phosphorous to Minimize Algal Blooms in Lake Erie (EBR #012-8760)*. Overall our submission emphasizes that CAs are committed to continuing their leadership role with the province, federal government, municipal partners and all stakeholders to address the Phosphorus challenge in Lake Erie and that it's critical that significant resources be put towards large scale implementation of best practices immediately to make any headway in meeting the 40% Phosphorus load reduction target by 2025.
- iii) endorsement of Kristina Anderson (TRCA) as the CO representative on the Groundwater Annex

Recommendations

- i) ***THAT Kate Hayes (Credit Valley Conservation) be endorsed as Conservation Ontario's representative on the Nearshore/Baseline Assessment Advisory Panel***
- ii) ***THAT Conservation Ontario's submission dated Nov 20, 2016 on Reducing Phosphorous to Minimize Algal Blooms in Lake Erie (EBR #012-8760) be endorsed***
- iii) ***THAT Kristina Anderson (Toronto and Region CA) be endorsed as Conservation Ontario's representative on the Groundwater Annex***

Background

A key outcome of the bi-national Great Lakes Water Quality Agreement 2012 (GLWQA) is recognition of watershed management agencies in decision-making through a seat at the bi-national Great Lakes Executive Committee (GLEC) which meets two times a year (June and December).

In 2013 and 2014, to ensure effective integration of efforts with watershed management agencies and an emphasis on 'action and implementation', Council endorsed Conservation Ontario (CO) representatives on five of the ten bi-national sub-committees of the GLEC. These Annex sub-committees include: Annex 2 – Lakewide Action and Management Plans; Annex 4 – Nutrients; Annex 8 – Groundwater; Annex 9 – Climate Change; and, Annex 10 – Science. B.Fox as the CO representative on the GLEC coordinates these reports to Council. Material on the activities of all the Annexes can be found at binational.net.

Current Status

Great Lakes Executive Committee (GLEC) – B.Fox (CO)

Staff participated via conference call and webinar in the June 1-2, 2016 GLEC Meeting held in Chicago. The next GLEC meeting is the afternoon of December 6, 2016 by conference call.

The Great Lakes Public Forum was held in Toronto on October 4-6, 2016; it is a tri-ennial commitment of the GLWQA and it will be alternating between Canadian and American locations. Conservation Ontario had an exhibit at the event highlighting our interactive Great Lakes St. Lawrence River watershed educational tool (<http://www.learnaboutthegreatlakes.ca/english/index.html>) which is also available in French. There were more than 700 attendees in attendance over the 3 day event. At least 13 CAs were represented in the audience and our participation was noted and appreciated by the Environment and Climate Change Canada staff.

The Governments of Canada and the United States released their proposed priorities for science and action to guide their work under the 10 Annexes of the GLWQA for 2017 through 2019. This commenting opportunity was circulated to CAs in the October 14th weekly update email. The proposed priorities for 2017-2019 can be found through the weblink provided under Additional Resources at the end of this report.

Annex 2: Lakewide Action and Management Plan Annex Sub-committee – B.Fox (CO)

Key deliverables under this Annex are to establish an integrated nearshore framework by 2016 which can be used to assess, identify priorities, and guide management of nearshore areas of the Great Lakes, and, to establish a governance framework for Lakewide Action and Management Plans that includes effective outreach and engagement.

Decision item i) Bonnie Fox (CO) has been participating on the Nearshore Framework Task Team. **The Great Lakes Nearshore Framework (weblink is available at the end of the report) was finalized and posted on binational.net on September 27, 2016. Council endorsed coordinated comments on the draft Nearshore Framework that were submitted on July 12, 2016. Conservation Ontario recommended that the pilot testing be advised by a multi-stakeholder advisory committee so that the**

outcomes take into account some of the detailed comments raised in the letter and facilitate future collaboration with local implementers. The first meeting of the Advisory Panel will take place on November 29 and 30th where they will be briefed on the pilot approach of the baseline assessment. Kate Hayes (Credit Valley Conservation) has been actively engaged in providing review of material generated in the development of the Nearshore Framework over the past few years. She has agreed to represent Conservation Ontario on the Advisory Panel.

Bonnie has been providing input to the work of the Lakewide Action and Management Plan (LAMP) Task Team as it is presented to the Annex Sub-committee. Each Lake has a LAMP and the LAMPs will be the primary implementation vehicle for the GLWQA Annex commitments; including the Nearshore Framework. Annex 2 requires that the parties develop LAMPs for each Great Lake every five years; Lake Superior's LAMP has been finalized and was posted on binational.net on September 19th 2016, Lake Huron will be drafted for Partnership Management Committee consultation in Dec 2016 and is planned to be finalized in 2017, Lake Ontario – 2017 and Lake Erie-2018. Annex 2 also requires release of Annual Reports for each LAMP and these were posted on binational.net for 2016 on October 3rd as part of the Great Lakes Public Forum. Staff have been informed that the CO representatives nominated to the Lake Partnership Management Committees to represent Conservation Authorities and the local watershed perspective and to provide 'highlights' to CO Council have been confirmed; this includes: LAKE SUPERIOR: Rhonda Bateman, Sault Ste. Marie Region Conservation Authority and, Tammy Cook, Lakehead Region Conservation Authority; LAKE HURON: Phil Beard, Maitland Valley Conservation Authority and, Brian McDougall, St. Clair Region Conservation Authority; LAKE ERIE: Ian Wilcox, Upper Thames River Conservation Authority, and, Richard Wyma, Essex Region Conservation Authority; and LAKE ONTARIO: Brian Denney, Toronto and Region Conservation, and, Terry Murphy, Quinte Conservation. It is noted that Gayle Wood, Nottawasaga Valley Conservation Authority has accepted membership on the Lake Huron Partnership Management Committee as well.

Annex 4: Nutrients Annex Sub-committee – J.Rzadki (CO)

Key deliverables under this Annex are: Lake Erie Phosphorous targets by 2016 and completion of a Phosphorous reduction strategy and domestic action plans by 2018.

Focus of Annex 4 activity has been on activities reported in the September, 2016 CO Council update. The Ontario, US States and Federal Governments are currently focused on draft Domestic Action Plan development and stakeholder engagement and timing and coordination of Bi-National Communications as the draft DAPs are released for comment.

The Targets & Objectives Task Team met on November 15-16 where the discussion was to include the Phosphorus reduction target for the Lake Erie Eastern Basin. There are no updates at this time, other than the available science on this is complex and has contributed to the delay in assigning a target.

The Lake Erie Nutrients Working Group (see September Council report for background) met via teleconference on September 29th to receive and discuss an update provided by federal and provincial government representatives on the draft Canada-Ontario Domestic (C-O Action Plan) for Lake Erie and engagement and proposed actions. The terms of reference for the Working group were also finalized.

Decision Item i): An Environmental Bill of Rights registry posting on *Reducing Phosphorous to Minimize Algal Blooms in Lake Erie* (EBR #012-8760) was circulated for CA comments for development of the attached submission dated November 20th. Comments were received from UTRCA, LTVCA, Grand River CA, NPCA, ERCA, LPRCA, LSRCA, CH, NBMCA, TRCA, and ABCA. Appreciation is extended to Karen Maaskant (UTRCA); Jason Wintermute (LTVCA); and Sandra Cooke and Louise Heyming (Grand River CA); and Lorrie Minshall (LPRCA) for their review and comment on drafts of this submission.

The province has indicated the release of this document is part of early public input on proposed high level actions to help guide the content of the draft Canada-Ontario Action Plan for Lake Erie and the list of proposed actions in the posting is not exhaustive.

While the focus of this document and the proposed actions is Lake Erie, all Conservation Authorities should continue to monitor and engage where possible in providing input on the development of policies, programs and actions associated with phosphorus reduction to reduce algal blooms and the development of the Canada –Ontario Action Plan for Lake Erie. This will have implications for programming and policies for action in other Lake Basins. The Province’s proposed actions cover a broad range of CA program areas including Water Quality and Quantity Monitoring and Reporting, Watershed Stewardship and Conservation Services, Low Impact Development and Stormwater Management and Green Infrastructure, Information Management and tools to Support Flood Management, Support of Natural heritage and Wetland Conservation and Restoration, Soil Health and Climate Change Adaptation and Mitigation.

