environmental defence
INSPIRING CHANGE

March 7, 2018

Protecting Water for Future Generations
Ministry of Municipal Affairs and Housing
Provincial Planning Policy Branch
777 Bay Street, 13th Floor
Toronto, ON, M5G 2E5

RE: EBR 013-1661, Protecting our Water for Future Generations

Premier Wynne and Minister Mauro,

Environmental Defence Canada (EDC) strongly supports the provincial initiative to expand the Greenbelt to include significant and sensitive hydrological areas throughout the Greater Golden Horseshoe. Over 1.25 millions residents in the region rely on groundwater. It is essential that we take action now to protect our water to manage the threat of climate change as access to clean water is vital to the health and well-being of our residents, communities, farm and rural businesses.

Environmental Defence Canada endorses the submission by the Oak Ridges Moraine Partnership (ORMP). We echo the ORMP's concerns that the provincial study area proposed by the province doesn't go far enough. Important headwater areas, the Lake Iroquois shoreline and plains, Niagara Escarpment expansion areas and whitebelt headwaters are missing from the provincial study area.

We encourage the province to expand the proposed Greenbelt study areas as our water systems are integral to the health and prosperity of the Greater Golden Horseshoe.

Sincerely,

Tim Gray
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Key Recommendations for "Protecting Water for Future Generations: Growing the Greenbelt in the Outer Ring"
EBR Posting # 013-1661
Prepared by the Oak Ridges Moraine Partnership

Summary of key recommendations:

Recommendation 1: Include all of the moraines and glacial features indicated in Figures 1 - 5 in the study area.

Recommendation 2: Include all of the coldwater streams and wetlands indicated in Figures 6 - 11 in the study area.

Recommendation 3: For the purpose of defining the study area and to enable a full consideration of all important building blocks, include all coldwater streams and wetlands, regardless of density, on the map of coldwater streams and wetlands in Appendix I.

Recommendation 4: Include all moraines, regardless of permeability level, in the study area.

Recommendation 5: In defining the study area, dispense with the criterion of overlapping building blocks. Include all building blocks for consideration on their own merit, regardless of overlap.

Recommendation 6: Include headwater areas, the Lakes Algonquin and Iroquois shorelines, the Lake Iroquois Plain, the entire Lake Simcoe watershed and source water protection plan areas as building blocks in determining the study area.

Recommendation 7: In defining the study area, proceed in a manner that recognizes and is informed by the responsibilities, rights and interests of Indigenous communities. Consider Indigenous Traditional Knowledge and Knowledge Systems on a community-by-community basis according to protocols established by the affected community. Also consider the following data sets in defining the study area: regional groundwater modelling, the Oak Ridges Moraine Groundwater Program, Source Water Protection Characterizations Studies, the Source Protection Information Atlas, conservation authority data, including the Flowing Waters Information System, and municipal data.

Recommendation 8: Expand the study area to include all components of our proposed Bluebelt so that any gaps are assessed and considered as part of the current Greenbelt expansion exercise.

Summary of key recommendations (continued):

Recommendation 9: Designate entire river valley corridors rather than only sections flowing through urban areas in order to adequately protect water resources. Consider the following for Urban River Valley designation: the Nith, Grand, Conestogo, Eramosa, Speed, Nottawasaga, Ganaraska and East Holland Rivers and Gages and Cobourg Creeks.

Recommendation 10: Ensure that the protection of our precious water resources takes priority over settlement expansions. Water must come first.

Recommendation 11: In determining Greenbelt boundaries, ensure that the assimilative capacity of watersheds and the capacity and allocation of capacity for all existing sewage treatment plants have been assessed and considered. The state of all aquifers should also be assessed and considered, including an assessment of the effects and implications of water-taking and water treatment infrastructure.

Recommendation 12: If included in the Greenbelt, small/rural settlement areas should be Hamlets and large settlement areas should become Towns/Villages. Important water features should be added in the expanded Greenbelt Natural Heritage System.

Recommendation 13: The Natural Heritage and Agricultural System (Land Base) for the GGH should form the basis of the extended Greenbelt natural and agricultural systems. The building blocks identified through the Greenbelt expansion exercise should be incorporated into the expanded Greenbelt Natural Heritage System.

Recommendation 14: Revise Greenbelt Plan policies to permit municipalities to establish mineral aggregates extraction policies that may be more restrictive than Greenbelt Plan policies. In the interim, grandfather any existing municipal policies that may be more restrictive and that offer higher levels of protection for water resources.

Recommendation 15: Explore and pursue opportunities to expand the Greenbelt to advance Ontario's commitment to reconciliation with Indigenous Peoples. Identify and pursue opportunities to achieve the objectives outlined in the Lake Simcoe Protection Plan, Ontario's Biodiversity Strategy, Ontario's Climate Change Action Plan, Ontario's Wetland Conservation Strategy and Ontario's Great Lakes Strategy.

Discussion Questions

1. Are there additional "building block" features that should also be considered for addition to the Greenbelt to protect water?

Yes, there are additional features that should be considered. The Province should be commended for taking a systems approach to identifying a study area for potential Greenbelt expansion. Considering moraines (and other significant sand and gravel aquifer areas), coldwater streams and wetlands (and associated upstream tributaries) provides a good start. However, there are major shortcomings in the Province's approach to the proposed building blocks such as a) missing moraines, coldwater streams and wetlands and b) the application of arbitrary criteria to building blocks (i.e., density and permeability criteria and requirement of an overlap to be included in the proposed study area). Further, there are additional building blocks that should be considered in order to meet the objectives of protecting water for future generations across the Greater Golden Horseshoe (GGH). These include headwaters, former glacial lake shorelines and plains, the entire Lake Simcoe Basin as well as vulnerable areas in Source Water Protection.

1 a. Missing Building Blocks

Missing Moraines and other Glacial Features

Considering moraines in a future expanded Greenbelt accomplishes a number of objectives as these include many headwaters areas, provide groundwater recharge and discharge (which contributes cold water to streams and rivers), and most significantly, store, cool and clean water. Given the correlation between the presence of moraines and enhanced groundwater discharge, i.e., baseflow, to upper reaches of river systems, they are a logical place to start.

There are a number of moraines and sand and gravel deposits that, for no stated reasons, are not included in the study area despite the significant role these features play in local and regional surface water and groundwater regimes.

The glacial depositional environment of the proposed study area is complex, situated as it is between Georgian Bay and Lakes Simcoe, Ontario and Erie. All of these different types of moraines, tills, proglacial lake deposits and ice contact stratified drift are integral to groundwater and surface water regimes and should in our opinion be identified as such, rather than aggregating them into merely 'sand and gravel.' For example, glacial deposits can be deposited in contact with ice, such as moraines and drumlins. However, ice contact stratified drift is distinct from other glacial deposits as it is deposited in the presence of meltwater and sorted by water or in a water environment. These include kames and kettles, eskers, outwash channels, ablation tills, and some interlobate moraines – all of which are important features that allow for rapid recharge and discharge and storage of groundwater.

These distinctions are important as some of the 'sand and gravel' layers as well as other morainic features shown in Appendix 1, Map 1 have not been included in the study area (Figure 1). For instance:

- The entire Grand Valley area has a high permeability moraine and sand and gravel/glacial drift deposits but it is not included in the study area (Figure 2). Anyone familiar with the land understands the hilly terrain around Grand Valley and its associated role as a key recharge and discharge area.

- The extent of the Orangeville Moraine and ice contact stratified drift westward is omitted as well as the area between Waterloo and Elora/Fergus which has both moraine and significant sand and gravel deposits (Figure 3). The moraines omitted in this area include high permeability moraines. These are key areas within the Grand River watershed which are facing challenges and constraints with both assimilative capacity and drinking water supplies.

- While the Paris-Galt Moraine in the northern part of Brant County is included in the study area, highly significant sand and gravel areas in the south west part of the county have not been included as well as some highly permeable morainic features south east of Brantford (Figure 4).

- While area 3 includes the Escarpment Area Moraines such as the Gibraltar and Singhampton Moraines, the rest of the Horseshoe Moraines that flank the Niagara Escarpment to the north near Clearview are omitted although they play a significant role in water recharge, discharge and storage (Figure 5). In addition, mapped sand and gravel south west of C.F.B. Bordon is also inexplicably outside of the study area. Furthermore, wide areas of sand and gravel in Springwater Township as well as near Georgian Bay north of Wasaga are omitted from the study area.

The following series of maps (Figures 1 to 5) indicate the moraines and other glacial features (circled in red) missing from the proposed study area in Appendix 1, Map 1: Moraines and other Sand and Gravel of the Public Consultation Document.

Recommendation 1: Include all of the moraines and glacial features indicated in Figures 1 - 5 in the study area.

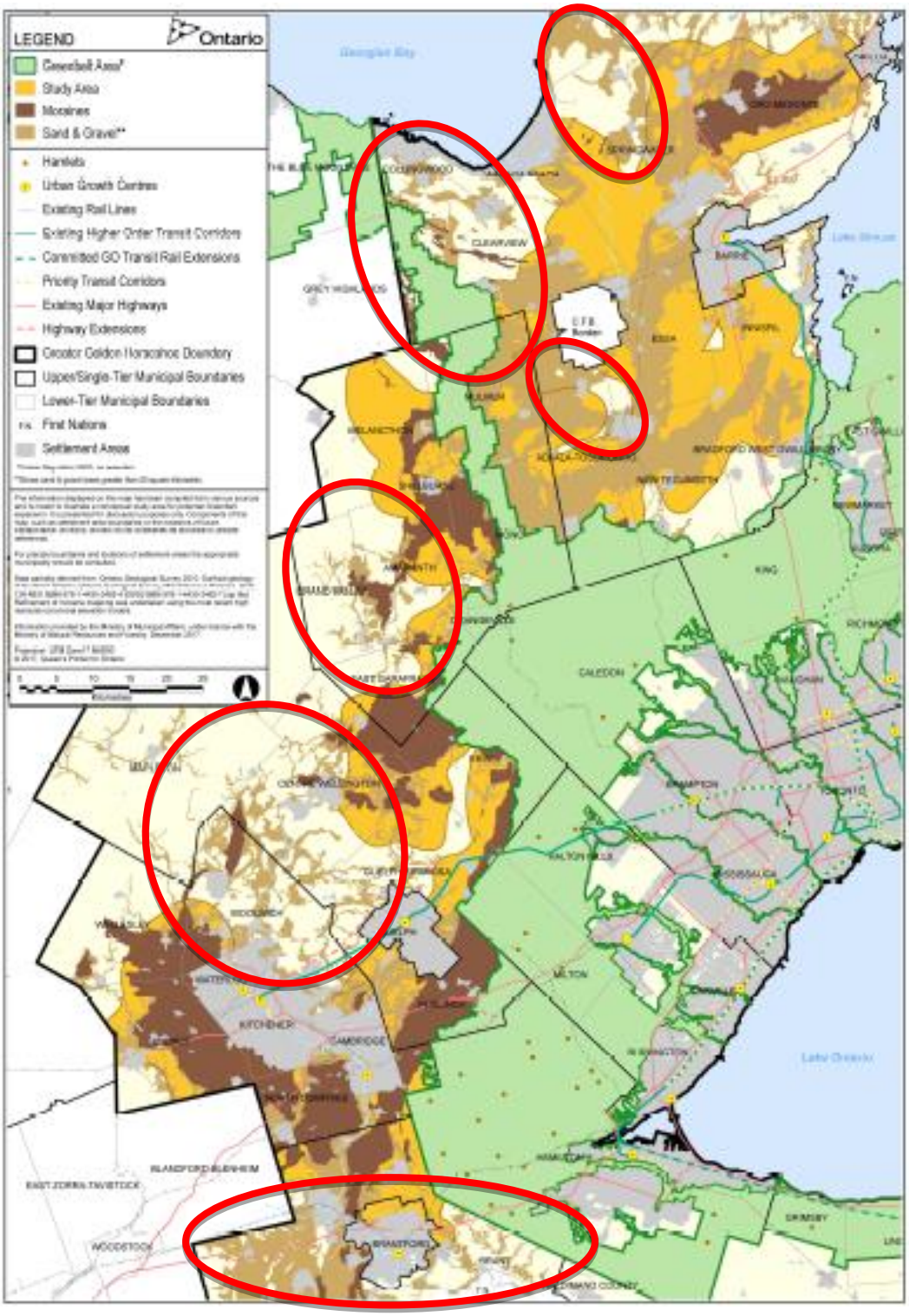

Figure 1. The Province's Map 1 in Appendix 1 with the moraines and other glacial features missing from the proposed study area outlined in red.

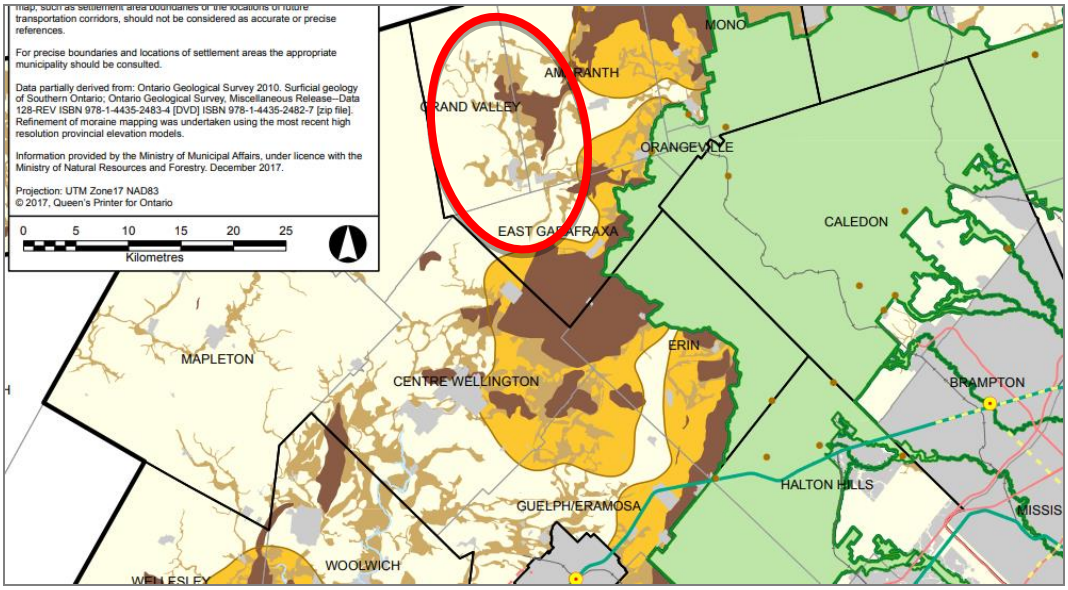

Figure 2. An inset of the Province's Map 1 in Appendix 1 with morainic and other glacial features in the Grand Valley Area missing from the proposed study area outlined in red.

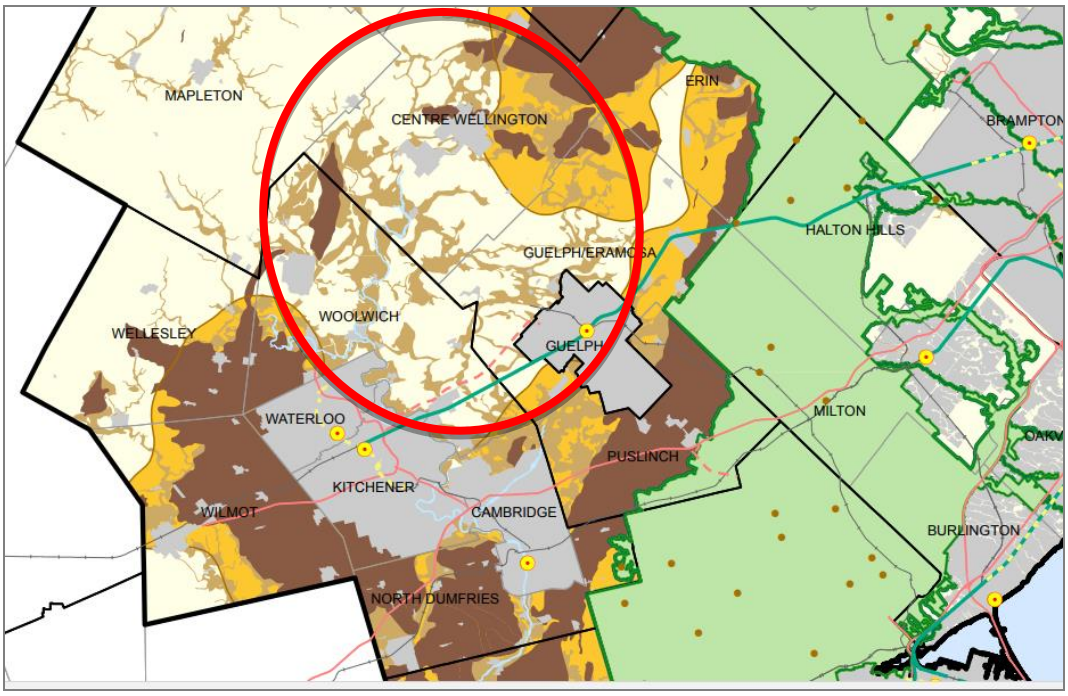

Figure 3. An inset of the Province's Map 1 in Appendix 1 with western extent of the Orangeville Moraine and other glacial features between Waterloo and Elora/Fergus missing from the proposed study area outlined in red.

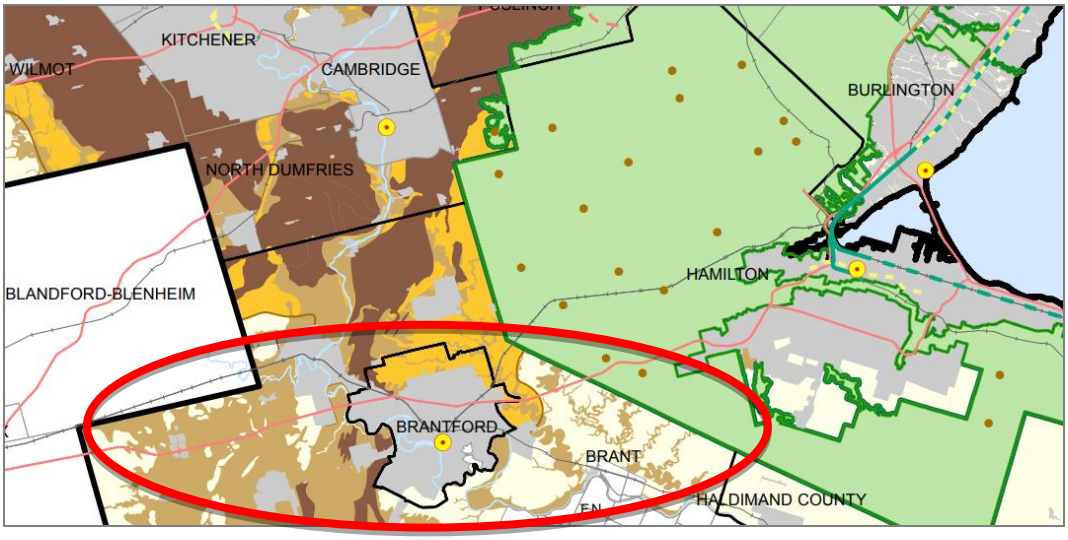

Figure 4. An inset of the Province's Map 1 in Appendix 1 with glacial features missing from the proposed study area from the south west section of Brant County outlined in red.

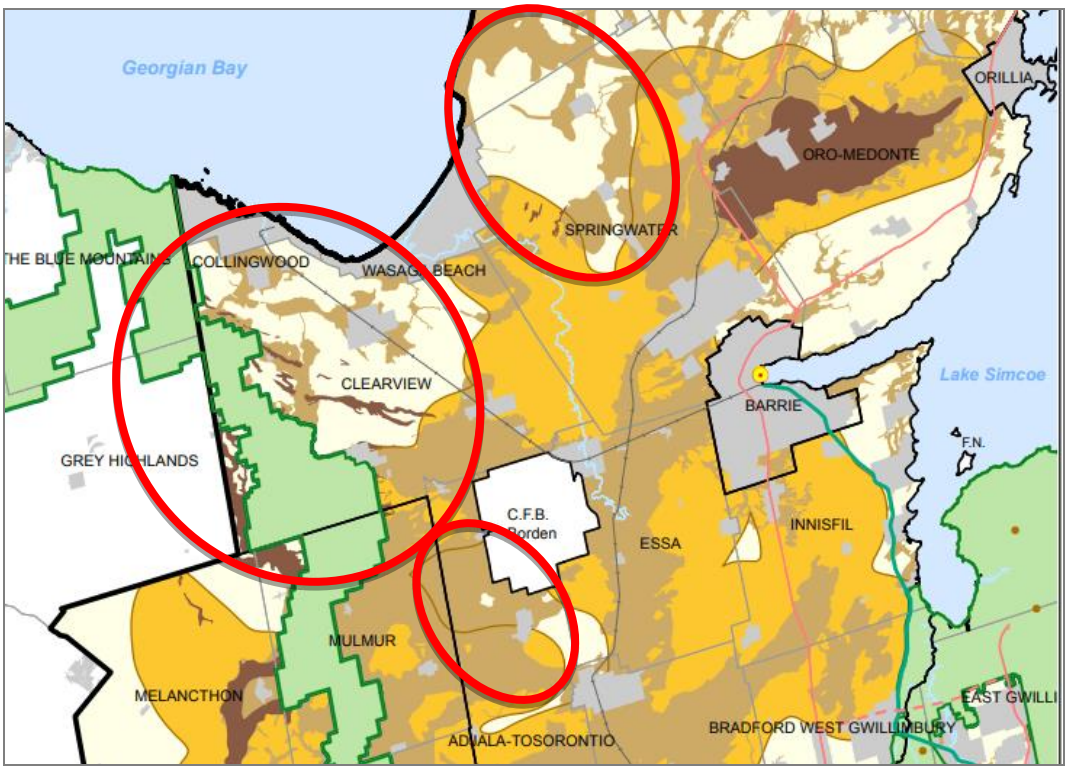

Figure 5. An inset of the Province's Map 1 in Appendix 1 with morainic and other glacial features missing from the proposed study area around the Niagara Escarpment and in the Springwater area outlined in red.

Missing Coldwater Streams and Wetlands

There are concentrations of coldwater streams and wetlands that have not been captured by any of the seven components of the study area even though they are mapped in Map 2 in Appendix 1 (Figure 6).

- West of the Niagara Escarpment, the Grand Valley area in Dufferin County and the adjacent County of Wellington have coldwater streams and wetlands but they are not included in the study area (Figure 7). This area includes the Luther Marsh, a Provincially Significant Wetland (PSW) and an Area of Natural and Scientific Interest (ANSI), described as an ecological treasure that "provide[s] not only sustained flows to the upper Grand River that help to assimilate the treated wastewater for Grand Valley, but also a wetland that can capture nutrients and sediment locally." [1,2]

- The area between Waterloo and Elora/Fergus is shown to have both coldwater streams and wetlands that are not included in the study area (Figure 8). These are key areas within the Grand River watershed which are facing challenges and constraints with both assimilative capacity and drinking water supplies.

- There are coldwater streams and wetlands west of Brantford have not been included despite substantial land speculation and development pressures (Figure 9). This missing section includes Whiteman's Creek – a coldwater creek that is one of three tributaries that "drain[s] most of the land in the southern Grand River subbasin" and also "helps to moderate its water quality."[3]

- The entire area of Clearview north of study area 7 is left out despite many coldwater streams flowing off the Escarpment and significant development plans and pressures around Stayner, Collingwood and Wasaga Beach. There are also concentrations of wetlands on the west side of the Niagara Escarpment and high concentrations of coldwater streams south west of C.F.B. Borden (Figure 10) that are omitted from the study area.

- There are a number of other PSWs and ANSIs that are omitted from the study area including Tiny Marsh and Matchedash Bay in northern Simcoe County: Tiny Marsh is a Provincial Wildlife Area that forms the headwaters of the Wye River along with Orr Lake; and Matchedash Bay is a Provincial Wildlife Area with "1840 hectares of combined wetland and upland habitats," a Ramsar Site (i.e., a Wetland of International Significance

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[1] Grand River Conservation Authority, "Report number: GM-02-017-24." www.grandriver.ca/en/our-watershed/resources/Documents/Water_Quality_Conditions_2017.pdf, (February 14, 2018).
[2] Grand River Conservation Authority, "Luther Marsh Birding," www.grandriver.ca/en/outdoor-recreation/Luther-Marsh-birding.aspx, (February 8, 2018).
[3] H.A. Loomer and S.E. Cooke for the Grand River Conservation Authority, "Water Quality in the Grand River Watershed: Current Conditions & Trends (2003-2008)," www.sourcewater.ca/en/source-protection-areas/resources/Documents/Grand/Grand_Reports_WaterQuality_2011.pdf, (February 17, 2018).

and Importance) and a Class 1 PSW (Figure 10).[4,5] Matchedash Bay is missing from the mapping altogether because the northern extent of the proposed study area goes only as far as the Oro Moraine.

The following series of maps (Figures 6 to 10) demonstrate the coldwater streams and wetlands (circled in red) missing from the proposed study area in Appendix 1, Map 2: Coldwater Streams and Wetlands of the Public Consultation Document. Overall, it is unclear why these areas are left out given the water resource features and functions and the land speculation and development pressures.

Recommendation 2: Include all of the coldwater streams and wetlands indicated in Figures 6 - 10 in the study area.

[4] M-T-M Conservation Association, "Matchedash Bay Provincial Wildlife Area," www.mtmconservation.org/index.php/matchedash-bay, (February 14, 2018).
[5] William Wilson and Edward Cheskey for the Tiny Marsh Important Bird Area Stakeholders, "Tiny Marsh Important Bird Area Conservation Plan," www.webcitation.org/6RkT45pG3, (February 14, 2018).

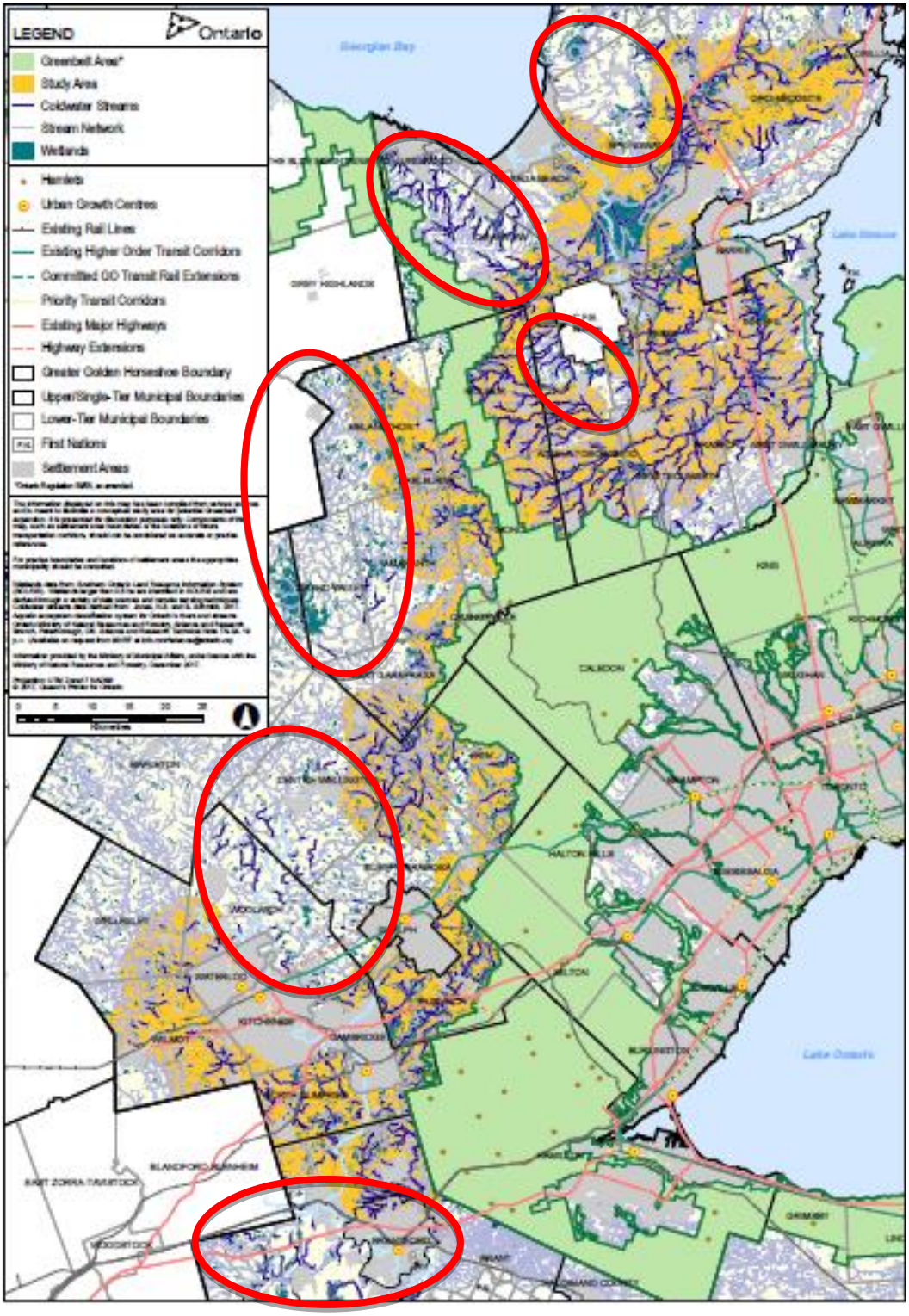

Figure 6. An inset of the Province's Map 2 in Appendix 1 with coldwater streams and wetlands missing from the proposed study area outlined in red.

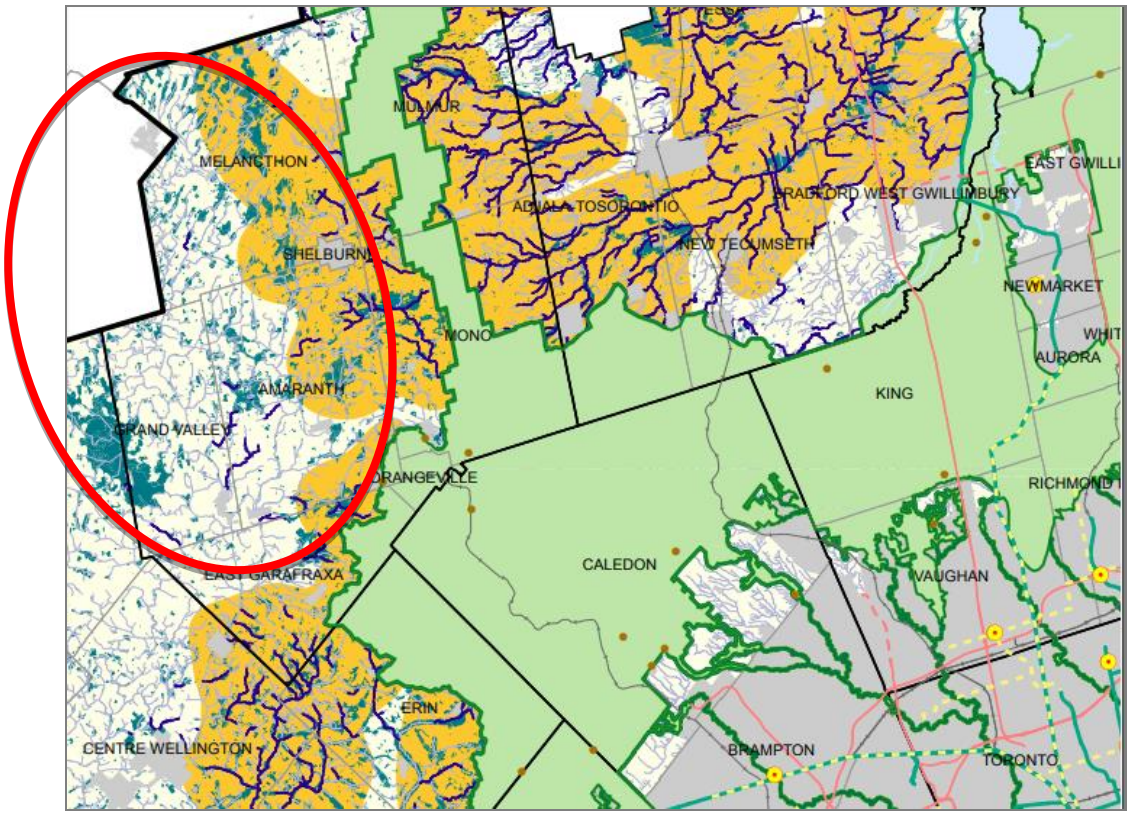

Figure 7. An inset of the Province's Map 2 in Appendix 1 with coldwater streams and wetlands in the Grand Valley area missing from the proposed study area outlined in red.

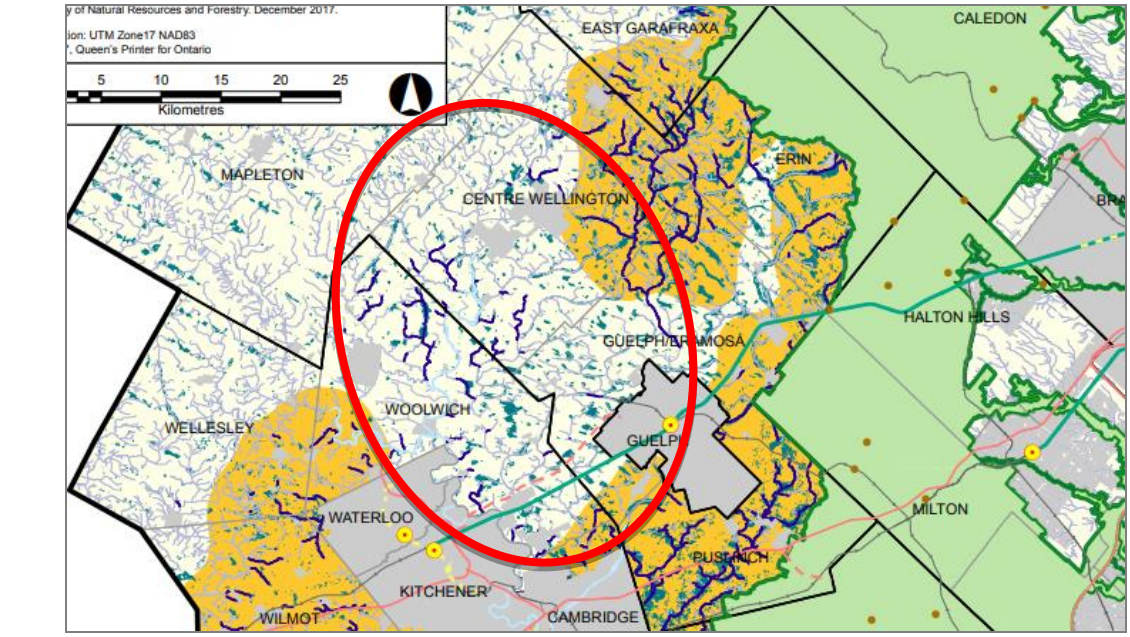

Figure 8. An inset of the Province's Map 2 in Appendix 1 with coldwater streams and wetlands between Waterloo and Elora/Fergus missing from the proposed study area outlined in red.

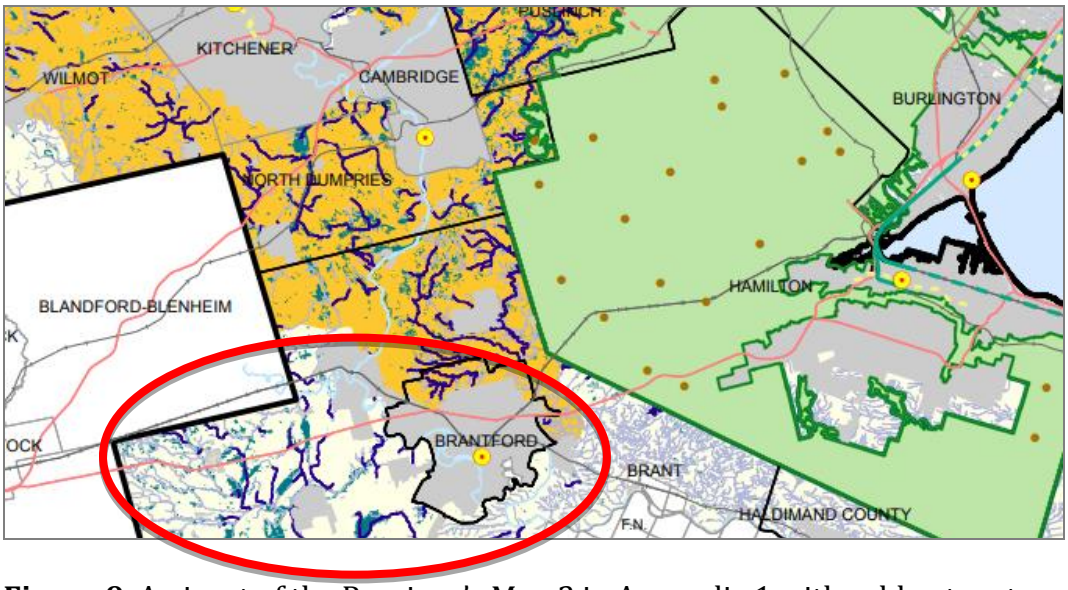

Figure 9. An inset of the Province's Map 2 in Appendix 1 with coldwater streams and wetlands missing from the proposed study area from the south west section of Brant County outlined in red.