General and Key comments in the Conservation Ontario submission include:

- Conservation Ontario generally supports the proposed actions recognizing the inherent challenges with reducing phosphorus from a multitude of sources across the Lake Erie basin. Generally the proposed actions are a good start to achieving the 40 percent phosphorus (P) reduction target and although a target has not yet been set for the Eastern Basin, it is recommended that the best practices and actions, as outlined in the EBR posting, should apply across Ontario. This will not only benefit Lake Erie, but other Great Lakes, inland lakes, rivers and aquatic systems.
- CAs are committed to continuing their leadership role with the province, federal government, municipal partners and all stakeholders to address the Phosphorus challenge in Lake Erie. Conservation Ontario recommends that while relevant research should continue it’s critical that significant resources be put towards large scale implementation of best practices immediately to make any headway in meeting the 40% Phosphorus load reduction target by 2025.
- Conservation Ontario recognizes the importance of targeted demonstration in priority subwatersheds for education and research. However, basin-wide/watershed-wide promotion and adoption of best practices across all sectors will be more effective for the long term reduction of P loads for Lake Erie than targeting only within specific geographies within watersheds. For the issue of P loading, targeting should be for specific best practices (eg. Soil erosion and continuous cover) to address the priority impact of seasonal runoff. All subwatersheds are contributing maximum P loads in these conditions of major runoff. Additional focused outreach would be beneficial to promote priority best practices in specific areas or across specific sectors.
- Conservation Ontario also supports actions and adaptive management implemented within an integrated watershed management framework. Watershed and adaptive management requires a commitment to monitoring and reporting on the implementation of actions and the condition of

the resource(s). Thus, a long term commitment to monitoring and reporting across watersheds within the Lake Erie basin is needed.

- **Conservation Ontario and Conservation Authorities look forward to providing further detailed input through engagement on the Draft Canada Ontario Action Plan for Lake Erie. To address the scale of this problem significant new provincial and federal resources and funding are needed immediately. Conservation Authorities in the Lake Erie Basin are ready to leverage existing local partnerships, funding and programs (including watershed stewardship and conservation services programs) to implement actions now to in order meet the 40 % reduction target by 2025.**

Related Initiative: Watershed Management of Nutrients in Lake Erie

The International Joint Commission Water Quality Board (WQB) Legacy Issues Work Group (LIWG) is convening a binational workshop on February 1st and 2nd, 2017 of approximately 30 experts, to build support for the findings of the work group report on *Watershed Management of Nutrients in Lake Erie* by defining and developing standard components that should be part of watershed management plans including key factors critical to the successful development and implementation of watershed management plans. Gayle Wood (NVCA) is a member of the WQB and LIWG. CAOs of Lake Erie Watersheds and Jo-Anne Rzedki (CO) have been invited to the workshop.

In 2015 the WQB formed the LIWG, which undertook a project to assess the state of watershed management plans for nutrient management in the Lake Erie basin, including the identification of key success factors that could be used to achieve nutrient load reduction targets and thereby restore and protect Lake Erie. The LIWG of the WQB put together recommendations on how watershed management plans should be used to manage nutrient pollution in Lake Erie and identifies key success factors necessary for watershed management plans to achieve meaningful nutrient load reductions. Jo-Anne Rzedki (CO) and some CA staff from the Lake Erie CAs have provided comment on this document. This report was publicly released in September 2016 (Weblink available at bottom of this report). The outcomes of this workshop will be used by the WQB to further develop the findings and recommendations from the WQB's report (August 2016) regarding key success factors in watershed management planning to achieve nutrient load reductions that may be presented to the Commission for their consideration in forwarding to the governments of Canada and the United States.

Annex 8: Groundwater Annex Sub-committee – (CO Representative to be determined)

Decision Item ii): A key deliverable under this Annex was a Report entitled "Groundwater Science Relevant to the Great Lakes Water Quality: A Status Report" which was released on July 6, 2016 and is available on Binational.net. Gayle SooChan (Credit Valley Conservation) was the CO representative on the Annex Sub-Committee and the binational co-chairs acknowledged her significant contribution in the development, writing and editing of this report. Gayle announced in September that she would be stepping down from the sub-committee. She assisted in identifying her recommended replacement, Kristina Anderson (P. Geo., Hydrogeologist II, Toronto and Region Conservation Authority), as the Conservation Ontario representative on the Groundwater Annex Sub-Committee.

Currently, the Annex Sub-Committee continues to work on development of a groundwater indicator (e.g. nitrates - rural, chlorides - urban) for Annex 10 science indicators project. Their proposed key priorities for 2017-2019 are focused on management actions and details can be seen through the weblink provided under Additional Resources at the end of this report.

Annex 9: Climate Change Annex Sub-committee –S.Shifflett (Grand River CA)

The purpose of this Annex sub-committee is to compile Great Lakes climate change knowledge, assess and identify critical information needs of the other Annexes and develop strategies to address those gaps.

Annex 9 continues to release the “Quarterly Climate Impacts and Outlook: Great Lakes Region” and these can be found on Binational.net.

Annex 10: Science Annex Sub-committee – C. Gowda (CO)

The purpose of this Annex is to contribute to the achievement of the General and Specific Objectives of this Agreement by assisting the other Annexes in the coordination, integration, synthesis, and assessment of their science activities. Science activities include monitoring, surveillance, observation, research, and modeling to support management decisions. Under the Annex 10, several milestones have been achieved and other work underway, as described below.

The Annex 10 provided a progress report for 2013-2016 for the GLEC and it was presented at the October 2016 Great Lakes Public Forum. The draft Science and Action priorities were consulted upon to Nov. 18, 2016 (see weblink provided at the end of this report), and these will be finalized by the December GLEC meeting. Two main pieces of work for Annex 10 are the revival of the Traditional Ecological Knowledge (TEK) task team and to consider more innovative ways to integrate science (such as citizen science) into the commitments and work under Annex 10. The Ecosystem Indicators and Reporting team (EI&R) have prepared reports on 44 ecosystem health sub-indicators reports. The Science Indicators information was pared down to 9 indicator summaries presented at the Great Lakes Public Forum meeting (Toronto, Oct. 4-6, 2016) to kick-off public consultation, and this will inform the State of the Great Lakes 2017 reports. The Cooperative Science and Monitoring Initiative (CSMI) team have finalized the Great Lakes monitoring priorities for Lake Superior (field year 2016), and activities for this lake have begun. Monitoring priorities for Lake Huron (field year 2017) have been identified and include addressing *Cladophora* growth. The Lake Ontario and Lake Erie reports are written for previous field years. Discussions will continue on branding CSMI and confirming the role and work of this task team as well as identifying and confirming the links to the Lake Partnerships and the LAMPs.

The Data Management and Sharing Task Team (DMSTT) provides guidance on data management and sharing to assist key stakeholders in meeting commitments under the GLQWA. George Sousa from the Grand River Conservation Authority is the new Canadian Data Management and Sharing task team co-lead, replacing Chitra Gowda. Kelli Paige of the Great Lakes Observation System (GLOS) is the new US co-lead for this task team. The DMSTT has developed a data platform assessment matrix tool, and started a comprehensive list of data platforms available and relevant to the Great Lakes Water Quality Agreement. The DMSTT is looking at opportunities to pilot the tool with the Annex 4 (‘Nutrients’), in order to support that Annex’s data management needs.

Conclusion

CO and CA staff will continue to report back on the progress towards annex workplan priorities and wherever possible will consult with and engage the larger CA community to ensure that the work being produced at a national and bi-national level supports CA action on the ground and vice versa.

Additional Resources (for information only, not required for printing)

Proposed 2017-2019 Great Lakes Binational Priorities for Science and Action

“The Great Lakes Nearshore Framework” (September 2016)

“Evaluating Watershed Management Plans – Nutrient Management Approaches in the Lake Erie Basin and Key Locations Outside of the Lake Erie Basin”



November 20, 2016

Ms. Madhu Malhotra
Manager, Ministry of the Environment and Climate change
Climate change and Environmental Policy Division
Land and Water Policy Branch
40 St. Clair Ave. W. Floor 10
Toronto Ontario
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Dear Ms. Malhotra:

Re: “Reducing Phosphorus to Minimize Algal Blooms in Lake Erie” (EBR # 012-8760)

Thank you for the opportunity to provide comments on “Reducing Phosphorus to Minimize Algal Blooms in Lake Erie” (EBR #012-8760). These comments are provided to you on behalf of the Province’s 36 Conservation Authorities (CAs) who have significant expertise as watershed based organizations applying subwatershed approaches to deliver programs at the local level within Lake Erie and across the Great Lakes Basin. These comments are not intended to limit consideration of comments shared individually by CAs on this EBR posting.

CAs are committed to continuing their leadership role with the province, federal government, municipal partners and all stakeholders to address the Phosphorus challenge in Lake Erie. Conservation Ontario recommends that while relevant research should continue **it’s critical that significant resources be put towards large scale implementation of best practices immediately to make any headway in meeting the 40% Phosphorus load reduction target by 2025.**

Conservation Ontario appreciates the efforts the Province has made to include CAs in the dialogue about what is needed to address this issue. This includes, recent CA engagement on November 14th, 2016, through CO and CA representation on the Lake Erie Nutrients Working Group and through a number of focused sessions on Agriculture towards the development of the Canada-Ontario Action Plan for Lake Erie (DAP). Conservation Ontario is also pleased to continue participation on the Great Lakes Water Quality Agreement Annex 4 (Nutrients) Bi-National Subcommittee which has involved active participation of CO and CA staff with technical expertise in:

- Water quality and quantity issues monitoring and reporting,
- Watershed stewardship and conservation services program development and delivery
- Point and non-point rural and urban stormwater management in addition to
- Other critical components of implementing an integrated watershed management framework.

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Conservation Ontario acknowledges this is part of early public input on proposed high level actions to help guide the content of the draft Canada-Ontario Action Plan for Lake Erie and the list of proposed actions in the posting is not exhaustive. The following comments are organized to respond to the proposed Actions and questions posed in the EBR Posting.

1.0 Do you have any feedback or input on the proposed actions outlined in this notice, which will ultimately support the development of the draft Canada-Ontario Action Plan for Lake Erie?

1.1 Key messages

- Conservation Ontario generally supports the proposed actions recognizing the inherent challenges with reducing phosphorus from a multitude of sources across the Lake Erie basin. Generally the proposed actions are a good start to achieving the 40 percent phosphorus (P) reduction target and although a target has not yet been set for the Eastern Basin, it is recommended that the best practices and actions, as outlined in the EBR posting, should apply across Ontario. This will not only benefit Lake Erie, but other Great Lakes, inland lakes, rivers and aquatic systems.
- **Conservation Ontario recognizes the importance of targeted demonstration in priority subwatersheds for education and research. However, basin-wide/watershed-wide promotion and adoption of best practices across all sectors will be more effective for the long term reduction of P loads for Lake Erie than targeting only within specific geographies within watersheds. For the issue of P loading, targeting should be for specific best practices (eg. Soil erosion and continuous cover) to address the priority impact of seasonal runoff. All subwatersheds are contributing maximum P loads in these conditions of major runoff.** Additional focused outreach would be beneficial to promote priority best practices in specific areas or across specific sectors.
- **Conservation Ontario recommends the Province directly leverage existing CA stewardship programs that deliver actions to reduce phosphorus to Lake Erie now**
- Conservation Ontario also supports actions and adaptive management implemented within an integrated watershed management framework. Watershed and adaptive management requires a commitment to monitoring and reporting on the implementation of actions **and** the condition of the resource(s). Thus, a commitment to monitoring and reporting across watersheds within the Lake Erie basin is needed.
- It is also recommended that the socio-economic effects of reductions should be considered and monitored as part of the adaptive watershed management framework. Considering socio-economic cost benefits will assist in efficiently allocating funds leveraged by Ontario to priority activities and actions in support of accomplishing the 40% reductions.
- The Province should integrate priorities like wetland conservation, soil health and climate change, source water protection and great lakes efforts within program design and delivery in

order to maximize efficiencies and allocation of scarce human and financial resources. Public-private partnerships should be explored, implemented and evaluated.

- The Province should support and enhance communication to profile existing and future successful collaboration across sectors of initiatives and actions focused on the reduction of phosphorus to minimize algal blooms in Lake Erie and other Lakes. This will assist in evaluation and reporting of success, adaptation and knowledge transfer across the entire Great Lakes Basin.

1.2 Point Sources

1.2.1 Proposed Action: Work with partners to update provincial policies for Lakes Erie and Ontario in order to establish a legal effluent discharge limit of 0.5 milligrams per litre of total phosphorus (TP) for all municipal sewage treatment plants (STPs) that have an average daily flow capacity of 3.78 million litres or more per day. This action will bring Ontario's policies in line with the binational recommendation under the Canada-U.S. GLWQA.

Conservation Ontario is supportive of the Province of Ontario updating existing wastewater treatment policies many of which date back to the mid-1990's. Wastewater Operators can reduce phosphorus loads through optimized treatment plant performance. **A holistic Phosphorus Reduction Strategy should be completed which evaluates all the P reduction opportunities and develops priorities based on cost-benefit.**

Furthermore, in the completion of this strategy, Conservation Ontario encourages the Province to develop a cumulative effects framework for evaluating both point and non-point sources that are discharging to the same receiver (river, lake etc.) so that best value solutions can be identified to ensure the outcome of cost effectively reduced phosphorus loads. This framework should include evaluating both point and nonpoint sources in the receiver, along with an inventory and evaluation of existing STPs, all other TP controls. Existing opportunities to upgrade should be based on cost benefit with priority for optimization (eg. Composite Correction Program) for better treatment as this usually less costly than a full upgrade. **Further, the Province should commit to Regulation 75 in the Ontario Water Resources Act to ensure the future application of Water Quality Trading as a means to reduce phosphorus loads equitably across sectors.**

Conservation Ontario also recommends ***Water reuse*** of the treated effluent as another very viable solution with reuse water quality criteria established by the Ministry of Environment and Climate Change (MOECC) which should include promotion with municipalities. Phosphorus Reuse (closing the P cycle) is a viable option for wastewater treatment. The evaluation of products like the Pearl by OSTARA (www.OSTARA.com) in relation to existing STPs for potential application is recommended. The Pearl precipitates phosphorus into a reusable form which can have economic benefit. It reduces costs by reducing solid sludge and most importantly reduces P discharge to surface waters.

1.2.2 Proposed Action: Work with partners to reduce loadings where feasible, through upgrades to secondary STPs that have an average daily flow capacity of 3.78 million litres or more per day in the Lake Erie basin to a tertiary level of treatment, as well as improvements to wastewater treatment and

collection infrastructure to reduce combined sewer overflows and bypasses, and stormwater management systems (including facility rehabilitation and incorporating green infrastructure).

Addressing the limiting factors has the potential to save significant capital costs. Therefore, **Conservation Ontario recommends a commitment to undergoing an Optimization Process, such as the Composite Correction Program noted above, either individually or through an area-wide approach is cost effective, offers “best value” solutions and it builds the skills and talent of Ontario’s wastewater treatment plant operators and managers.**

An unpublished study undertaken by the Grand River CA shows that 75% of the Secondary treatment plants in the province already achieve effluent quality of 0.50 mg/L Total Phosphorus (TP) or less and through process control, can easily achieve 0.40 mg/L TP if not lower (0.3 mg/L TP) concentrations. The interim voluntary performance target for secondary plants in Grand River Watershed is 0.40 mg/L TP . **Conservation Ontario recommends provincial investments in operations, operator training and technical assistance which results in improved process control and optimized performance.**

Also overflow design from Sewage Pumping Stations (SPS) should be investigated to prevent / mitigate potential direct discharge to Lake Erie or other natural systems.

Conservation Ontario cautions that capital upgrades to wastewater treatment plants to tertiary treatment does not necessarily guarantee the reduction of phosphorus loads from the plant. Good treatment process control is necessary to do this. Operator training and skills development is needed to ensure good process control. Municipalities should implement Comprehensive Performance Evaluations of their plants to determine the capability of each plant before capital investments are made. This approach identifies the limiting factors for achieving the desired result of reduced phosphorus loads. Most commonly, the limiting factors are a lack of data to inform decisions, poor process control and a lack of understand of the operational needs of the plants.

1.2.3 Proposed Action: Ontario will promote and encourage optimization of sewage treatment as a way for municipalities to improve treatment plant performance (including lower phosphorus discharges) and achieve operational efficiencies. As part of this effort, Ontario will continue to support the development of area-wide optimization programs for municipal STPs to reduce phosphorus loads, and make Lake Erie the priority geography for this effort.