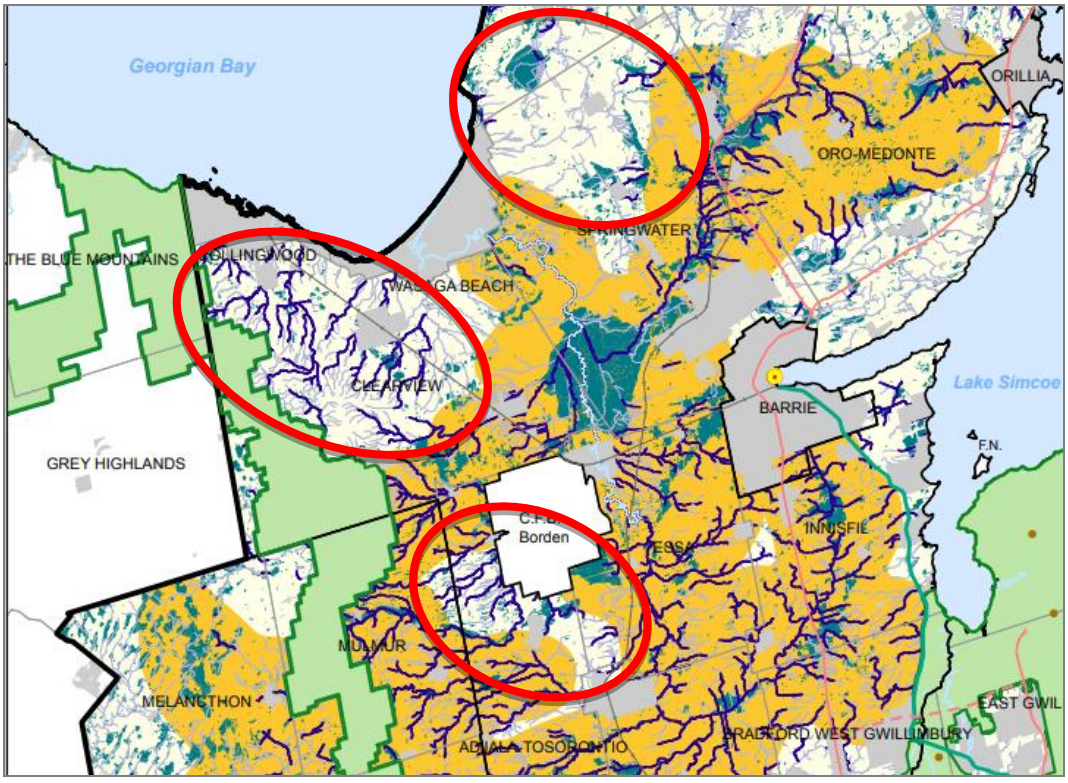

Figure 10. An inset of the Province's Map 2 in Appendix 1 with coldwater streams and wetlands missing from the proposed study area around the Niagara Escarpment and Georgian Bay outlined in red.

1 b. Arbitrary Criteria Applied to Building Blocks

Densities of Coldwater Streams and Wetlands

The Province has included only areas with high densities of coldwater streams and wetlands, without explanation. We note, however, that coldwater streams and wetlands are important water features in and of themselves, and that the 'high density' criterion arbitrarily risks excluding significant features. As explained in the Province's Public Consultation Document, coldwater streams "improve water quality by diluting contaminants and cooling water in larger downstream rivers" and "are important habitat for fish and wildlife." In addition, wetlands provide a number of valuable ecosystem services including "clean and abundant water, controlling flooding and erosion, storing carbon, facilitating recreational opportunities and providing other important social and cultural benefits."

> **Recommendation 3: For the purpose of defining the study area and to enable a full consideration of all important building blocks, include all coldwater streams and wetlands, regardless of density, on the map of coldwater streams and wetlands in Appendix I.**

Permeability of Moraines

The Province has mapped moraines in and around the study area in terms of their permeability (i.e., high, medium and low). For the most part, only high and medium permeability moraines have been included in study area (although to some degree even those moraines are also omitted from the study area as outlined above). This criterion was not mentioned in the Public Consultation Document but provided at a provincial technical stakeholder session. Given the reliance of communities on groundwater for drinking water supply and the high development pressures in the study area, the entirety of moraines (high, medium and low permeability) are important for the hydrologic function and integrity of the area.

> **Recommendation 4: Include all moraines, regardless of permeability level, in the study area.**

Overlapping Building Blocks

The provincial study area is based on overlapping groundwater and surface water features. We have two major concerns with this approach: 1) there are overlapping groundwater and surface water features missing from the study area, and 2) the overlap criterion results in the exclusion of water features that are significant in and of themselves.

The Province has inconsistently applied its own criterion of overlapping building blocks. We have identified six areas not included in the study area where there is overlap among features in Map 1 and Map 2 in Appendix 1 (Figure 11). Regardless, whether building blocks overlap or not, they are important to the water resource system and should be considered on their own merit. For example, wetlands across the GGH provide critical and numerous ecological services and yet their loss has been significant. In and around the Greenbelt, there has been a

loss of at least 50% of wetlands since European settlement with the highest percentage loss (75% to 100%) in areas such as Waterloo, Brant, Niagara, Barrie, Toronto, York Region and southern Halton, Peel and Durham Regions (see Figure 12).[6]

Recommendation 5: In defining the study area, dispense with the criterion of overlapping building blocks. Include all building blocks for consideration on their own merit, regardless of overlap.

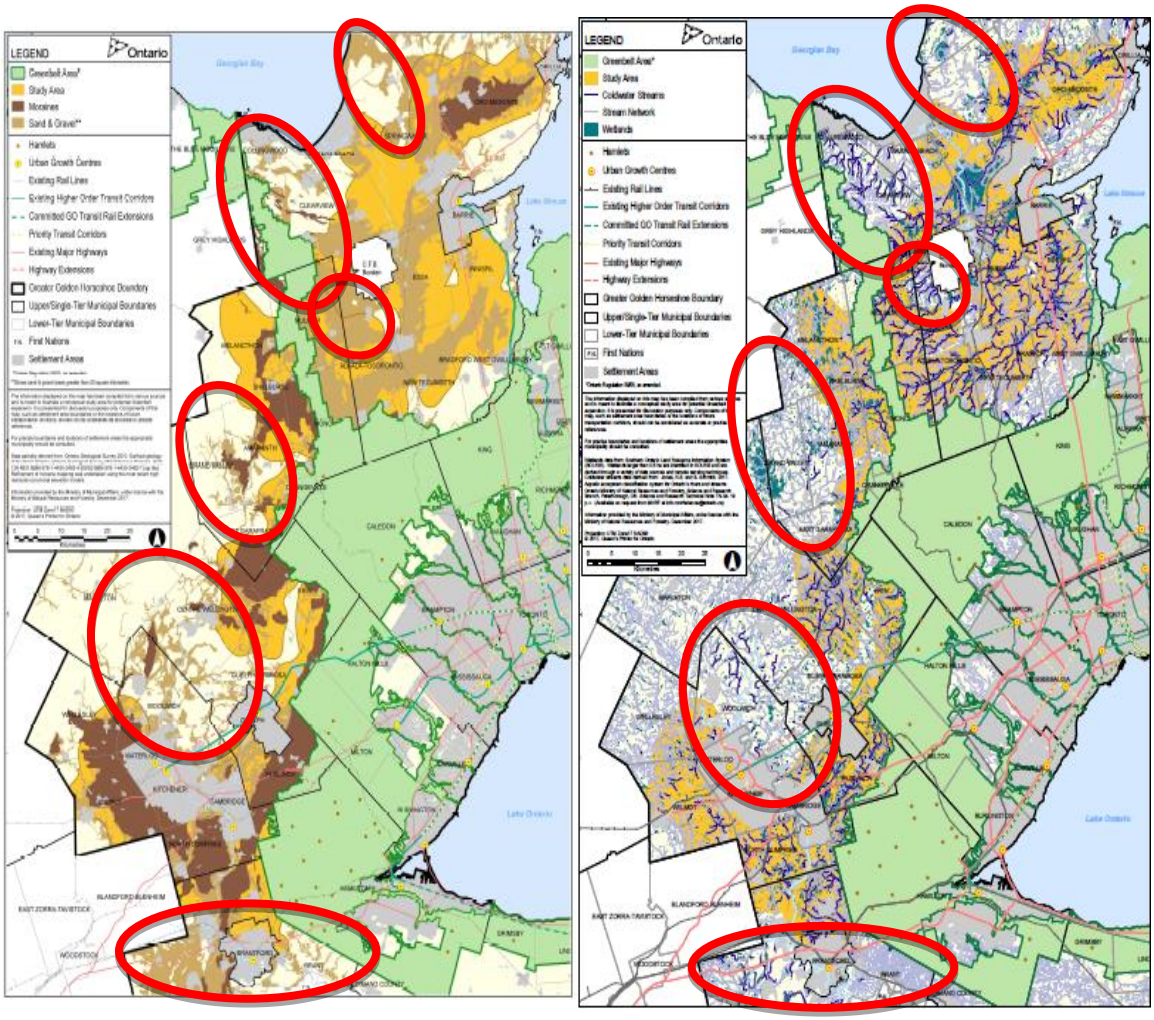

Figure 11. A comparison of Map 1 and Map 2 in Appendix 1 where areas with moraines, sand and gravel, coldwater streams and wetlands overlap (circled in red) but are not included in the proposed study area.

[6] Ducks Unlimited Canada, Earthroots, Ecojustice and Ontario Nature, "Protecting Greenbelt Wetlands: How Effective is Policy," www.ontarionature.org/discover/resources/PDFs/reports/protecting_greenbelt_wetlands_ report.pdf, (February 14, 2018).

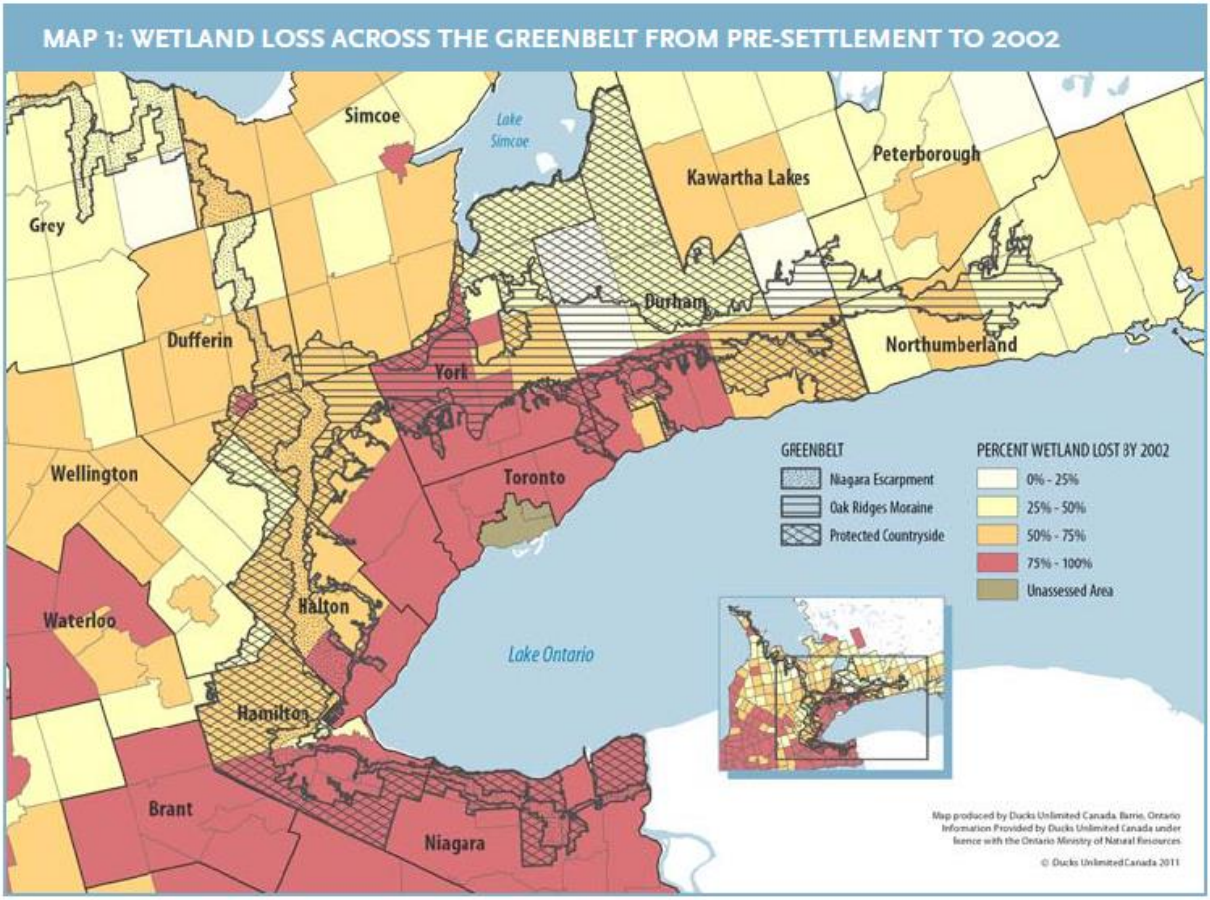

Figure 12. A map produced by Ducks Unlimited that demonstrates wetland loss from pre-settlement to 2002 in and around the Greenbelt where red denotes a loss of from 70% to 100%.

1 c. Additional Building Blocks

i. Headwater Areas

Headwater areas (i.e., headwater drainage features) should be included as an additional building block to be applied across the Greater Golden Horseshoe. Headwater drainage features are "small [temporary] stream, swale and wetland features that capture water and transport it to larger streams and rivers."[7] The Toronto and Region Conservation Authority (TRCA) and its partners define these as "non-permanently flowing drainage features that may not have defined bed or banks; they are first-order and zero-order intermittent and ephemeral channels, swales and connected headwater wetlands, but do not include rills or furrows."[8]

[7] Toronto and Region Conservation Authority, "What is a Headwater Drainage Feature (HDF)?" www.trca.on.ca/dotAsset/216167.pdf, (February 10, 2018).

[8] Evaluation, Classification and Management of Headwater Drainage Features Guideline. Toronto and Region Conservation Authority and Credit Valley Conservation, TRCA Approval July 2013 (Finalized January 2014).

Headwater areas play an extremely important role in the watershed. Headwater streams make up the majority length of streams in a watershed (50% to 80%) and headwater catchments may account for as much as 90% of a river's flow. Headwater areas provide important downstream resources such as nutrients, organic material and sediment, as well as important downstream benefits and functions such as improved water quality, storage and release. Changes, therefore, in headwater areas through urbanization can have a negative impact on downstream systems, both aquatic and terrestrial.[9] The importance of headwater areas to the health of watersheds cannot be overstated and yet these areas remain highly vulnerable to being tile drained, channeled, relocated or simply buried.

Considering only coldwater streams as building blocks omits many headwater streams. The Province has used stream baseflow data as a measure for coldwater streams. While the science behind the baseflow modelling is sound, the methodology used (based on the Aquatic Ecosystem Classification for Ontario's Rivers and Streams) excludes many intermittent and perennial streams (i.e., headwaters) by size,[10] capturing significantly less than what is actually on the ground.

Further, focusing exclusively on coldwater streams belies the fact that at one time all headwater streams were coldwater and it is through tree and natural cover removal that some streams became warm water streams. It is our responsibility to try to remediate these negative effects.

Including headwater areas as an additional building block builds upon recommendations and updated policies from the Coordinated Land-Use Planning Review. For example, in its recommendation regarding Greenbelt expansion the advisory panel for the Coordinated Review recommended the consideration of key headwaters (Recommendation 71). The Growth Plan (2017) and Greenbelt Plan (2017) also include updated protection policies (sections 4.2.3 and 3.2.4 respectively) for significant surface water contribution areas (i.e., generally associated with headwater catchments) as a component of key hydrologic areas.

A case in point is the area to the south and east of Brantford in Brant County. There, many small streams have retained much of their natural character, which is unusual in such an intensively farmed landscape (Figures 13 and 14). These streams contribute significantly to water quality and quantity and to the ecological health of the watershed by regulating water flow, and by providing nutrients, organic material, and sediment as well as habitat for the breeding, feeding, and sheltering of aquatic species.[11]

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[9] Evaluation, Classification and Management of Headwater Drainage Features Guideline. Toronto and Region Conservation Authority and Credit Valley Conservation, TRCA Approval July 2013 (Finalized January 2014).

[10] Aquatic Ecological Classification System. Jones, N.E. and B. Schmidt. 2017. Aquatic ecosystem classification system for Ontario's rivers and streams. Ontario Ministry of Natural Resources and Forestry, Science and Research Branch, Peterborough, O. Science and Research Technical Note TN-04.

[11] Ontario Headwaters Institute, "What are Headwaters?" ontarioheadwaters.ca/what-are-headwaters/, (February 8, 2018).