Conservation Ontario is encouraged that the province proposes to continue to support area-wide optimization programs. **This Action should be part of the development of the holistic Phosphorus Reduction Strategy and framework noted above ensuring this is evaluated based on all P reduction opportunities and cost-benefits.** It is noted that the Grand River Conservation Authority is willing to continue to work with the province to implement the Grand River Watershed-wide wastewater optimization program and provide support for Performance Based Training. **This knowledge should be transferred to other Lake Erie watersheds and across the Great Lakes Basin.**

1.2.4 Proposed Action: Ontario, in collaboration with the greenhouse sector, will continue to work towards eliminating phosphorus-containing wastewater from entering Leamington area watercourses that flow into Lake Erie, through education, awareness, innovation, cost-shared investments and regulatory compliance and enforcement efforts.

There is strong supporting evidence that phosphorus concentrations are significantly higher in greenhouse influenced streams vs those that are not greenhouse influenced. **Conservation Ontario is supportive of the efforts being made to reduce or eliminate the P contributions directly from greenhouses.** Essex Region Conservation Authority has been working with Ontario Greenhouse Vegetable Growers (OGVG) and MOECC towards achieving this goal. Also the greenhouse industry is growing in nearby communities. **Conservation Ontario encourages the province to ensure that similar problems don't arise beyond the Leamington area watercourses.**

It is also recommended that the term 'wastewater' should be defined in this case and to clarify that efforts are being focused specifically on keeping greenhouse process water separate from storm runoff.

Continued monitoring of streams to ensure the effectiveness of the technologies being implemented is critical. The Essex Region Conservation Authority has been monitoring the watercourses in the Leamington area since 2012 and is committed to continuing to monitor for ongoing effectiveness.

There are other concentrations of greenhouses in Southwestern Ontario where new technologies for nutrient /phosphorus reduction and recapture are being implemented. **Conservation Ontario supports the continued research, monitoring and evaluation of these technologies with opportunities to showcase and transfer knowledge and benefits, including economic.**

1.3 Non-point Sources

1.3.1 Proposed Action: Ontario is working with developers and others to promote and support the use of green infrastructure and low impact development (LID), including clarifying and enhancing policies, and developing green standards. Ontario is in the process of drafting a LID guidance manual that will assist proponents in implementing their efforts. The draft manual is expected to be available for public comment in early 2017. Note:

Conservation Ontario is supportive of the efforts to work with developers and others to promote and support the use of green infrastructure (including natural systems) and low impact development (LID). The province is commended for the current process of developing the MOECC Guidance Manual for Low Impact Development which should contribute to improvements in Lake Erie and elsewhere. Conservation Ontario, Lake Simcoe Region CA (LSRCA), Toronto Region CA (TRCA) and Credit Valley Conservation (CVC) staff are currently at stakeholder table for development of this Guidance Manual.

Note that Conservation Ontario's definition of Green Infrastructure includes natural systems in addition to vegetative technologies associated with Low Impact Development for Stormwater Management (LID).

While the application of LID for stormwater management technologies has been focused in the Greater Toronto/Greater Golden Horseshoe Area, in the Lake Erie Basin Upper Thames River Conservation Authority has initiated and is implementing LID programs working with developers, municipalities, consultants and the public to implement green infrastructure for water quality protection.

The implementation of LID will help to further reduce TP by 40% over conventional practices. Greater efforts on stormwater capture reuse needs to be examined. The proposed action, working with developers to promote green infrastructure and LID technologies, appears to only consider new developments. The building industry is critical moving forward for new building however the Erie target can only be achieved with a retrofit program. **Conservation Ontario recommends an action associated**

with pre-existing developments to deal with outdated and possibly failing stormwater ponds and other infrastructure which could be releasing stored or legacy nutrients to the lake. This could be achieved through the installation of LID features to help treat SWM runoff where conventional Stormwater Management (SWM) treatment cannot.

Conservation Ontario also emphasizes that Low impact development (LID) should only be implemented in areas that are not sensitive to groundwater contamination like moraines and sand plains. There is concern that the adoption of LID solutions in urban areas can increase chloride contamination in local drinking water supplies. A 'one-size-fits- all' approach to implementing LID for controlling urban nonpoint source contamination and trade-offs will have to be recognized to safeguard local water supplies.

Another consideration is the ongoing maintenance costs that might be associated with LID which are raised as a concern by municipalities and other stakeholders. It will be important for the key stakeholders to agree to maintenance of such infrastructure as rain gardens, etc. As an example Municipalities, such as Kitchener, Guelph, Mississauga have been evaluating or are now implementing Stormwater Utilities to address the funding gap for stormwater management, maintenance and operational costs. Conservation Authorities like Credit Valley Conservation are working with municipalities and partners to develop tools for the evaluation of environmental and economic cost benefits of LID technologies that should be transferable to other watersheds and municipalities across the province, including the Lake Erie Basin. This incorporates the cost of maintenance. **Conservation Ontario recommends that the Province formally acknowledge this work and provide support through enhanced funding of pilot projects that incorporate tools for assessing cost-benefits of all components and phases of LID technologies implementation.**

There are also new SWM LID policies being implemented by conservation authorities with municipalities (eg. Lake Simcoe CA). Training is being offered through the Sustainable Technologies Evaluation Program (STEP) and other vehicles in collaboration with Toronto, Lake Simcoe CAs and Credit Valley Conservation, municipalities and other partners. **Furthermore, MOECC should provide clear direction requiring the use and design of LIDs wherever feasible in support of the adoption of LID technologies. The Province should support training and education for Conservation Authority and municipal staff with the roll-out of the new LID manual to facilitate implementation in Lake Erie watersheds and across the Great Lakes Basin.**

1.3.2 Proposed Action: In collaboration with partners, Ontario is considering enhancing and clarifying regionalized requirements for mandatory pump-out and inspections of septic systems to increase protection of ground and surface water quality.

Conservation Ontario is encouraged to see the Province considering strengthening septic system inspection and mandatory pump-outs. This is a source of phosphorous in poorly drained clay soil in Essex Region, for example where failing septic systems and under-maintained septic systems are common. In addition, the following comments are presented as the Province considers this proposed action.

Conservation Ontario recommends that requirements for mandatory pump-outs and inspections should be based on current science and consider local conditions with respect to the movement of phosphorus in soils. Planting of deep-rooted vegetation between the septic bed and water course to attenuate phosphorus should be encouraged. Healthy soil biota also attenuate P.

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It is also recommended that costs to municipalities and other stakeholders of implementing mandatory pump-out and inspections programs should be considered while promoting the avoided long term environmental, economic and social costs of not implementing such a program. For example in Wainfleet ON, where there has been a boil water advisory in effect since April 10, 2006, the issue of the groundwater contamination (bacteria and nutrients) in this municipality is ongoing and needs to be addressed.

There are also areas adjacent to lakes and watercourses where erosion has compromised the septic systems. Some septic systems were placed in areas of high water tables and/or frequent flooding that impedes their effectiveness. Outside the Lake Erie Basin in the Lake Simcoe watershed, septic system inspection within 100 m of the lake or its tributaries is already in place in Lake Simcoe as legislated by the Lake Simcoe Source Protection Plan.

1.3.3 Proposed Action: As part of the hauled sewage policy and program review, Ontario will develop, and post for public comment, a draft policy framework for managing hauled sewage in the province.

Conservation Ontario supports this action emphasizing the need for municipal input.

1.4 Agricultural Sources

1.4.1 Proposed Action: In order to reduce phosphorus runoff during the high risk period (non-growing season), Ontario will partner with the agriculture sector to further enhance its outreach to farmers to promote the application of nutrients at the right time and is considering tighter restrictions on the application of nutrients during this period.

Conservation Authorities (CAs), have strong Agricultural Stewardship, Extension and Outreach programs supported by local municipalities and periodic provincial and federal funding programs. CA staff are trusted catalysts who can mobilize stewardship efforts and are critical, well-respected, on-the-ground advocates for watershed stewardship and actions that address multi-ministry priorities within the Great Lakes Basin. **Conservation Ontario recommends that the Province formally and directly support CA stewardship outreach and extension staff for long term (for example >5 years) action implementation.**

Given that much of the phosphorus load flows into the Great Lakes during spring freshet, **Conservation Ontario supports the Province's recommendation to promote the application of nutrients at the right time, at the right rate, in the right place and using the right type of fertilizer. Conservation Ontario also supports the restriction of nutrient application during the winter period.** Restricting nutrient application during the winter will have implications to manure storage requirements **and will require the Province and farming industry to facilitate further investments in additional storage possibly through cost share programs in some instances**

In order to reduce phosphorus runoff during the high risk period this action is 'high priority' to making achievement towards the target P load reduction for Ontario. Focus needs to be on 'priority' actions that contribute to highest loading conditions in winter-spring runoff which include best practices for continuous cover and soil erosion measures. This also includes recognition that the 'best approach to reducing P loss may vary between operations' and that there are many physical factors such as soil

type, climate zone, topography, that will influence the choice of the best BMP to implement. Continued research and evaluation of best practices to reduce P load during the non-growing season will be important.

Conservation Ontario also encourages the province to consider the investment required in human and financial resources to enforce regulations. Incentive programs for Best Management Practice (BMP) implementation will be needed and along with effective enforcement of the Nutrient management Act. Conservation Ontario recommends that existing incentive mechanisms and programs should be evaluated for their effectiveness in encouraging adoption of best practices. Some of this could include a review of various tax incentive programs like the Farm, Conservation Land Tax Incentive and Managed Forest Tax incentive programs. The province could also consider placing conditions on certain financial programs and benefits tied to landowners' compliance with minimum best practices associated with current regulations.

1.4.2 Proposed Action: Support for the implementation of an Ontario industry-led 4Rs program (right time, rate, source and placement of nutrients), based on the internationally-recognized 4R Nutrient Stewardship system which helps farmers reduce nutrient losses into the environment through efficient nutrient application.

Conservation Ontario has representation on the provincial committee established under an MOU with the province, the agricultural industry and other stakeholders to support the development of the 4R Nutrient Stewardship system.

Conservation Ontario is strongly supportive of the Ontario industry-led 4Rs program as a key action to manage fertilizer/nutrient application. Similarly BMP systems are needed to reduce phosphorus loads and thus, additional BMPs like manure storage, erosion control, riparian buffers, etc. are also needed. This should be supported by ongoing research. For example it may be that further investigation of the balance between crop yields and typical nutrient management rates to meet phosphorus load reduction targets is needed. There are studies that show that enhanced conservation tillage or the use of cover crops across study watersheds resulted in more substantial estimated reduction of phosphorus loads compared to nutrient management actions. The development of a provincial Agricultural Soil Health and Conservation Strategy is also welcome.

Conservation Ontario also recommends that while relevant research should continue it's critical that large scale implementation of BMPs move ahead immediately to make any headway in meeting the Phosphorus load reduction target by 2025.

Conservation Ontario also recommends that the Province support CA extension, conservation services and watershed stewardship staff who can develop integrated stewardship solutions for the farming sector that includes the industry-led 4R program as a best practice.

Other uses of fertilizer:

Conservation Ontario also recommends the province consider efforts to manage and reduce sources of phosphorus from commercial/institutional and residential use of cosmetic fertilizers for example promoting the sale of reduced P fertilizers for these purposes.

1.4.3 Proposed Action: Ontario will continue to leverage funding for initiatives such as the Great Lakes Agricultural Stewardship Initiative that support nutrient management and soil health best practices within targeted areas in the Lake Erie basin.

To make real progress with P load reduction in short time frame, Conservation Ontario recommends the Province directly leverage existing CA stewardship programs that deliver actions to reduce phosphorus to Lake Erie. For example, this approach of building on locally established delivery mechanisms was used for Ontario's Drinking Water Stewardship Program.

A phosphorus strategy associated with real costs and plans for sustainable funding will be required to attain results. New funding (not re-profiled funding) is required to fix the agricultural component of the Phosphorous issue. Current programs in place are good, but the scale and scope of existing programs needs to be increased significantly to achieve provincial targets. **Conservation Ontario recommends that focused and sustainable program is required to deal with this issue.**

The Great Lakes Agricultural Stewardship Initiative (GLASI) has been successful to date but is not well known across other parts of the Lake Erie and Great Lakes Basin. The implementation of GLASI in priority locations of the Thames River and Leamington is justifiable to meet the Canada –Ontario commitment to reduce the P load by 40% by 2025. **Conservation Ontario recommends that information about the GLASI should be communicated, promoted and where resources permit subwatershed projects should be expanded to other parts of the Lake Erie Watershed enabling CA leadership to facilitate action. Administrative requirements of the program should be reviewed and streamlined to allow for more outreach and action.** The monitoring and evaluation component of the GLASI subwatershed projects is a model that should also be considered for expansion where resources permit along with the outreach and action components.

1.4.4 Proposed Action: In collaboration with stakeholders, Ontario is developing an Agricultural Soil Health and Conservation Strategy to support agricultural soil management practices that provide economic, environmental and social benefits to Ontario. A document was released for public input titled "Sustaining Ontario's Agricultural Soils: Towards a Shared Vision" proposing to build a collaborative framework for developing the strategy, which includes a draft vision, goals and objectives. The importance of long-term soil health is also featured in Ontario's recently released Climate Change Action Plan and the government intends to provide further support for soil health initiatives.

Conservation Ontario supports the development of Agricultural Soil Health and Conservation Strategy proposed by the Province to support agricultural soil management practices that are to provide economic, environmental and social benefits to Ontario.

CO currently has representation on the Soil Health Working Group and is coordinating comments on the collaborative framework currently posted on the Environmental Bill of Rights. The strategy is urgently needed.

1.4.5 Proposed Action: Ontario will continue to work with the agricultural sector to enhance and promote environmentally sustainable best practices, including the development of information and tools to increase use of cover crops during the non-growing season to reduce soil loss and field runoff.

This action is 'High Priority' to making achievement towards the target P load reduction for Ontario and Conservation Authorities provide a delivery mechanism for the promotion and implementation of associated best practices through current and future programs. Conservation Ontario recommends that a strategy for long term funding is required including incentive mechanisms along with information, training and tools to support adoption. For long term protection of Lake Erie, adoption should be promoted across the Erie basin for widespread implemented of winter cover as a standard practice by all producers. To attempt to reach the P load target for the Thames, there should be additional promotion in the Thames.

Conservation Ontario recommends that financial incentives should be available for a number of years to assist producers in developing approaches to establishing winter cover for their local conditions and operations. These could be sliding scale incentives for 5 years (highest at start and lower by 5th year)

Effectiveness monitoring of the use of cover crops during the non-growing season is needed. Monitoring which uses Satellite imagery should be ground-truthed in some locations to verify imagery accuracy. Timing of seeding of cover crops is an important consideration. Cover crops are not easily established after a corn crop is removed and planting into a standing crop of corn has been met with some mixed results. For this reason the opportunity to extend insurance to the planting of cover crops should be considered.

Conservation Ontario recommends there are policies and legislation that could be reviewed or used to support P reduction (eg. the Drainage Act). Also, there are already examples of the incorporation of natural channel design into drainage projects which facilitate nutrient retention reducing transport downstream. The provision of incentives and maintenance of these types of projects should be considered in the review.

While spills are not likely to be a major contributor to P loadings overall, Conservation Ontario recommends the Province continue to promote and support actions that reduce spills and other discharges such as leakages from livestock operations or nutrient storage.

Finally, Education and Outreach (E&O) is acknowledged as essential component of a BMP adoption. OMAFRA's soil health road show is an excellent example of successful E&O where farmers were given the opportunity for hands on demonstrations. More localized presentations and information like this would be helpful. Knowing what BMPs are best under different circumstances would also be extremely beneficial. There have been successes with "hyper-local outreach events" for subwatershed projects (eg. Essex Region). The importance of the personal, local relationships in encouraging adoption cannot be over-emphasized. Conservation Ontario encourages the Province to increase support to those existing partnerships, and existing local knowledge as effective tools and approaches.

1.4.6 Proposed Action: In an effort to support evidence based decisions to ensure healthy lands and waters, Ontario will develop a publicly available digital elevation model of the Lake Erie watershed (based on LiDAR technology) to assist all stakeholders with environmental stewardship planning.

Conservation Ontario supports the Province in developing publicly available high-accuracy LiDAR and Digital Elevation Models (DEMs) of the Lake Erie watershed as there are many opportunities to leverage these types of data. The Province should commit to developing up-to-date and high-accuracy large-water course data as it is needed for the development of DEMs that are used for informing

stewardship and land management decisions, especially for identifying hydro-logically connected nutrient source areas.

Conservation Ontario recommends that the province build capacity in the development and application of Digital Elevation Models (DEMs). This work has been started in watersheds (eg. Grand and Thames watersheds). It is important to build on current DEM work in watersheds, for efficiency and best product for multiple uses. However, Conservation Ontario encourages the province to provide support to stakeholders for understanding and use of DEM/LiDAR. Conservation Authorities have used this information to help inform producers and other stakeholders and with support are well positioned to continue this role.