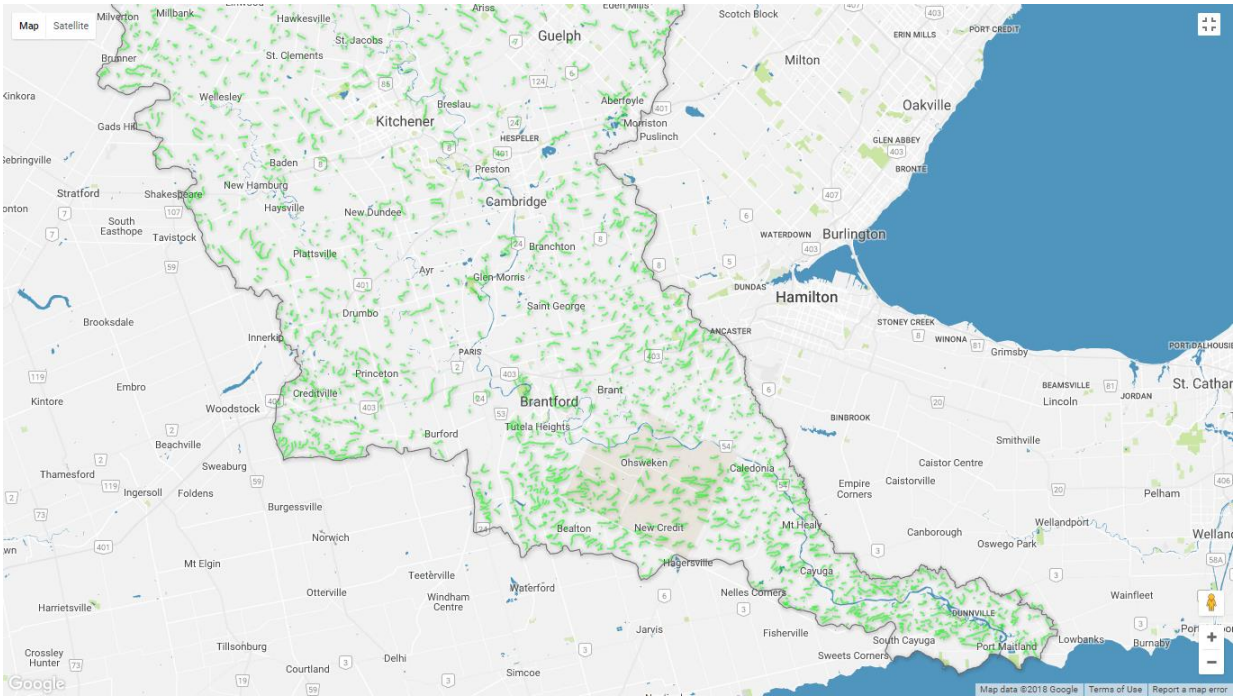

Figure 13. First order streams (green) of mid to lower Grand River Watershed (outlined in blue). (Source: Ontario Headwaters Institute, ontarioheadwaters.ca/ohmapping/watersheds/grand/index.html)

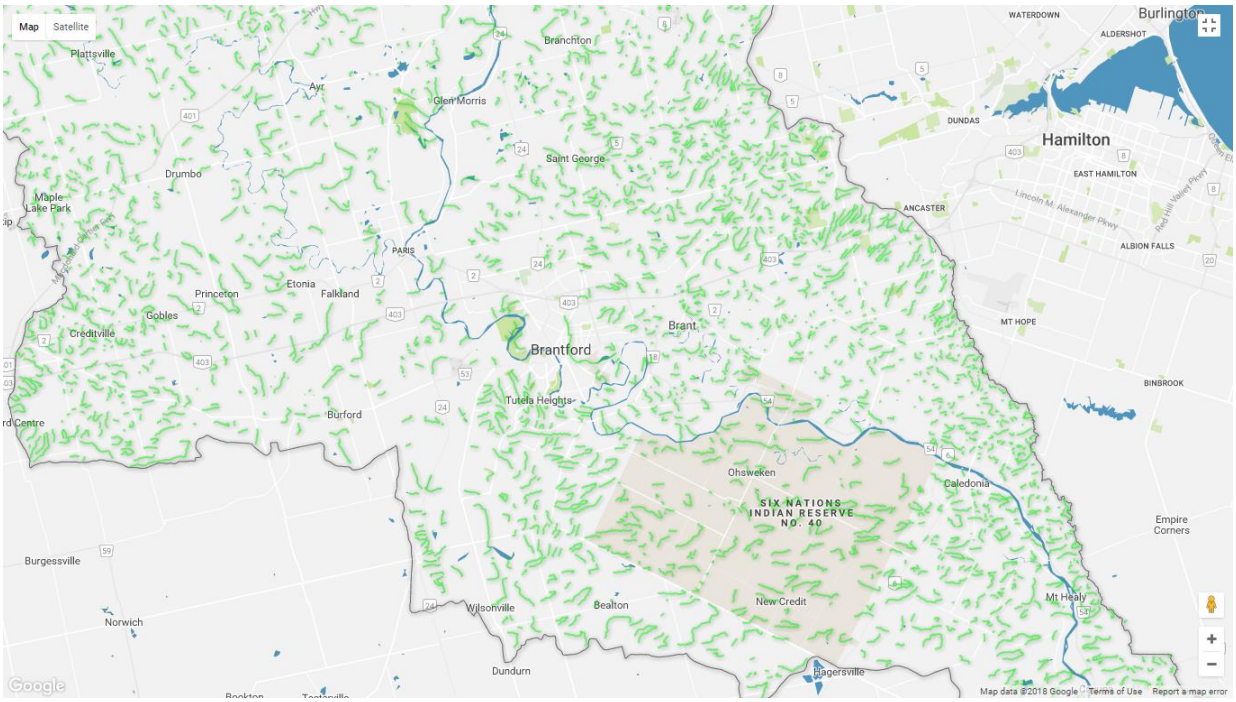

Figure 14. An inset of first order streams (green) in Brant County in the Grand River Watershed. (Source: Ontario Headwaters Institute,

ontarioheadwaters.ca/ohmapping/watersheds/grand/index.html)

ii. Former Glacial Lake Shorelines and Plain

Lakes Algonquin and Iroquois

The shorelines of proglacial Lakes Algonquin and Iroquois are remnants of a time when the continental ice sheet was beginning its retreat thus creating massive ice dams that resulted in the formation of these lakes (Figures 15 and 16). The shorelines of these old lakes are locally and regionally significant groundwater discharge zones, contributing baseflow to receiving stream systems.[12] The Lake Algonquin shoreline is easily seen west of Orillia and Barrie where the groundwater discharge forms the headwaters of the coldwater streams in those areas. The beach terraces associated with the Lake Iroquois shoreline define parts of downtown Toronto, Scarborough and the area between the south slope of the Oak Ridges Moraine and present-day Lake Ontario.

The Greenbelt Plan (2017) already includes "several areas of hydrological significance, including…the former Lake Algonquin Shoreline within York and Durham Regions; and [t]he former Lake Iroquois shoreline in Durham and Niagara Regions." Given the established hydrological significance of these shorelines and their partial inclusion in the Greenbelt, it makes sense to include the remainder of these shorelines in the study area. Their potential addition to the Greenbelt would support the Greenbelt Plan's External Connections policies (3.2.6), which aim to ensure that the "Natural Heritage System is connected to local, regional and provincial scale natural heritage, water resource and agricultural systems beyond the boundaries of the Greenbelt."

Note that policy 3.2.6.3 in the Greenbelt Plan (2017) signals the importance of the Lake Iroquois shoreline and urges municipalities to consider maintaining or enhancing its associated natural and aquatic features:

> In addition to the urban river valleys, portions of the former Lake Iroquois shoreline, particularly within Durham Region, traverse existing or approved urban areas. Municipalities should consider planning, design and construction practices that maintain or, where possible, enhance the size, diversity, *connectivity* and functions of *key natural heritage features*, *key hydrologic features* and *key hydrologic areas* of those portions of the Lake Iroquois shoreline within their approved urban boundaries.

[12] Meriano, M. (1999). Hydrogeology of a Complex Glacial System, Rouge River-Highland Creek Watershed, Scarborough, Ontario (Master's thesis), University of Toronto. Retrieved from: tspace.library.utoronto.ca/bitstream/1807/14943/1/MQ46201.pdf.

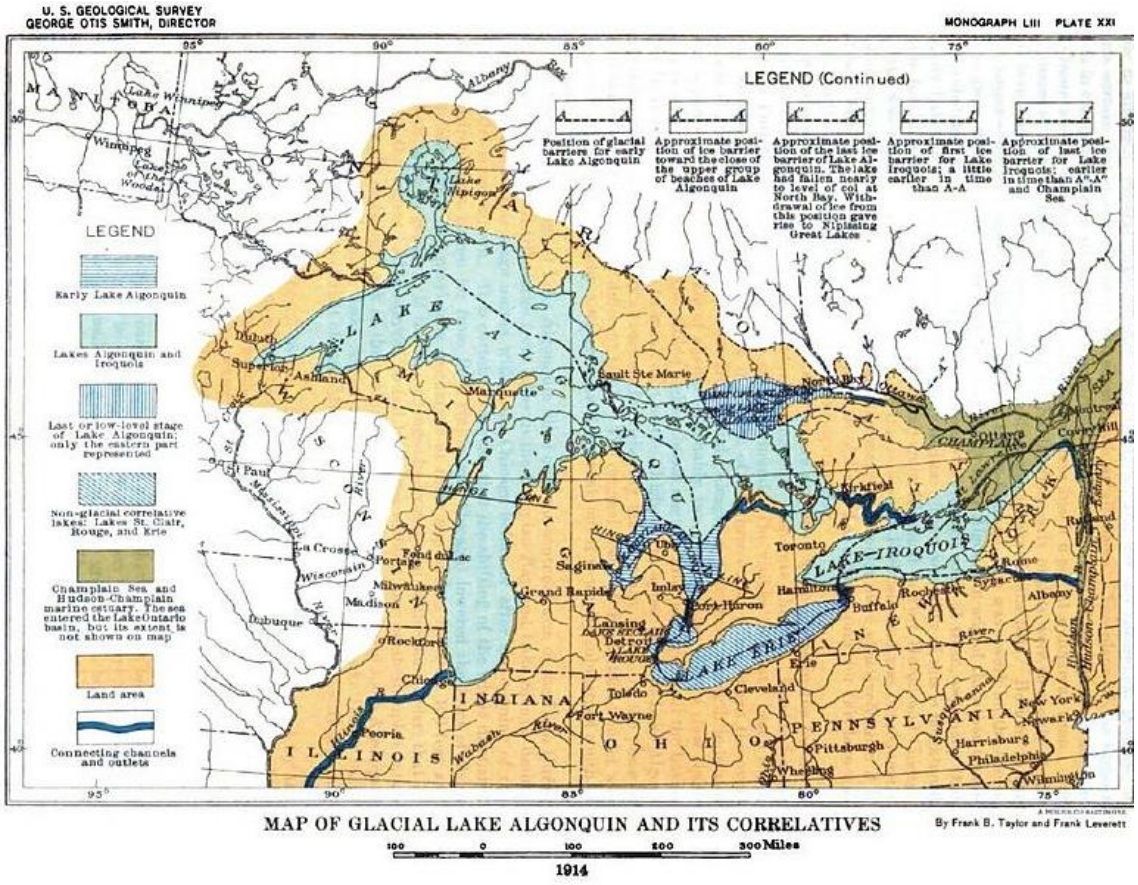

Figure 15. A map of Lake Algonquin and its correlatives including Lake Iroquois within the current Great Lakes region. Source: Frank Leverett [Public domain], via Wikimedia Commons

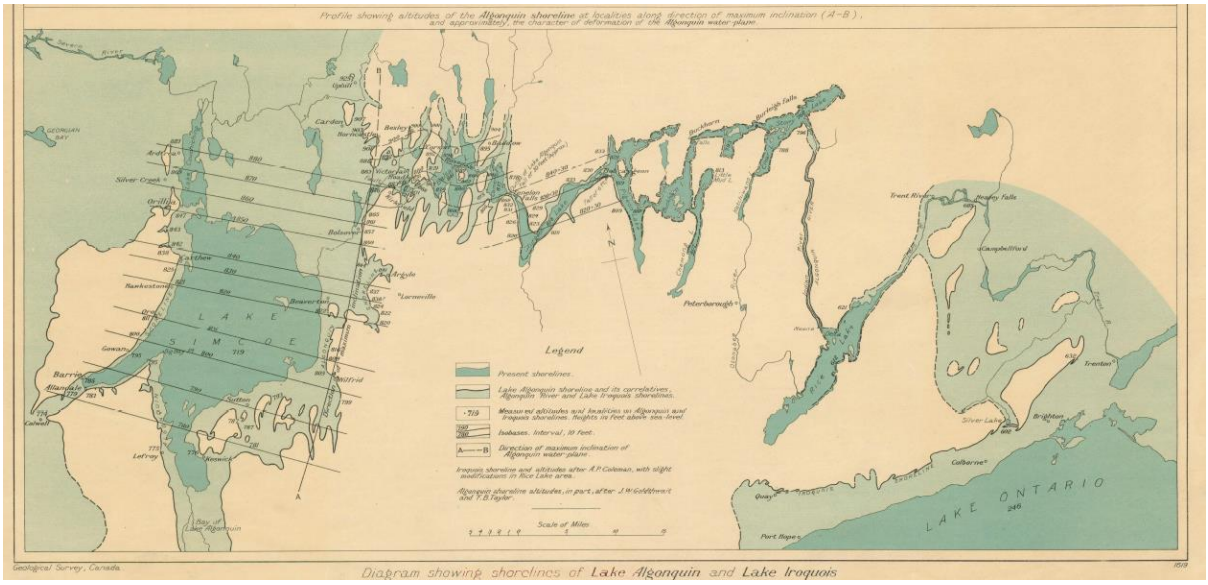

Figure 16. A diagram showing shorelines of Lake Algonquin and Lake Iroquois in comparison to the current shorelines of Lake Simcoe and Lake Ontario. Source: Johnston, W A. Geological Survey of Canada, Multicoloured Geological Map 1619, 1916 sheet.

Lake Iroquois Plain
Similar to the Lake Iroquois shoreline, the Lake Iroquois Plain is also comprised of significant ecological and hydrological features including:

- *Important Water Systems*: The Iroquois Plain features groundwater discharge areas that form the headwaters of dozens of creeks that flow into Lake Ontario. Its springs also feed cool groundwater into streams enhancing water quality so that fish species such as the endangered redside dace can survive.

- *Wetlands:* Within the Lake Iroquois Plain, the shoreline of Lake Ontario is known for many significant coastal wetlands. These and the many inland wetlands provide a multitude of societal benefits and are home to many at-risk species.[13]

- *Biodiversity:* Environment Canada ranked the Iroquois Plain as the number one landscape south of the Shield where conservation actions may have the greatest impact.[14] It is home to 57 species at risk, has some of the largest and most extensive coastal wetlands in southern Ontario, and provides vital habitat for numerous bird species during migration. Significant natural features such as the Wesleyville Ravines and Carr's Marsh lie just beyond the current Greenbelt boundary.

It is important to note that while this eastern part of the GGH may not have the same 2041 growth projections (as forecast by the Growth Plan) as does the western part, rural countryside is being lost, ground and surface water regimes are impacted, and farmland and supporting agricultural communities are fragmented by activities that are not governed by any of the land use plans that seek to manage growth and protect the countryside (e.g., from the negative impacts of electrical generation and related facilities, extension of the 407 provincial highway and aggregate mining).

iii. Lake Simcoe Watershed
Potential expansion of the Greenbelt into the remainder of the Lake Simcoe Watershed would enhance the protections provided under the Lake Simcoe Protection Plan (LSPP) by limiting urban sprawl, a major stressor on the ecological integrity of the lake.

The Lake Simcoe Watershed provides clean drinking water to seven municipalities. There are 35 tributaries and 18 major river systems which, together with Lake Simcoe, provide habitat for 75 fish species and over 32 species at risk.[15,16] The former Lake Algonquin

[13] Environment and Climate Change Canada. "A landscape assessment for the Ontario Mixedwood Plains: Terrestrial biodiversity of federal interest in the Mixedwood Plains ecozone of Ontario; 2015," www.ec.gc.ca/nature/default.asp?lang=En&n=3B824EDF-1, (February 22, 2018).
[14] ibid
[15] Lake Simcoe Region Conservation Authority, "Lake Simcoe Watershed," www.lsrca.on.ca/Pages/watershed.aspx, (February 19, 2018).

encircles Lake Simcoe and provides both locally and regionally significant groundwater discharge zones, contributing baseflow to receiving stream systems.[17]

The Greenbelt Plan (2017) already recognizes the importance of Lake Simcoe and its watershed. The environmental protection goals of the Protected Countryside (section 1.2.2) include the "[p]rotection and restoration of natural and open space connections between the Oak Ridges Moraine, the Niagara Escarpment, Lake Ontario, Lake Simcoe and the major river valley lands." Furthermore, portions of the Lake Simcoe Watershed are recognized as areas of hydrological significance in the Protected Countryside (section 3.2.1). The External Connections policies (section 3.2.6) support the connection between the Greenbelt's Natural System and Lake Simcoe.

Including the remainder of the watershed in the study area would align with the watershed-based approach to Greenbelt expansion outlined in the provincial discussion document. This is particularly important considering the immense growth pressures around Barrie, Innisfill, Midhurst and Orillia.

According to the Lake Simcoe Protection Plan, major threats to the watershed are human-related activities including those resulting in the "loss and fragmentation of sensitive natural areas and habitats, such as shorelines, *wetlands*, streamside areas, or forested lands, [which] directly affect the health of the watershed ecosystem."[18] Including the entire watershed in the study area would support the objectives and targets of the Lake Simcoe Protection Plan which aims to:

- "Protect, improve or restore the elements that contribute to the ecological health of the *Lake Simcoe watershed*, including, water quality, hydrology, key natural heritage features and their functions, and key hydrologic features and their functions;
- restore a self-sustaining coldwater fish community in Lake Simcoe"

Relevant targets include (Chapter 6):

- No further loss of natural shorelines on Lake Simcoe
- Achieve a greater proportion of natural vegetative cover in large high quality patches
- Achieve a minimum 40 percent high quality natural vegetative cover in the watershed
- Achieve protection of wetlands
- Achieve naturalized riparian areas on Lake Simcoe and along streams

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[16] Ontario Ministry of Environment and Climate Change. 2009. Lake Simcoe Protection Plan. Ontario: Queen's Printer for Ontario.
[17] Meriano, M. (1999). Hydrogeology of a Complex Glacial System, Rouge River-Highland Creek Watershed, Scarborough, Ontario (Master's thesis), University of Toronto. Retrieved from: tspace.library.utoronto.ca/bitstream/1807/14943/1/MQ46201.pdf.
[18] Ontario Ministry of Environment and Climate Change. 2009. Lake Simcoe Protection Plan. Ontario: Queen's Printer for Ontario.

- Restore natural areas or features
- Achieve increased ecological health based on the status of indicator species and maintenance of natural biodiversity

Natural shoreline areas provide many ecological services (e.g., run-off and erosion control, habitat conservation and temperature regulation). Given that most of the natural cover (woodlands and wetlands) in the watershed is fragmented, Greenbelt expansion offers a policy approach including an implementation mechanism to help achieve these ambitious and progressive targets.

iv. Source Water Protection Plan Areas

Greenbelt expansion would address gaps in existing water protection policies. Source Water Protection is focused on the protection of municipal drinking water supplies and not private wells. Greenbelt policies complement Source Water Protection and go further by maintaining groundwater volumes and quality for private wells, agriculture and ecosystem health. Furthermore, the Greenbelt Plan has a stricter policy than the Growth Plan around protecting the function of key hydrologic areas (section 3.2.4.1) as well as more limits to growth (i.e., no settlement area boundary expansion into the Greenbelt NHS, modest expansion for Towns and Villages and prohibited expansion of Hamlets), minimizing potential future threats to drinking water quality.

Within Source Water Protection Plans, vulnerable areas identified as important sources of drinking water include:

- Significant Groundwater Recharge Areas (SGRAs)
- Highly Vulnerable Aquifers (HVAs)
- Wellhead Protection Areas (WHPAs)
- Intake Protection Zones (IPZs)

While specific components of SGRAs were used in the preparation of the Moraines, Sand and Gravel study area mapping, the other SGRA components and other vulnerable areas are missing altogether.

Most of these vulnerable areas are recognized in Greenbelt Plan policies. For example, key hydrologic areas (section 3.2.4) include SGRAs and HVAs. Furthermore, SGRAs are defined in the plan as including ecologically significant groundwater recharge areas. In the implementation of the Greenbelt policies (section 5.3), "[m]unicipalities should also include a map of *wellhead protection areas* together with associated policies for these areas within their official plans as appropriate and in accordance with any provincial directives on source water protection."

While not mentioned in the Greenbelt Plan, IPZs are part of municipal water treatment plans related to protecting water sources from pollution (e.g., spills around a surface water intake).

Recommendation 6: Include headwater areas, the Lakes Algonquin and Iroquois shorelines, the Lake Iroquois Plain, the entire Lake Simcoe watershed and source water protection plan areas as building blocks in determining the study area.

2. Are there additional data sets or types of analysis that should be considered?

Yes, additional data sets and types of analysis should be considered, as outlined below.

Indigenous Traditional Knowledge and Knowledge Systems

In defining the study area, the Province must proceed in a manner that recognizes and is informed by the responsibilities, rights and interests of Indigenous communities. In Ontario, as elsewhere in Canada, the Crown owes a legal duty to consult Indigenous peoples when "considering a decision that may adversely affect established or asserted Aboriginal or Treaty rights."[19] Indigenous Traditional Knowledge and Knowledge Systems should be considered and applied, with areas to be included determined on a community-by-community basis, according to protocols established by the affected community.

Regional Groundwater Modelling

Work is underway between the Province (i.e., Ontario Geological Survey and Ministry of Environment and Climate Change (MOECC)) and the Geological Survey of Canada (i.e., Federal Department of Natural Resources) in preparing regional groundwater flow models for parts of the western/southwestern GGH. In defining the study area, the Province should engage and collaborate with the steering group of the groundwater modelling initiative.

Oak Ridges Moraine Groundwater Program

The York, Peel, Durham, Toronto and the Conservation Authorities Moraine Coalition (YPDT-CAMC) has an Oak Ridges Moraine Groundwater Program and an associated mapping geoportal with world class water-related data on the Oak Ridges Moraine and surrounding areas. These data range from groundwater quality and levels, surficial geology, geological features, and wells to active permits to take water. Data with respect to Simcoe County, Northumberland County and the inner ring of the GGH should be considered in defining the study area.

Source Water Protection Characterization Studies

Assessment of all Source Water Protection Plan Characterization Studies should be undertaken to determine whether there are additional data/information to inform the identification of features and functions and the subsequent overall analysis.

Source Protection Information Atlas

[19] Ontario Ministry of Municipal Affairs and Housing, "Municipal-Aboriginal Relationships: Case Studies," www.mah.gov.on.ca/Page6054.aspx, (February 24, 2018).

The MOECC has compiled an online database that maps the four vulnerable areas in source water protection.[20] This Atlas should be used to inform the identification of the study area.

Conservation Authority Data

Conservation authorities across the GGH (not only those within the proposed study area) should be consulted to gain access to their data. These detailed and watershed-focused data would greatly inform this exercise, including data on:

- Coldwater streams, baseflow and headwater drainage features
- Ecologically significant groundwater recharge areas already identified (e.g., Lake Simcoe Region Conservation Authority, TRCA, Credit Valley Conservation and Central Lake Ontario Conservation Authority)
- Assimilative capacities
- Groundwater recharge areas (for example, in the Grand River watershed, about 30% of the land accounts for about 80% of the recharge[21] and there are areas outside of SGRAs that can provide significant recharge to features[22])

These data, which indicate changes over time (status, health of water resources) can support the prioritization of water protection. The ***Flowing Waters Information System*** is an excellent source of water-related data collected by conservation practitioners to manage information on flowing waters or streams, including data about fisheries, benthos, habitat and more.[23]

Municipal Data

Some municipalities have detailed scientific information and mapping that can inform Greenbelt expansion. For example, the Region of Waterloo has mapping and scientific data on its Protected Countryside and Countryside Line in its official plan.

Recommendation 7: In defining the study area, proceed in a manner that recognizes and is informed by the responsibilities, rights and interests of Indigenous communities. Consider Indigenous Traditional Knowledge and Knowledge Systems on a community-by-community basis according to protocols established by the affected community. Also consider the following data sets in defining the study area: regional groundwater modelling, the Oak Ridges Moraine Groundwater Program, Source Water Protection Characterizations

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[20] Ontario Ministry of the Environment and Climate Change, "Source Protection Information Atlas," www.gisapplication.lrc.gov.on.ca/SourceWaterProtection/Index.html?viewer=SourceWaterProtection.SWPViewer&locale=en-US.

[21] Grand River Conservation Authority, "The Grand, 2006 Watershed Report," www.grandriver.ca/en/learn-get-involved/resources/Documents/The_Grand/Publications_Grand_2006Fall.pdf, (February 18, 2018).

[22] Golder Associates for the Lake Simcoe Region Conservation Authority, "Maskinonge, East Holland and West Holland River Subwatersheds: Ecologically Significant Groundwater Recharge Area Assessment," www.lsrca.on.ca/Shared%20Documents/reports/Groundwater_Recharge_Assessment.pdf, (February 14, 2018).

[23] The Centre for Community Mapping, "Flowing Waters Information System," www.comap.ca/fwis/.

Studies, the Source Protection Information Atlas, conservation authority data, including the Flowing Waters Information System, and municipal data.

Study Area Refinements

In terms of analysis, it would be helpful if further refinements were made to mapping of the study area including topography, soil types, key recharge and discharge areas and baseflow
rates. In addition, examining stressors and changes over time (decline) would also support study area refinements. Specifically, we would like to see:

- More detailed topographic information that would allow identification of hummocky terrain or "knobs and kettles" (a key characteristic of moraines) as not all portions of a moraine contribute the same amount of infiltration/ground water recharge. Hummocky terrain provides significantly more recharge than the slopes of a moraine.
- More detailed information on soil types and infiltration rates. Sand and gravel deposits near or at surface would provide more infiltration than areas with tills overlain on sands/gravels.
- More information on key recharge areas on a watershed/subwatershed basis (e.g., the TRCA watershed study showed that 9% of the Duffins Creek watershed contributed upwards of 30% of all recharge).
- Information on baseflow characteristics of the streams in the study area and the western/southwestern part of the GGH (e.g., amounts, reduction of flows from historic levels). Among other things, this can help identify the streams currently most impacted by reduced baseflow arising from urbanization.
- Information on discharge rate contributions for coldwater tributaries. Some areas contribute proportionally more baseflow to these tributaries and are thus of more importance to protect.
- Information on extractions of large amounts of groundwater and surface water (i.e., through Permits to Take Water or through dewatering), that can lower the water table and reduce baseflow and overall flow of water.

3. Of the seven areas, are there some that are more or less important?

It is too early to make this determination in the absence of the other data and analyses. Regardless, it is important to note that all water related features work collectively at varying scales – from site, to catchment, sub-watershed, watershed, regional, sub-provincial and national. As part of a water resource system, all areas play an important role.

Further, each of these areas has strong and committed community champions who have invested time and resources working with their respective municipalities to raise awareness about threats to their waters from urban development. At this early stage, and in the absence of more comprehensive data and analyses, they rightly expect that the study area will include the 'building blocks' (moraines, wetlands, streams, headwaters, etc.) that are important to their communities.

4. Are there areas beyond the study area that you think should be considered for potential future Greenbelt expansion?

The ORM Partnership and other partner organizations (those involved in the #ProtectOurWaters initiative) mapped a 'Bluebelt' of important and vulnerable water resources that should be protected through Greenbelt Expansion (Figure 17). The key components of the 'Bluebelt' are discussed below. A map comparing the 'Bluebelt' to the proposed study area is presented in Figure 18.

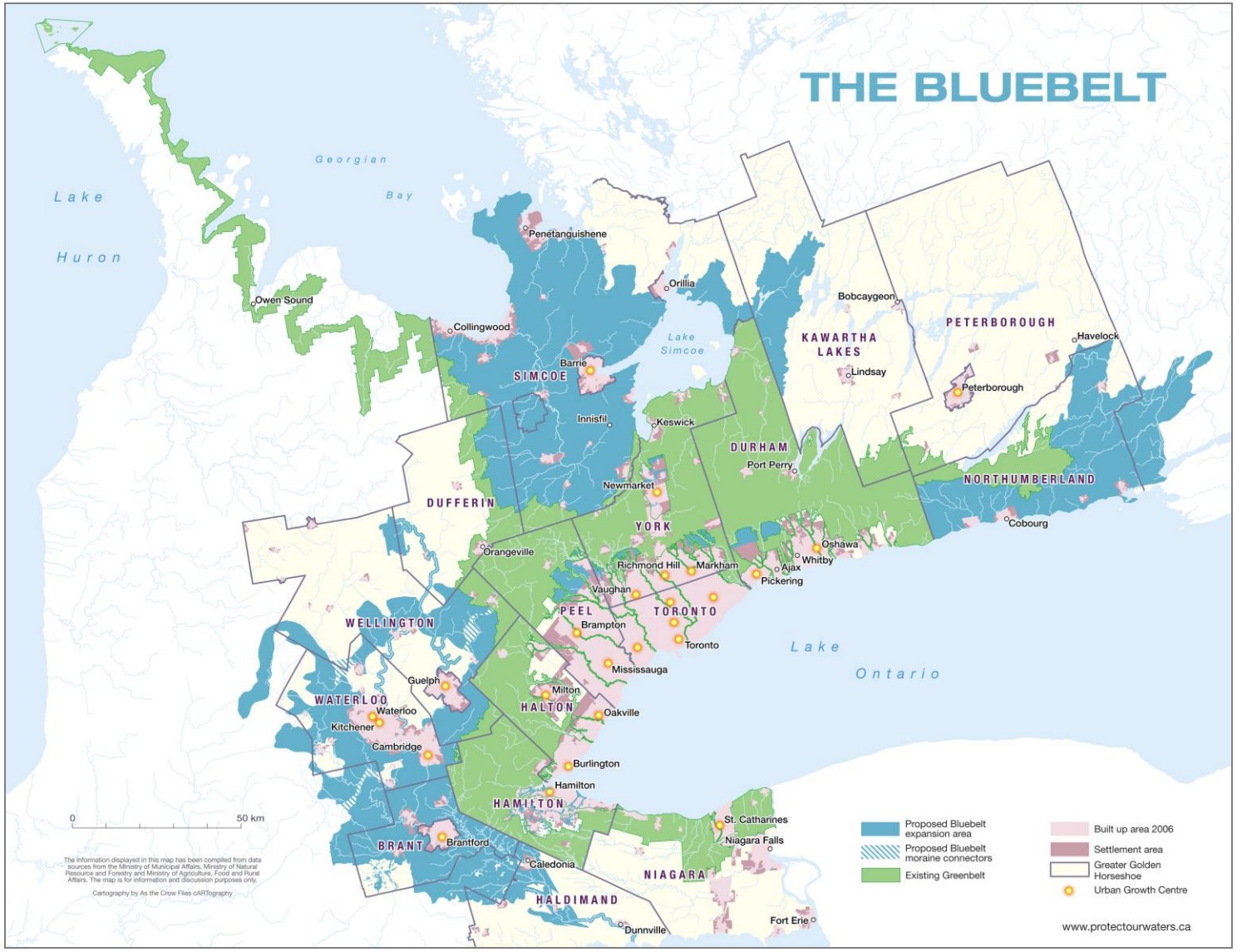

Figure 17. A map of the proposed 'Bluebelt' for consideration in Greenbelt expansion to protect at-risk waters from development pressures.

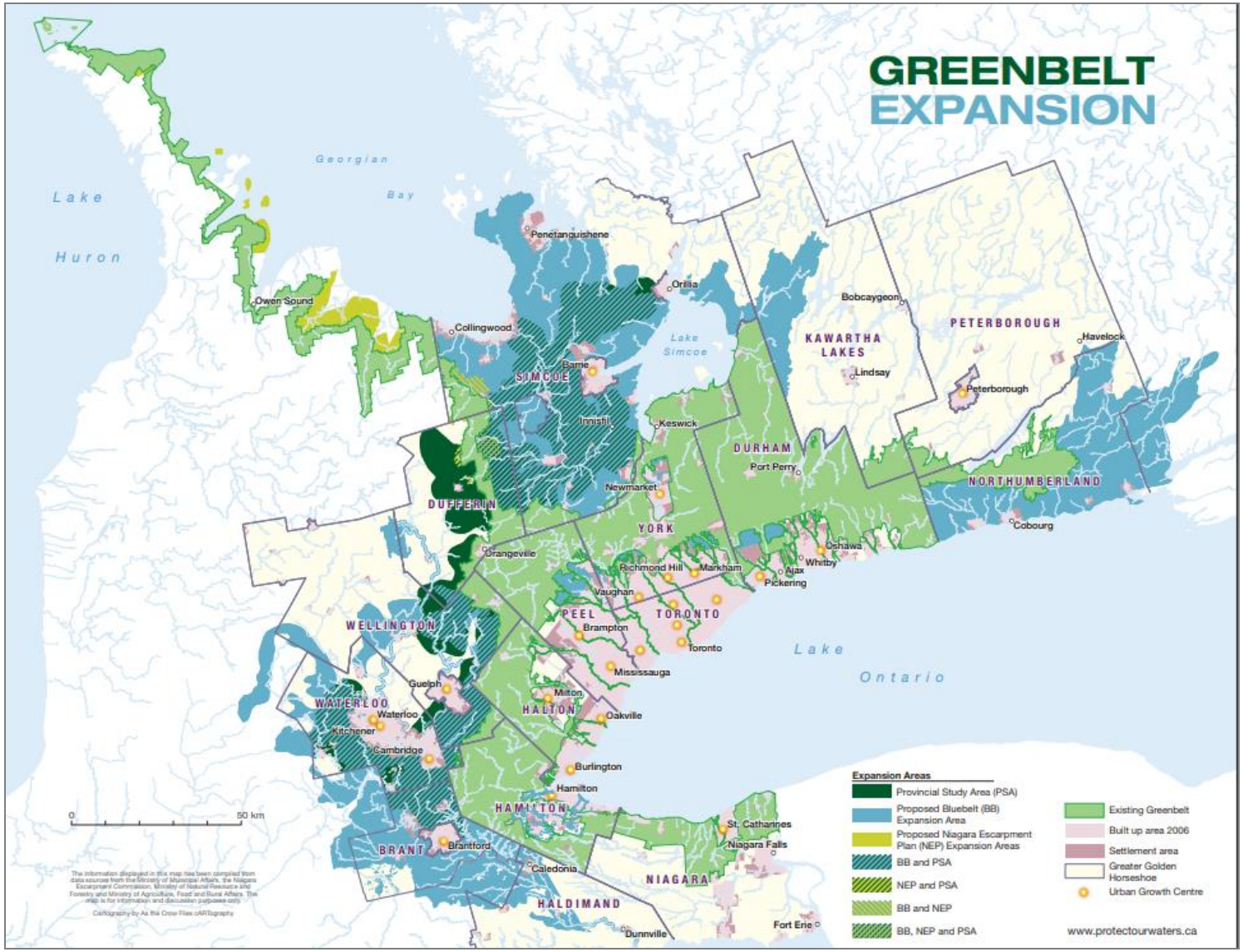

Figure 18. A map comparing the proposed 'Bluebelt' to the provincial study area and proposed additions to the Niagara Escarpment Plan by the Niagara Escarpment Commission.

i. South Slope of the Oak Ridges Moraine and the Iroquois Shoreline and Plain in Northumberland County:

The eastern parts of the GGH should be included in the study area, in particular Northumberland County. It is our understanding that they were excluded because development pressures in the east were not deemed to be as intensive at the moment as in the areas west of Lake Simcoe. We object to this approach on two grounds. First, the significance of the water resources should be the deciding factor in whether to include them or not. As noted above (response to question 2), along the south slope of the Oak Ridges Moraine and the Lake Iroquois Shoreline and Plain (Figure 19) there are many small headwaters, streams, seeps and upwellings which feed south flowing rivers.[24] In addition, a high number and concentration of coldwater streams flow from the Oak Ridges Moraine to Lake Ontario in Northumberland County (Figure 20). These merit Greenbelt protection. Second, while the Growth Plan forecasts only a modest population increase for Northumberland County until 2041, low land values and the adjacency of highway and transportation infrastructure (two 400-series highways and transit stations) are bound to attract land speculation and create development pressures. It behooves the government to be strategic and forward thinking by protecting significant ecological and hydrologic systems now, before land speculation drives up prices and makes land use decisions much more controversial.

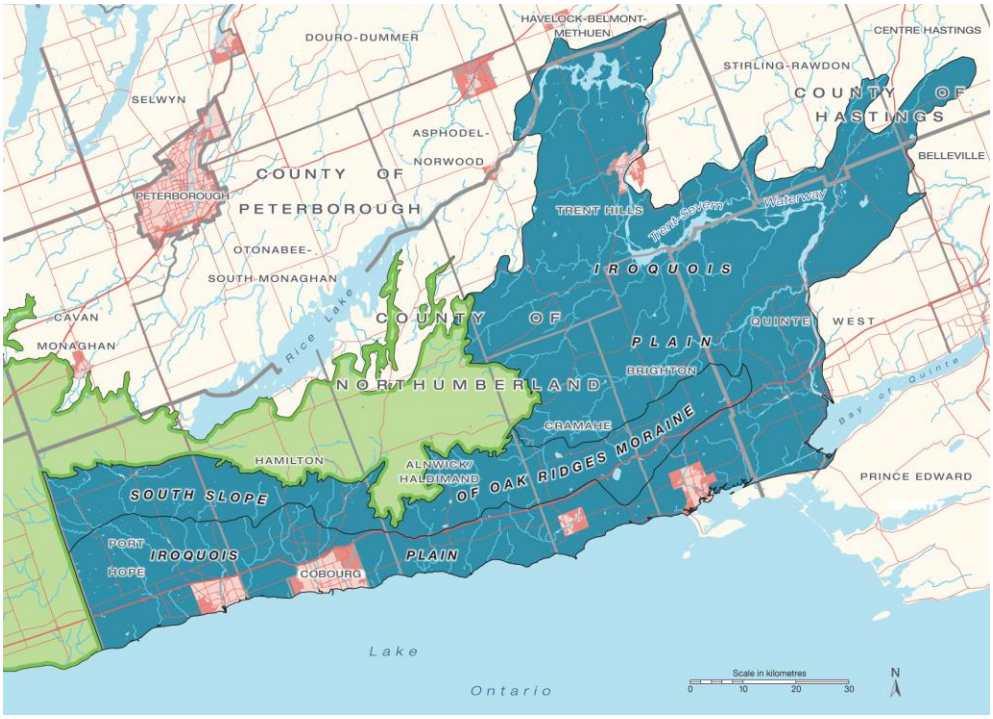

Figure 19. An inset of the 'Bluebelt' map showing the south slope of the Oak Ridges Moraine and the Lake Iroquois shoreline and plain.

[24] A Hydrogeological Study along the North Shore of Lake Ontario in the Bowmanville-Newcastle Area, S. N. Singer, Ministry of the Environment Water Quantity Management Branch, River Basin Research Section, Toronto Ontario, (1974).