Conservation Ontario also recommends that province support the development, custodianship and use of watershed models and tools (eg SWAT,CANWET etc) to predict TP load and run scenarios for P reduction.

These models can be useful but it is important also to recognize the need to target key actions' immediately' by producers across entire watersheds to address non growing season nutrient loads. For example, during highest P load delivery conditions (winter/spring runoff) all subwatersheds in the Thames are contributing maximum P load.

Social science should also be considered recognizing long term effectiveness to be best achieved through standardized best practices adopted by all in each sector (ie: - Agricultural producers, producers, WWTPs, golf courses, etc.).

1.5 Natural Heritage

1.5.1 Proposed Action: Through the implementation of the proposed Wetland Conservation Strategy for Ontario, we will improve wetland protection through strengthened policies to stop the net loss of wetlands and sustain essential ecosystem services, including improved water quality.

Conservation Ontario supports the proposed actions to protect and restore natural heritage areas like wetlands through the Wetland Conservation Strategy for Ontario and has coordinated comments on the associated EBR posting.

Conservation Ontario recommends that the province recognize that these areas not only capture phosphorus but also can store water on the landscape that can help to mitigate downstream flooding, mitigate the effects of severe rainfall events and build resilience on the landscape. It must be acknowledged that wetlands can become a source of P if not managed properly. Locations of wetlands must also be carefully chosen to actually have an effect on P loss. **Also, more research is needed regarding the use of constructed wetlands for the purpose of capturing and treating nutrient run-off from farm fields (ie. appropriate design/sizing for catchment area/nutrient load, lifespan, long-term maintenance and cleanout required).**

Generally, there are three broad actions (protect, enhance and reduce) required to reduce phosphorus loads to the Great Lakes. Protection of those areas that are currently wetland is a most efficient strategy. From an ecosystem perspective, it seems more effective to maintain an existing wetland than to create new wetlands. **Conservation Ontario recommends the Province strengthen policies that incent the protection of all marginal lands and wetlands in Lake Erie watersheds. An exploration of the potential use of tax deferrals or credits as incentives is encouraged.**

Also in areas most affected by wetland loss (such as Essex Region, and the Chatham –Kent portion of the Lower Thames River watershed **where 95-98% of wetlands have been eliminated**), stopping ‘net loss’ is not enough. In those affected areas, **the goal should be to create ‘net gains’ in wetlands. Current methods of evaluating wetlands for significance do not consider importance in reducing nutrient loads and therefore should be incorporated.** There should also be a ‘net gain’ in areas where phosphorous load is high.

The delineation of a wetland boundary should include consideration of hydrology, such as identifying high water marks, mapping recharge and discharge areas and aquifer mapping.

In addition, Conservation Authority regulations already contain strong protection for wetlands and enhanced financial support from the province for Conservation Authorities to assist with the mapping, evaluation and protection of wetlands through our existing mandate and programs is needed. However, there are a number of policy gaps that leave wetlands currently vulnerable to drainage and legislation does not define wetland clearly in instances that might be helpful for protection (**Please see Conservation Ontario comments on the Wetland Conservation Strategy**).

Finally, as part of well managed natural systems, prairie, woodlots and windbreaks and non-wetland aquatic habitat can also provide benefits that include reduction of Phosphorus loading. Prairies and meadows are one of the main types of natural heritage features used for watercourse buffers and provide pollinator habitat. Woodlots and windbreaks can also reduce soil loss from wind. **Conservation Ontario recommends that the protection and rehabilitation of these features should be integrated into watershed management framework for Phosphorus reduction.**

1.5.2 Proposed Action: Ontario will explore opportunities to target funds for properly managed wetland restoration/rehabilitation in priority basins and for continued maintenance of new and existing wetlands.

This proposed action is strongly supported with consideration of the comments made in the previous section on the Wetland Conservation Strategy. **Please consider inserting the underlined words to strengthen this action. It is recommended that priority basins be identified on a watershed basis in consultation with partners on the basis of such factors as historical wetland losses, existing percent cover within watersheds.** In much of the southwestern region of the Ontario, wetland coverage is exceedingly low. For instance, in the Ausable River watershed (admittedly not in the Lake Erie basin, but not very different from a land use perspective), there is a current wetland coverage of less than two percent of the landscape area. Pre-settlement landscape estimates are close to 20 per cent coverage of wetlands. **Restoration, proper management and continued maintenance of new and existing wetlands is required and conservation authorities are strong delivery partners.**

When guidelines for compensation / mitigation, restoration / rehabilitation are being developed, there should be consideration for nutrient reductions in addition to hydrology (hazards) and biology (systems approach).

It is also noted that the MPAC formula for rural property assessment is a very significant disincentive to retiring marginal land from agricultural production and action is needed to address this.

1.5.3 Proposed Action: Continue to participate in partnerships such as the Ontario Eastern Habitat Joint Venture (EHJV) that work to promote and conserve Ontario's wetlands.

Conservation Ontario generally supports the Ontario EHJV. It should be noted that the EHJV focuses on the conservation of migratory bird habitat. While this focus undoubtedly also captures other valuable ecological goods and services, it does not necessarily result in the implementation of wetland projects in areas that would be most beneficial from a phosphorus/nutrient reduction perspective. As a result **the Province should also seek to partner with stewardship and land securement programs already in existence at many Conservation Authorities and whose mandate is more aligned with the goal of phosphorus reduction.** Partnerships with conservation authorities and upper and lower tier municipalities that have gone beyond the minimal mapping of evaluated wetlands and have identified unevaluated wetland areas is encouraged through the implementation of the Wetland Conservation Strategy.

1.6 Science, Monitoring and Public Reporting

1.6.1 Proposed Action: Enhanced monitoring will be undertaken in the Thames River watershed and in Lake St. Clair to better understand the sources and types of phosphorus that are feeding algal growth.

Conservation Ontario recognizes the urgent need and support the Province to focus phosphorus reduction efforts to the western and central basin of Lake Erie. However, monitoring and reporting of resource conditions and the implementation of actions is required across the Lake Erie basin to measure the collective impact across Ontario and characterize Ontario's contribution to the Great Lakes Water Quality Agreement.

To achieve a 40% phosphorus load reduction target, Conservation Ontario recommends that the Province re-instate the long term enhanced tributary monitoring network that once operated across Ontario at the mouth of the major tributaries to the Great Lakes. Since the demise of this network, phosphorus loading estimates (or any other parameter loading estimates) are nonexistent. To support the development of an enhanced monitoring network a review of existing monitoring programs should be undertaken to determine whether necessary data is being collected by the appropriate means and whether these programs could be easily enhanced (e.g. addition of flow measurements and winter sampling). **Enhanced or additional monitoring should be considered for small sized watersheds across the Lake Erie Basin as well as they can produce local algal issues that affect Lake users.**

Conservation Ontario encourages the Province to work with the Environment and Climate Change Canada to continue the major tributary monitoring program to enable measuring progress to achieving the Phosphorus load reduction targets.

Proposed Action: Ontario will work with its partners to provide an annual update on Lake Erie through its website, and produce a progress report every three years

Conservation Ontario recognizes that monitoring for phosphorus loads is challenging and demands a high amount of staff time and effort. However the need for monitoring data for science-based decision making is evident. **Conservation Ontario urges the Province to invest in piloting new technologies for on-line monitoring of phosphorus and other parameters for accurate loading estimates on critical tributaries across the basin.** Leveraging technology incubators such as the Southern Ontario Water

Consortium may provide opportunities for advancing on-line phosphorus analyzer technology. Existing stream monitoring infrastructure (e.g. stations) exists in watersheds to pilot on-line technology.

Phosphorus loads are a reflection of the land cover and management in a watershed. To understand the relationships between land use/management and to track changes over time, **Conservation Ontario recommends that the Province invests in updating land cover and management information on a regular basis (e.g. every three to five years) to support watershed modelling tools**, value-add to the LiDAR-derived digital elevation models and provide context for tributary phosphorus loads.