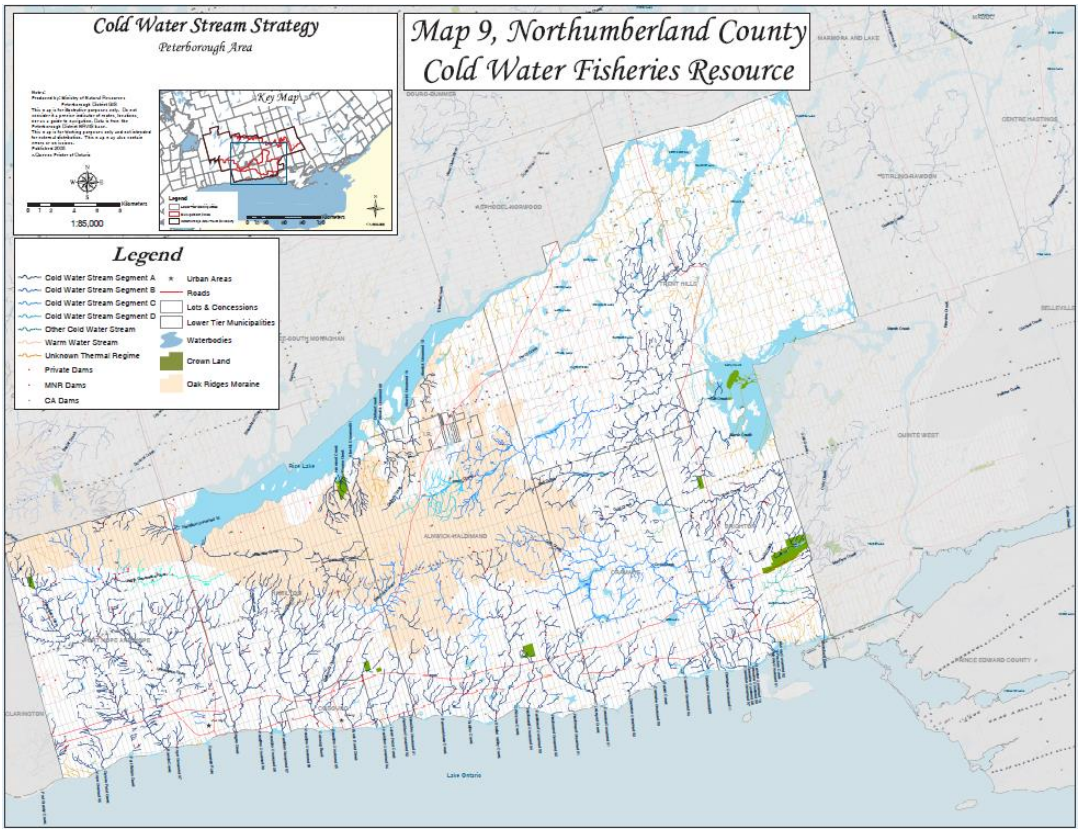

Figure 20. A map of coldwater streams in Northumberland County (Source: MNRF's Coldwater Stream Strategy – Peterborough Area, 2005)

ii. Headwaters of South-flowing Rivers within the Inner Ring

The headwaters of the Humber, Don and Rouge Rivers and Duffins and Carruthers Creeks lie in the unprotected countryside south of the Oak Ridges Moraine (the 'Whitebelt') and remain particularly vulnerable to urban development (Figure 21). It is commendable that most of the municipalities are undertaking watershed and subwatershed studies in these areas to identify hydrologic features that perform essential functions. However, implementing no development zones or mitigation practices will not suffice to protect these high functioning features. As previously mentioned, headwater areas perform important functions within a watershed. There is also a high volume and concentration of headwaters within the inner ring of the GGH that are vulnerable. These headwater areas should be considered for inclusion as Protected Countryside areas of the Greenbelt.

An example of an important headwater area is the Carruthers Creek in the northeastern part of the City of Pickering and northwestern part of the Town of Whitby, just south of the Oak Ridges Moraine (Figure 22). This area is gap or hole in Greenbelt protection as it is fully encompassed by the Greenbelt. This area supports the redside dace, a species-at-risk for which the headwaters of the Greater Toronto Area are one of the last strongholds.[25,26]

[25] Toronto and Region Conservation Authority for the Region of Durham, "Carruthers Creek Watershed Plan: Aquatic Habitat and Community Characterization," trca.ca/wp-content/uploads/2017/11/CCWP-Aquatic-Ecology-2017.pdf, (February 28, 2018).

The ORM Partnership and the #ProtectOurWaters initiative are not alone in our request to include vulnerable headwaters area in the inner ring of the GGH as part of the provincial study area. Both the Town of Ajax and the Region of Halton have passed council resolutions (on December 11, 2017 and February 21, 2018 respectively) to incorporate 'Whitebelt' lands within the inner ring to protect limited freshwater and natural heritage features. There is strong alignment with these requests and our collective desire to protect vulnerable headwaters through Greenbelt expansion.

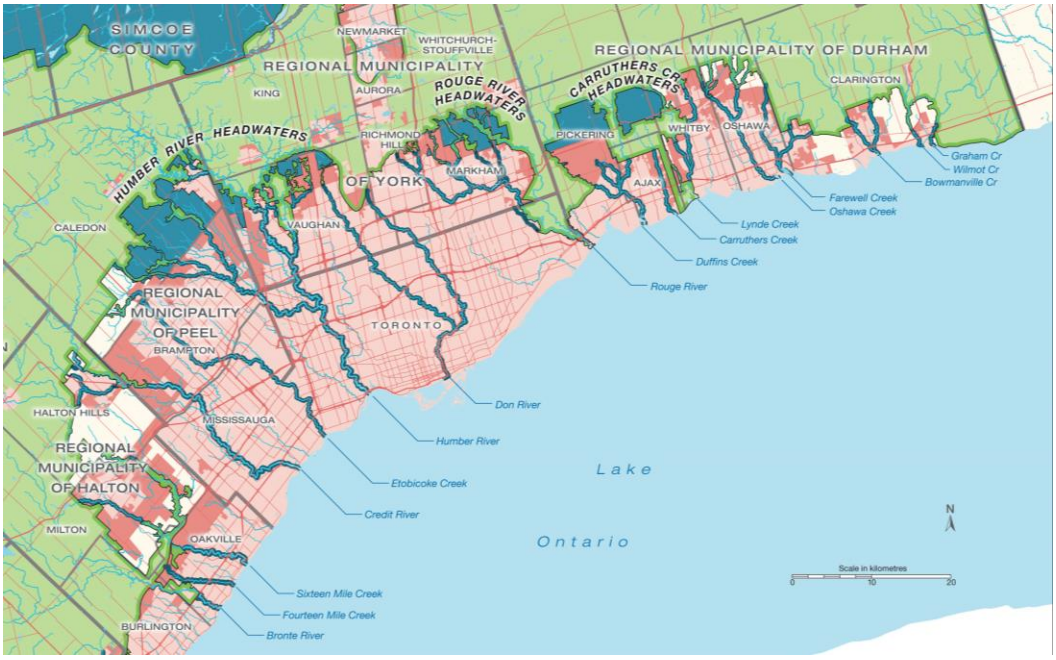

Figure 21. An inset 'Bluebelt' map of the vulnerable headwater areas in the GGH's inner ring.

[26] Ministry of Natural Resources and Forestry (MNRF). 2016. Guidance for Development Activities in Redside Dace Protected Habitat. Version 1.2 Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario. iv+54 pp.

Figure 22. A map of the headwaters of the Carruthers Creek that is lacking Greenbelt protection. (Source: Neptis Geoweb, www.neptisgeoweb.org)

iii. Northern Simcoe County and the Lake Simcoe Watershed

Many water resources in Simcoe County are vulnerable to land speculation and intensive development pressures. These areas, along with the entire Lake Simcoe watershed (see above response to question 2), should be included in the study area to ensure that the water resources are adequately assessed and considered for inclusion in Greenbelt expansion (Figure 23).

In addition to the important physiographic regions in Simcoe area and their contribution to the surface and groundwater regime (e.g., Horseshoe Moraine, Oro Moraine, Dundalk Till Plain, Simcoe Uplands and the Peterborough Drumlin Fields), and the Lake Simcoe Watershed, there are also important drinking water sources and vulnerable areas that should be included (SGRAs, HVAs and WPAs). Figure 24 shows these vulnerable areas mapped individually, along with PSWs and the Oro Moraine.

In addition to the depicted 'Bluebelt' in Simcoe Area, we also support the potential expansion of the Greenbelt into Northern Simcoe County advocated by the Simcoe County Greenbelt Coalition to protect PSWs and to provide added protection to SGRAs and HVAs.

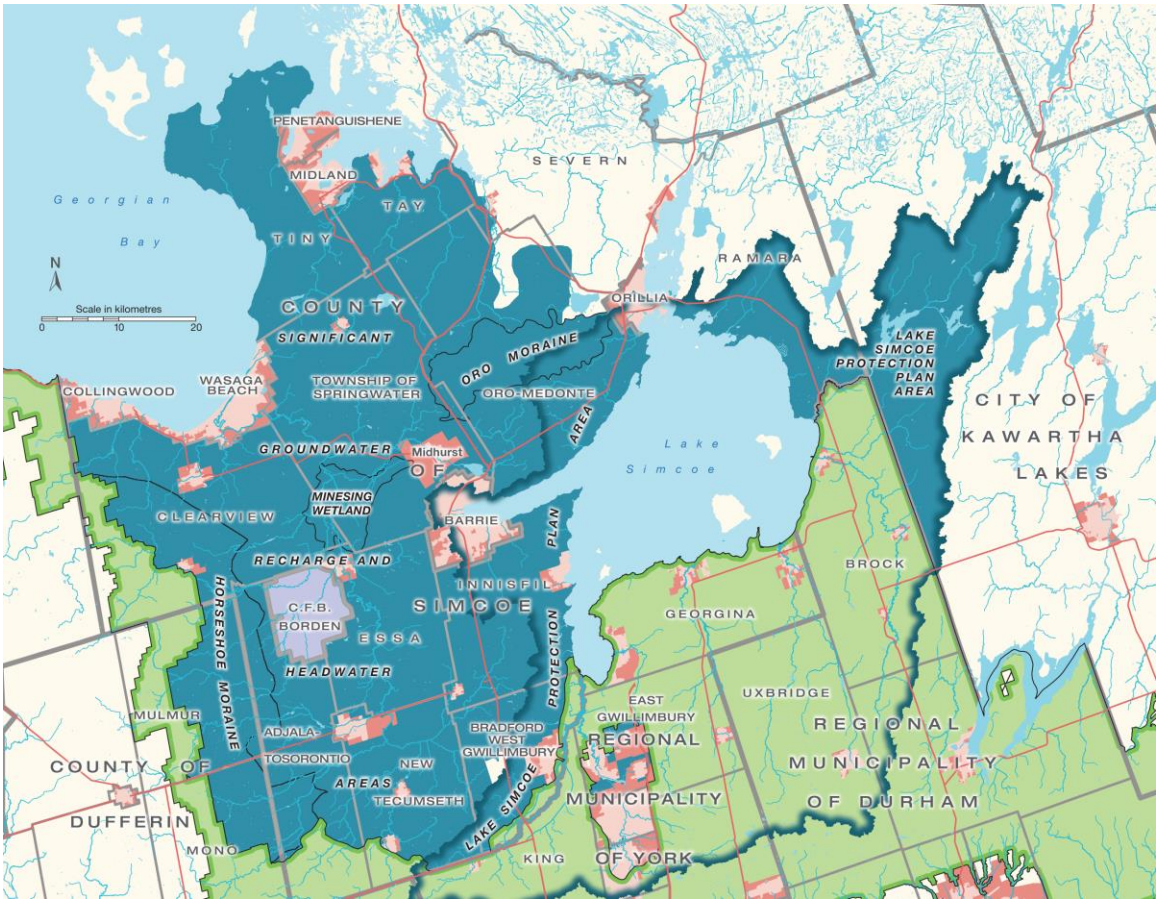

Figure 23. An inset 'Bluebelt' map of the Simcoe area.

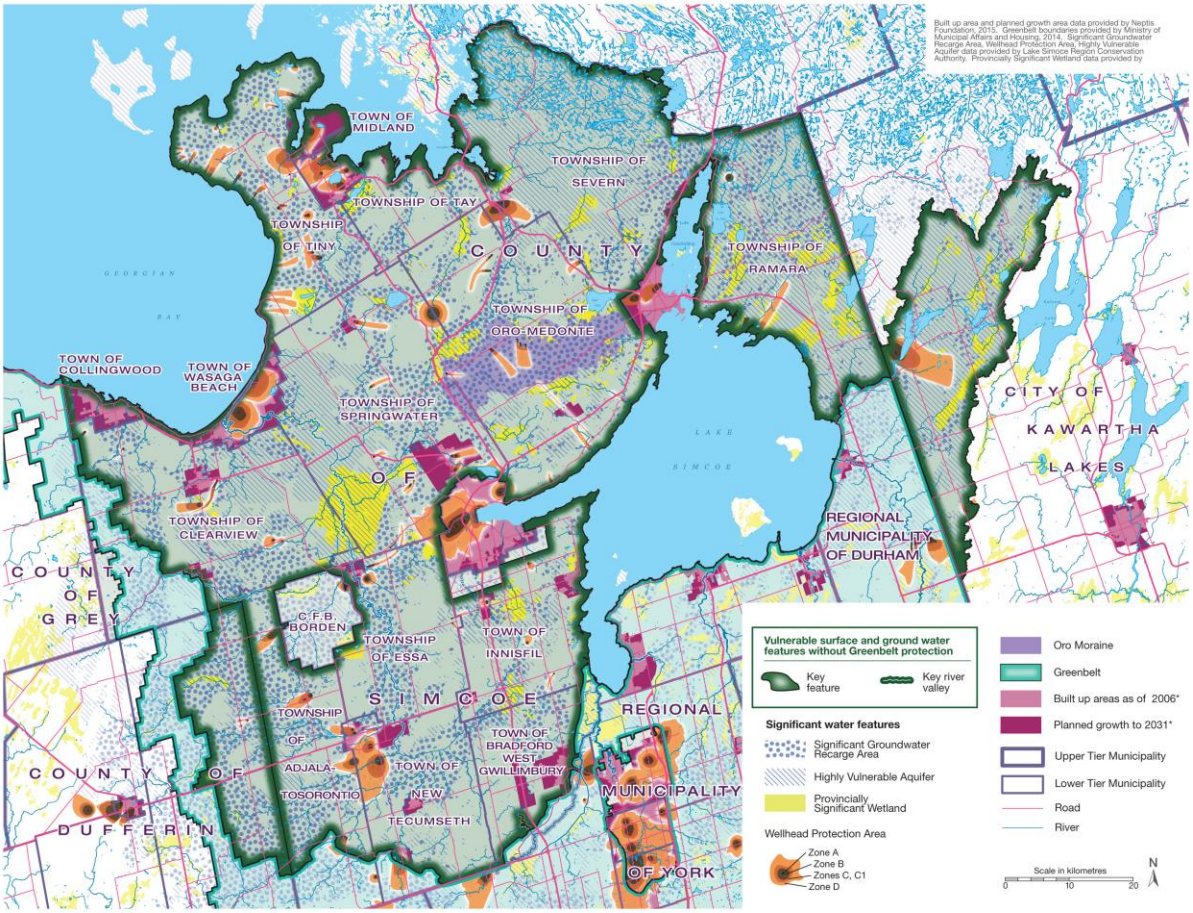

Figure 24. A map of the three vulnerable areas in Source Water Protection, provincially significant wetlands and the Oro moraine in the Simcoe Area.

iv. Grand River Watershed

Our 'Bluebelt' includes areas in the Grand River Watershed such as the Waterloo, Orangeville and Paris-Galt Moraines (the entirety of each moraine), the Grand River Valley, Luther Marsh and the Grand River watershed in Brant and Haldimand Counties (Figure 25). As noted above (response to question 2), there are many 'building blocks' (moraine features, wetlands, streams) in the Grand River watershed that have not been included in the study area. Again, these areas are subject to land speculation and development pressures and should be assessed and considered for inclusion in Greenbelt expansion. In Brant County, for example, there are many important headwaters that have retained much of their natural character and contribute significantly to water quality and quantity (Figure 26). Furthermore, expanding the Greenbelt in the Region of Waterloo and Brant County also supports local agricultural protection such as the Waterloo Region Protected Countryside and the Brant Agricultural Ribbon.

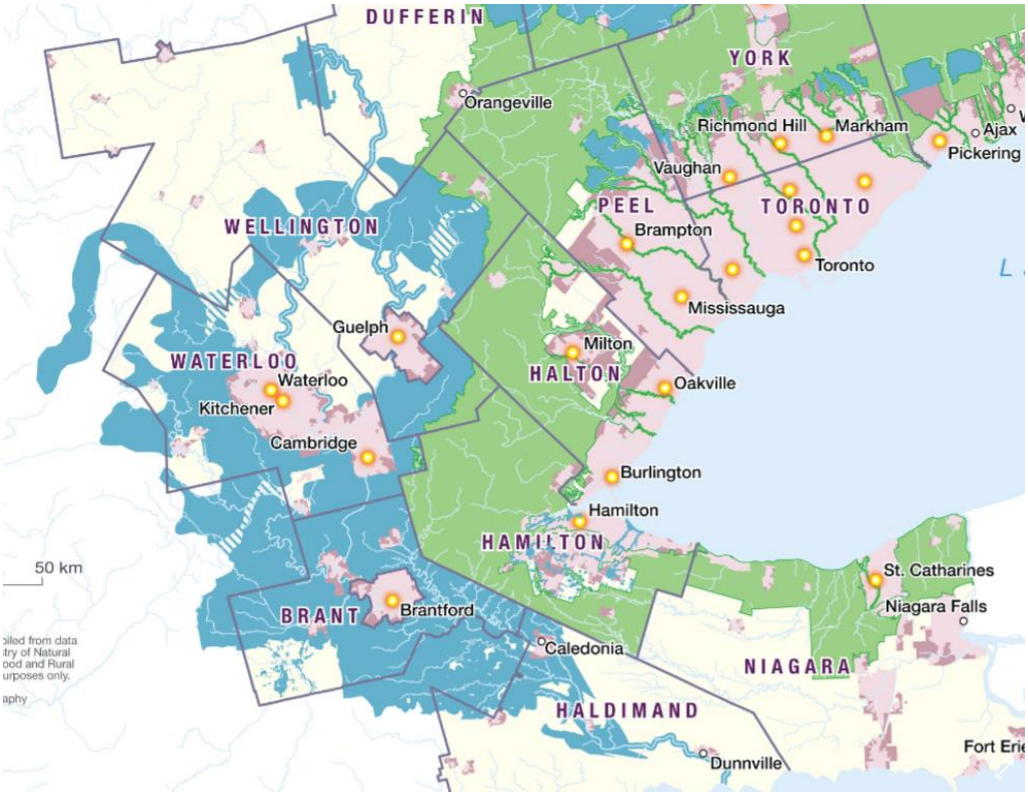

Figure 25. An inset 'Bluebelt' map of the vulnerable water resources in the Grand River watershed.