Long-term datasets are required to evaluate trends and measure progress. **Conservation Ontario recommends that the Province continue to support pilot research sites**, set up through the Agricultural Great Lakes Stewardship Initiative (OMAFRA) and the Nutrient Watersheds (MOECC), and identify and establish other priority sites in order to evaluate the effectiveness of BMPs and nutrient delivery from small agricultural watersheds respectively. **When resources are limited quality of research sites is more important than limited quantity of research sites when conducting small subwatershed research and in that case Conservation Ontario recommends fully monitoring and implementing fewer small watersheds over the long term (10 yrs plus) than to have many under-resourced sites.**

Conservation Ontario recommends that the province strengthen its commitment and efforts to communicate and educate the public about the complexities of Phosphorus issues in Lake Erie. For example, Total and Soluble Reactive Phosphorus are mentioned in the reduction strategy. It should be clarified that a large amount of phosphorus can be associated with particles/sediment being transported to the lake. With the invasive dreissenid mussels in Lake Erie, particulate phosphorus reduction would also be important as the mussels filter the suspended solids releasing newly bioavailable phosphorus for algae. Although particulate phosphorus is a component of total phosphorus, this is not general knowledge of the public.

2.0 Are there other actions for Lake Erie that should be pursued in specific parts of the watershed or from specific sources within the Lake Erie basin?

Conservation Ontario recognizes the importance of targeted demonstration in priority subwatersheds for education and research. **However, basin-wide/watershed-wide promotion and adoption of best practices across all sectors will be more effective for the long term reduction of P loads for Lake Erie than targeting only within specific subwatersheds.** For the issue of P loading, targeting should be for specific best practices (eg. Soil erosion and continuous cover) to address the impact of seasonal runoff. **All subwatersheds are contributing maximum P loads in these conditions of major runoff. Additional focused outreach would be beneficial to promote priority best practices in specific areas or across specific sectors. Finally, targeting high priority best practices (at the farm-scale etc.) will have the best long term benefit for P reduction across sectors.**

Financial support for the development and implementation of integrated watershed planning and management in the Lake Erie Basin is needed to support the above actions.

The following provides some additional specific comments and suggestions:

2.1 Modelling and Research

Monitoring and research data support the development, calibration and validation of predictive tools or models that can inform decisions. **Conservation Ontario recommends the Province continue to support research and development of predictive tools and approaches for informing BMP placement and effectiveness. Similarly while** predictive model development is useful for the immediate P load reduction challenge at hand, **Conservation Ontario recommends that the majority of resources should immediately be put into implementing currently known priority best practices.**

Models developed for identifying targets and evaluating land management scenarios must be maintained so that they can assist with evaluating progress over time. **Conservation Ontario recommends the Province identify and support custodians for these models and data collection so that over the long-term, progress toward achieving the targets can be evaluated.**

2.2 Action for Instream Sources

Sheet, gully and instream erosion are the dominant processes responsible for mobilizing phosphorus from the land to water and then downstream to Lake Erie. In-river sources of phosphorus are not acknowledged nor considered in the Canada-Ontario Action Plan. For example Grand River CA staff are working with the University of Waterloo to develop an approach for identifying priority in-river reaches that are highly erodible that can mobilize sediment-bound phosphorus downstream. This work will help to identify areas for stream rehabilitation, restoration and/or riparian buffer enhancements.

Conservation Ontario recommends that the Province support exploratory pilot projects using the newly developed tools and approaches based on high-resolution hydrologically conditioned Digital Elevation Models to continue to identify nutrient source areas that are both on-land and in-stream. The knowledge from these projects should be reported and transferred broadly.

Spring non-point source particulate phosphorus loads stored behind dams may release significant summer soluble phosphorus. Research has been carried out in the Thames to gain an understanding of on-line reservoir effects on P load delivery. **Conservation Ontario recommends continued research and data collection to determine if action is warranted.**

2.3 Cladophora in the Eastern Basin

Cladophora issues along the Lake Erie North Shore of the Niagara Peninsula CA (NPCA) watershed is quite significant. NPCA regularly receives calls/complaints about beach fouling and closures from residents and municipalities. **Conservation Ontario recommends the contribution and impacts of nutrients (phosphorus) loadings in the nearshore from these smaller watersheds should be considered in the Canada- Ontario Action Plan.**

2.4 Research on less well understood sources of Phosphorus

Conservation Ontario recommends research be supported by the province on the role and significance of two additional sources of phosphorus which are not well understood. These are stream bank erosion (vs soil washoff) and online dams/ponds. In the nutrient-rich Great Lakes-St. Lawrence lowlands, stream bank erosion likely contributes significant particular phosphorus loads, therefore bank erosion control, in addition to 4R and cover crops, may be important.

In particular areas such as Chatham-Kent and Essex, agricultural drainage requires pump schemes. These could be considered online dams but they don't have the constant flow running through them. These structures create sediment traps and potential locations for the conversion of TP to DRP. When the pumps turn on, they move a significant amount of water and potentially sediment and P into the receiving watercourse or lake. **This dynamic is another area of poorly understand P processing that Conservation Ontario recommends requires additional research.**

There should also be government funding for research to assess the effects of glyphosate use. These are believed to include negative impacts to soil biota (particularly fungi) and stimulation of blue green algae. The latter mechanism is based on the finding that phosphonates (a breakdown product) can be used as a source of phosphorus by cyanobacteria (blue-green algae). Also the negative impacts to agricultural soil health would reduce moisture holding capacity, increase erosion by both water and wind, reduce soil capacity for infiltration and reduce the amount of phosphorus contained within soil organisms

2.5 Best Value Solutions must be incorporated into Program Design

Conservation Ontario recommends that program design from current and past programs to address nutrients need to be evaluated for best value solutions and incorporated into the development of sustainable program funding models. For example in Lake Simcoe, the LSPOP or P Trading is a viable solution to generate funding to complete works. This gets back to the cost-benefit approach to selecting remedial projects and control options. For example: one upgrade to an STP may cost \$20 million to reduce 500 kg of P. However if you invest\spent \$10 million to incentivize changes to agricultural practices you might achieve 4 tonnes of P. In Lake Simcoe, the overall investment to improve STP's exceeds \$500 million and if invested differently could have achieved more than the 3 T/y reduction.

2.6 Climate related strategies should be considered in the actions performed to create reductions

Conservation Ontario recommends climate impacts need to be researched, reported and incorporated within the adaptive watershed management framework for Lake Erie. While it is well recognized that non-point source contributions of P can vary greatly depending on the season, nutrient loadings can also be quite variable between wet and dry climatic years. It is also possible that the proportion of phosphorus species released may also change between wet and dry seasons or years. Therefore, reduction strategies may differ with climatic variation; for example: a strategy to target SRP reductions in wet years might not work the same when it's dry. Strategies should either exhibit versatility or come with an understanding that reductions are not expected under all conditions.

2.7 Outreach and Education is needed across all Sectors and Demographics

Conservation Ontario recommends continued financial and technical support for the development and implementation of programs for urban/rural (non-ag) residents focused on the issues, the importance of P reduction and solutions that all individuals can undertake as part of the solution. This includes developing and providing information to institutions and industry about what is required from them to achieve reduction.

Conservation Ontario recommends the Province support the development of curriculum and other approaches to educate youth about Lake Erie issues, at all ages and particularly at high-school. A number of CAs have achieved some local success engaging youth and encouraging them to speak with their peers and classmates. This has led to youth participation in community events, achieving tangible

results, which leads to broader awareness that this is a problem shared by everyone and they can be part of the solution.

2.8 Drainage Act and other Legislation should be leveraged to support P reduction.

These proposed policies do not discuss examining existing relevant Policies and Legislation that could be reviewed or used to support Phosphorus reduction. In particular, the Drainage Act has a significant role in how drainage is implemented in Ontario's Lake Erie basin watersheds.

In Essex County and Chatham-Kent, nearly all watercourses have been turned into municipal drains and even the rare few that aren't almost always have tributaries upstream that are. The rest of the Lake Erie basin municipalities also have very large proportions of municipal drains. **Conservation Ontario suggests the *Drainage Act* can be a tool to assist in P reduction efforts.** When a municipal drain is created, the physical design of the municipal drain is enshrined in a municipal by-law. This aspect could greatly assist in the outstanding questions around the permanence of implemented agricultural BMPs. The drains are also designed by professional engineers who if appropriately trained and supported could greatly assist in designing the best BMPs for each particular drain.