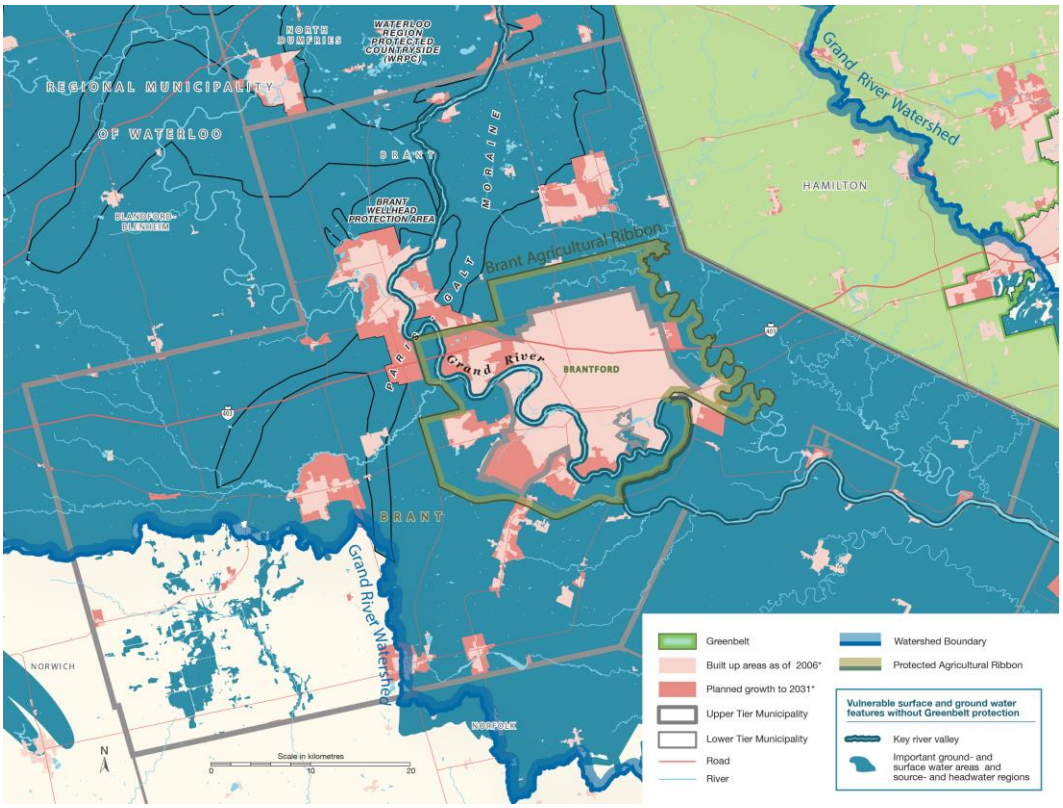

Figure 26. An inset 'Bluebelt' map of the vulnerable water resources in Brant County.

v. Additional Gaps

There are some obvious gaps between the seven areas identified by the Province for potential expansion. These include, for example:

- a large "bay or inlet" between Area 1 and Area 2 north of Halton, i.e., between the Speed and Eramosa Rivers, two contiguous watersheds
- segments of the Eramosa and Nith Rivers omitted from study area 1
- notable gap southwest of C.F.B. Borden, including a narrow inlet running west from Alliston, encircled by Study Areas 5 and 7
- a gap between area 4 and area 6, west of Innisfill
- lands west of Bradford, an area that would be contiguous with the existing Greenbelt
- lands along the Lake Simcoe shoreline in Innisfill and north of Barrie

Recommendation 8: Expand the study area to include all components of our proposed Bluebelt so that any gaps are assessed and considered as part of the current Greenbelt expansion exercise.

5. Should the province consider adding rivers that flow through urban areas as Urban River Valleys in the Greenbelt?

The Province should consider adding entire river valley corridors as Urban River Valleys in the Greenbelt, and not only the sections that flow through urban areas. Such a holistic, systems-based approach is needed to properly protect water quality and quantity.

Based on our proposed 'Bluebelt' the following river valleys should be under consideration: the Nith, Grand, Conestogo, Eramosa, Speed, and Nottawasaga Rivers, as well as rivers in Northumberland County that run south from the Oak Ridges Moraine into Lake Ontario through to settlement areas, e.g., the Ganaraska River, Gages Creek and Cobourg Creek (Figure 27).

In addition, the Province should a consider adding the entire East Holland River valley that originates from the Oak Ridges Moraine and flows north into Lake Simcoe. It is already identified as an external connection in the Greenbelt Plan's Schedule 1, 3 and 4 and Appendix 1 and 2 (Figure 28), and its inclusion would build upon the External Connections policies (section 3.2.6).

Recommendation 9: Designate entire river valley corridors rather than only sections flowing through urban areas in order to adequately protect water resources. Consider the following for Urban River Valley designation: the Nith, Grand, Conestogo, Eramosa, Speed, Nottawasaga, Ganaraska and East Holland Rivers and Gages and Cobourg Creeks.

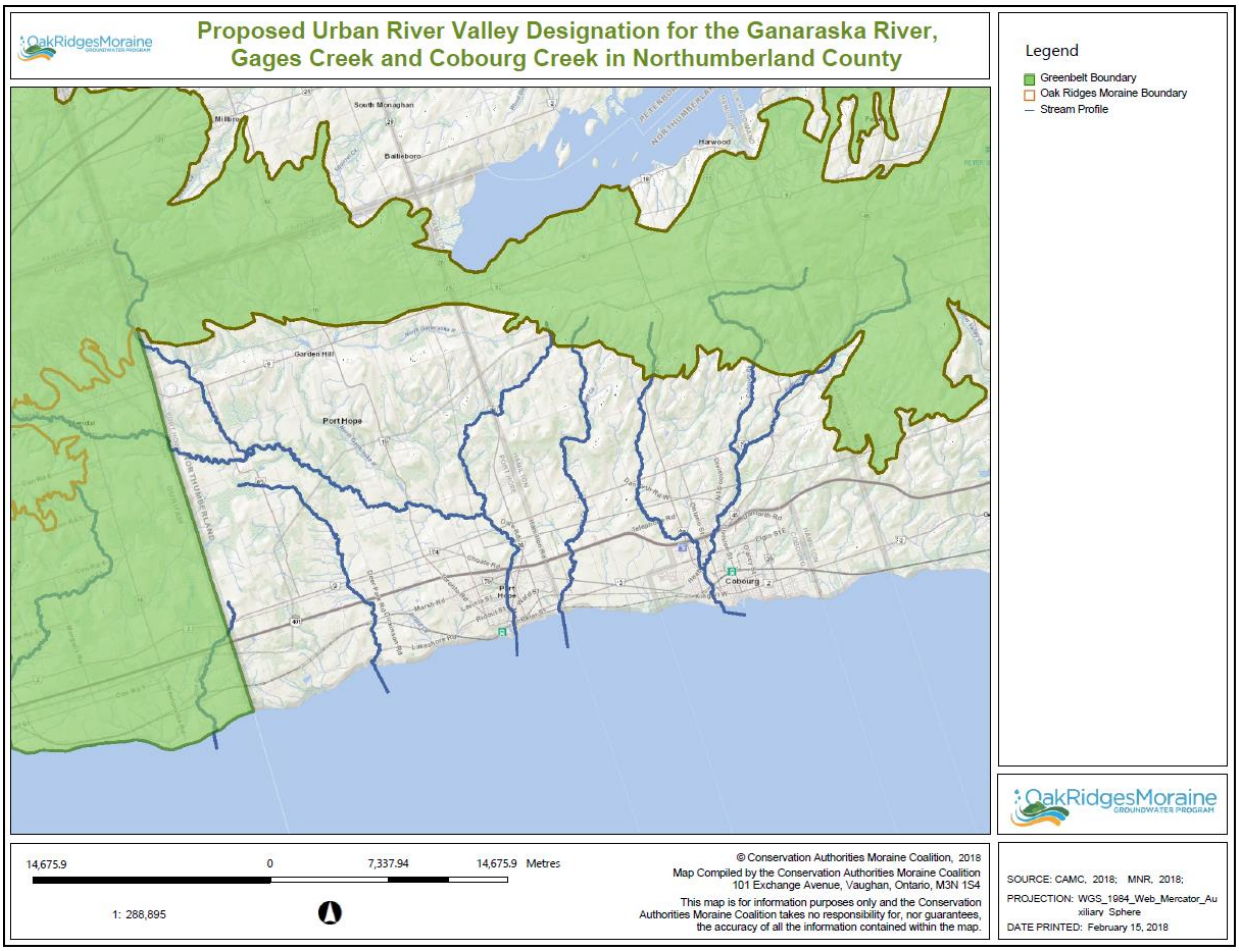

Figure 27. Rivers (Ganaraska River, Gages Creek and Cobourg Creek from west to east) that
should be considered for designation as Urban River Valleys. (Source: Conservation Authorities Moraine Coalition, Oak Ridges Moraine Groundwater Program).

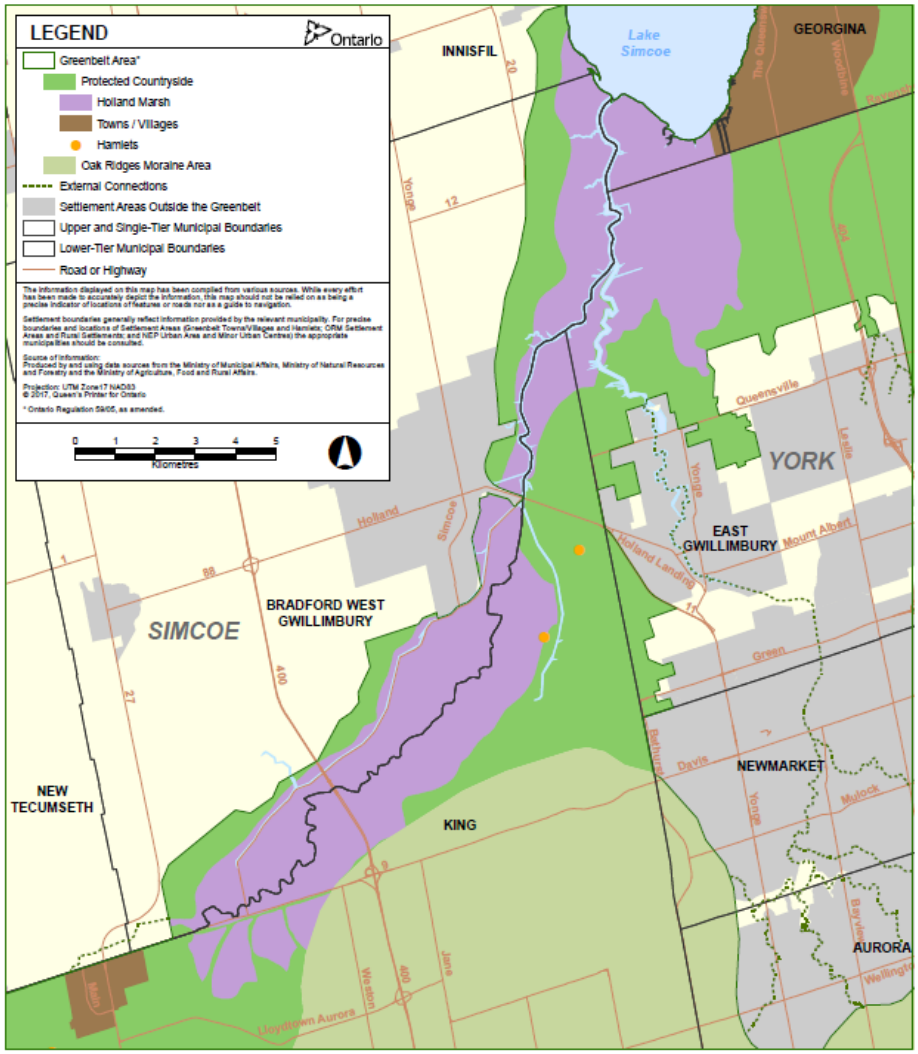

Figure 28. Schedule 3 from the Greenbelt Plan (2017) shows the East Holland River and its tributaries that flow into Lake Simcoe as an external connection (dotted green).

6. With the range of settlement areas in the GGH, how should the province balance accommodating future urban growth with protecting water resources?

"Food and farming cannot occur just anywhere. Can you build houses anywhere? Yes, you can. And our environmental, natural heritage areas, we have to make sure… nature has to come first." Avia Eek, King Township Councillor and Holland Marsh farmer
https://www.youtube.com/watch?v=K2HGO77O_5M

The notion of 'balancing' water protection with urban growth is inappropriate. Our water resources are finite, irreplaceable and invaluable. Most in the GGH have already been seriously compromised by development. Their protection should take priority over any settlement boundary expansion within the GGH.

There are strong precedents for limiting settlement expansions where important provincial interests exist. For instance, the Greenbelt Plan precludes settlement expansions in our specialty crop lands. Both the Greenbelt and Growth Plans preclude settlement expansions within the Greenbelt NHS and proposed Growth Plan NHS respectively. The Oak Ridges Moraine Conservation Plan precludes any further settlement expansion within its boundaries in order to protect its water resources and functions.

There is already more than enough land designated in the outer ring settlements to accommodate growth to 2041 and beyond.[27] The 2017 Growth Plan has an excess lands policy for lands in the undelineated settlement areas of outer ring that are "in excess of what is needed to accommodate forecasted growth to the horizon of this Plan."

Another matter for consideration is the lack of real protection for water features within settlement areas of the Greater Golden Horseshoe. Our planning regimes impose set rules and inflexible boundaries which do not respect or accommodate the natural flow and myriad interconnections of our waterways across the landscape. Our planning regimes must go further to protect water features inside and outside settlement areas.

Recommendation 10: Ensure that the protection of our precious water resources takes priority over settlement expansions. Water must come first.

7. What are other key considerations for drawing a potential Greenbelt boundary around settlement areas?

As noted above, a critical consideration in defining the Greenbelt boundary is consultation with affected Indigenous communities (Recommendation 7). Their responsibilities, rights and interests must be understood and fully considered and their free, prior and informed consent granted. This will require investment, cooperation and sustained commitment from the provincial government.

Another important consideration is the assimilative capacity of water bodies - particularly rivers and streams, but also downstream receiving bodies such as Lakes Simcoe and Couchiching and nearshore areas of the Great Lakes (e.g., Wasaga Beach outfall of Nottawasaga River, Severn Sound and the north shore of Lake Erie).

Simply put, few if any rivers or streams in the western/southwestern GGH have the capacity to accept further sewage effluent, at least not without very expensive improvements to install more sophisticated treatment systems. This is the case, for example, with Alliston, Tottenham,

[27] Neptis Foundation, "An update on the total land supply: even more land available for homes and jobs in the Greater Golden Horseshoe," www.neptis.org/sites/default/files/land_supply_briefs_2016/an_update_on_the_total_land_supply_even_more_land_available_for_homes_and_jobs_in_the_ggh.pdf, (February 23, 2018)

Beeton, Angus, Orangeville, Shelburne and Grand Valley.[28,29] Lake Simcoe is already at its limits with provincially imposed caps on effluent discharges from the 15 sewage treatment plants that drain into it.[30] The Lake Simcoe Region Conservation Authority has indicated that the amount of currently approved urbanization cannot proceed without further degradation of the lake. Lake Couchiching, into which Lake Simcoe flows, is similarly degraded and is more vulnerable as it will receive further degraded water from Lake Simcoe. The Grand River, which provides drinking water for several communities, already has 13 sewage treatment plants along it that annually release 65 million cubic metres of treated sewage into the river. The Region of Waterloo is investing nearly $500 million for sewage treatment plant upgrades.[31]

It is absolutely critical to document and assess the assimilative capacity of waterways as well as the other water-related information noted above under question 2. This needs to be augmented by data on the existing capacity and allocation of capacity within all existing sewage treatment plants, especially since major inland sewage pipelines within Simcoe County and the Grand River basin have been considered.

Another consideration is the vulnerability of inland aquifers. The state of all aquifers in the study area and the effects and implications of water-taking and water treatment infrastructure also need to be documented and assessed. Orangeville and Guelph are two examples of settlements facing constraints in drinking water supplies from groundwater.

Recommendation 11: In determining Greenbelt boundaries, ensure that the assimilative capacity of watersheds and the capacity and allocation of capacity for all existing sewage treatment plants have been assessed and considered. The state of all aquifers should also be assessed and considered, including an assessment of the effects and implications of water-taking and water treatment infrastructure.

8. How should the province determine which settlement areas become Towns/Villages or Hamlets if included in a potential Greenbelt?

[28] Nottawasaga Valley Conservation Authority and Lake Simcoe and Region Conservation Authority, "Assimilative Capacity Studies for the Lake Simcoe Watershed and Nottawasaga River: Executive Summary, July 2006," www.lsrca.on.ca/Shared%20Documents/reports/acs/executive_summary_2006_jul.pdf, (February 22, 2018).
[29] Town of Grand Valley and Burnside, "Grand Valley Water and Wastewater Serving Master Plan Class Environmental Assessment – Information Centre" www.townofgrandvalley.ca/en/doing-business/resources/040938_Grand-Valley-Master-Plan-EA-PIC_Display-Boards_adobe.pdf, (February 22, 2018).
[30] Ontario Ministry of Environment and Climate Change, "Lake Simcoe phosphorus reduction strategy," www.ontario.ca/page/lake-simcoe-phosphorus-reduction-strategy, (February 22, 2018).
[31] Catherine Thompson, "A Grand challenge," www.therecord.com/news-story/7975783-a-grand-challenge/, (February 22, 2018).

This question is essentially already determined, based on existing municipal servicing. Any settlement with municipal sewage and water services (i.e., large settlement areas) should be a

Town/Village. Other settlements (i.e., small/rural settlement areas) should be designated as Hamlets in an official plan that does not allow them to expand given the limited servicing.

Another consideration should be to temper any expectation that a Town/Village can expand its boundaries if it is in an area with significant water features. To this end, given that Towns/Villages can only have modest expansion, and given that Towns/Villages cannot expand into the NHS, the significant water features (i.e., building blocks) should be added to the Greenbelt's NHS to ensure the protection of these water resources.

Recommendation 12: If included in the Greenbelt, small/rural settlement areas should be Hamlets and large settlement areas should become Towns/Villages. Important water features should be added in the expanded Greenbelt Natural Heritage System.

9. Once the Agricultural and Natural Heritage System under the Growth Plan are finalized, how should they be considered as part of potential Greenbelt expansion?