Also costs are borne by the landowners on the drain. This provides a particular challenge for introducing a BMP into a municipal drain design as it may raise the cost of a project and may be perceived as counter to a particular landowner's interests. This challenge could be overcome by education and outreach, policies around municipal drain design, policies around assessment schedules, and grant money to offset the additional costs of putting BMPs on municipal drains. As well, **Conservation Ontario suggests consideration should be given to policies that ensure that P reduction BMPs have a means to be implemented, or reinstalled if removed, in a fairly efficient manner without having to open up every drainage report.**

Another challenge around municipal drains is getting the required environmental information to make good decisions. While there are some example projects which highlight good work in P reduction, the Drainage Act itself does not say that any environmental factors, other than adequate outlet, need to be considered in either proceeding with or designing a municipal drain. To compensate for this, OMAFRA has put restrictions in its Agricultural Drainage Infrastructure Program: with Administrative Policies to ensure that public funding is not going to projects that would otherwise go against provincial policies or are contrary to other environmental legislation. **Conservation Ontario suggests these Administrative policies should be reviewed for inclusion of measures that further support P reduction actions.**

Consideration should be made regarding all the private connections made to the municipal drains. Oversight should be improved where private systems are connected to reduce potential of diversion of water from one watershed to another, drainage of wetlands, or connections of untreated sources of P.

Conservation Ontario recommends that enforcement of Municipal drainage by-laws should be reviewed, to ensure other landowners on the drain are not paying for damage caused by one particular 'at fault' landowner. Keeping municipal drains consistent with their original design may help to reduce P loading, especially where BMPs have been installed.

Noted previously, Drainage Superintendents are the primary facilitators of the *Drainage Act* process and act as liaisons with project proponents. As such they can have a great influence on how the *Drainage*

Act process plays out and on the final design of the drainage works. **Conservation Ontario acknowledges progressive Drainage Superintendents have already made important contributions to P reduction by convincing proponents to incorporate BMPs into drainage works and by facilitating research. Drainage Superintendents should be further supported as programming rolls out and provided with specific education and outreach materials.**

On a related issue, **Conservation Ontario suggests that the Licensed Drainage Contractors program could be improved to assist with P reduction efforts.** Information about why and how wetlands should be protected around municipal drains, how to prevent agricultural drainage from impacting wetlands, and how agricultural drainage affects phosphorous should be included. Improved education and outreach could greatly assist in ensuring these front line workers can implement BMPs and help inform landowners of the BMPs' value.

Finally, nutrient inputs from drainage also occur outside of the *Drainage Act*, including work undertaken through tile drainage. **Conservation Ontario recommends the Province should consider how future tile drainage will be addressed in the context of P reduction.**

3.0 As all sectors and communities within the Lake Erie basin need to take action to reduce phosphorus loads, do you have any recommendations on how to encourage collaborative action across the basin? Are there specific actions that you or your sector or community are taking or considering?

Conservation Authorities in the Lake Erie Basin have built the tremendous expertise as local watershed management agencies in working with local stakeholders (e.g., Municipalities, Health Units, farm and community organizations) and land owners. **Conservation Ontario supports the development of integrated watershed management planning framework that supports stakeholder collaboration in the review of issues and identification of actions that will have significant impact on the health of the lake Erie and its watersheds.** Recognizing that all stakeholders have a role to play, an integrated watershed management framework incorporates monitoring, evaluation, reporting and adaptation.

The Province is strongly encouraged to support and work with Conservation Authorities and well established multi-sectoral groups in Watersheds within the Lake Erie Basin (eg. Thames River Clearwater Revival) and to work with community based subwatershed groups that undertake planning and action for combined farm, non-farm and urban implementation. The GRCA illustrates the success of this 'Collective Impact' approach for the development and current implementation of the Grand River Water Management Plan which requires long-term relationship building for which Conservation Authorities have developed a strong reputation since their inception.

The Province is encouraged to work with all partners to clearly identify and define their roles in Lake Erie Phosphorus reduction efforts based on expertise, experience and mandate. This includes the development of a work plan, timelines, and budgets (allocation and apportionment of financial resources) for all aspects of the plan and how all stakeholders are to be engaged. Identification of who is responsible for monitoring and progress reporting, identification of where targets are or are not being met, holding partners accountable and adapting as necessary to achieve the targets.

Finally, given that phosphorus loading to Lake Erie is a demanding challenge both from scope and from geographic area, the Province must provide the vision and financial support for local implementers responsible for coordinating, facilitating and promoting actions. A Conservation

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Authority (CA) is by definition ‘a partnership of municipalities that manage water and other natural resources on a watershed basis’. **CAs are in a unique position to facilitate, coordinate and mobilize local efforts to reduce phosphorus loads to Lake Erie. However, Conservation Authorities need the long term provincial funding to provide this critical ‘backbone support’ role.**

4.0 Making progress will be essential for ensuring that actions are making a measurable difference to Lake Erie’s water quality. Do you have any specific ideas for measuring progress towards achieving Lake Erie phosphorus load reduction targets?

Conservation Ontario recommends that a commitment must be made by the province to continue water quality monitoring and to work with their partners to ensure that the monitoring conducted is sufficient to track progress toward the goal of 40% reduction of P to Lake Erie. This is because the tributaries and Lake Erie may not respond immediately.

Lake and tributary monitoring must be conducted for the assessment of long term trends. This includes:

- Effective and long-term monitoring of P loads at EC established tributary monitoring stations
- Commitment to high quality monitoring for high quality loading data for the long-term at key locations.
- Tracking both actions and changes in phosphorus loads and land use management conditions is important to communicate progress effectively.
- Comprehensive monitoring that supports the identification and addressing of the temporal and biochemical complexity of the problem, rather than merely quantifying the TP loading to the lake from tributaries and STPs.
- Building on the PWQMN at least in priority areas, rather than added as short-term project based scans.

A scaled approach to monitoring is required. Monitoring at a catchment and site scale can provide quicker demonstrated results of the benefits of implementation efforts. The GLASI priority subwatershed project approach is one model for this including selection of catchments to focus efforts and having before and after data will help demonstrate the effectiveness of remedial efforts. Site level before\after will help with modeling P reduction associated with specific BMP’s or controls. It also allows for better understanding of cost\benefit of the BMP’s going forward.

4.1 Measuring progress in the Thames

Conservation Ontario recommends that continued and additional water quality and quantity monitoring is required on the Thames River. In particular, sufficient and stable funding is required for the automated water quality station located at Thamesville. This station was used by EC in the past to calculate loadings and will need to be operating in the future for comparison purposes to detect reductions in P loadings. While the Thamesville gauge is critical, attempts should be made to add additional monitoring further downstream on the Thames. There are several significant watercourses downstream of the Thamesville gauge including McGregor Creek, Jeanettes Creek and Big Creek that are therefore not captured and their contributions are modelled. Recent discussions with Water Survey of Canada engineering staff have brought to light newer technologies that should be able to deal with

backwater situations around the mouth of the Thames that were restricting the use of traditional flow measurement techniques and making Thamesville the most downstream viable monitoring location. Such a station could be implemented by Water Survey of Canada if brought under the Canada – Ontario Agreement on Hydrometric Monitoring. Generally across the basin newer technologies such as portable labs and on-site labs should be explored. **Conservation Ontario recommends that newer technologies be explored and one of these newer stations implemented downstream on the Thames River.**

Achieving the goal of 40% reduction will require the participation of many sectors and it will be important to track their progress. This has two very important outcomes – acknowledging the efforts made and also providing an understanding of the amount of effort required to achieve change. Communications and messaging will be important to balance expectations as it may take decades to see results in Lake Erie. **In summary Conservation Ontario recommends that in order to track progress the Province is strongly encouraged to establish a long-term commitment to the collection, management and reporting of monitoring data, including translation of the information for decision making by all stakeholders.**

Thank you once again for the opportunity to provide comments on “Reducing Phosphorus to Minimize Algal Blooms in Lake Erie”. Conservation Ontario and Conservation Authorities look forward to providing further detailed input through engagement on the Draft Canada Ontario Action Plan for Lake Erie. To address the scale of this **problem significant new provincial and federal resources and funding are needed immediately. Conservation Authorities in the Lake Erie Basin are ready to leverage local partnerships, funding and programs to implement actions now to in order meet the 40 % reduction target by 2025.** Should you have any questions regarding these comments, please do not hesitate to contact me at extension 224.

Sincerely,



Jo-Anne Rzadki, MSc.
Business Development and Partnerships

Cc: CAOs, All Conservation Authorities
Susan Humphrey, Canadian Co-Chair Great Lakes Water Quality Agreement Annex 4(Nutrients)
Bi-National Subcommittee and Associate Regional Director General, Ontario Region,
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