Where the Greenbelt is expanded, the regional NHS should be the basis for extending and connecting with the Greenbelt's NHS. 'Building blocks' (moraines, wetlands, coldwater streams, headwaters, etc.) should be incorporated into the expanded Greenbelt NHS.

While the final NHS for the GGH covers 45% of the region, it is skewed to the north east corner of the GGH. As mentioned in the ORM Partnership's EBR submission (013-1014) on the Criteria, methods and mapping of the proposed regional NHS for the GGH, a core size of 100 hectares is much too small in the highly fragmented areas of the GGH. As a result, there is very little NHS coverage in the very areas that require as much as possible given the development pressures. Figure 29 demonstrates that the proposed provincial area is a good start as it covers areas that are lacking in the regional NHS. However, our proposed 'Bluebelt' (Figure 30) provides a more comprehensive protection of water resources in Brant, Haldimand, Wellington, Simcoe and Northumberland Counties where there are immediate and future growth pressures and minimal coverage in the regional NHS.

The Agricultural Land Base of the Agricultural System under the Growth Plan should form the basis for the Agricultural System in the Greenbelt Plan. With the permanent protection of farmland through the Greenbelt, the provincial study area also provides a good start (Figure 31); however, the 'Bluebelt' would provide permanent protection to more water resources and agricultural land in support of the vision and goals of the Greenbelt Plan, i.e., environmental protection and agricultural viability and protection (Figure 32).

Recommendation 13: The Natural Heritage and Agricultural System (Land Base) for the GGH should form the basis of the extended Greenbelt natural and agricultural systems. The building block' identified through the Greenbelt expansion exercise should be incorporated into the expanded Greenbelt Natural Heritage System.

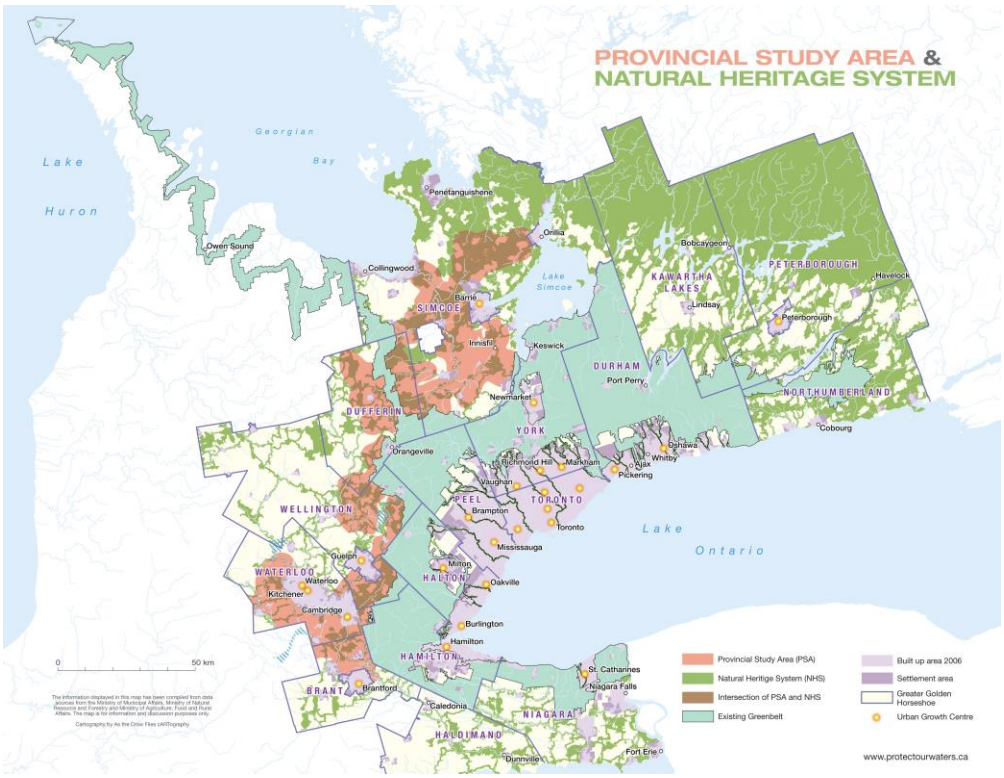

Figure 29. A map of the Natural Heritage System (green) for the Greater Golden Horseshoe and the proposed provincial study area for Greenbelt expansion (pink).

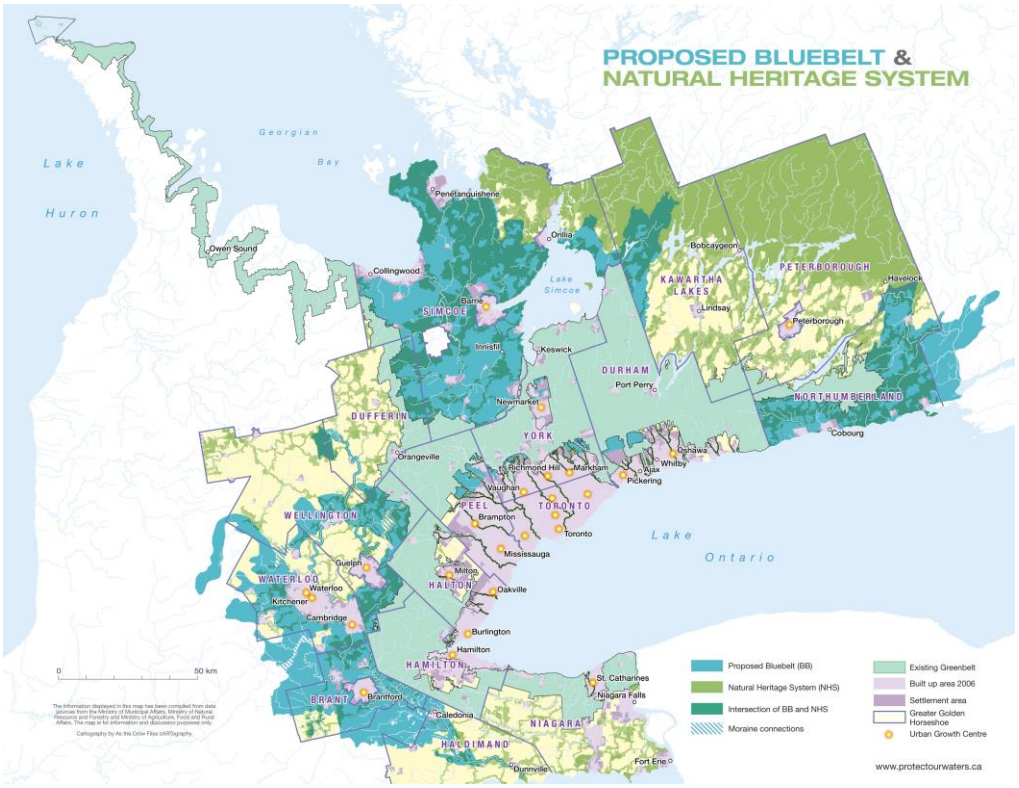

Figure 30. A map of the 'Bluebelt' (blue) and the Natural Heritage System for the Greater Golden Horseshoe (green).

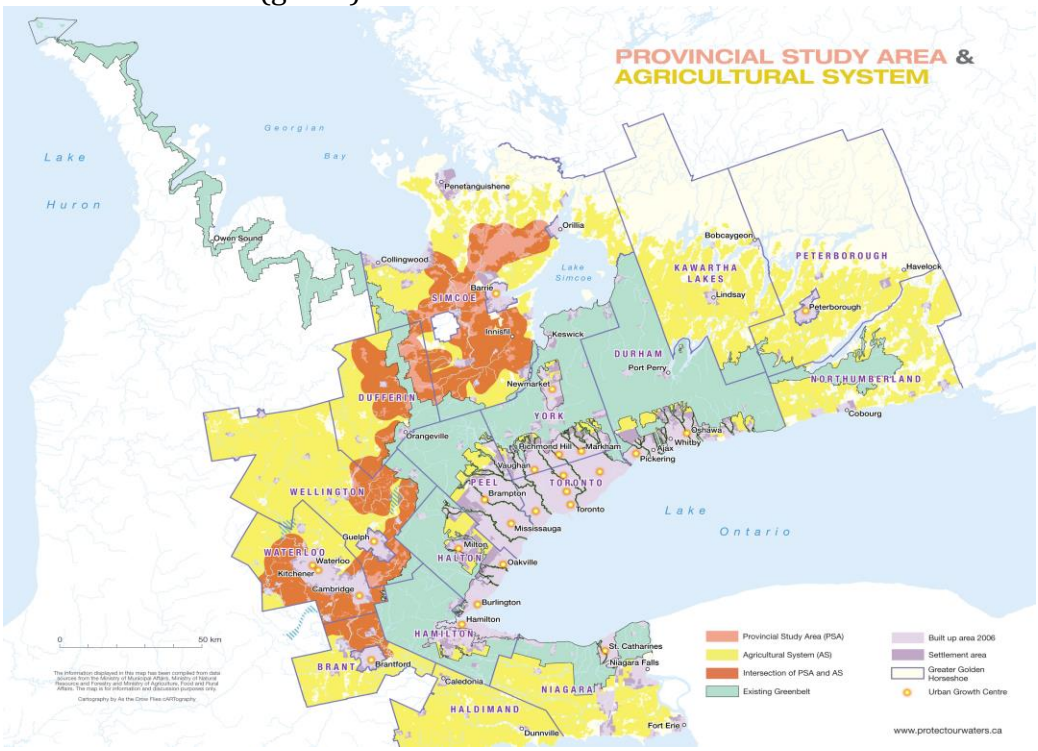

Figure 31. A map of the Agricultural System (yellow) for the Greater Golden Horseshoe and the proposed provincial study area for Greenbelt expansion (pink).

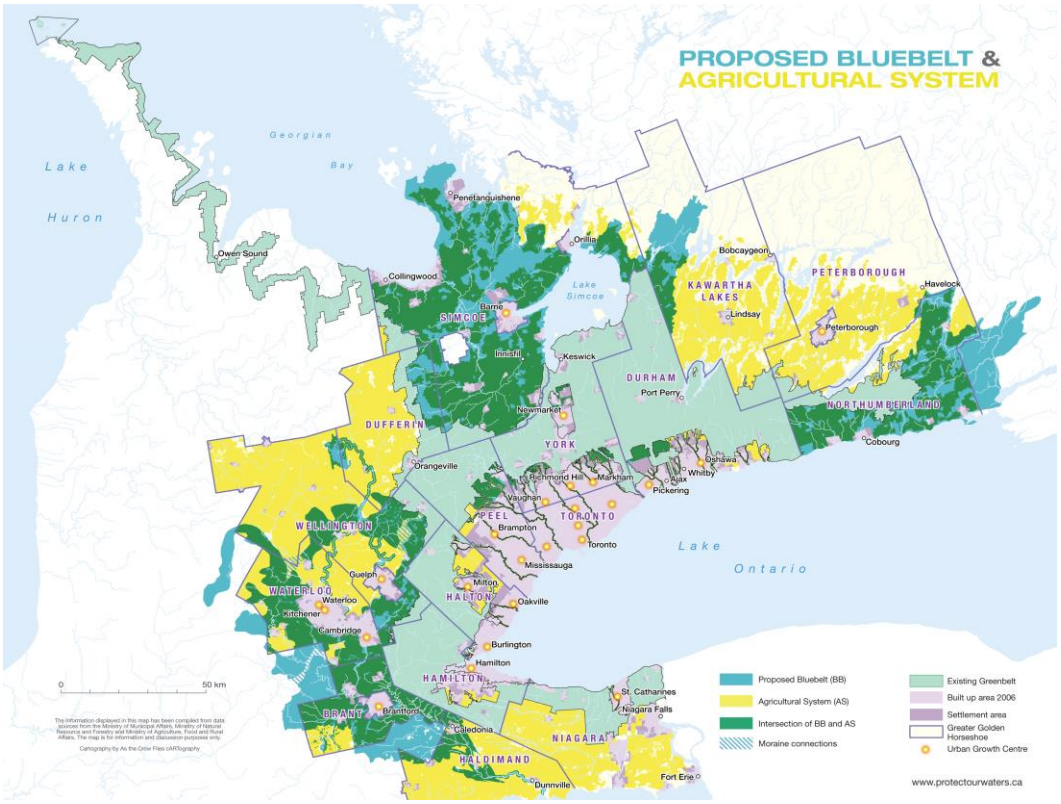

Figure 32. A map of the 'Bluebelt' (blue) and the Agricultural System (yellow) for the Greater Golden Horseshoe.

10. How should other provincial priorities or initiatives, such as mineral aggregates and infrastructure, be reflected in potential Greenbelt expansion?

Moraines and sand and gravel deposits in the GGH are key water resource features that contribute to the recharge, storage, cooling, cleaning and discharge of water. We note with great concern, therefore, that municipalities within the Greenbelt "are not able to establish policies that are more restrictive on mineral aggregate extraction than those in the Greenbelt Plan" even though, outside the Greenbelt, other GGH municipalities "are able to establish policies that may be more restrictive on mineral aggregate extraction than the Growth Plan's policies" (discussion paper, p. 35). This is an odd and perturbing situation where municipalities are not allowed to go above and beyond Greenbelt policies to protect precious water resources. It creates a true conundrum for municipalities where more restrictive policies are deemed necessary to protect water quality and quantity: inclusion in the Greenbelt expansion would prohibit them from doing so.

A case in point is Waterloo Region, a municipality with strong water resource protection policies that are more restrictive with respect to aggregates extraction than Greenbelt Plan policies. The region relies almost exclusively on groundwater for its drinking water supply, a critical consideration from a public health and safety perspective.[32] It is unreasonable to

[32] Region of Waterloo, Planning, Development and Legislative Services, Community Planning. "Protecting Water for Future Generations Growing the Greenbelt in the Outer Ring" (February 27, 2018).

expect Waterloo Region to sacrifice these higher local standards for the sake of Greenbelt expansion within the municipality.

With potential Greenbelt expansion, mineral aggregate extraction policies should default to the policy offering the highest level of protection for water resources, including municipal policies. Until this policy is revised, more restrictive municipal mineral aggregate extraction policies than those in the Greenbelt Plan should be grandfathered for municipalities that are part of the Greenbelt expansion, recognizing that the policies in the Provincial Policy Statement, Growth Plan and Greenbelt Plan generally represent minimum standards which decision-makers are encouraged to exceed to address matters of local importance.

Recommendation 14: Revise Greenbelt Plan policies to permit municipalities to establish mineral aggregates extraction policies that may be more restrictive than Greenbelt Plan policies. In the interim, grandfather any existing municipal policies that may be more restrictive and that offer higher levels of protection for water resources.

11. What other priorities or initiatives do you think the province should consider?
The Province should consider Greenbelt expansion in light of the priority of reconciliation with Indigenous peoples (https://www.ontario.ca/page/journey-together-ontarios-commitment-reconciliation-indigenous-peoples). Respect for Indigenous responsibilities to the land and
associated knowledge systems, rights and interests are all critical components in the process of reconciliation among the peoples who share this land.

The Province should also consider how it can help to achieve the objectives and targets of other provincial plans, policies and strategies including:

- Lake Simcoe Protection Plan, 2009:
  In Chapter 6 of the plan (Shorelines and Natural Heritage), there are targets that can be supported through Greenbelt expansion into the Lake Simcoe watershed:
    - No further loss of natural shorelines on Lake Simcoe
    - Achieve a minimum 40 percent high quality natural vegetative cover in the watershed
    - Achieve protection of wetlands
    - Achieve naturalized riparian areas on Lake Simcoe and along streams
    - Achieve increased ecological health based on the status of indicators species and the maintenance of natural biodiversity

- Ontario's Biodiversity Strategy, 2011:
  Expanding the Greenbelt can support the resilience of the ecosystems in the proposed area, reduce the threats to biodiversity by promoting significant urban development, and provided a connected and expanded Greenbelt of connected

terrestrial and aquatic systems. In so doing it would complement the following Biodiversity Strategy targets: enhance the status of species of conservation concern; develop and implement natural heritage system plans and biodiversity conservation strategies at the municipal and landscape levels; and conserve at least 17 percent of terrestrial and aquatic systems through well-connected networks of protected areas and other effective area-based conservation measures.

- Ontario's Climate Change Action Plan, 2016:
  Under the section, "Action area: Agriculture, forests and lands: Productive, sustainable," subsection 4 (Understand and enhance carbon storage in natural systems) outlines actions to "protect, plan for and enhance natural areas" in order for Ontario's natural systems to support climate change mitigation. Specifically, subsection 4.1 addresses the benefits from an expanded Greenbelt: "This will enable more green spaces to be protected and enable the carbon sequestration potential of the area to be maintained." While climate change is not featured as heavily as it should be in the discussion document, greater Greenbelt expansion will support climate change mitigation.

- Ontario's Wetland Conservation Strategy, 2017:
  Since wetlands are one of the building blocks of Greenbelt expansion, there is obvious overlap with the Province's intention to value, conserve and restore wetlands to sustain biodiversity and to provide ecosystem services for present and future generations.

- Ontario's Great Lakes Strategy, 2012:
  The Great Lakes provide many benefits to Ontarians including drinking water, energy, food, recreation and economic. However, the health of the Great Lakes is in decline with stressors including urban growth, increasing phosphorus levels, shoreline hardening and the spread of invasive species. Expanding the Greenbelt will help meet the goal of protecting and restoring the health of the Great Lakes-St. Lawrence River Basin including: wetlands, beaches and coastal areas, and the natural habitats, biodiversity and resilience of its ecosystems.

In addition, the Province should consider further Greenbelt expansion across the Greater Golden Horseshoe and beyond. Additional areas of importance, as made evident through the inclusion in the GGH's Natural Heritage System includes 'The Land Between,' a unique mosaic of habitats including globally rare ecosystems (e.g., alvars and savannahs fens and meadow marshes) – this area in fact has of the highest habitat diversity in Ontario.[33] Furthermore, Downtown Peterborough is an urban growth centre and the city forecasted to grow to 103,000 by 2041. There are areas just outside the GGH that are vulnerable to

[33] Leoman Berman for The Land Between, "What Do You Mean, The Land Between," www.thelandbetween.ca/wp-content/uploads/2015/08/What-Do-You-Mean-The-Land-Between.pdf, (March 2, 2018).

leapfrog development, especially with the existing and planned transportation corridors (see Schedule 6 in the Growth Plan), e.g. Oxford County which also includes part of the Waterloo and the Paris-Galt moraines.

Recommendation 15: Explore and pursue opportunities to expand the Greenbelt to advance Ontario's commitment to reconciliation with Indigenous Peoples. Identify and pursue opportunities to achieve the objectives outlined in the Lake Simcoe Protection Plan, Ontario's Biodiversity Strategy, Ontario's Climate Change Action Plan, Ontario's Wetland Conservation Strategy and Ontario's Great Lakes Strategy.